Hort Innovation

Final Report

DIY laneway greening – simplifying vertical greening at a community level

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Delivery partner:

University of Technology Sydney

Project code:

GC17002

Project:

DIY laneway greening – simplifying vertical greening at a community level (GC17002)

Disclaimer:

Funding statement:

DIY laneway greening – simplifying vertical greening at a community level (GC17002) is funded by the Hort Frontiers Green Cities Fund Fund, part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from UTS Shopfront (Community University Engagement) and contributions from the Australian Government.

Publishing details:

ISBN 978-0-7341-4792-9

Published and distributed by: Hort Innovation

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North Sydney NSW 2060

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www.horticulture.com.au

Summary

The intended result of the overall project was to establish an enabling environment by developing a guide to facilitate the expansion of the use of green walls in metropolitan Australia. Additionally, communication of the project findings will improve consumer understanding of the benefits of green walls, and the options for developing vertical greenspace in the different types of small spaces typically found in medium and high-density residential developments and laneways.

This community Green Wall Guideline publication was developed by the UTS team. The diverse and extensive research experience of the UTS team ensured that this is based on the best available scientific, legal and architectural evidence.

The primary outcomes of the project will be the high impact of the project findings in broadening the appreciation of community-level urban greening, and subsequent benefits to the nursery industry

The proposed project involves a high level of community, industry, public and academic engagement. This research will complement governmental climate resilience strategies, informing future planning policy on urban form. The significance of this project lies in harnessing the natural ability of urban greening for enhanced urban environmental quality, extending to the psychosocial health of urban residents. To discover the genuine potential of vertical greening systems for urban improvement, horticultural science must be combined with engineering expertise along with urban design and humanities research to identify how and where these systems can be most effectively designed and employed, especially on a community level. Only with this knowledge, can the systems be developed to provide maximized value to our cities, and promoted as a valuable addition to modern urban spaces. This work will produce high-level media and industry exposure for green wall technology, and will produce benchmark governance in a rapidly growing industry and field of research.

Keywords

Green Infrastructure;
Living Walls;
Green skins;
Vertical gardening systems;
Vertical greening;
Vertical vegetation;
Vertical gardens;
Vertical green skin;
Green walls;
Sustainable walls;
Bio walls;
Vegetated facades;
Green Facades;
Indirect green facades;
Supported green facades;

Introduction

Urban forestry and green infrastructure, in particular when integrated as a design component of the built environment, including green wall and green roofs, is gaining in popularity. These structures not only help ameliorate many problems associated with urban consolidation, but may also reduce the need for re-allocation of scarce land from other urban developments for traditional urban forestry and dedicated green space. A diverse range of services have been associated with green walls, including community engagement; provision of social, psychological, and biophilic satisfaction; a reduction in the urban heat island effect; reductions in building energy consumption; enhanced air quality; increased biodiversity; and improved storm water management. Green walls can also reduce noise pollution and facilitate greater urban food production.

Over the last two decades, green wall technology has been widely implemented in North America and Western Europe, mainly through retrofitting to existing buildings and structures. Government instruments and support provided through financial incentives, policies and standards, appear to be driving this increase in projects. For example, Stuttgart, Germany, has employed a combination of green wall policies and subsidies which have led to the creation of an estimated 2 km2 of green rooftops. In contrast, green wall technology has been much less frequently implemented in Australia. This can be attributed to a number of constraining factors, such as a lack of standards for construction and installation; limited numbers of installers; a lack of community awareness resulting from few effective examples to give people confidence in the value of the technology; and a possibly well-founded perception that little information is available associated with successfully growing vertical gardens within Australia's diverse climates. This trend notwithstanding, green wall projects have increased in frequency somewhat in Australia in the past 5 years, despite the absence of easily available instructional guides or handbooks, and a general lack of understanding on how vertical gardens can be integrated in urban environments at the community level.

Certain local councils in Australia have been attempting to encourage green wall uptake, by implementing various policies and guidelines with the objective of reducing or overcoming the factors constraining green wall use. Whilst the efforts of these councils are aimed at supporting and encouraging the uptake of green wall projects on large scale projects, no overall green wall guide has been developed and, more importantly, there is little creditable information widely available on the practical, legal and economic aspects of green wall construction and maintenance at the community level.

The objectives of this project were to establish an enabling environment to facilitate the uptake of vertical greening systems within urban environments at a community level. In doing so, a coherent framework will be provided, that provides guidance on planning, designing and managing a green wall within community space. This project is a collaborative enterprise that will unite academia, government and community know-how to produce a complete, practical and inclusive means of enabling the expansion of urban greening. We achieved this by researching then communicating:

- What plants work best, and which green wall system should be used in common scenarios,
- How aesthetically appealing and functional green wall systems can be built on a DIY budget.
- What barriers and legislative concerns relate to urban green walls? Is approval needed?
- How the community will benefit? Transforming spaces into places
- How to mobilise local communities to get involved?

Methodology

Stage 1 Engagement with stakeholders, policy makers and community

The initial stage of the project involded the compilation of information on the legislative and regulatory constraints surrounding the installation on green walls in public and private spaces in urban laneways.

A 'brains trust' of stakeholders was developed to guide the project, and to brainstorm a framework for laneway greening. Team members' previous experience also provided a strong basis on which to develop information relating to green wall installation and considerations.

The project team has significant expertise in urban greenspace development regulation. Along with our existing knowledge, representative local governments that do not provide clear guidelines for public space and structural greening systems were contacted directly to determine the legal restrictions surrounding the development of vertical greening systems to determine whether legislative requirements are consistent across greater urban areas.

With respect to exploring the current barriers to adoption of greening laneways, the brains trust also informed on the compilation of information on the legislative and regulatory barriers surrounding the installation on green walls in public and private spaces in urban laneways. Our previous research has indicated most of the current barriers to green wall technology, and that issues relating to legislation, regulations and policies have resulted in relatively slow uptake of green infrastructure in Australia (https://doi.org/10.1016/j.ufug.2017.03.026).

Stage 2 Laneway green wall design

After a briefing on the findings from the relevant stakeholders, a series of criteria was provided to Engineering, Architecture and Landscape Architecture students to form a design competition. All systems that fulfilled the pre-determined basic criteria a catalogued for the final Project Guide. The current proposal plans to offer the competition targeted at university undergraduates and Masters candidates.

Along with our previous research experience and a literature review, a survey of commercial plant suppliers and green wall companies was made to determine the most successful plant species for use in different climatic areas. Concurrently, we additionally assessed the various forms of available green wall structure (eg. Green facades, living walls, and other vertical greening systems) to determine the relationship between maintenance, aesthetics, cost and ease and flexibility of construction.

The cumulative findings of this research was communicated in an easily understood form in the Guide.

Stage 3 Community Engagement

A synopsis of the potential beneficial relationships stemming from the incorporation of community green walls, was provided, exploring the interaction between space, place, and social life. In doing so, the project communicated how community green walls enable individuals and communities to interact within the space, and how people transform their local area into a jointly experienced, meaningful, and memorable place. To enable this component of the project, a working map of suitable green wall sites was developed; assessing relationships to the community that can be leveraged for the DIY green walls with photographic documentation.

Stage 4 Communication

The final stage of the work was to communicate the findings, though the production of a 'how to guide' directed primarily at the community, but also of value for policy makers and environmental staff at the LGA level. This was produced both in document (pdf) form, and published as an interactive website.

Outputs

http://www.itstimetogrowup.com.au/

www.itstimetogrowup.com.au/Download/INTERACTIVE%20FINAL_GROWUP.pdf

Monitoring and evaluation

Project outcomes can be monitored through website hits, downloads and internet traffic.

Recommendations

Dedicated research funding to explore and quantify green wall ecosystem services.

Refereed scientific publications

Journal article

'Mapping the green wall retrofitability of Australia's urban centers.' Manuscript In Preperation. *Urban forestry and Urban Greening*.

'Has green infrastructure hit a wall': Capturing the perceptions and perspectives of Australians towards green walls. Manuscript In Preperation. *Cities*

The following conference has been a platform to present the outcomes of this research:

Conference name: Healthy Plants, Healthy People Greenlife Industry Australia's biennial national conference : 3-5 March 2020. Venue**:** The Westin Perth, Perth WA Australia.

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Intellectual property, commercialisation and confidentiality

No project IP, project outputs, commercialisation or confidentiality issues to report

Acknowledgements

Professor Paul Ashton. Team Atmos Design. Coal Loader Community Garden, Waverton NSW – especially Mr Ray Jackie. Turramurra Community Garden, Milson Community Garden, Glovers Garden, Wentworthville Community Garden, Taringa St Community Garden, Ultimo Community Garden. Junglefy Pty Ltd for the amazing pictures. UTS Interns: Angela Morgan, Erin Rogers, Matilda Seppelt, Megan Tan, Chan Vi Thang, Cooper Torrens, Olivia Viant. Edward Warburton and Marianne Mentis from Greenwall Solutions, Sydney, New South Wales. Sydney Wildflower Nursery, New South Wales. Greg Lamont from Growing Friends Nursery, Sydney, New South Wales. Paul Taylor from Atlantis Gro-Wall, Sydney, New South Wales. Jeff Lugg from Adelaide Zoo, South Australia. Garden Grove, Adelaide, South Australia. Daniel Haeyen from Vertical Gardens Direct, Victoria. Stephen Collis from Wallgarden Australia, Victoria. Ted Magurie from Greenstock Nurseries, Queensland. Benara Nurseries, Perth, Western Australia.

The e-book was developed in collaboration with UTS Shopfront at the Centre of Social Justice and Inclusion and the student Visual Communication team from the Faculty Design Architecture and Building at the University of Technology Sydney. Aaron Davis, Beth Sacco, Emma Lai, Leeanne Nguyen, and Lucy Ward were supervised by Claudia Leigh.

Appendices