



Executive Summary

Purpose and approach to the research

In 2012 the City of Sydney commenced development of its *Green Roofs and Walls Strategy*, which will direct further work in this area for the next two to three years. As part of this initiative the City of Sydney commissioned Urban Affect, in collaboration with Jo Manion and Marketinfo, to undertake a perception study on greening infrastructure called green roofs (GRs) and green walls (GWs).

The overarching aim of the study was to identify attitudinal factors influencing the growth of the local green roofs and walls industry within the City of Sydney. The City's key research objectives were to:

- Understand varying levels of awareness on green roofs and walls amongst participants
- Understand motivators promoting installation of the current green roofs and walls
- Determine perceived barriers limiting the delivery of green roofs and walls
- Understand user satisfaction with current green roofs and walls installations, and
- Determine the role the City could potentially play in promoting green roofs and walls.

The primary research involved qualitative research (focus groups and in-depth interviews) with industry stakeholders, along with a community survey conducted online and through a street intercept survey of random respondents, which occurred at locations around the City of Sydney LGA. A total of 22 stakeholders participated in the qualitative research, and a sample of 416 community responses were gathered.

A Technical Advisory Panel was established at the outset of the research, comprising academics and architects with expertise in the field, who were engaged to offer insights and assist with analysis at key points in the research process.

The results provide a sound basis from which the City can progress the development of its *Green Roofs and Walls Strategy*.

Industry perceptions

The findings of the qualitative research with stakeholders from the property industry, specialist infrastructure suppliers and policymakers are discussed in Section 3. Key findings are as follows:

- The reliability of waterproofing and irrigation systems is a key consideration in green roof and wall installation. There are significant concerns about the reliability of systems and risks associated with leaks. Latest technological advancements are considered to be affectively addressing risks, though perceptions of risks remain high.
- Plant species selection is a critical factor impacting the viability and long term survival rates of green roof and wall infrastructure. The risks of poor species selection – taking into account local climactic conditions – is high.
- Ease of maintenance and accessibility of the infrastructure for maintenance purposes is a critical design consideration. Green roofs and walls are generally maintenance-intensive, particularly if planted with edible plants or non-native species. Ongoing maintenance was a key perceived cost barrier to installation.



- The property industry is heavily concerned with the costs of green roofs and walls, and costs are generally considered to be high in relation to environmental returns. This is resulting in a situation where “green dollars” available to a property development were spent on other measures perceived to have more impact, such as design for passive heating and cooling or photovoltaics (PV). This has resulted in greening infrastructure primarily being seen on prestigious schemes.
- Further research is required to ascertain a range of issues associated with green roofs and walls in the Australian context. This included the need for more research (and dissemination of information/guidelines) on appropriate species selection for different climatic conditions, and accurate data on costs associated with design, installation and maintenance.
- There was a good level of support for the City’s desire to take a proactive approach to encouraging green roofs and walls, and the use of incentives – both financial and non-financial – to encourage take-up was strongly supported. The potential for demonstration to enable learning and information-sharing was also supported, potentially through partnership approaches.
- A note of caution was sounded in relation to the proposed mandation of green roofs and walls before there was sufficient capacity in the industry to support increased take-up, and sufficient regulation to ensure benchmark minimum standards of quality are achieved.
- The strongest drivers for provision of green roofs and walls are considered to occur in situations where environmental and social/amenity benefits intersect. This is particularly the case in relation to the provision of green roofs (or green balconies) on commercial or residential buildings. These may provide green space for building occupants as well as localised environmental benefits.
- The City is encouraged to explore potential partnership approaches to further research, information dissemination and awareness-raising among industry and the wider community, to support the implementation of the Strategy.
- The City is encouraged to explore the differentiation in drivers for green roof and wall provision in different land uses zones/development types, eg industrial, residential, commercial. Further, the City is advised to ensure the Strategy reflects this differentiation.

Community perceptions

The findings of the quantitative research are discussed in Section 4. Key findings are as follows:

- There was a high level of community awareness of green roofs and walls, which may be attributed to the level of attention they have received in the mainstream media of late, as well as new high profile development occurring across the City. While this attention has raised awareness it has also led to an expectation that they will deliver a range of social and environmental benefits.
- The survey tested what importance people placed on nine potential social and environmental benefits that green roofs and walls can contribute to with a view to establishing priorities for delivery of this style of infrastructure. Only two of these potential benefits were rated as less than a “high priority” by fewer than 50% of the sample group.
- “Increasing habitat and biodiversity” and “improving air quality” were identified as the two highest priority areas for the inclusion of green roofs and walls on development projects. However the difference in rating between these and the effect of “reducing glare between buildings,” which received the lowest overall score, was negligible – suggesting that the community values a range of perceived environmental impacts.



- The results show clearly that greater importance is placed on establishing green roofs and walls within the CBD than for any other locality followed by commercial areas, industrial areas and lastly suburban residential. This hierarchy roughly translates to an expressed need that areas with proportionally less greenery should have more and support the need for expansion of the provision of green space in the CBD in the immediate term. Importantly the priority of the working population on this question differed slightly from the overall sample group placing “improving views and city landscapes” and “increasing habitat and biodiversity” as their priorities. These findings provide a guide for development of projects within the CBD and a basis for discussion with the business community regarding the need for provision of green space for their employees.
- The main benefit of green roofs in terms of potential social uses were as places to “get some fresh air” or “peace and quiet.” They were not seen as an extension of active social spaces, more as replacement “pocket parks” in high density areas providing space to get close to nature. The data did not show a higher priority for workers or residents across any of the potential social functions of green roofs, the highest level of importance in terms of locality was placed on establishment of new projects in the CBD and commercial areas. We can assume therefore that where they are accessible that green roofs would be expected to provide places of respite and relaxation.
- The key role for the City as identified in the survey question on general attitudes is clearly one of facilitator and regulator. There was strong support that the City should be encouraging building techniques which minimise environmental impacts. These results show a clear community expectation that the City of Sydney will play an active role in promotion of environmentally friendly building techniques and in regulation of building techniques that ensure high quality building projects. This expectation is reinforced by the level of support for the City to undertake pilot projects rather than providing subsidies or grants as a strategy to motivate further take-up.
- The value of green roofs and walls in terms of cost was tested at several points within the survey research. The attitudinal questions asked whether the benefits of having greenery outweigh a small additional cost, and respondents were also asked directly at what level of additional building and maintenance cost they would hesitate to support establishment of green roofs and walls into a building.
- “Having greenery around us” scored the highest level of agreement for all of the attitudinal statements second only to the statement that “encouraging new building techniques that minimise environmental impacts should be a priority for the City of Sydney”.
- The overall cost sensitivity of the respondent group was quite high with a median score at an additional cost of 11 – 15 % and mode of 6 – 10%. The only significant trends in the data with regard to specific groups were the lower cost tolerance of high income earners and a slightly more cost sensitive result for intercept survey respondents. The results show an acknowledgement that green roof and wall technology comes at a higher cost and support for payment of that cost as a trade-off to ensuring that there is greenery throughout the City.

Comparative analysis of industry and community attitudes

Following further analysis of the qualitative and quantitative research results, a comparative analysis of these results was undertaken to ascertain similarities and differences in industry and community attitudes. Section 5.3 provides this detailed analysis, which led to the following key considerations being highlighted (refer to Section 5.4):

- There are a range of design and technological considerations to be taken into account in the provision of green building infrastructure, and the requirement for specialist technical expertise –



and lack of mainstream understanding of appropriate technologies – is currently a cost barrier to take-up.

- Social amenity values associated with greening infrastructure are a significant driver for take-up, potentially more so than environmental values. The most powerful drivers are achieved in situations where infrastructure may achieve both environmental and social benefits concurrently – such as through accessible green roofs.
- With regard to environmental benefits, widespread take-up is required in the urban context to affect significant impacts to, for example, urban heat island effect. Achieving widespread take-up requires a proactive approach by policymakers.
- There are a range of governance tools and techniques available to policymakers to effect take-up rates in the urban context. A range of methods has been trialled in North America, South East Asia and Europe. Financial incentives and pilot projects have been found to be effective, along with regulatory approaches, such as mandation in new development.
- More research is required on the particularities and associated drivers that may be effective in the Australian context. Partnerships between the public and private sectors may be beneficial in informing current knowledge gaps on quadruple bottom line aspects of greening infrastructure, and the subsequently tailoring effective local government policy approaches.
- It may be beneficial to conceive of the City's *Green Roofs and Walls Strategy* in relation to short, medium and longer term drivers. This is on the understanding that a cost benefit “tipping point” may be reached in the longer term, for example, with regard to the potential of green roofs and walls to help address issues such as urban heat island effect and urban food production, as environmental issues such as climate change and urban food security come to the fore.

Principles underpinning policy recommendations

Following this final analysis, the following principles arose as key underpinning considerations in relation to the policy recommendations:

- Support for the City in taking the initiative associated with a proactive policy to encourage green roofs and walls, subject to caution being applied in relation to the current available evidence base for policy and the current regulatory environment.
- Policy/strategy to be considered holistically in the context of the City's wider range of strategies for urban greening/open space/social infrastructure provision.
- Ensure the pace of policy development and implementation does not outstrip the pace of industry capacity to deliver – ie available skills, capacity and technologies – nor the pace of regulation, on the understanding that doing so would pose an unacceptable level of risk to the City.
- Strong support for the City to continue to work closely with internal and external stakeholders to promote awareness and understanding, share information and technical expertise, leverage partnerships opportunities and existing resources, avoid duplication of research, and gain support for the Strategy as it is implemented.
- Support for the City to take a leadership role, but to temper it with a cautious approach to over-regulation including policies such as mandation.
- Encouragement for the City to take an approach that differentiates between different areas and development types – ie a fine grained, rather than broad brush approach to the Strategy.



Policy recommendations

Section 6 sets out the research team's 12 specific policy recommendations for the City arising from the research, which may guide the further development and implementation of the *Green Roofs and Walls Strategy*.

1. Play an active thought leadership, education and awareness-raising role in the industry and community
2. Continue to engage and collaborate closely with external stakeholders
3. Engage and collaborate closely with internal City of Sydney stakeholders
4. Ensure the *Green Roofs and Walls Strategy* is contextualised in relation to the City's open space and urban greening planning objectives
5. Take an active leadership role in promoting and implementing green roof and wall infrastructure on civic buildings
6. Enact a staged approach to policy implementation
7. Consider the application of incentives – financial and non-financial – to support the growth and development of the sector as a first priority
8. Ensure policy reflects the differentiation in drivers and viability among new build and retrofit developments
9. Ensure policy reflects the differentiation in drivers for green roof and wall infrastructure within different development types and land use zones
10. Ensure the policy reflects differentiation in drivers for green roofs and walls
11. Harness and promote opportunities for green roof and wall development from a TBL sustainability perspective
12. Deliver the *Green Roofs and Walls Strategy* as a “live” policy that is responsive to changing drivers over time