Comparative UK/Australia study of retrofit SuDS in the CBD for improved flood mitigation,

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Photos J Lamond

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Approach

- What is the evidence for the role of retrofitted green roofs and permeable paving in contributing to flood control in urban areas?
- **How feasible is it to retrofit green roofs and permeable paving in CBD**
- What other benefits accrue from retrofitting green roofs and permeable paving?
- To which stakeholder group(s) does the array of benefits accrue?

"At year five, the benefit is $101,660, and at year 40 the benefit is $191,421. The ecoroof benefit is generated from reduced stormwater management system improvements and O & M costs, carbon reduction, improved air quality, and habitat creation."(Bureau of Environmental Services - City of Portland, 2008)

Photos J Lamond

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Evidence of effectiveness

- Reported annual percentage of stormwater controlled, ranged from 42-90% of annual rainfall; average retention during storm events varied from 30-100%, however, with some runoff being inevitable in extreme events.
- Regional climatic conditions are a key variable, however: vegetated roofs in a sub-tropical Mediterranean climate will perform differently from those in a temperate maritime climate such as the UK.
- Complex issue, dependent on a combination of factors including the characteristics of the roof itself and those of the weather.

Melbourne – Hoddle Grid

Source : N Bhattacharya from data supplied by Melbourne Council

Newcastle – Grainger Town

Source : N Bhattacharya from data supplied by Mastermap

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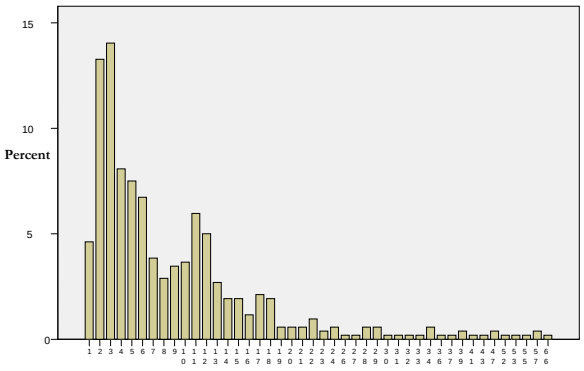
Building features affecting suitability for greeen roof retrofit

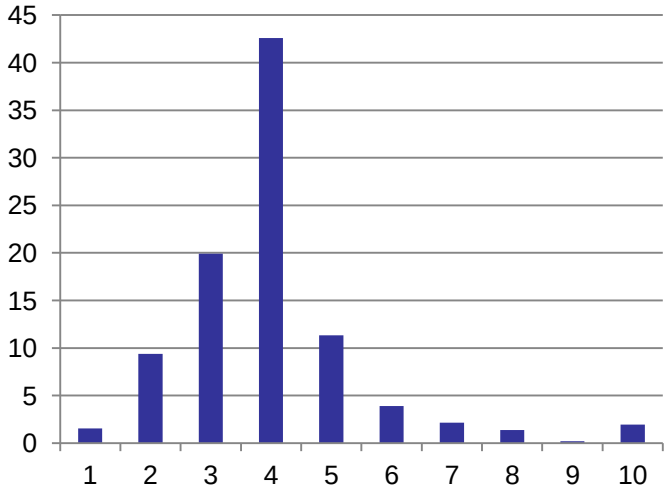
- Position of the building
- Location of the building
- Orientation of the roof
- Height above ground
- Roof pitch
- Roof type
- Competing /complementary roof uses
- Weight limitations of the building
- Access characteristics
- Listing or conservation status
- Preferred planting options
- Sustainability of components
- Levels of maintenance
- Occupancy.

Height of Buildings

Number of Storeys Newcastle CBD buildings

Figure 2: Number of Storey's in Melbourne CBD Buildings





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Melbourne suitability based on pitch, percent plant and type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	78	14.8	15.0	15.0
	no	418	79.5	80.2	95.2
	3	25	4.8	4.8	100.0
	Total	521	99.0	100.0	
Missing	System	5	1.0		
Total		526	100.0		

Newcastle suitability based in pitch, percent plant and historic listing

pitch_list_plant

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	76	15.0	15.0	15.0
	2.00	410	80.9	80.9	95.9
	3.00	21	4.1	4.1	100.0
	Total	507	100.0	100.0	

Further analysis for Newcastle data

Considerations	Percent suitable
Pitch, plant, listing	15
Include historic listing	18
Exclude street only access	8
Exclude Conservation area	4.5
Exclude metal roof	3.9

Paved area features affecting suitability for permeable retrofit

- Position of nearby buildings
- Slope of ground
- Sink Area
- Traffic Load
- Competing /complementary uses
- Permeability of Soil
- Local pollution/sediment loads
- Water quality requirements
- Frost considerations
- Listing or conservation status
- Levels of maintenance

Conclusion

- Buildings database useful in evaluating potential for green roof retrofit
- Need to consult on criteria for installation of green roof in specific city context
- Limited scope for extreme flood control using green roof in study area but retrofit would be helpful in stormwater management
- Blue Green thinking about multiple benefits needed to strengthen the case
- Permeable paving cost benefit clearer for flood control but fewer other benefits are expected