

Delivering and Evaluating Multiple
Flood Risk Benefits in Blue-Green Cities

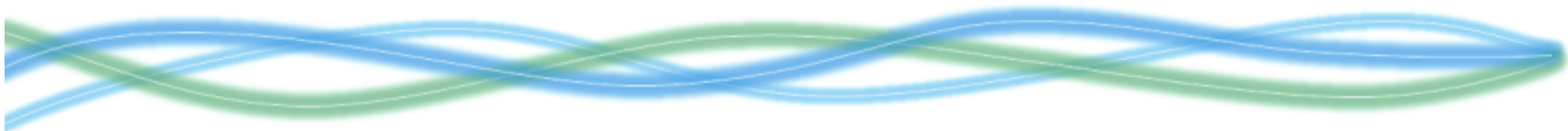


Changing Perceptions and Behaviours around Blue-Green Infrastructure

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18/02/2016



University of the
West of England



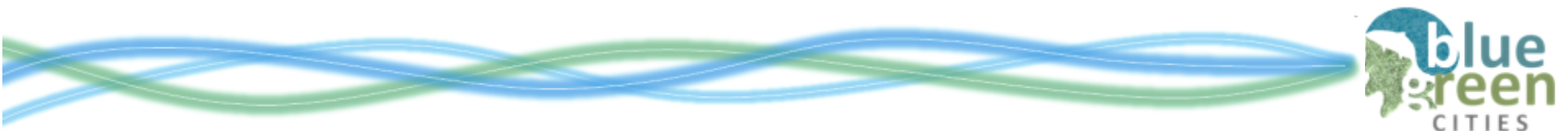
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Content

- Drivers for research
- Scope of research
- Selected Findings
- Summary and Implications



Drivers for the Research

- Lack of research in an UK context on perceptions of BGI
- Lack of consideration of how this evolves over time
- Lack of understanding of how communities and BGI interact in the long term

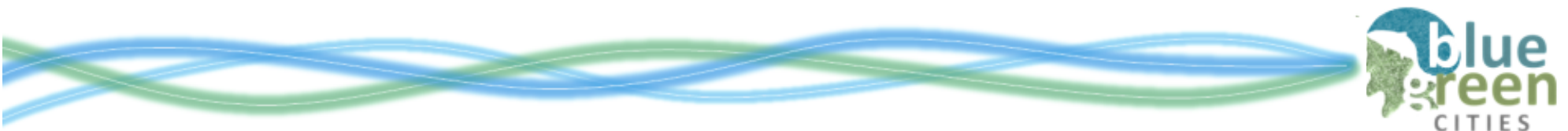


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Ponds in need of TLC

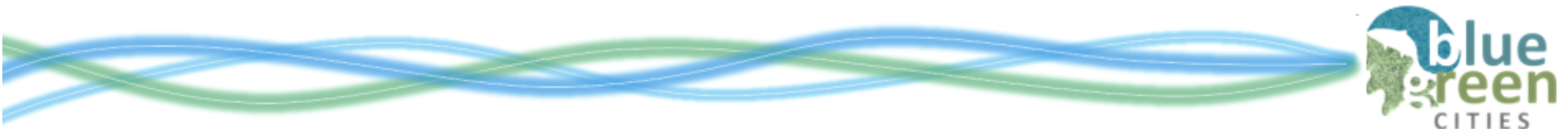
Scope of the empirical research

- Discussions including interviews, POI interactions and focus groups
 - **UK**
 - **USA**
 - Australia
- Quantitative attitude surveys
 - **Three locations in Newcastle**
 - One in NI
 - Around installations
 - In areas with potential for future installations



Scope of the empirical research

- Range of BGI including:
 - Green Roof
 - Ponds
 - River Realignment
 - Raingardens/bioswales
 - Permeable paving
 - Treatment trains
- Range of urban demographics
 - Suburban
 - Urban core
 - CBD
 - Peri-urban



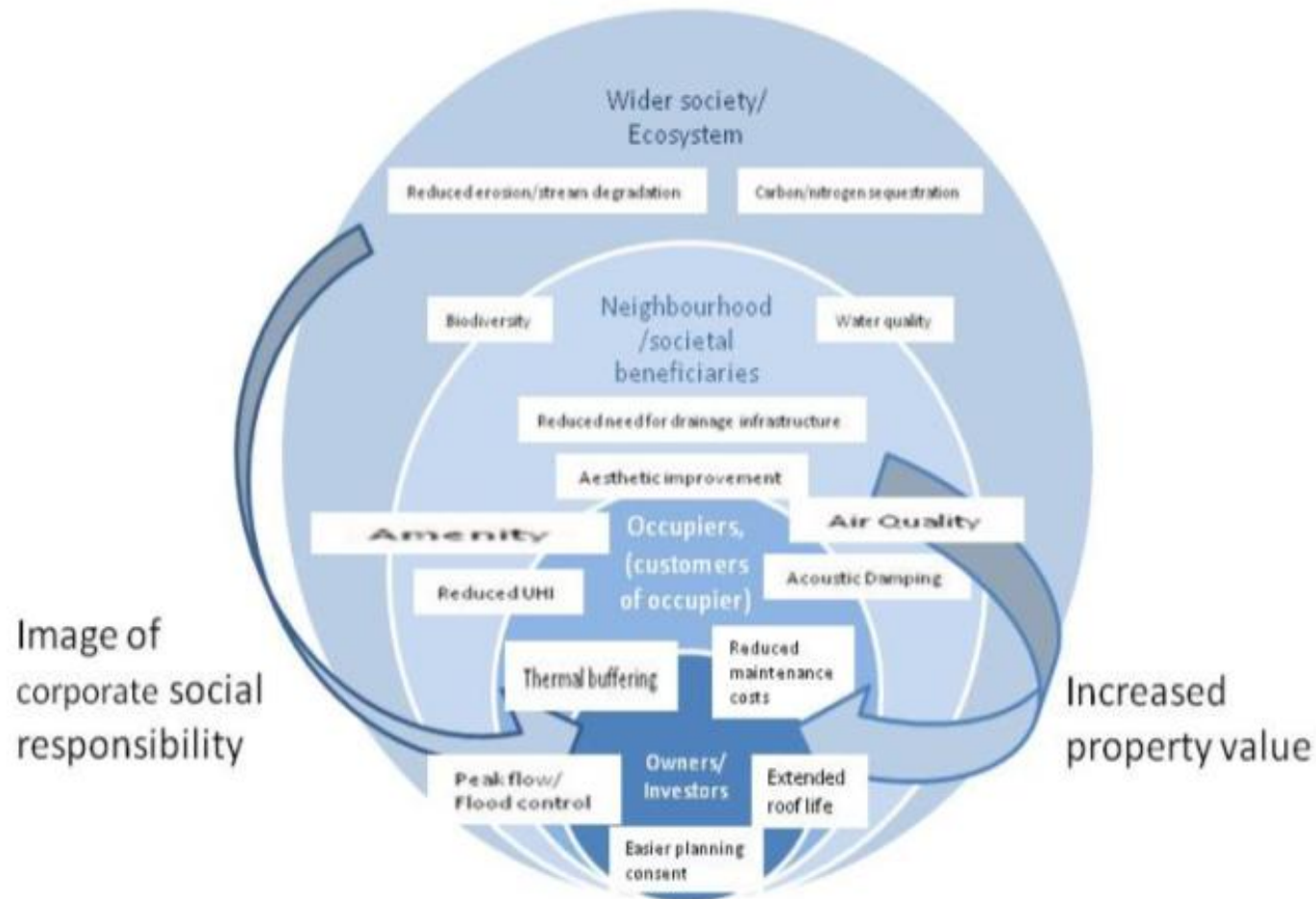
Selected findings from Qualitative Discussions

Rain Gardens in Portland

Green roofs in the UK



Commercial property perspectives

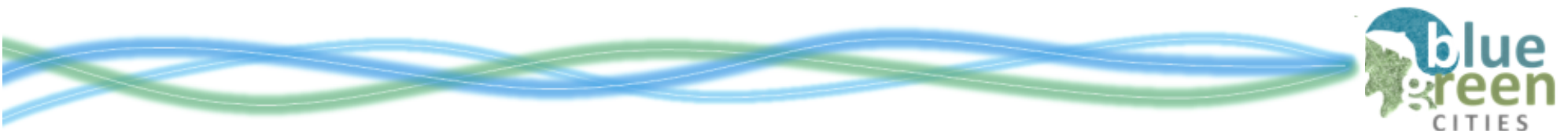


Lamond *et al.*, 2014

Green Roof Perspectives



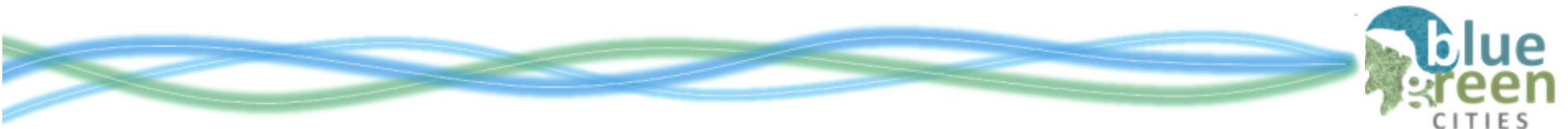
*I think the main function is actually a **visible expression of** a central tenet of the **philosophy**, in terms of the environment. It is a silly thing, but it is about having a green roof, otherwise, **a lot of what you do is absolutely invisible** to people. The benefits are that it has enabled us to extend the environmental agenda - because it's **visible** –*



Green Roof Perspectives

but it's really for aesthetics, purely the look of the buildings, and you're protecting the roofing membrane, so it makes it more durable for a longer period.

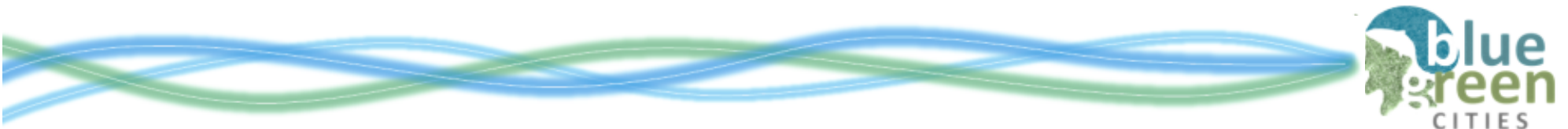
we hear a low background noise of general appreciation, rather than anybody saying 'I've seen this green roof for the first time, it's absolutely fantastic.' We don't get that.



Green Roof Perspectives

we've had complaints from people about weeds looking untidy and we've got a bee hive on the roof and we had complaints from a house over there saying that the bees were stinging their children.

and people still say to me 'well how do you mow it?' and 'won't the roots of the trees get into the roof cavities?'



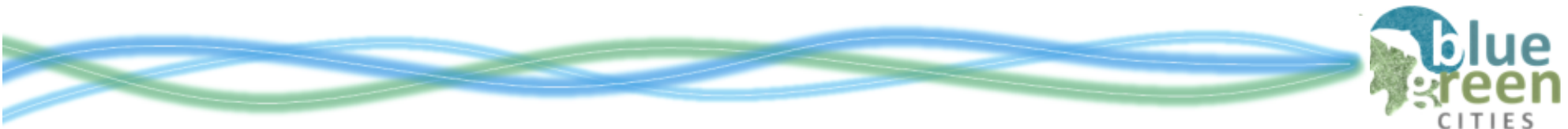
Initial findings from Surveys - work in progress

Brunton Park

- 89% White (inc. European), 6% Asian/Asian British, 2% Mixed/Other
- 61% first degree or higher
- Median stated income >£45k
- N= 299

Wingrove

- 50% White (inc. European), 28% Asian/Asian British, 6% Black/Black British, 13% Mixed/Other
- 6% first degree or higher
- Median stated income <£15k
- N=500



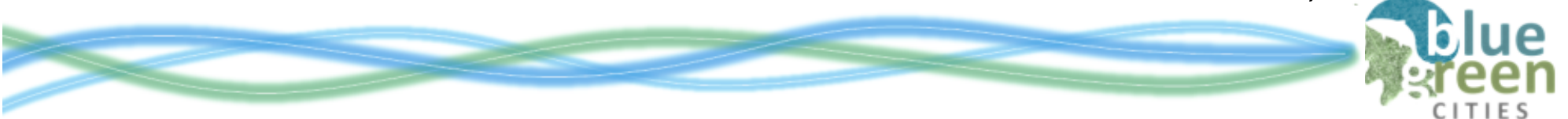
Rain garden perspectives



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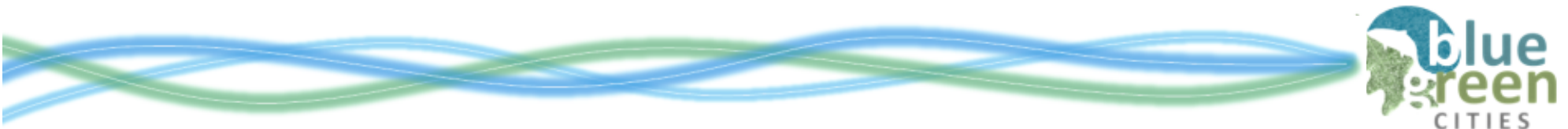
I don't hate nothin' about them, I like the beauty of them. The trees, they put really nice trees in them, they could've been putting some ugly trees in!

Everett *et al.*, 2015



Raingarden perspectives

- *So it's taking away traffic when it's designated for people to drive and it's taking away parking when it's later in the evening. These are in residential/commercial areas, so the people who live there don't have a place to park anymore. The people who have businesses there don't have places for their customers anymore.*
- *Terrible! ... All this grass is supposed to be native to the area, it's supposed to be like drainage for water, whatever ... it's nothing, it's just stupid, it looks terrible.*

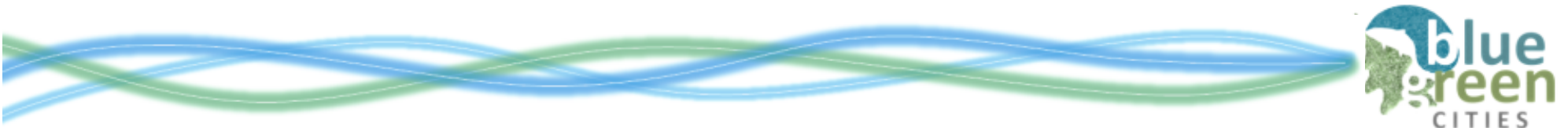


Raingarden perspectives

The bioswale there - if you look around that corner, when the grass is tall, you can't see as you're trying to pull out.



I think that there should be a little more attention to barriers, or signs, or something to say 'this is different, watch your step.' ... it is something I've always wondered about ... it's like, let's get a little human interaction.



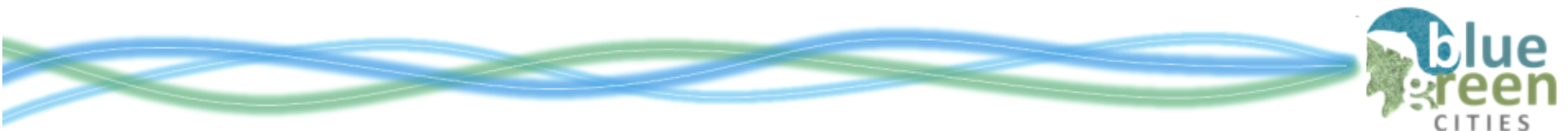
Raingarden Perspectives

the best thing is it doesn't put a strain on the water treatment and it doesn't let the water into the street drains for salmon protection because here, we've got big fish protection.

Well, this is a nice way to take care of part of the wastewater that runs off the street and off the roof.

It's got a long way to go before it gets to the river – be a thousand years before it gets there, probably.

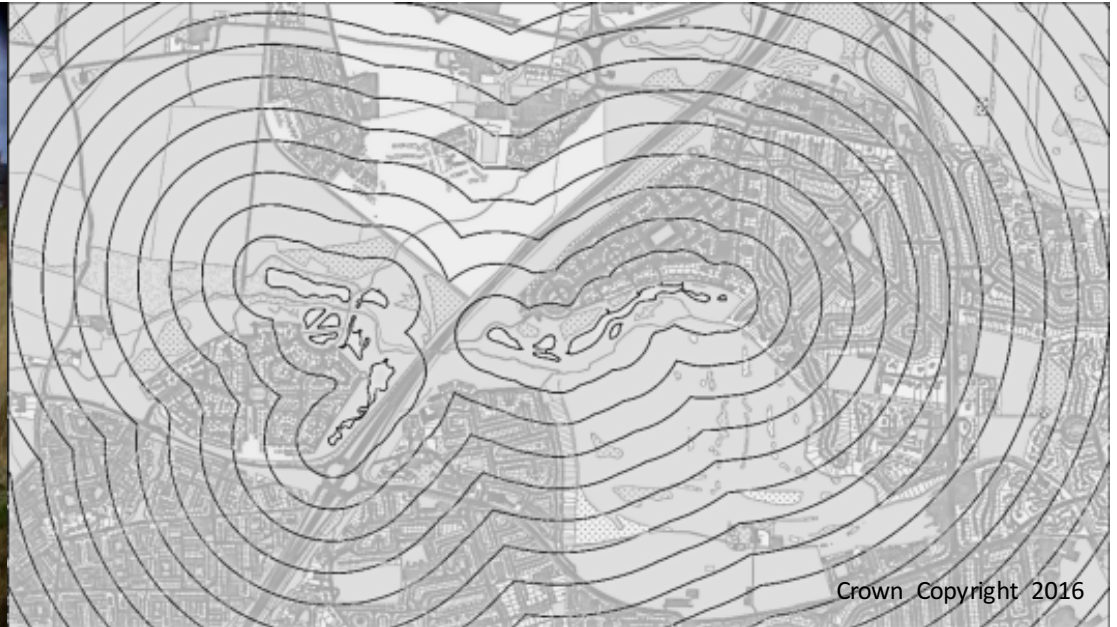
Everett *et al.*, 2016



Newcastle Great Park Ponds



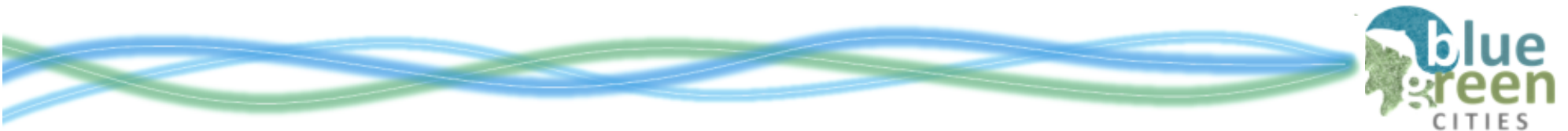
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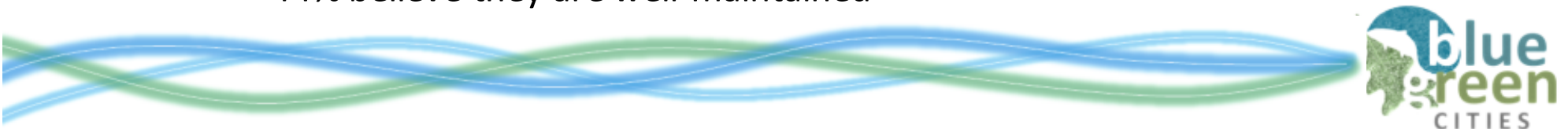
Houses seen from the ponds

Area Surveyed



Great Park returns

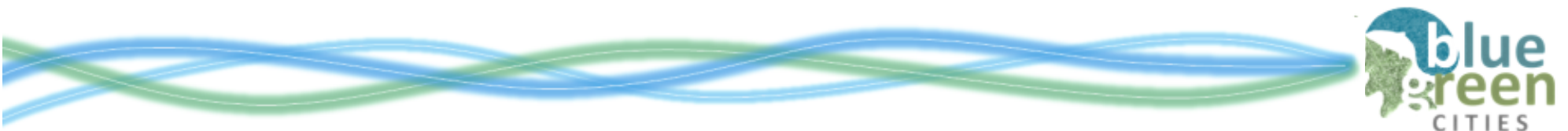
- Ponds very popular overall - 90% liked ponds in their area
- Awareness of ponds strong (83%)
 - 61% knew about purpose of ponds before receiving survey;
 - 73% said they understand the role of the ponds;
 - 69% believed they would work
- Over half (55%) visited the ponds at least once a week
 - Most commonly for exercise (54%),
 - Recreation (23%) &
 - Dog-walking (28%) also popular
- Almost one third 29% said happy to help clear the ponds
 - 21% happy to do other pond maintenance
 - 30% currently clear other people's litter
 - 44% believe they are well-maintained



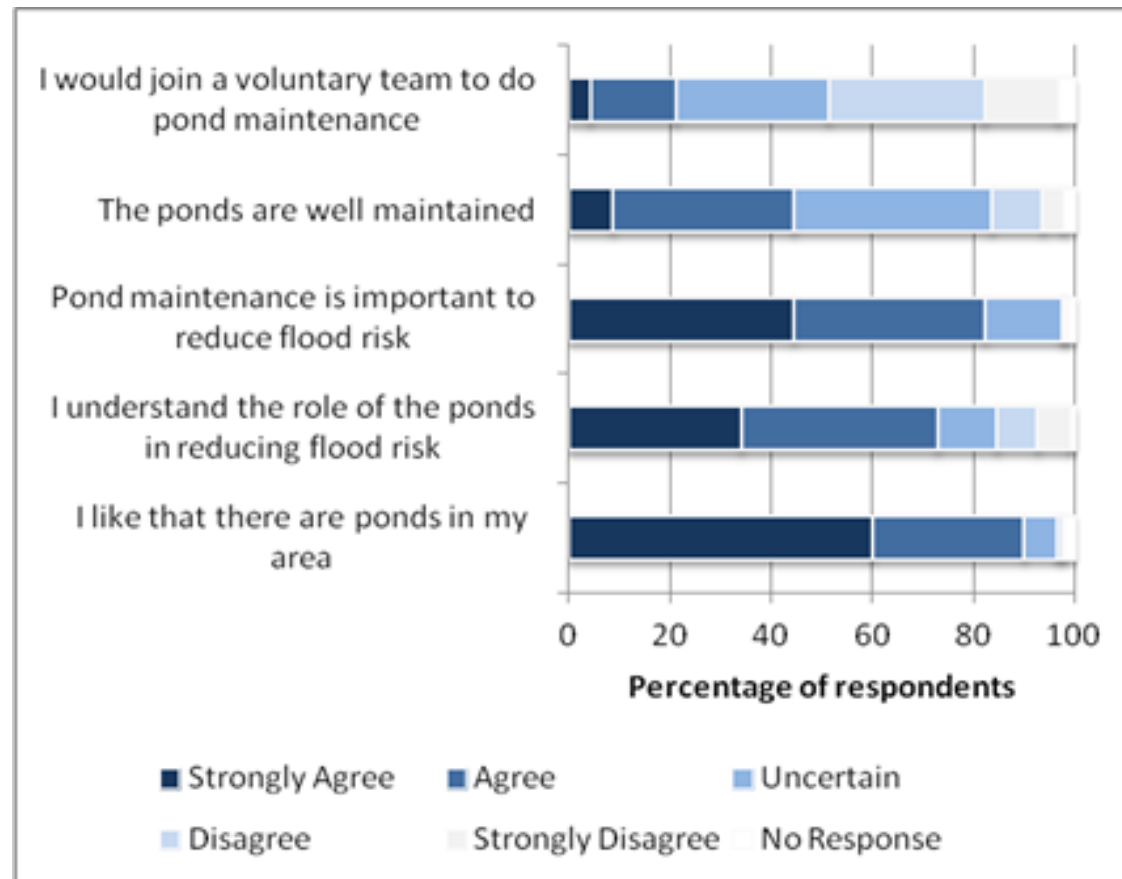
Rating Pond Services

Percent rating as important or very important

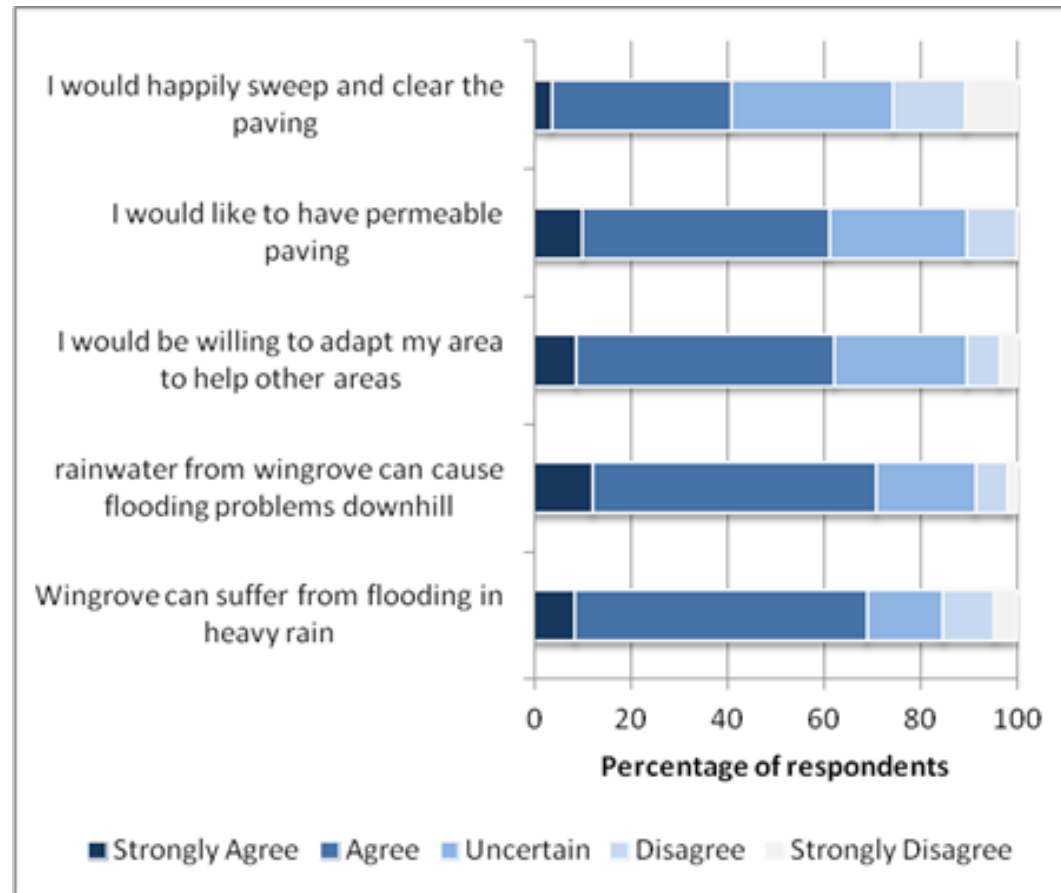
•Reducing flood risk	94%
•Wildlife corridor	93%
•Aesthetics	86%
•Reducing greenhouse gases & carbon	86%
•Providing recreation space	81%
•Cooling the urban environment	74%
•Noise reduction	70%
•Reducing traffic disruption	58%



'I understand the role of the ponds in reducing flood risk'

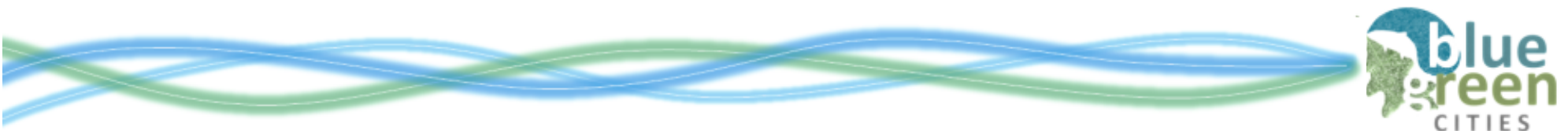


'I would voluntarily clear around the ponds'



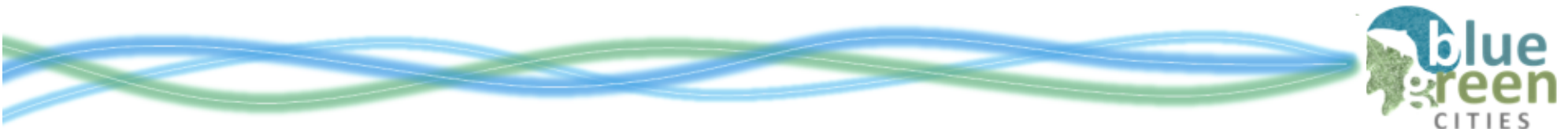
Some 'other' Likes...

- **Biodiversity:** The sounds of the wildlife in the evenings and mornings ... Enable wildlife to develop natural habitats ... the abundance of wild flowers ... We have swans; I've seen a kingfisher, sister-in-law saw a hare!
- **Environmental attitude:** They encourage consideration of the environment.
- **Children:** Educational for children ... nice nature area to take children ... Great place to take my new born twins when I walk them ... Great to have green space like this with children - a lovely area for them to walk, ride bikes, scooters etc. safely.
- **Relaxation:** Relaxing and tranquil. A great place to forget the troubles of the day ...
- **Self-interest!** It means no house will be built in front of our house ... stop too much house building on the green sites.



Some Dislikes & Concerns re Ponds & Green Areas

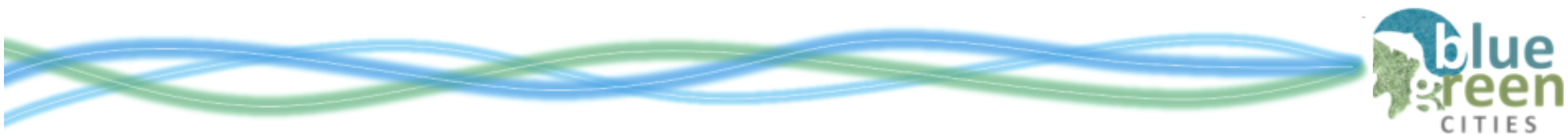
- **Scruffiness:** The whole area seems scruffy and unplanned. It is neither countryside nor a town park, so seems soulless - a place you pass through just because you fancy a walk rather than an attractive destination in itself. It has no charm and very little beauty.
- The paths become very overgrown in summer. They aren't a very attractive space unlike country parks and other areas we might walk.
- **Safety:** Teenage daughter feels vulnerable ... My 13 year old daughter feels scared when around there.
- Worry about safety with children ... Concerns over child safety with ponds generally ... Unprotected and potentially dangerous for children ... They are not suitably fenced to discourage small children and dogs. There are zero life saving rings



Wingrove



Photo of Wingrove Avenue Fenham by Mike Quinn under creative commons



Wingrove options for reducing flood risk



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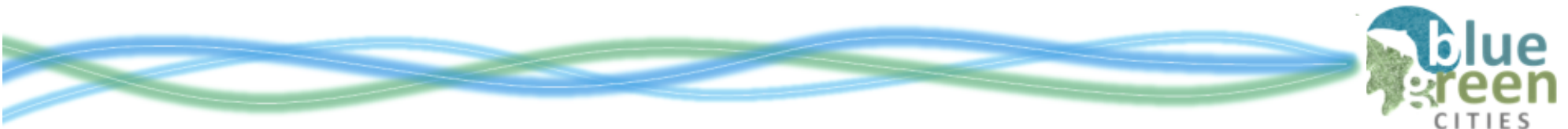
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Wingrove returns

- 71% agreed rainwater from Wingrove could cause problems elsewhere
- 52% were concerned about this
- 62% willing to adapt their area to address it

Waterbutts

- 38% believed waterbutts could reduce flooding problems downhill
- 12% had waterbutt, 22% of remainder would like to have one
- 35% used (or would use) the water, 45% struggle (or would struggle) to use
- 38% emptied (or would empty) waterbutt before rain, 47% would find this difficult



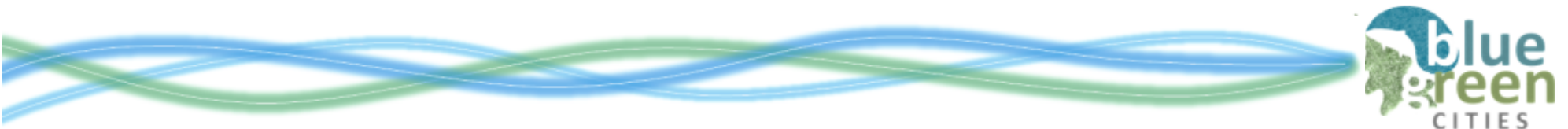
Wingrove returns

Permeable Paving

- 61% would like permeable paving
- 63% happy for it to be installed if it helps other parts of Newcastle
- 41% happy to help sweep & clear,
- 30% happy to remove weeds
- 66% said they understood the role of paving,
- 49% believed it could help with flooding

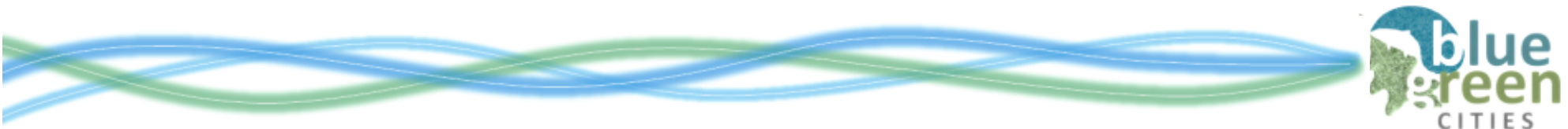
Rain Gardens

- 79% thought rain-gardens would make the area more green,
- 49% that they could help with flooding,
- 29% happy to weed & tidy



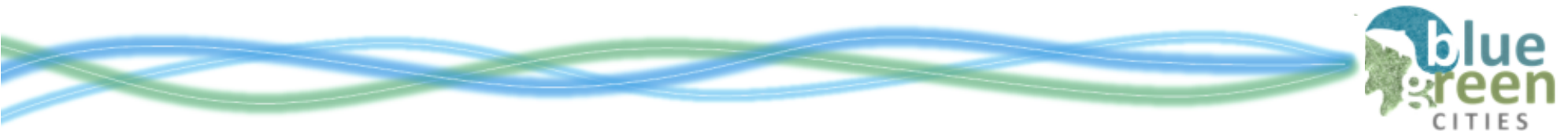
Main Findings

- People generally hold positive feelings towards BGI facilities; they were frequently felt to improve the aesthetics, and people were appreciative of this
- Opinions on individual facilities and amenities is related to specific detail of the design in each instance. We have no objective measures for amenity. For BGI to realise amenity benefits, it is important to understand and work with local preferences
- Members of the public value having a voice in the development of solutions - and this can help increase 'buy-in'



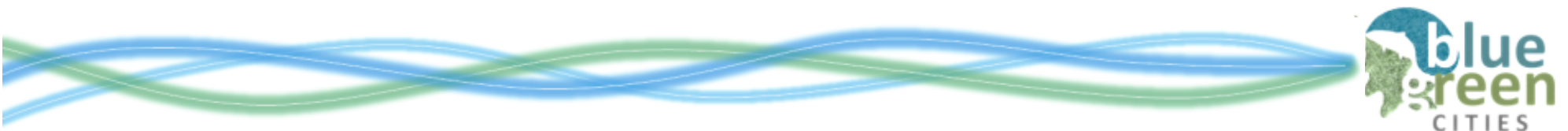
Main Findings

- Deeper understanding of BGI functions is frequently lacking. Appreciation does not necessarily relate to primary functionality
- Awareness of purpose can decay over time if engagement is not long-term. People also get used to /accept the BGI
- People are willing to have local BGI installations that can help areas downstream, even when they themselves are not at flood risk
- Willingness to help maintain facilities is variable and depends on multiple factors, including ease of maintenance and perceived “ownership” of responsibility



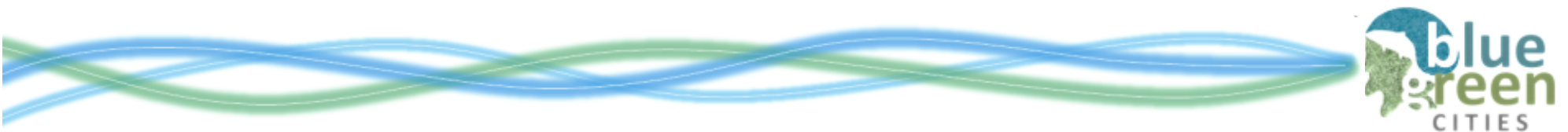
Implications

- Support for BGI is likely to be popular and appreciated as an approach and in principle.
- Publics have local knowledge that can inform proposals. Solutions will be more effective and more sustainable if they are co-developed in conversation with those who will live alongside them.
- Creative efforts at longer-term engagement and awareness-raising need to be ongoing: populations change over time and people forget, so outreach can always be beneficial.



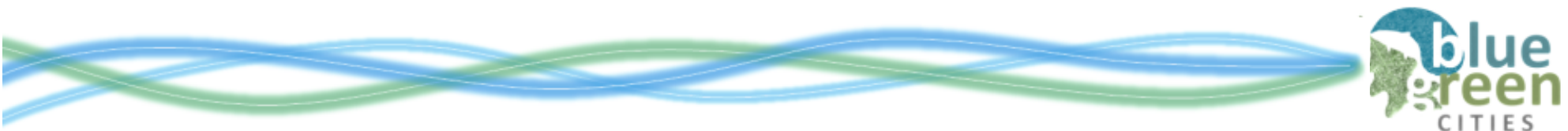
Implications

- Making information accessible, especially relating to encouraging sustainable behaviours, is helpful.
- Consultation on maintenance has to be part of the conversation – multiple benefits depend on the interaction between BGI and communities.



References

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- EVERETT, G., LAMOND, J., MORZILLO, A. T., CHAN, F. K. S. & MATSLER, A. M. (2015) 'Delivering Green Streets: An exploration of changing perceptions and behaviours over time around bioswales in Portland, Oregon', *Journal of Flood Risk Management*, <http://dx.doi.org/10.1111/jfr3.12225>.



Selected Outputs

- EVERETT, G. & LAMOND, J. (2014) 'A Conceptual Framework for Understanding Behaviours and Attitudes Around 'Blue-Green' Approaches to Flood-Risk Management'. *Flood Recovery Innovation and Response IV*. Southampton, WIT Press.
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