



The Centrality of Felt Voice and Ownership to Developing *Sustainable* 'Sustainable Drainage Systems'

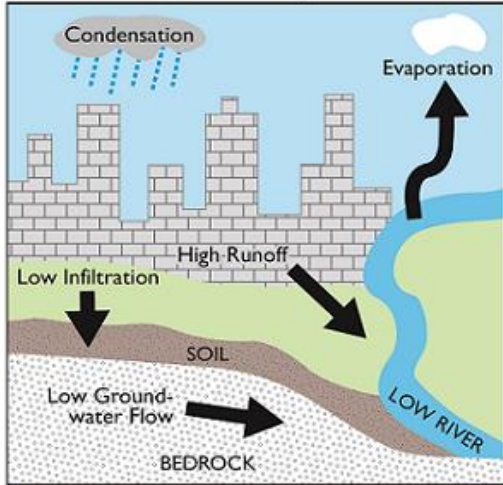
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Delivering and evaluating the multiple flood risk benefits in Blue-Green Cities

Water Cycle



Streetscape



Flood risk management does not fit into any one disciplinary boundary

- Hydrodynamics
- Geomorphology
- Physics
- Engineering
- Environmental Science
- Social Science
- Economics
- Ecology
- Geography

The whole is hopefully(!) greater than the sum of its parts

BLUE-

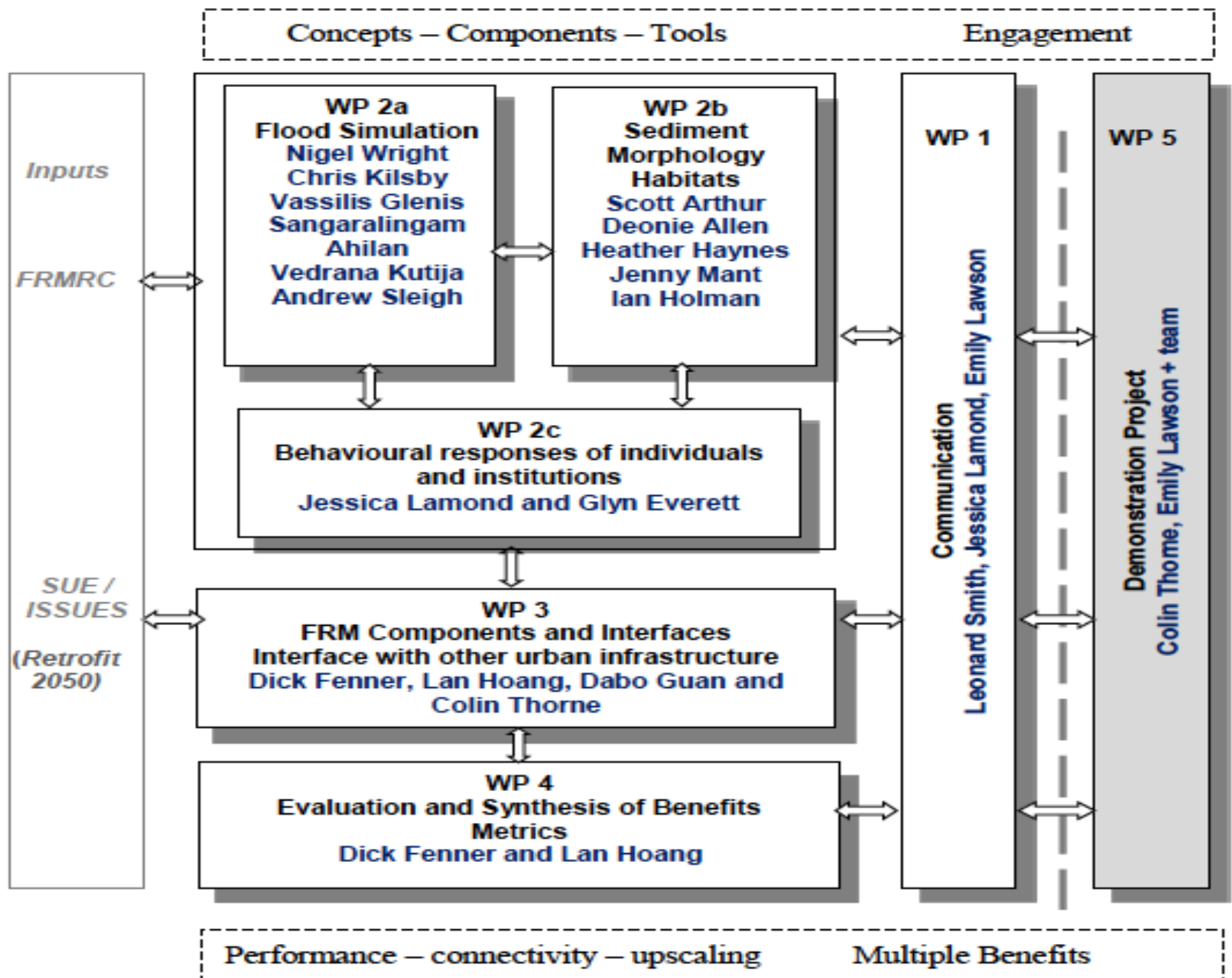
GREEN

Evaluation and synthesis of benefits

Aim: Develop procedures for the robust evaluation of the multiple functionalities of BGI components within FRM strategies



- Blue (flood) and non-flood (Green)
- Evaluate the **relative significance of benefits** in context specific locations
- Establish preference ratings
- Review current design procedures and make **recommendations to the design guidance** to enhance the most significant non-flood benefits



Blue-Green Approaches



Multiple Benefits?...





Local Knowledge



Co-Develop!

‘Ownership’

Local Preferences

Willingness to help maintain & clear



Co-Develop!!

Willingness to pay

Willingness to behave

Improve sustainability & function



Co-Develop!!!

Reduce costs

Improve multiple
benefits (ESS)

Portland, Oregon – Willamette River



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https://upload.wikimedia.org/wikipedia/commons/4/4f/Willamette_River_at_Molalla_SP_eb.jpg

Faculty of Environment and Technology

Portland, Oregon – Willamette River...



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https://en.wikipedia.org/wiki/Willamette_River#/media/File:USACE_Fremont_Bridge_Portland.jpg

Faculty of Environment and Technology

Empty Bioswale



Active Bioswale



IF people understand & appreciate them!

I'm glad that you told me what the hell it is. I had no idea, I didn't know *what* that was.

I was like, 'why is that there? what is the purpose?'

And you know a lot of our neighbors, family and friends come ask the same thing, 'Why is it even there though?'

You see, before you even came today, I didn't even know what the purpose of that was.

You educated me - I didn't know it's for the water. I just thought it's pretty, and it looks nice for the neighbourhood.

Not Understanding can = Bad Behaviour...

Have to be a lot of litter to clog it up. Someone would have to drop their garbage can in there once a week for a month.

One of my elderly neighbours, who was a gardener, he would throw garbage into his swale; he just didn't understand its purpose.

Somebody, about a year ago, had these little bean-bag, berries in the intake and it was blocking it – somebody was trying to deliver water from them.

Somebody in this one right here, didn't they pull some parts up out of it? They exchanged the plants.

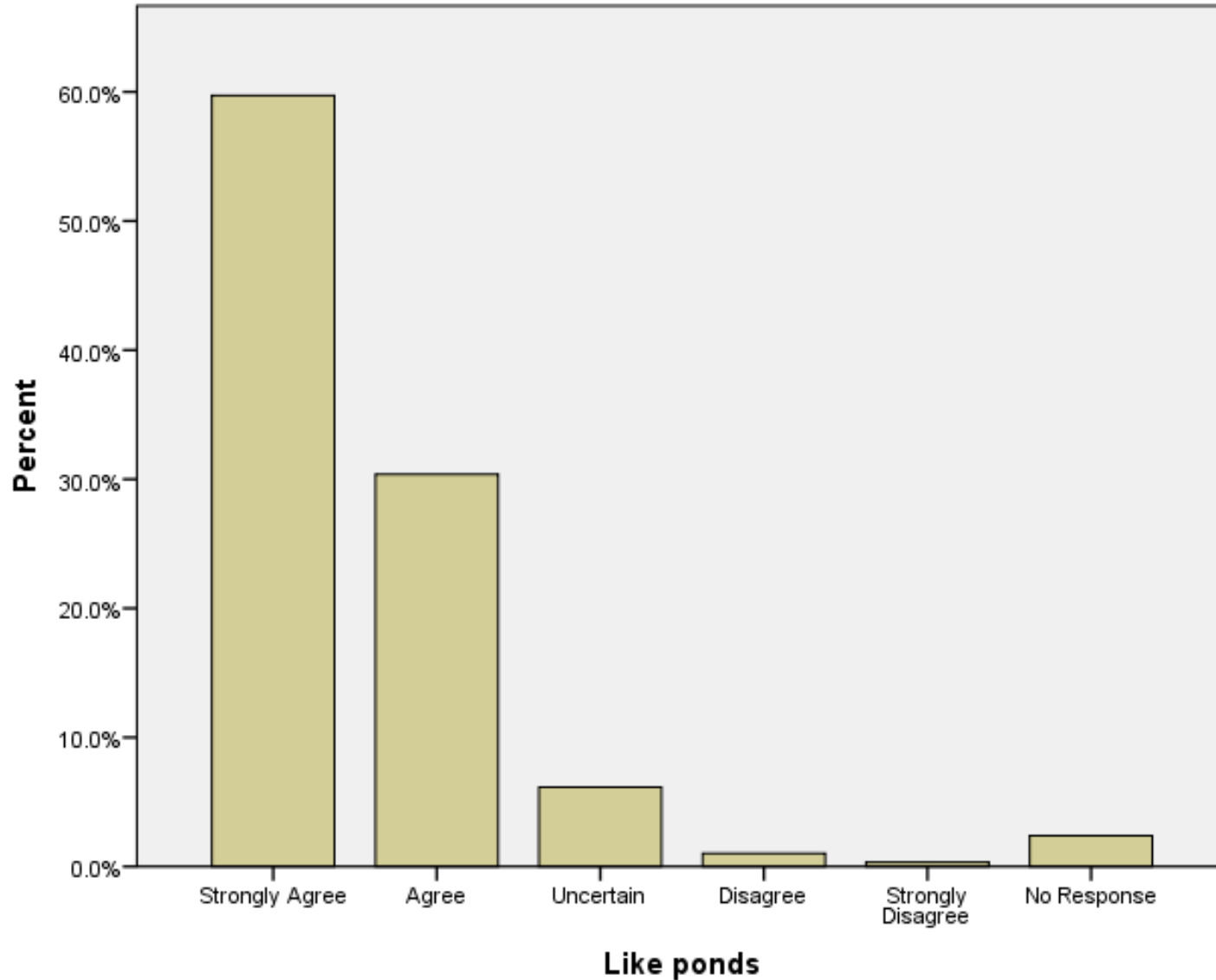
Portland, Oregon

- **Mess**
 - **Ugly Plants, Wrong Plants**
 - **Litter, Detritus**
- **Plant Choice**
 - **Safety – plants too tall**
 - **Fauna – mosquitoes, flies**
 - **Trees – ‘I can’t look after another tree, man!’**
- **Parking**
- **VOICE**
 - **Choice of *where & what***

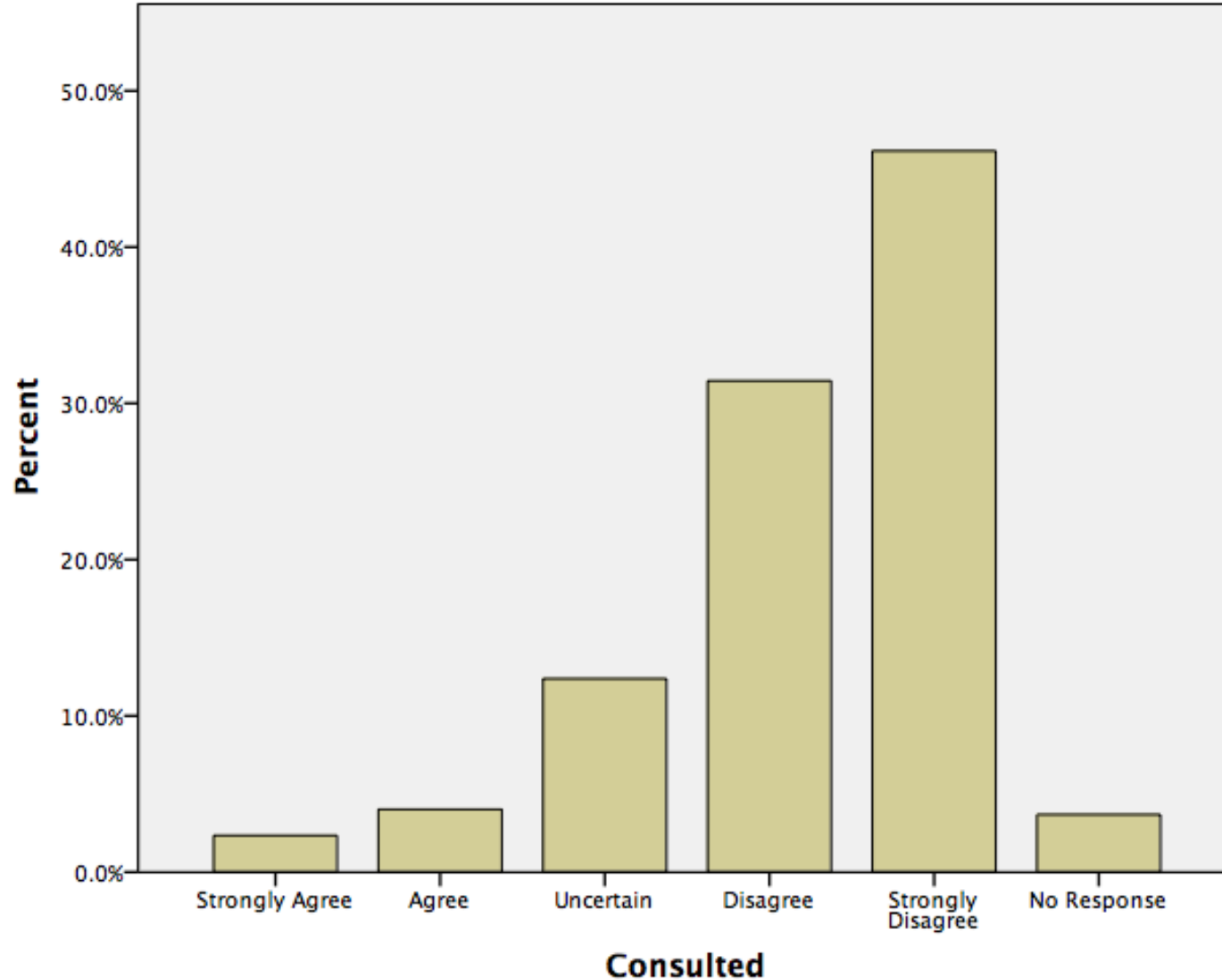
NEWCASTLE



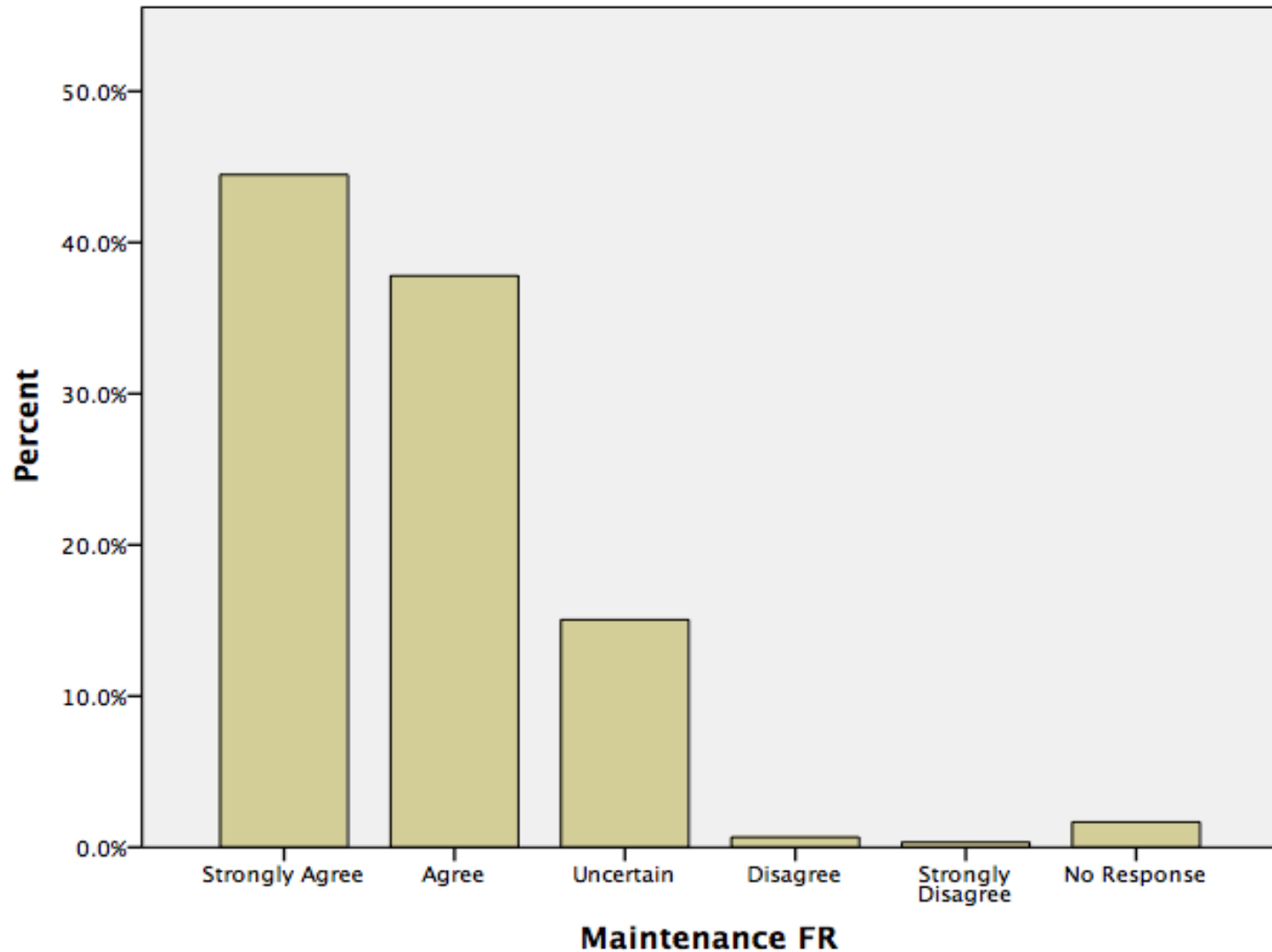
I like that there are ponds in my area



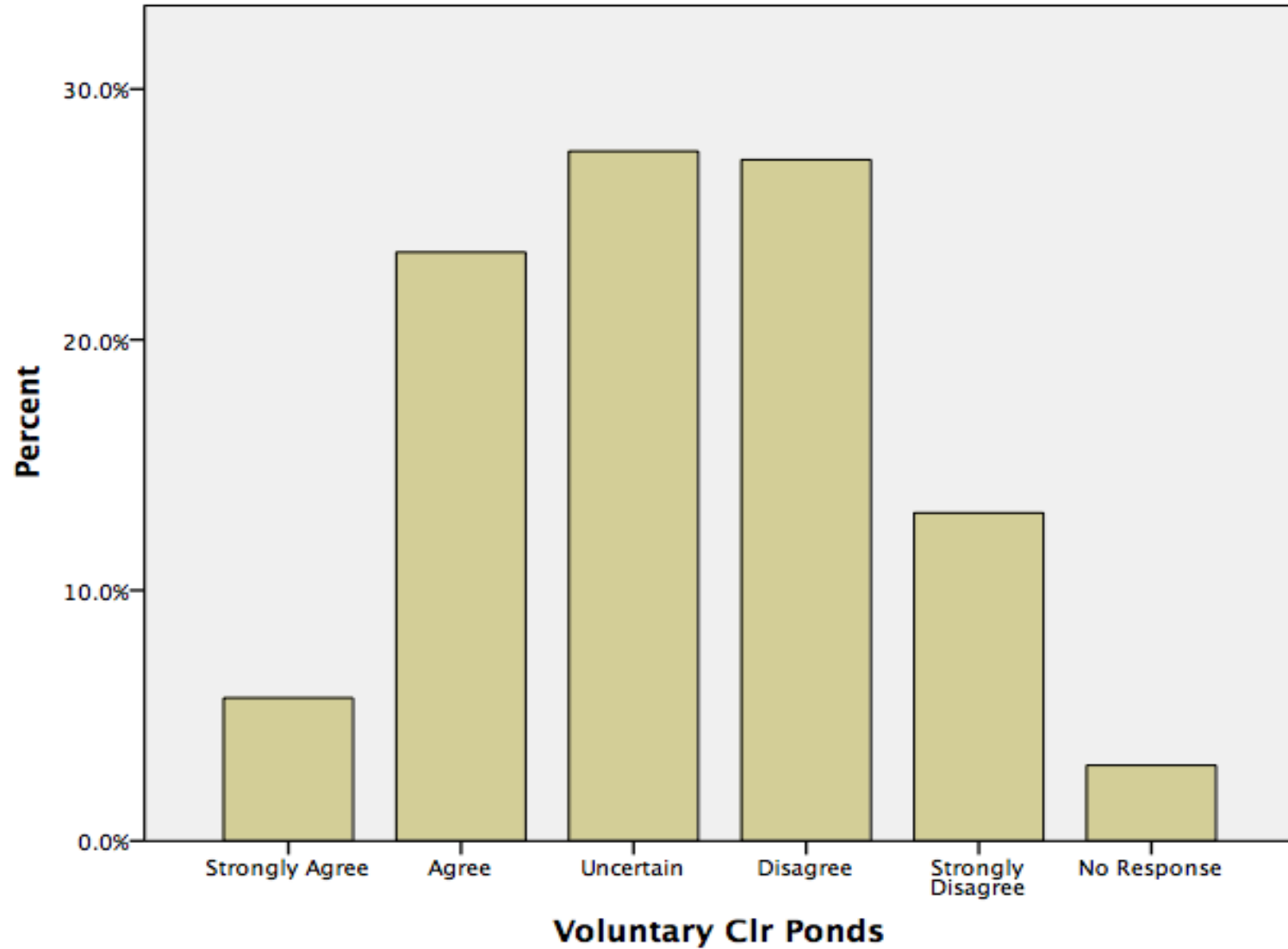
I was consulted about having the ponds



Pond maintenance is important, to reduce flood risk



I would be happy to clear up around the ponds



Good Practice

- Newcastle: 1/3 said they *would* help clear & maintain...
- Green Streets Stewards

Would you ever want to be part of [the Green Streets Stewards]?

R1: Oh yeah. Yeah, sure we could do that ... People like to do that kind of stuff around here.

R2: If it was the one in front of my house, yeah! I'd probably go out every day.

- Friends of ... Parks

[The Friends] have taken on the maintenance of the area ... there is scope for them to do more as the years progress ...

They're [also] really useful in getting hold of external funding that the Council can't get. We're keen to have Friends Groups on all our sites, because they're our eyes and ears.

Lessons Learnt

- People need to be engaged before, during & after
 - People move, and they forget, and get distracted – busy lives!
 - Demographics, preferences & urban spaces change
- We need to find creative, innovative ways of *truly* engaging
 - Information boards get ignored
 - Consultations can attract the ‘usual suspects’
- And yes it will cost!
 - BUT, the paybacks could be as multiple as the ESS
 - AND, it could reap savngs over time as people take ownership



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