

## ACTIVATING WATER SENSITIVE URBAN DESIGN IN NEW ZEALAND

### Barriers Workshop

**Venue:** Auckland

**Date:** 30 November 2017

**Time:** 9am – 3pm

### Attendees

ORGANISATION	CONTACT NAME
ACH Consulting	Linda Norman
AR & Associates	Andrés Roa (Apologies)
AR Associates	Andrew Nel (Apologies)
AR Associates	Rowan Carter
Auckland Council	Gretel Roberts
Auckland Motorway Alliance	Peter Mitchell
Boffa Miskell	Benjamin Loh
CKL	Zeb Worth
Hamilton City Council	Andrea Phillips
Land and Water Forum	Andrew Schollum (Apologies)
Ministry for the Environment	Sarah Boone
Morphum	Emily Afoa
Morphum	Caleb Clarke
MWH Stantec	Hannah Andrew
Natural Habitats	Hayden Sefonte
Natural Habitats	Mel R.
Ngati Manuhiri	Fiona McKenzie
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Opus	Suman Khareedi (Apologies)
Porirua City Council	Torrey McDonnell
Stormwater360	Troy Brockbank
Todd Property	Neil Donnelly
University of Auckland	Marjorie van Roon
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## Project Team

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## Workshop Notes – Summary of Key Comments

A copy of the notes taken on the whiteboard are included in Appendix B.

### Burning Issues

- Would love to see WSUD easier to get through the Council process, so that designs are not bespoke designs but standard approach to stormwater management.
- Similar to the above barrier. It's about getting around the regulatory process, and understanding and getting it right through from the planning stage through council processes.
- My networking outcome customer needs requires resilience and value for money assets/ outcomes, but the toolbox is very limited and lacking in good tools, including good decision making based on CBA over the life-cycle of the device. We need safe, reliably functional and resilient WSUD assets. We have a weak fluffy definition of WSUD and if it is not clearly defined you can't set goals and outcomes and then define risk.
- There is a clear differentiation in standards between new development and existing development issues and trying to alleviate existing issues whilst setting high standards for new – difficult to justify WSUD needs and what we do. This leads to a knowledge gap relating to macro-benefits.
- We understand the benefits around water quantity and quality, but better quantification of the other benefits is needed so other benefits can be maximised and WSUD can be a whole package (economic – real estate, environmental benefits, as well as social and aesthetic benefits).
- Politics of these experiments of water sensitive cities – is something to be explored and understood by looking differently at how we make decisions.

- We know economic, social and environmental well beings and benefits, but cultural well-being is being used as a token. We don't fully understand these benefits and we need to promote and raise cultural values both nationally and internationally.
- We can't separate stormwater from leaking wastewater, streams, oceans. Grass roots level – we can design all we want amongst ourselves, but until the community looks at what we're designing as an asset, it has a very short length of life in the ground. Community engagement (incl. landscape architects is key) – need to create the value by changing perception.
- Key barrier is whole life cycle cost benefit analysis to support good decision making - and support from Treasury. Drilling into those social, amenity and cultural values and putting a quantifiable number to justify that. Identifying tipping points / critical leverage points for behavior change. Where do people make the decision to go for grey water approaches vs WSUD.
- There is a lack of integration between typical urban design thinking (places and spaces) and WSUD thinking at the urban design level. [strategic growth alliance]
- It is important to quantify the wider benefits to get some of these devices over the line. Also missed opportunities through lack of understanding by those who do urban planning for development areas, and those in the regulatory process?
- There is a disparity between what is approved by Council and then what is actually installed (through push-back after consenting, for example during 'cost/value engineering'). Try and get more of these types of devices over the line and from a developer point of view it would be good to have more information around perception of cost, benefits and maintenance. Can then "sell" this to the clients.
- Opex is poorly understood – reflected by types of procurement models for long term maintenance. It is helpful to distinguish between cyclic, periodic, reactive, improvement and renewal maintenance through the life of a device (useful data is available on wetland maintenance in Auckland). NPV is useful when assessing whether to retrofit or do nothing for an existing asset, whereas CBA is useful when considering a new asset.
- Barriers at the 'back-end' of the development cycle – 4 different designs for rain gardens. Where is the specification or generic standard that people are following? E.g. rain garden media is a problem. Green infrastructure is generally outsourced at construction and there is lack of knowledge or care around this.
- Doing LTPs, we need to know are we investing in the right things by doing WSUD activities; compared with investing in better technologies?

It's about building on cultural and social values and ethics, but land ethics seems to trump things a lot – setting a line to keep people with standards, but is that line suitable since we are still getting adverse effects. NPS FM can help with this, but will

the community have the kaitiaki to spend that money? How do we get a 'land stewardship ethic' rather than a 'minimum compliance to just get over the regulatory line' approach?

- We need to work out why there is such sporadic intermittent uptake and why? What can we do about it?
- Is planting big trees in bioretention systems a problem and how stable they are in the long term. Also around maintenance as AT are reluctant to maintain tree pits.
- Need to better understand opportunities around WSUD to incorporate into Council planning processes and target setting for the NPS-FM.
- There is no way for developers to 'show off' their good environmental work and market it (no incentives). Maybe we need to include it in the green star rating system. We need developers to be able to appropriate the benefits created by adopting WSUD, including being recognized as market leaders

#### **General Discussion (morning session)**

- Are the devices being over-engineered as some sources of pollution may become obsolete? For example if Cu and Zn sources are eliminated, then different designs may be effective.
- Devices are quite flexible and can also be designed to assist with air quality. Overengineering may not be a negative outcome.
- Is there a lack of understanding around the value of implementing WS work in existing areas?
- The criteria for how benefits of WSUD are quantified depends on the people or customers that are influenced by the outcomes. What industry members think is desirable may be different to the average person. Customer outcome needs are specific to different areas. WSUD is either priceless or worthless depending on the point of view (tree hugger or concrete manufacturer).
- It is surprising that maintenance and the consenting process scored so low in the survey results. This is a large piece of the picture that is not represented.
- How much does the composition of survey respondents influence the survey results? Maintenance may not be presented as a large barrier because the respondents are not involved in that side of the process.
- The survey reflects the dominant disciplines charged with making decisions in urban spaces, which are usually very deterministic and technical. The results reflect the audience (eg scientists, economists) and how decisions are made.

- Whilst it is important to learn from international research, we should ensure that our research is focused in a New Zealand specific context. For example, elements such as labour costs that may contribute to the success of WSUD in Singapore may not be transportable to New Zealand.
- Outcomes could be improved if WSUD was part of the initial vision. Architects often see WS solutions as a burden. There is an opportunity to spread the WSUD message with Auckland architects who invite guest speakers on a monthly basis.
- There could be value in educating the public on what these devices are and how they work. Signage could be a method of achieving this.

### **Site Walk Over**

- How effective are these devices and could they be having adverse effects? Is the hoggin at site 1 impermeable or is it causing sediment runoff? The grassed area (site 3) doesn't work because it is impervious in the winter due to impermeable clay and lack of slope, and is rock-hard when dry in the summer. The unshaded rock-lined device could be a source of temperature pollution. Rain gardens may not be functioning properly because the inlets are in the wrong place and may not be receiving much load at all.
- It is easier to manage devices when they are in defined areas because they can be expensive to put in and after a certain length of time you need to perform renewals.
- There is no standardization. People put devices in to meet regulations but if there is no follow up this may be harmful in the long run.
- There are practical maintenance issues with many of these devices. For example the central medians with single traffic lanes on each side means they are dangerous to maintain or road closures are required. This creates potential for a negative legacy. Material and maintenance should be considered in the design phase. For example, use of deciduous trees require more maintenance, and use of the photo-degrading or brittle plastic caps (which were often now broken) in the tree pits.
- Although we want to encourage everyone to do the best, rather than the minimum, regulations may go against incentivizing uptake.
- Urban developments are showing interest in having orchards in green spaces and fruit trees in rain gardens. However, there is confusion over the safety of eating from trees that may have treated stormwater due to the safety risks of bioaccumulation. Most orchard species also generally need relatively fertile soils (and raingardens should not be fertilized); others may require fungicide sprays (which are often copper based – and copper is a major stormwater contaminant)
- There are landscape features amongst the WSUD devices in Albany that some consider to be lost opportunities. Missed opportunities also occur when designs focus too heavily on technical compliance.

- Councils and planners must accommodate for engineers who prefer traditional approaches. For example, certain councils won't allow curb cutting and prefer catch-pits for ease of construction, transport and removal.
- Auckland has the ugliest stormwater devices.
- Devices such as the rock-lined detention area could benefit from planting around the devices for aesthetic and ecological reasons.
- If you leave the implementation of these devices to the market you'll get a continuation of the old approaches.
- People are disconnected from the water. The waterways are fenced so you walk past them and see them, but you can't connect with the water.
- There are socio-economic implications of WSUD. Who gets the benefits? Devices are more likely to be present in more affluent neighborhoods.

#### **Site Walk Debrief**

- We need a more holistic approach because these assets are part of multiple disciplines. There is a lack of flexibility and clarity around who is responsible for devices because they cross multiple jurisdictions within council (eg parks, Stormwater, roading authorities). This limits their design and implementation. How do they know they have these assets?
- Safety, design, engineering and risks need to be addressed right throughout life cycles.
- Devices would benefit from incorporation into the planning stages. Many devices appear to be an afterthought. These areas have potential to provide more social and cultural values.
- We should be trying to upskill and inform local people by exploring pathways of community involvement and fostering an understanding of water. Possible methods for this include community involvement in the development process, increasing amenity values and signage.
- People want to be more connected with water. For so long water has gone into pipes and removed from sight. It is important to educate people that rain and runoff are part of the hydrological cycle and it should be brought to the surface. Education around this will help to address health and safety issues. Why are stormwater assets fenced off and perceived as bad?

- What are the regulations or implications of minimal fencing and allowing for interaction? The level of fencing around waterways is overwhelming. This is also a missed opportunity for enhancing amenity value.
- Our communities need places to sit by the water and connect to water. There was a stone on site that said water was the life giving source of all things, but we didn't feel connected to the water because it was all fenced off and concrete. A review of current practice for integrating safety with stormwater (requirement or not of fencing/ barriers) and benefits of including places to sit near water to establish connectivity and observation of water, kaitiakitanga may be useful. What are the actual ecological outcomes and are they beneficial? For example, should we be encouraging fish and wildlife into these ponds? Perhaps not if they are hazardous, shouldn't encourage habitat value. Should we promote fish passage into stormwater ponds and wetlands? What is the impact on wildlife in these areas, e.g., pukeko.
- Best practice should consider the implications of construction and maintenance periods.
- 'Safety in Design' applied for roading design uses a life cycle model that could be useful for WSUD
- It could be worthwhile to explore the costs of doing this poorly. Some examples we saw are better than others, and there were varying levels of maintenance. Is a poorly managed device better or worse than a pipe? Poor application is inevitable. For example, a developer did not want ponds as he was aware of a site where ponds had dead ducks
- Maintenance is an issue and there is very little data available to inform this. At every stage of the process things can go wrong, so we need construction checklists that are well known. This should be done with ecologists as well.
- There is danger that if devices are not maintained well people will say "wetlands are bad, please build a pipe".
- Performance and conditions failure are two separate allocations of money.
- Decision makers need to know the costs of these processes. Is there currently any data to inform these budgets?
- Quick wins could include:
  - WSUD signoff checklists /inspection guides, rating and reporting systems – these have been developed both locally and internationally (CiRIA)
- In a recent subdivision, Auckland Council demanded roadside bioretention was planted in (non-native) *Lomandra*, not oioi (*Apodasmia similis*) on the basis that the oioi required trimming

- There is massive value for money in using the right people. It is easier to teach certain people particular skills than others. For example, construction workers aren't going to know about different types of plants. 'I can teach a wetland plant specialist how to assess inlets and outlets, but I can't teach a gumboot chap what a weed species is'.
- How do you get people more interested in developing these assets? When the existing assets are poorly maintained it has the opposite effect because it turns people off. How can we look at existing infrastructure and can we improve/maintain this to a higher level to build developer interest?
- What are the customer objectives and are they being reflected? Devices that look bad may be very functional.
- Public perceptions of WSUD can be influenced by the narrative that we give to people and public engagement. We could be educating to show that although these things may not be 'beautiful', they are what will allow your kids to swim in rivers.
- So many little things that came out today – the importance of proper compaction of soil, need for better distribution of flow into raingardens and wetlands – if there is no agreement or standard in this room, how will the broader industry get it right?
- It would be great to get national design guidelines. There is a desire to seek best practice and codify these elements. If we had national guidance you could inform decision makers.
- There is concern that standardization will lead to a loss of adaptability.
- Albany is not a good example of WSUD. Whilst it has a number of devices, the overall landscape reflects traditional approaches to development.

### **Afternoon session on Barriers and Transitioning**

Appendix A includes a summary of the results of the activity group session. Some of the key points raised during the discussion include:

- Although there are some examples of multifunctional value, there is a general lack of cohesion in devices.
- It is almost as if cities are going through the cycles multiple times. For example, initially saying 'ponds are awesome' then acknowledging the downfalls and going to wetlands or raingardens or back to the start.
- An 'aspirational' vision doesn't need to be a realistic goal as long as it represents the right objectives.
- Benchmarking is useful and constructive for understanding our WSUD trajectory. Recognize that you don't have to fall within a single category. Decision making is not solely based on benchmarking.

- We need to acknowledge that there is also value in these devices as they can start the WSUD conversation (i.e. over and above just the technical value of the device itself).
- We do have individual champions but they may not be very influential or at the organization level. Many elements are in progress or simply aspirational. There is a key gap between policy and practice.
- How connected are individual champions to developers, stakeholders and each other?
- Need to showcase benefits and involve champions in networking and sharing of ideas. Different stakeholders have different interests.
- In cases where solutions have been developed, the sources of impact need to more in deeply researched.
- We have agreement that there is a problem and the current state of our receiving water quality is not acceptable. We are starting to build capacity as we build new solutions. This involves experimenting.
- Uptake needs to be driven by the community not industry. Build communities where WSUD devices are focal points, have continuity and community connectedness.
- Barriers can be opportunities. For example, the reduced use of plastic bags in supermarkets. This even creates a new market for selling bags rather than giving them away. When people saw the impact of plastic on wildlife, 'mum and dad' drove removal of plastic bags from supermarkets; what do we learn from this when considering impacts of Stormwater?
- We need to understand the intention behind WSUD from all levels (e.g. community through to developers). WSUD should have a clear design intention rather than be about a tick box checklist. We need to change the perception that maintenance is a burden by making it accounted for at the start of the design process.
- Do we need different guidelines in each region or is New Zealand small enough to have an overarching source of knowledge transfer?
- We need to broaden the discussion so that we are all walking in the same direction.
- It would be useful to have school-scale and school-suitable WSUD retrofit packages with educational resources – seeing surface rain and rainfall is part of reforming our relationship with land and water (moving from drained to water sensitive city)
- The biggest barrier is a lack of cohesion and multidisciplinary input. There is no “big picture”. Within the council alone there are lots of threads and competing

requirements which comes back to silos of professions and departments within government and industry. This can be partly attributed to funding models. For example, Watercare are incentivized to maintain and build wastewater assets, but stormwater is a public good. The Watercare model would not work for WSUD because that would incentivize more infrastructure which will create more issues. Stormwater falls through the cracks because it has no monetary value (no monetary cost or benefit) and this leads to a lack of ownership and associated problems.

### Closing

The research team thanked all the attendees for their time and participation at the workshop.



National  
**SCIENCE**  
Challenges

BUILDING BETTER  
HOMES, TOWNS  
AND CITIES

Ko ngā wā kāinga hei  
whakamāhorahora



*Batstone  
Associates*



### Thanks also to the following people for their assistance:

- Clare Feeney, The Sustainability Strategist, for facilitating the workshop.
- Briony Rogers, Monash University, and the CRC for Water Sensitive Cities, for sharing their research information with us and allowing us to use it in the workshop.

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## Appendix A: Summary of Afternoon Activity Group Session

### Activity 1 - Benchmarking

#### Workshop 1 (Auckland and Hamilton)

	GRP 1	GRP 2	GRP 3	GRP 5	GRP 6	GRP 7
<b>Water Supply City</b>	98%	Existing Dev	Rural and existing Dev	Existing Dev		Existing Dev
<b>Sewered City</b>	85% - 90%				Some	
<b>Drained City</b>	75% - 80%		Most			
<b>Waterways City</b>	10% - 15%	Greenfields	New and some parts of Auckland	Te Papa Wetland	A little	Greenfields
<b>Water Cycle City</b>	1% - 10%					
<b>Water Sensitive City</b>	0.1%					

<b>TDF Narrative (workshop 1)</b>	GRP 1	General public is between issue emergence and issue definition (1 and 2); Professionals tend to be between Shared understanding + issue agreement and Knowledge dissemination (3 and 4); maybe also some policy + practice diffusion
	GRP 2	We are at the issue definition stage (2).
	GRP 3	Depends on perspectives and backgrounds, but potentially between the shared understanding + issue agreement and policy dissemination stage (3 and 4)
	GRP 4	Between issue emergence and shared understanding (2 and 3)
	GRP 5	General public is between issue emergence and issue definition (1 and 2); Professionals tend to be between knowledge dissemination and policy + practice diffusion (4 and 5); maybe also some policy + practice diffusion
	GRP 6	Issue emergence (1)

#### Additional Comments:

Water Cycle city is very isolated (only Long Bay).

Waterways City = Flat Bush (2005).

Existing areas never go far enough - new areas are further along the city spectrum.

Well along the spectrum with respect to Socio-Political Drivers, but lagging behind badly in service delivery.
Predominantly drained cities with pockets of sewerage, but also pockets of waterways cities.
Opportunities to enhance/ move forward to water cycle city.
Water Sensitive City is aspirational.
Wider Albany area shows variance between waterways, water cycle and water sensitive cities.
Some examples of multifunctional structures (e.g. Lake and path, rain gardens, landscape amenity).
Lack of cohesion in treatment areas.
Some examples on integrating amenity within treatment devices.
Different cities are at different levels of the advocating vs contesting narrative and may need to go through the cycle more than once.

<b>Activity 3 - Barriers</b>
Local government political model (10 year LTCP so not long term 50 year planning)
CCO model - Watercare model set up as a funding model by volumetric charge on wastewater and water supply, but not stormwater
Justify investing ratepayer in Water
Wellington water type.
Whilst there is some regional and community buy-in, take-up is not good at the individual level (nor is understanding)
Need to educate individuals, builders
Lack of guidance on specs, plants, etc.
Contractors need to be skilled up and need to create an 'auditing' framework
Community stewardship and continuity
Barriers should be seen as opportunities
Need an additional column in the Transition Dynamics Framework which is about Asset Management and Operations

### Activity 3: Building a Strategic Transition Program: Where are we?

The matrix presented below is indicative only, and represents a summary of the results from the different group discussions. The green and yellow box (technical guidance) highlights that an equal number of groups said that "we are doing this" and said "we are partly doing this".

Transition phase	Champions	Platforms for connecting	Knowledge	Projects and applications	Tools and instruments
1. Issue emergence	Issue activists		Issue highlighted	Issue examined	
2. Issue definition	Individual champions	Sharing concerns and ideas	Causes and impacts examined	Solutions explored	
3. Shared understanding & issue agreement	Connected champions	Developing a collective voice	Solutions developed	Solutions experimented with	Preliminary practical guidance
4. Knowledge dissemination	Influential champions	Building broad support	Solutions advanced	Solutions demonstrated at scale	Refined guidance and early policy
5. Policy and practice diffusion	Organisational champions	Expanding the community of practice	Capacity building	Widespread implementation and learning	Early regulation and targets
6. Embedding new practice	Multi-stakeholder networks	Guiding consistent application	Monitoring and evaluation	Standardisation and refinement	Comprehensive policy and regulation

■ we are doing this  
■ we are partly doing this  
■ we are not doing this

## Appendix B: Whiteboard Notes

### Burning issues

- Make it easier for WSUD to get through council processes
- Understanding the regulatory process
- Resilient whole of life value for financial asset
- Lack of tools and lack of good tools
- NPS kit – will the community want to spend the \$?
- WSUD definition is weak and fluffy, so we can't develop any KPIs or indicators
- Different standards for new developments vs existing issues – capex and opex – not the same level of commitment to existing areas of the city. Knowledge gap with respect to macro-benefits
- The Sustainable Society – values, ethics are not winning – benefits/rules – where to draw the line with respect to development
- Water quality and water quantity are understood – need more quantification of other benefits e.g. numbers on amenity/social/real estate benefits to help sell the benefits / procurement models for big contracts
- Understanding the politics of experiments with WSUD – explore and develop different ways of looking
- Knowledge of economic/social/environmental benefits but only token for cultural benefits – nationally and internationally; bridge engineering to Te Ao Maori
- All waters not just stormwater flow to the oceans
- Grass-roots design/community asset – short life in the ground leads to need to engage community early on in the piece to generate value
- Preserve te mana o te wai – life cycle assessment, cost/benefit analysis and social, cultural and amenity values quantifiable + tipping points for changes in practice
- Whole catchment, lack of integration between urban design thinking “places and spaces” vs urban design is never linked to results in the receiving environment
- Quantifying wide range of benefits to get WSUD over the line / missed opportunities – business as usual not working
- Disparity between what council approves vs what is built on the ground > more council cohesion needed / how to get more devices over the line depends on perceptions of benefits and cost – and the benefits with respect to durability / O&M (operation and maintenance) LCA (life cycle assessment)
- Give us the business case so we can give that to our clients
- At the back end of the project cycle we see 4 completely different rain garden designs: no standard specs
- Contracts > cost engineering
- Huge \$ in 10-year plan/infrastructure strategy – what is the right spend for local authorities under the LGA for O&M?
- Must have (= BAU) vs nice to have (=WSUD) – how to address WSUD in the district plan review?
- How to change sporadic uptake
- O&M vs design
- Strategic growth alliance

### Benchmarking against the urban water transitions framework

Hannah's team

#1: Albany example

- Wider scale = waterways-water cycle-water sensitive city
- Some multifunctional structures e.g. the lake and rain gardens but general feel of lack of multifunctional infrastructure
- Lack of coherent plan

#2: State of change New Zealand is in: NZ cities are all different. Going through the transition cycle multiple times e.g. first with ponds, how with rain gardens

Sam's team

- #1: Useful conceptual model of post-industrial development – simplifies a very complex process to help us think
- #2: Water sensitivity is an aspirational goal, not one that can be achieved [Sue I: it's not a continuum; different places are in different stages]
  - We are trying to be more water sensitive. Peter M: a vision can be aspirational but it helps > the right values in decisions
  - Sam T: value of this is in recognising multiple values about and beyond devices

Matthew Davis' team

- #1: The CRC model is a useful categorisation of the trajectory/multiple values even though our cities have different pockets
  - The team worked with Panmure and Porirua: mostly they are drained cities, except for some floodable areas, with some water cycle elements
- #2: NZ is in between issue definition and the next stage (between stages 3 and 3)

Peter Mitchell's team

- #1: the first three are still high/ 2<sup>nd</sup> three are <50% / 10% / <1% - leads to lots of opportunities for growth
- #2: NZ is in between issue definition and the next stage (between stages 3 and 3)

Sarah's group

- #1: Central Wellington/Waitangi Park/Te Aro: upper catchment not always drained; lower catchment is more a water way city
- #2: NZ: Marjorie van Roon: look at different sectors of the population in different places e.g. WSUD professionals can be between 2 and 5 simultaneously while the rest of the population is around 1

## Barriers activity

Sarah's group

- Filled in boxes – what we're doing, sort of doing, little or nothing
- Different parts of the same organisation can be in different phases
- 5. Policy and practice diffusion – policy is a long way behind practice, so split these two

Hannah's group

- similar to Sarah's group – lots of question marks
- issues/organisational champions – yes – connected champions – connected with each other, but..... how connected to developers and councils?
- Answers not really Yes/No

Chris's group – Linda

- Not whole-hearted agreement
- Column 1 pretty good but not multiple stakeholders/community outrage at polluted waters is the beginnings of a community voice
- Challenges grow our capacity / last column > no collective council policy: depends who you talk to
- How can we help developers build communities based on water sensitive design – connected communities
- Until Mums & Dads understand and really want this, it won't happen – like supermarket plastic bags
- Can we reframe barriers as opportunities? Sam T has a student working on this
- How we unpack barriers

#### Emily/Jonathan/Matthew Davis group

- Didn't use the grid – just chatted, trying to understand the real intention behind WSUD
- Now = tick-boxes to get consent – needs to reflect waters sensitive aspiration
- Designing for whole of life is better than the professionals all working separately at different stages
- Might with help buy-in by public.
- A lot around knowledge transfer New Zealand is small enough to share knowledge and skills – champions, networking, site visits to see what does and doesn't work
- Share success stories across multi-disciplinary sectors and with the community > all walking in the same direction in our different professions

#### Robyn's group

- Waxed philosophical about the general issue < lack of multi-disciplinary input < lack of cohesion within and between councils and with the wider sector and professional groups.
- Everyone's siloed even at central government level – no-one's looking at the bigger picture. Partly funding e.g. Watercare and other utilities vs stormwater and land uses leads to less WSUD due to reliance on the capex/asset model. Integrated thinking leads to coherent design and flood plain avoidance.

#### Wrap-up

From what we saw and talked about today, what topics could the research team most usefully focus on?

- Devices cross multiple jurisdictions within and beyond councils – who is responsible? Who coordinates?
- Who "owns" the water – e.g. AT – discharges can only be treated in the road reserve, limiting options. Straight to pipes becomes a community issue/integrate so we can be more connected to water
- Devices are present because they are tacked on because the development is not WSUD at the start. Better design leads to fewer devices. Eliminate don't treat the problem > bigger common areas and plant choice not just from the biofiltration palette
- Pathways for community involvement to lead to better public understanding of goals < innovations they see
- "adopt a device" < O&M
- engage at the design level and grass roots e.g. rain gardens demo at school: kids tell their parents and understand water
- lack of interpretive signage / reconnect with what nature does in the water cycle. Very few children drown in natural water. Fencing cuts us off from the water
- is there a barrier to using fruit trees?
- Fencing around ponds: what are the options for ponds with no fencing? Gradient of batters, stormwater health and safety
- Education of customers around wetlands/native fish? Or water quality of artificial surfaces – toxics going for phytoremediation – plant palette + disposal options and costs
- What are the costs of doing this poorly? Financial and cost to society – is a bad device better or worse than a good pipe?
- In councils there are many stages of consenting: need construction checklists to keep the process smooth
- Maintenance: hard to find data to identify O&M costs
- Peter M: for \$1k/year they do 3 inspections, rate device performance and condition and maintain or renew it accordingly. These things come from different budgets – but how much money is needed? What is the useful life of an asset?
- Contractors need plant (vegetation) skills – refer to Peter M's 4 Rs, including risk and the cost of using the wrong people

- What is the business/value case for developers and others? Cost of poor O&M to communities and investors
- Value case of community vs performance – e.g. for good erosion and sediment control, link to fishing – join the dots
- What is WSUD all about? Different customer values
- More information on things to think about in design and construction and effects on O&M
- Role of “safety in design” – Peter M – and LCA
- National design guideline: is this feasible? Or would it stifle WSUD?