

Large Scale Stormwater Harvesting

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Business Case: Challenges

Technical

- Volumes, storage, transfer, land
- Environmental value
- Quality for end use

Economics & Funding

- Economic benefit v Business Value
- Costs > BAU
- Key assumptions

What will help ?

- *High value uses*
- *Land for storage within urban landscape*
- *Waterway strategy and scientific modelling*
- *Community support (mandate), willingness to pay.*
- *Offset schemes for stormwater management*
- *Co-funding (demonstrating local or broader value)*



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Stormwater harvesting (typical)

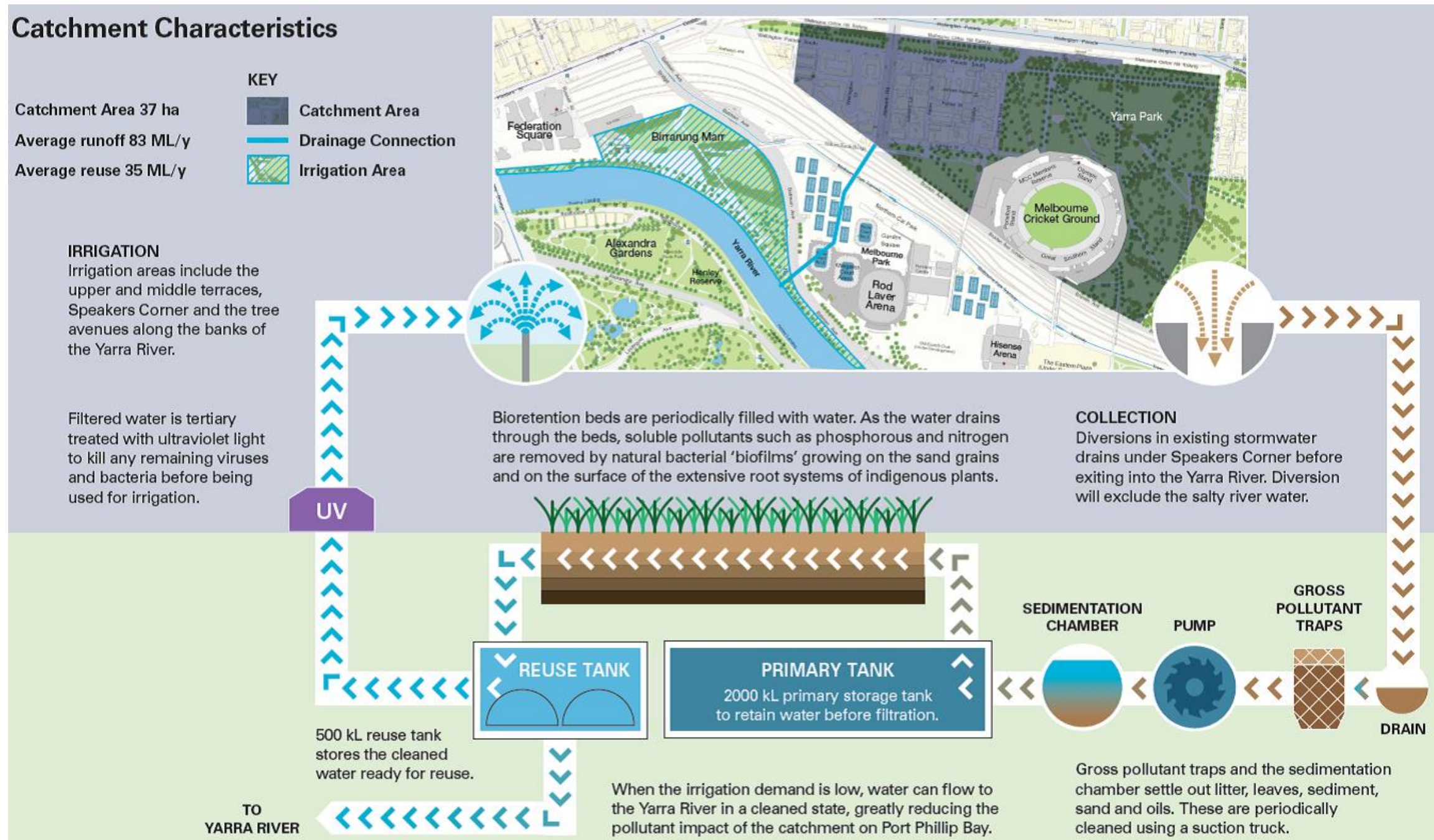
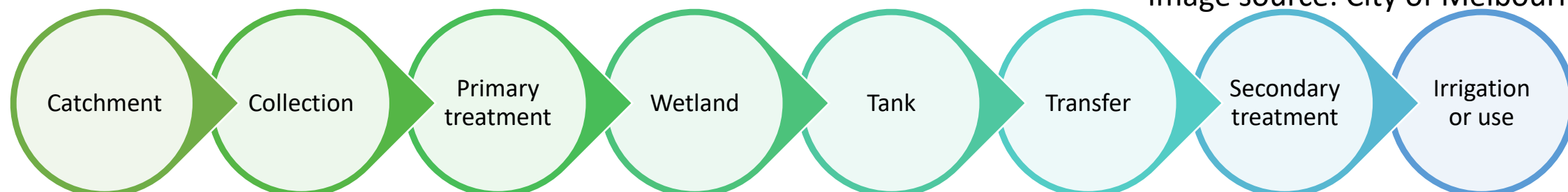
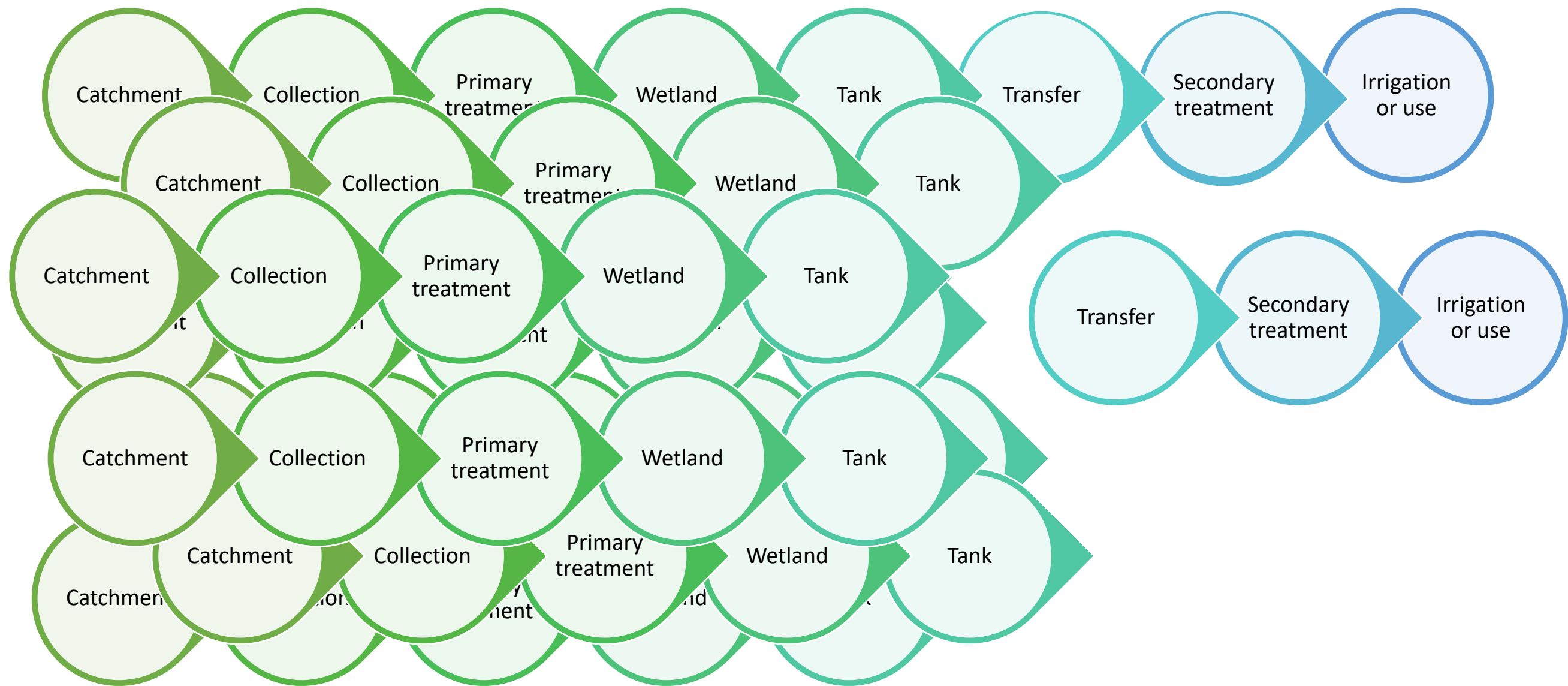


Image source: City of Melbourne



How do we model a network of stormwater harvesting systems?



Modelling approach

1. MUSIC model of drainage schemes (wetlands) to generate catchment runoff and wetland fluxes
 - 6 minute timestep (any time series)
2. ~~Import MUSIC outputs (csv) to InfoWorks model~~
3. ~~Model many (30) pumps operating simultaneously to size balance storages, pumps, pipes~~
4. Model wetlands in InfoWorks, and re-run your model to optimise network
5. Source catchment model to understand creek flow regime
 - Model at 6 second timestep (max 1 year time series)
 - To do multiple years, need to run in series with boundary condition
 - 27 year time series



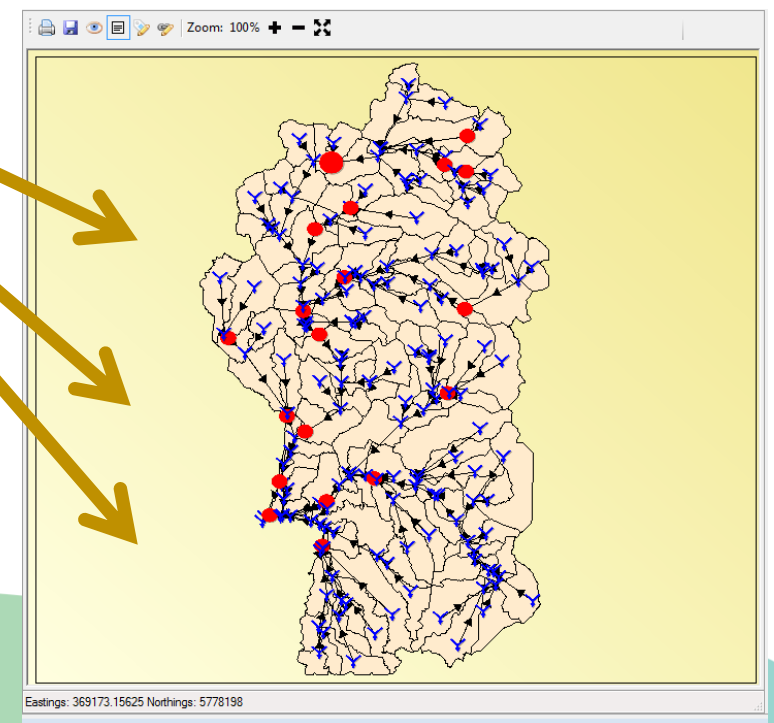
Modelling approach

music BY eWater

eWater Source

InfoWorks® ICM

The screenshot displays the 'Properties' window for a pump object named 'WetWell1: VFD pump RTC'. The 'Pump Object Properties' section includes fields for 'US node ID', 'DS node ID', 'Link suffix', 'Link type', 'Asset ID', 'Sewer reference', 'System type', and 'Branch ID'. The 'Water quality settlement efficiency' section shows 'US settlement efficiency (%)' and 'DS settlement efficiency (%)'. The 'Pump definition' section includes 'Switch on level (m AD)', 'On delay (s)', 'Switch off level (m AD)', 'Off delay (s)', 'Head discharge table', 'Nominal flow (l/s)', 'Nominal speed (rpm)', 'Electric mechanical power ratio', and 'Regulator' settings. The 'General properties' section includes 'Minimum speed (rpm)', 'Maximum speed (rpm)', 'Speed threshold (rpm)', 'Positive change in speed (rpm/s)', and 'Negative change in speed (rpm/s)'. A network diagram shows a 'WetWell' node connected to a 'Discharge' node, with a red circle '1' highlighting the 'Link type' field in the properties window.



Technical challenges and lessons

1. Use the right tool for the job
2. Get your data talking
 - Rainfall data
 - Timestep, time series length, climate change
3. Iterate, iterate, iterate

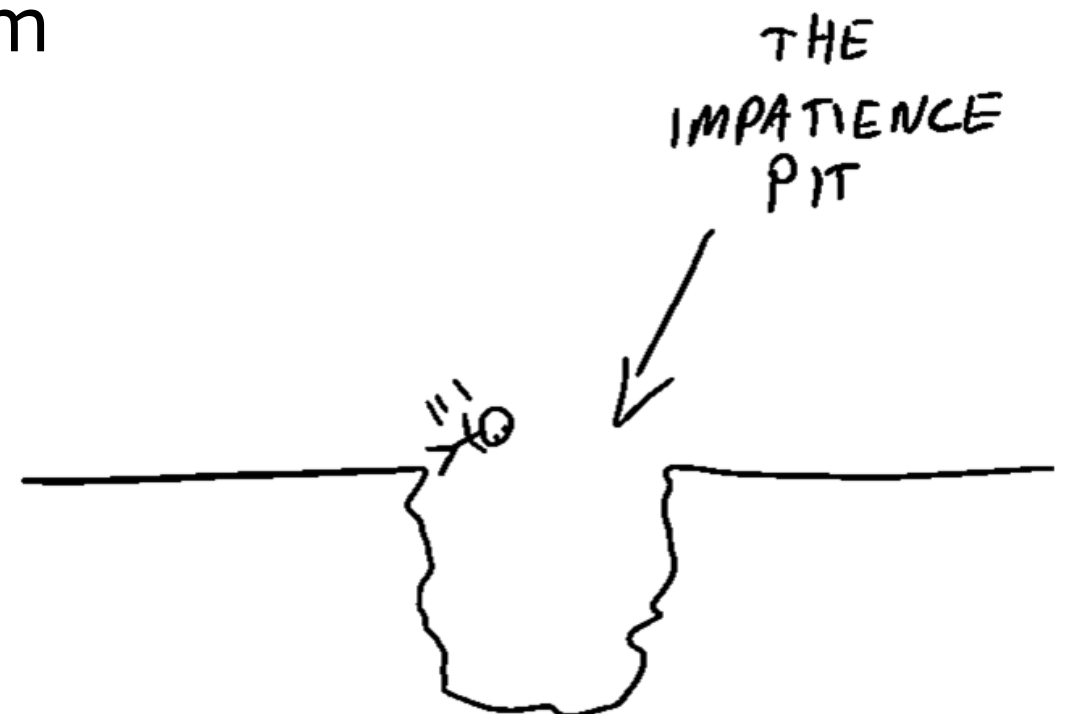
"If all you have is a hammer, then everything starts to look like a nail."



Learnings

Modelling a large scale, networked harvesting scheme that achieves high yield is possible, but requires careful consideration

- Make assumptions
...and then strategically test them
- Take your time, do it well



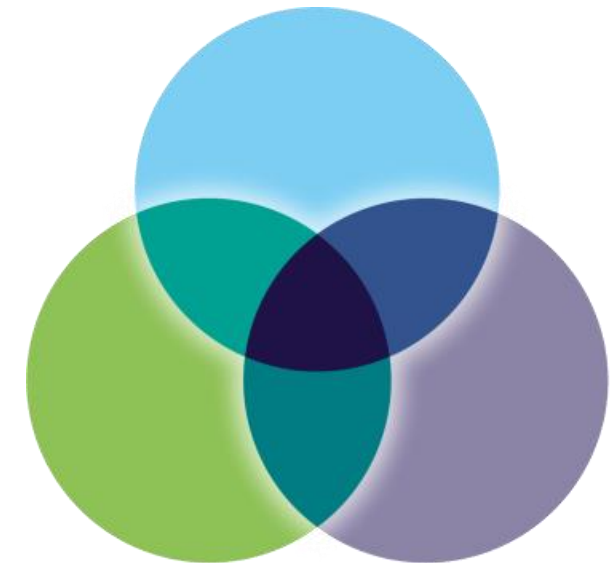
Nigel Corby

**Manager Strategy and Partnerships
Western Water**

Collaboration & Community/Stakeholders

Collaboration

- No single organisation is responsible for all aspects of the urban water cycle
- Collaborative effort between
 - Western Water (Water Supply and Sewage Management)
 - Melbourne water (Waterway Manager and Drainage)
 - Hume City Council (Drainage, Open Space, Streetscapes)
 - DELWP (Policy, IWM Forums)
- Collaborative effort involves a commitment to buy into the values of other organisations and aim for a best community outcome solution



Community and Stakeholder Input

- Initially a technical feasibility exercise, now a community engagement exercise
- Community Engagement
 - Online Survey to explore values
 - Local Community Group Presentations (10+ Sessions)
 - Deliberative Panel (35 Participants, 5 x Full day sessions)



Challenges and Learnings

Challenges

- Growth is happening, and fast (WW is growing $\sim 5\%/yr$)
- Collaboration is not easy, it takes time
- Science is evolving, there is a lag time before Policy catches up
- Staying open-minded

Learnings to Date

- Water cycle values are place based, however it is not just the local community who benefits from protecting these values
- There are technical solutions that can achieve multiple benefits
- Don't focus on the costs, focus on the outcomes, we can work on the funding later
- The community may be more forward thinking than we give them credit for



Thank you