



Travelling through

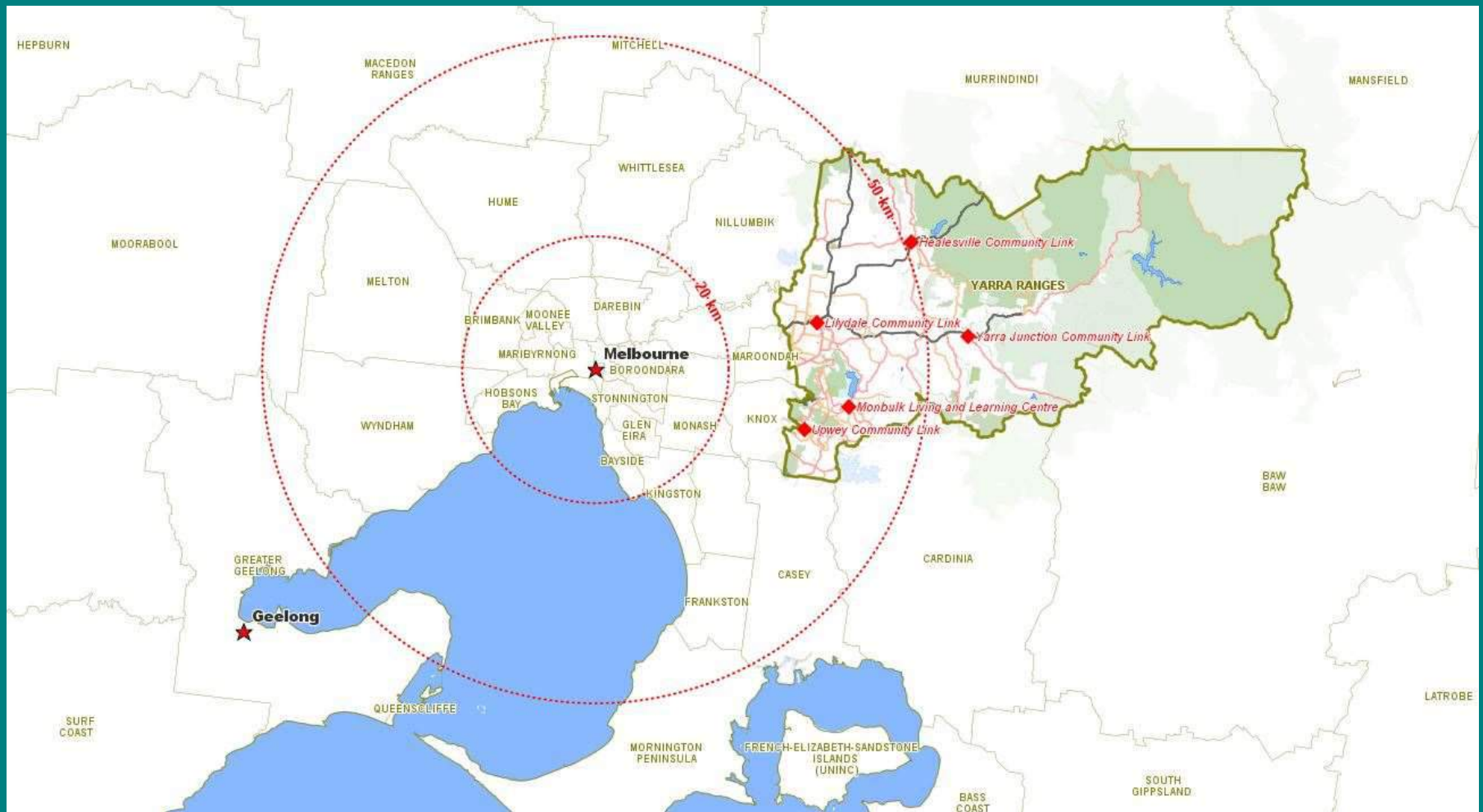
# Yarra Ranges'

## WSUD Transformation

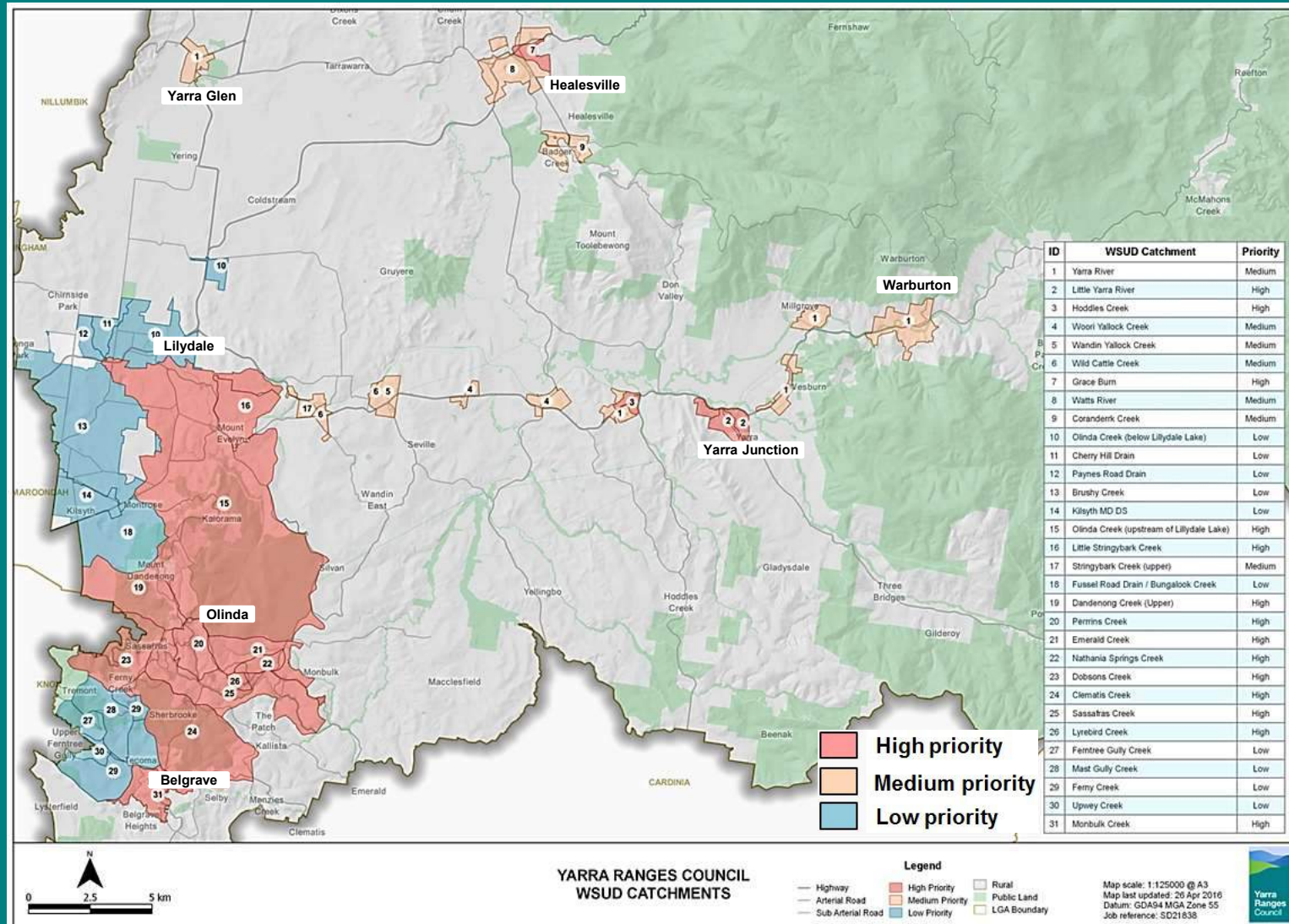
Presentation by **Matt Pilcher** &  
**Patrick Jeschke**, June 2019



# WSUD in the Yarra Ranges



# Priority Catchments

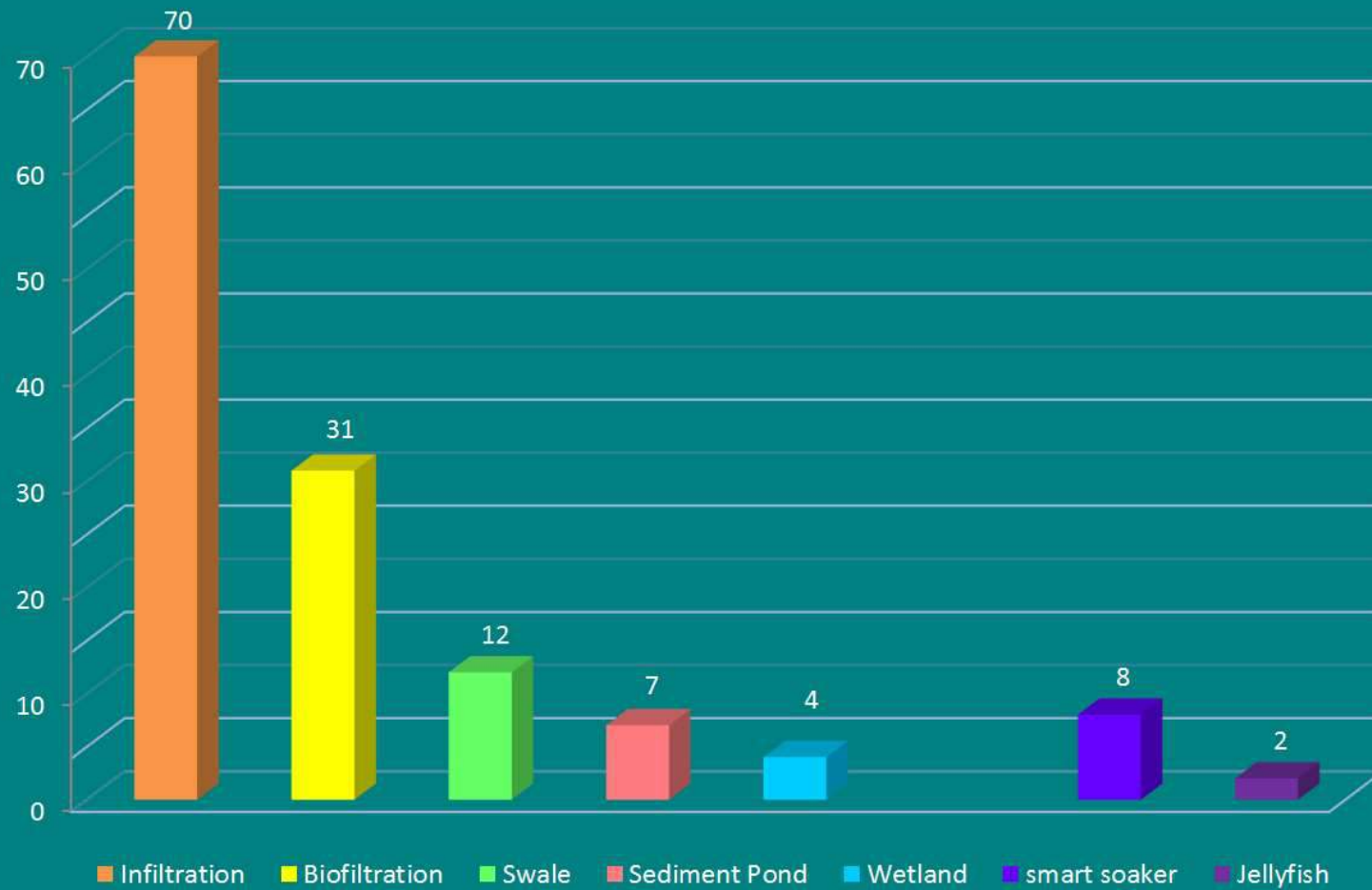


# Asset Types



# Asset Types

Number of assets



# **Asset Types**

## Infiltration



# Asset Accumulation per year





# **Findings in the Field**

## 2014

# **Findings in the Field**

## 2014



# Findings in the Field

## 2014



# **Findings in the Field**

## 2016



# Findings in the Field

## 2016





## **Perception** 2014

- Asset origins?
- Types? Numbers? Locations?
- Ownership?
- Performance?
- Maintenance?



2013

- Success in funding for construction but no maintenance
- Councillor request: resident complains for poorly maintained WSUD



2014

- WSUD working group decided to establish a steering committee
- Council budgets steers more focus on asset renewal

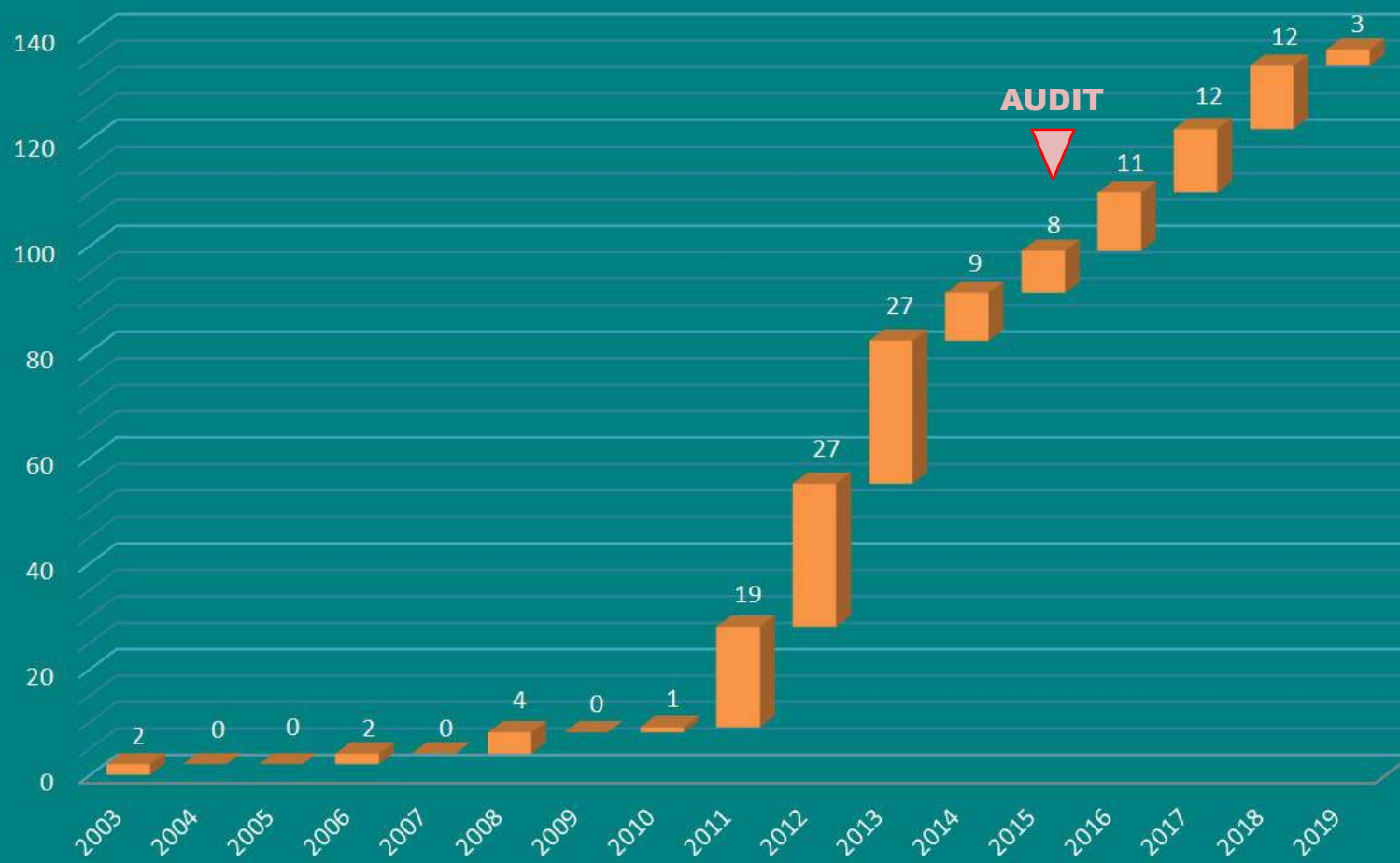


2015

- Steering committee allocate funds for independent audit
- 2yrs maintenance funding



# Asset Audit 2015



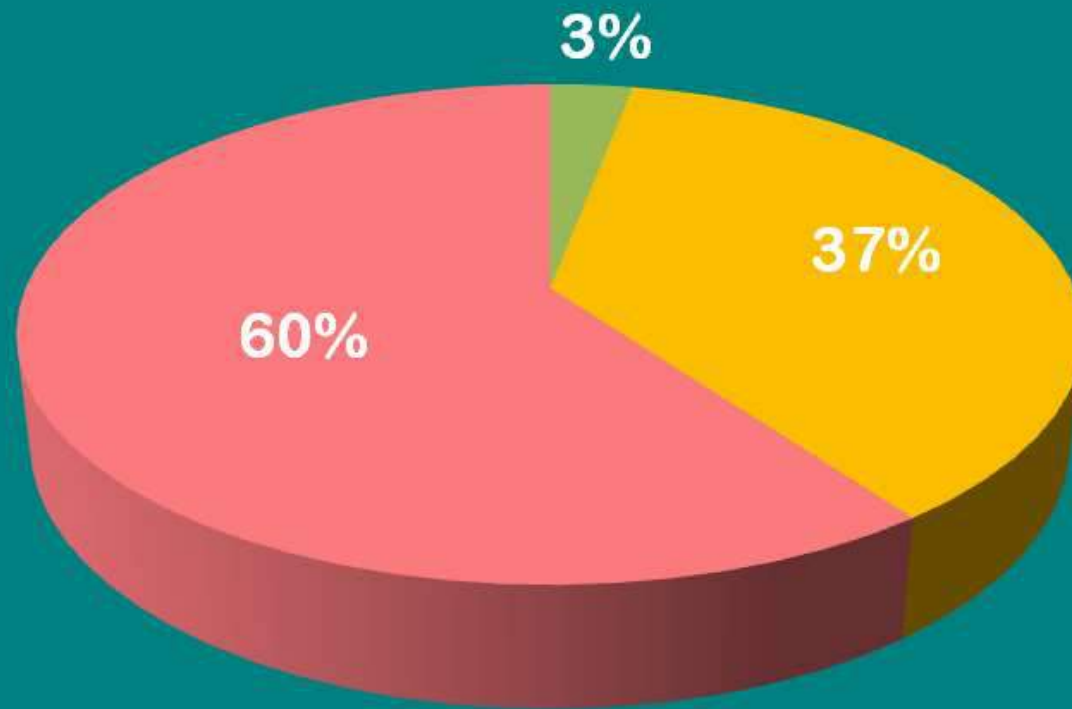
# Asset Audit Methodology

## 2015

- **Audit reported on asset characteristics:**
  - type, size, filter area/depth, hydraulic conductivity, location etc.
  - condition, major issues, recommendation and rectification estimates.
- **Condition scoring (1-5) and failure modes**

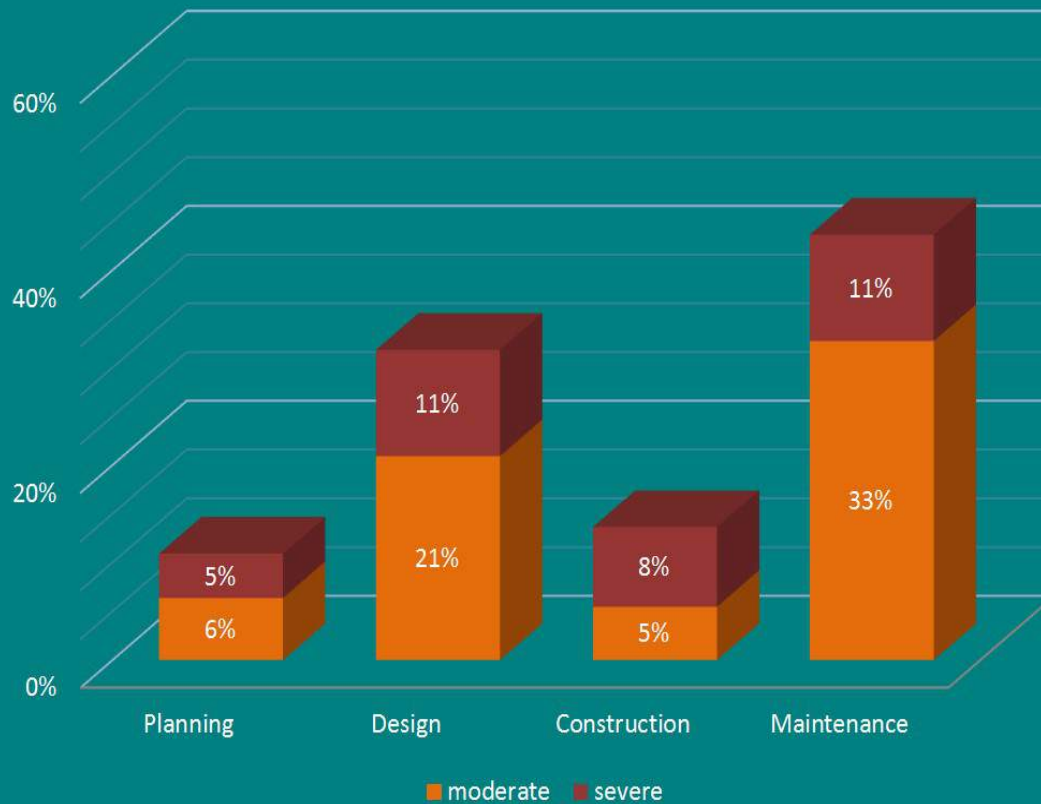
Civil score	Landscape score	Overall score	Planning	Design	Construction	Maintenance
5	4	5				

## Asset Audit Results 2015



■ good ■ moderate ■ poor

# Typical failure modes



Maintenance failure



Design/construction failure

## Development towards maintenance

- WSUD Steering Committee convinced to invest
- But who pays for it!?



- Melbourne University advocate to Council Chamber and provide maintenance funding support



# Milestone in Maintenance 2017



# Milestone in Maintenance 2017



# Maintenance Recording

## 2017

ID	Location details	WSUD Type	June 17																
			Inspection								Maintenance								
			physical damage visible? Scouring?	Inlet compromised?	Outlet compromised?	Surface clogging evident? Ponding Water?	Vegetation unhealthy? Weed infestation?	Underdrain blocked?	date inspected	Comments (incl. pathway request number, if applicable)	Sediment Tray cleanout	litter removal	leave litter removal	weeding done	vegetation attended (pruning/planted)	sediment removal from filter	dead plant removal	date attended	Comments (incl. pathway request number, applicable)
1	In Morrisons Reserve near intersection of Mikado Rd and Old Hereford Rd	Infiltration	N	N	N	N	N	N	2/06/2017	Ficinia tube stock being dug up by rabbits.	Y	n/a	n/a	n/a	n/a	N	n/a	6-Jun	07/06 Batters planted with Dianella Tasmanicax50, Lomandra Longafoliax50.
	Morrison Reserve upper basin / Opposite7-13 Mikado Road	Infiltration trench	N	N	N	Y	Y	n/a	29/05/2017		n/a	Y	Y	Y	n/a	n/a	n/a	29-May	
	Morrison Reserve Mid-level basin	Infiltration trench	N	N	N	Y	Y	n/a	29/05/2017		n/a	Y	Y	Y	n/a	n/a	n/a	29-May	More planting required along exposed batters.
	Morrison Reserve lower level basin	Infiltration trench	N	N	N	Y	Y	n/a	29/05/2017		n/a	Y	Y	Y	n/a	n/a	n/a	29-May	
2	3 Fernhill Rd	Infiltration	N	N	N	N	N	n/a	29/05/2017		Y	Y	Y	n/a	n/a	Y	n/a	29-May	
3	9 Fernhill Rd	Infiltration	N	N	N	N	N	n/a	29/05/2017	1mm silt in filter bed.	Y	Y	Y	n/a	n/a	Y	n/a	29-May	Silt layer from carpark removed
4	14 Fernhill Rd	Raingarden	N	N	N	N	N	N	29/05/2017		Y	Y	Y	n/a	n/a	n/a	n/a	29-May	
5	17 Fernhill Rd	Raingarden	N	N	N	N	N	N	29/05/2017		Y	Y	Y	n/a	n/a	N	n/a	29-May	Stone mulch has silted.
6	Opposite 46 Fernhill Rd	Raingarden	N	N	N	N	N	N	29/05/2017		Y	Y	Y	n/a	n/a	n/a	n/a	29-May	

# Development towards a renewal program 2016-2017

**WSUD Asset Management Plan established...  
Renewal funding provided!**



**Prioritisation framework for renewal planning:**

- **Multi-Criteria Analysis** included environmental and social benefits, e.g. priority catchment areas
- **Cost- benefit analysis provided** score to rank renewal works and the Program Began....

# Asset Audit 2018

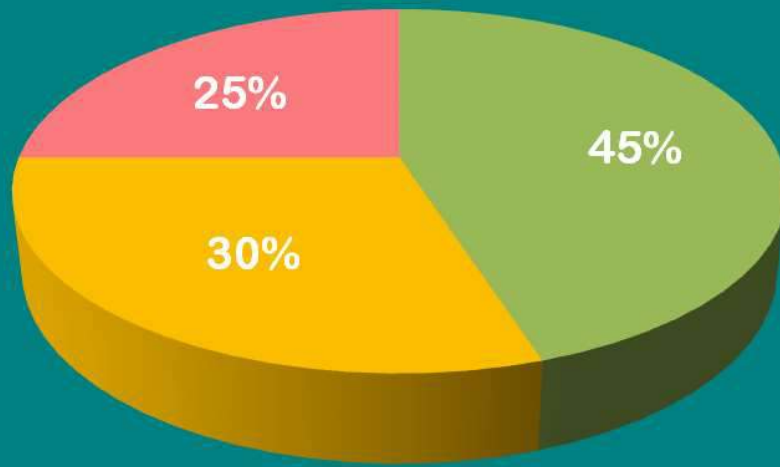


## Asset Audit 2018

- WSUD data strategy led Internal data collection on assets supported efficient info capture in-field
- Melbourne Water WSUD Audit Guidelines 2018
- Modification to scoring system to distinguish minor from major maintenance efforts (usually outsourced)



## Asset Audit results 2018

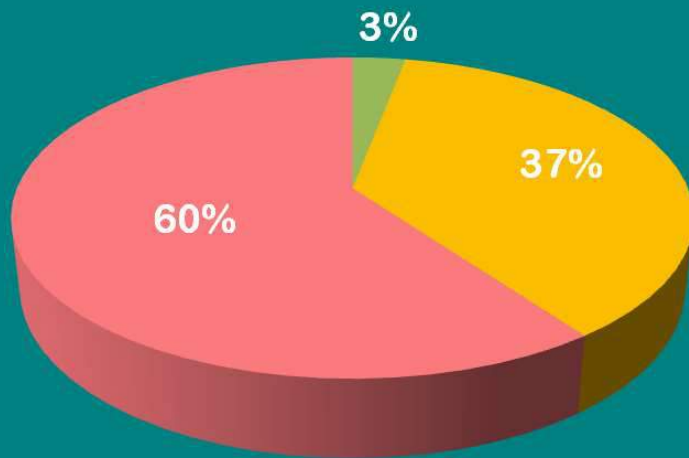


■ good ■ moderate ■ poor



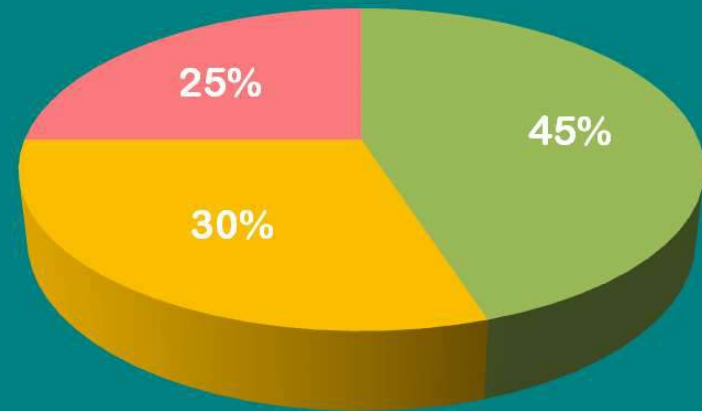
**Well maintained Assets, but  
still some rectification works  
to go**

# Asset Audit 2018



■ good ■ moderate ■ poor

**2015**  
**83 Assets**



■ good ■ moderate ■ poor

**2018**  
**115 Assets**

**Good = no action**

**Moderate = maintenance works**

**Poor = rectification or decommissioning**

\*not including smartsoakers/Jellyfish/GPTs

## Where are we now? 2019

- Established asset database
- Over 80% of systems in working order
- Secured renewal budget
- Ongoing WSUD Officer role
- Permanent WSUD Maintenance staff
- Commencing guidelines and standards

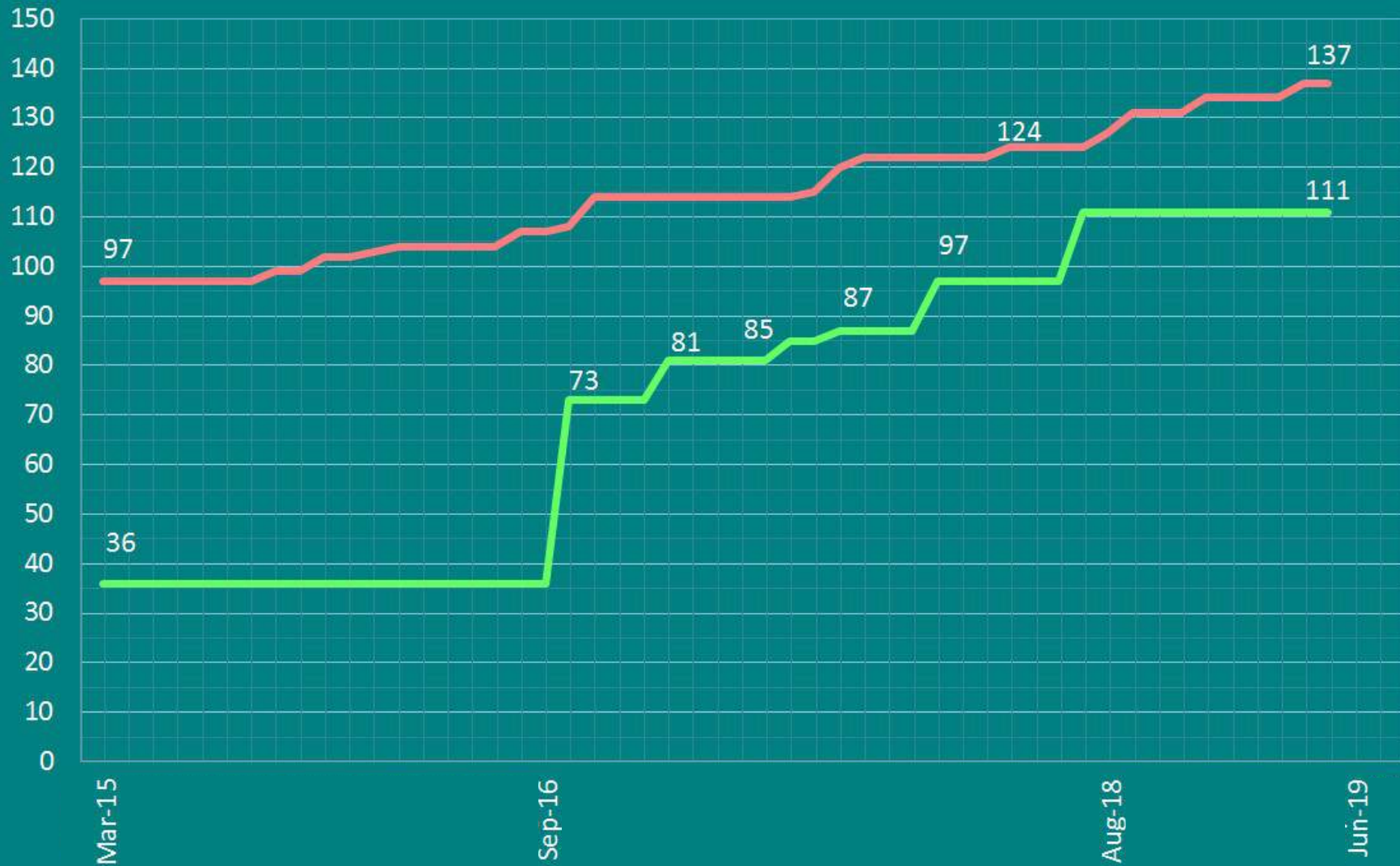


# **Renewal Program**

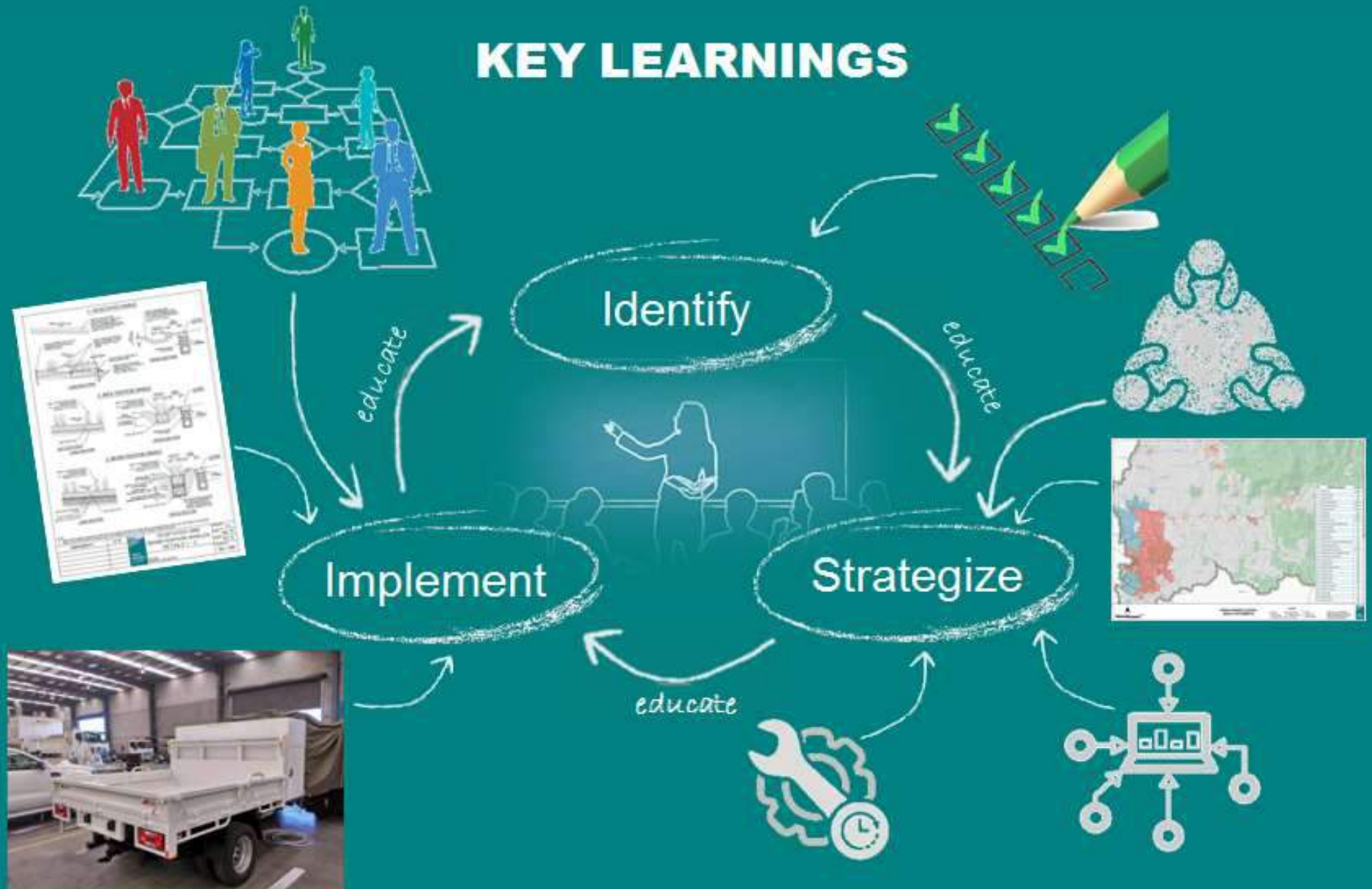
## Methodology



# Renewal Program



# KEY LEARNINGS



## Case Studies

### Bayview Road Raingarden, Belgrave

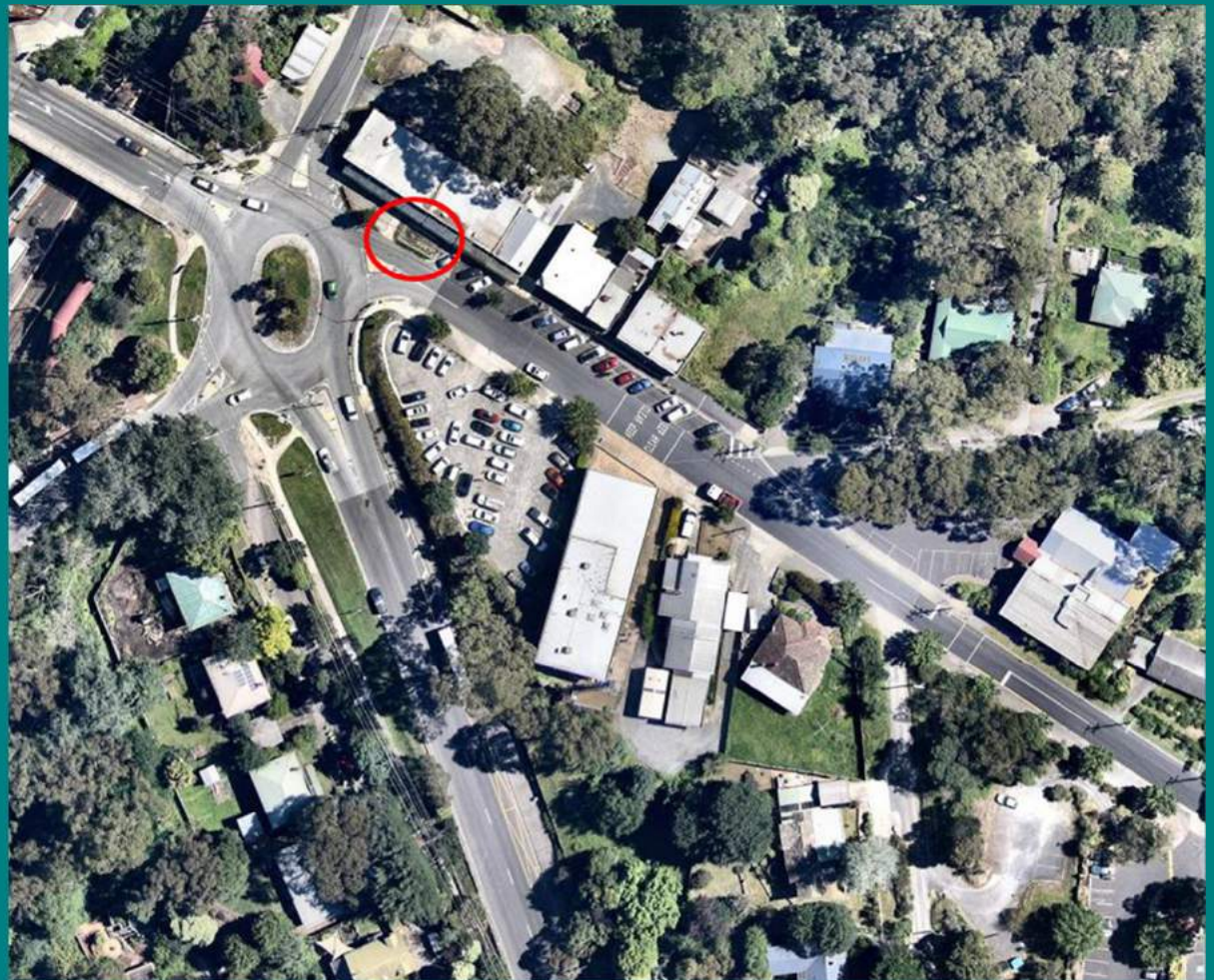
- Terminal drainage point
- In-line with high-flow path
- Constructed on slope
- No extended detention depth
- No more filter vegetation
- Footpath flooding



# Case Studies

## Bayview Road Raingarden, Belgrave

- Terminal drainage point
- In-line with high-flow path
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## Case Studies

### Bayview Road Raingarden, Belgrave

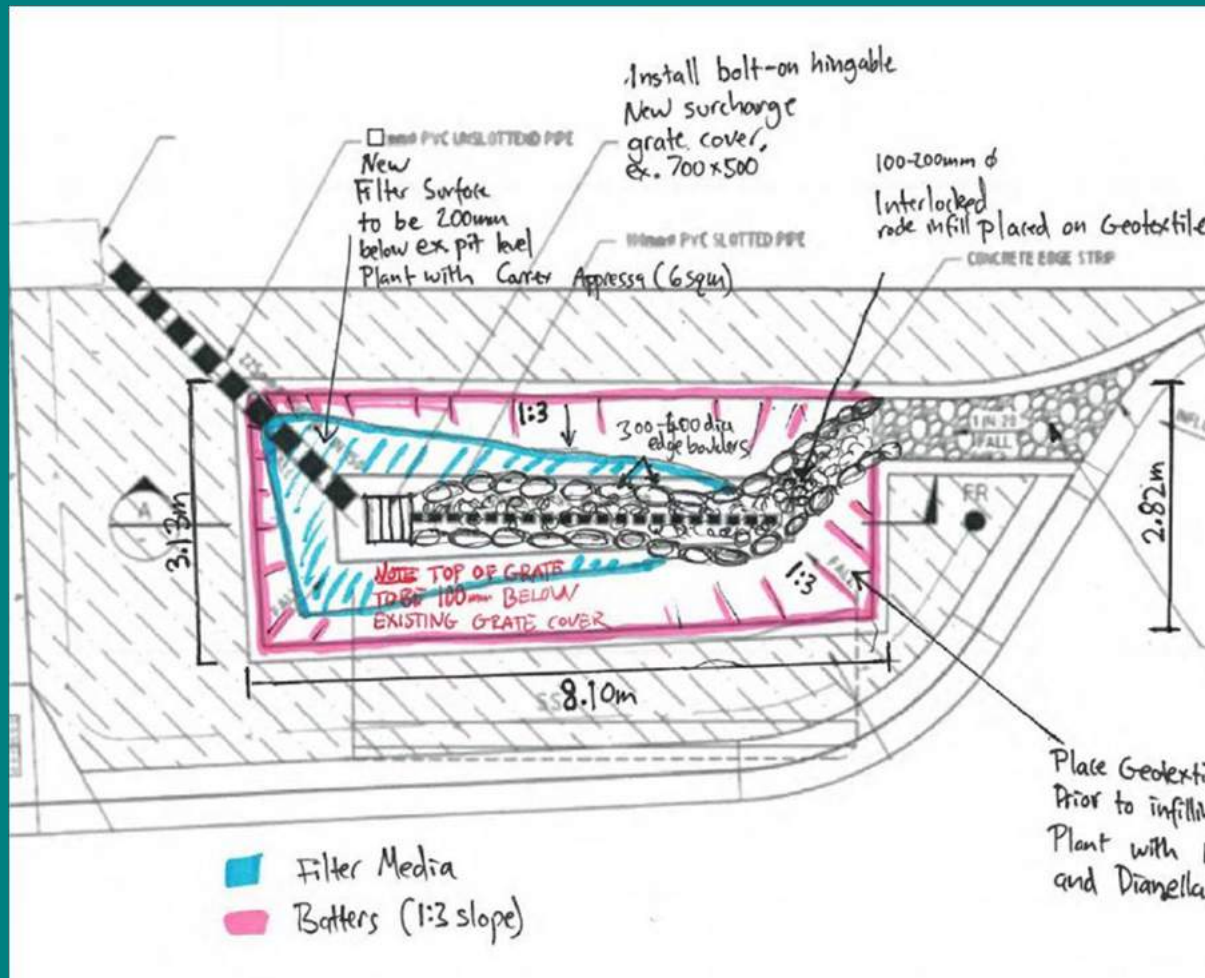
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# Case Studies

## Bayview Road Raingarden, Belgrave

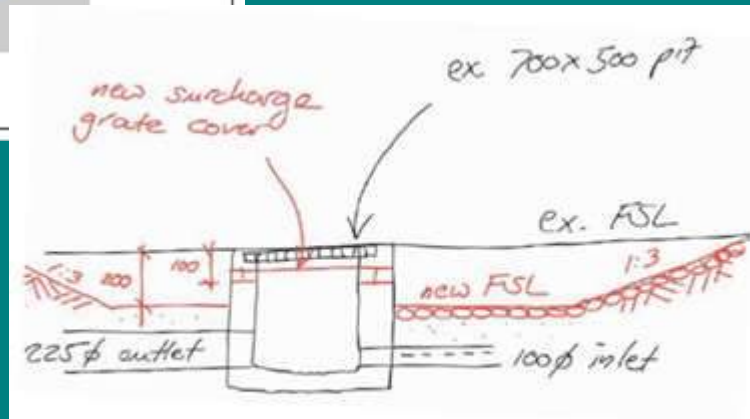
- Re-defined filter bed



# Case Studies

## Bayview Road Raingarden, Belgrave

Cut the existing overflow pit down 100mm and replace with a 700x500mm bolt-on surcharge grate with a hinge.



- Re-defined filter bed
- Overflow modification

# Case Studies

## Bayview Road Raingarden, Belgrave

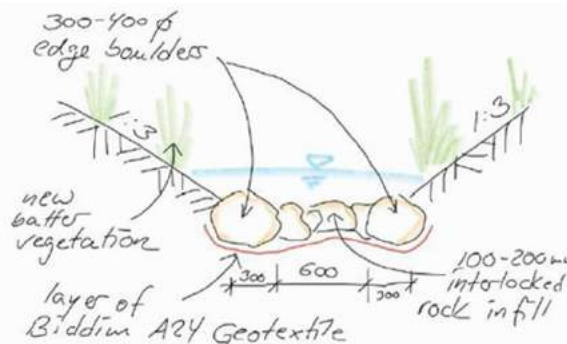
7.4 i) Manually remove silt build up between rocks at inlet and stabilize any displaced rocks.

ii) Line the inlet-to-pit route with a 600mm wide, 6.5m long rock channel as per sketch (rocks placed on A24 Biddim geotextile). See Appendix 1 for rock channel route.

iii) Place 100-200mm dia. angular rock (match existing or similar) properly interlocked for scour protection ( $0.6\text{m}^3$ )

iv) with edge boulders placed either side of 300-400mm dia ( $\sim 1\text{m}^3$ ).

This will concentrate high flows into channel then into pit.



- Re-defined filter bed
- Overflow modification
- High-flow path re-inforcement

# Case Studies

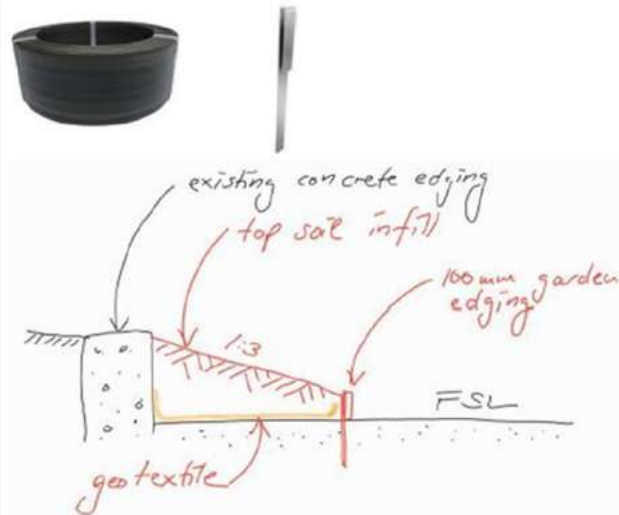
## Bayview Road Raingarden, Belgrave

Cut underdrain riser to 100mm above the new pit level.

Gently flush out underdrain to loosen any blockage and silt accumulation.






Place Garden Edging (100 x 3mm x ~15m), as a barrier between top soil and filter surface, peg in every 1m with galvanised garden edging peg (270 x 20 x 3mm). At least 50mm of edging should extrude from surface.



- Re-defined filter bed
- Overflow modification
- High-flow path reinforcement
- New edging technique trial

# Case Studies

## Bayview Road Raingarden, Belgrave

rock mulch e size 10mm) ure even	
andra (in.) tube stock arrex Appressa	 Dianella Revoluta
	 Carex Appressa
	 Lomandra Longifolia

- Re-defined filter bed
- Overflow modification
- High-flow path reinforcement
- New edging technique trial
- Vegetation stock

## **Case Studies**

### Bayview Road Raingarden, Belgrave

During  
construction



## Case Studies

### Bayview Road Raingarden, Belgrave



Before

# **Case Studies**

## Bayview Road Raingarden, Belgrave



After

# Case Studies

## Cruz Court Raingardens, Yarra Glen

- Inherited through subdivision
- Almost everything was wrong with them!
- Safety risk
- Ongoing lot development



# Case Studies

## Cruz Court Raingardens, Yarra Glen

Planning and design issues:

- Catchment area
- Unsafe design

1 Rectified

1 Decommissioned to passive garden bed



## **Case Studies**

### **Cruz Court Raingardens, Yarra Glen**

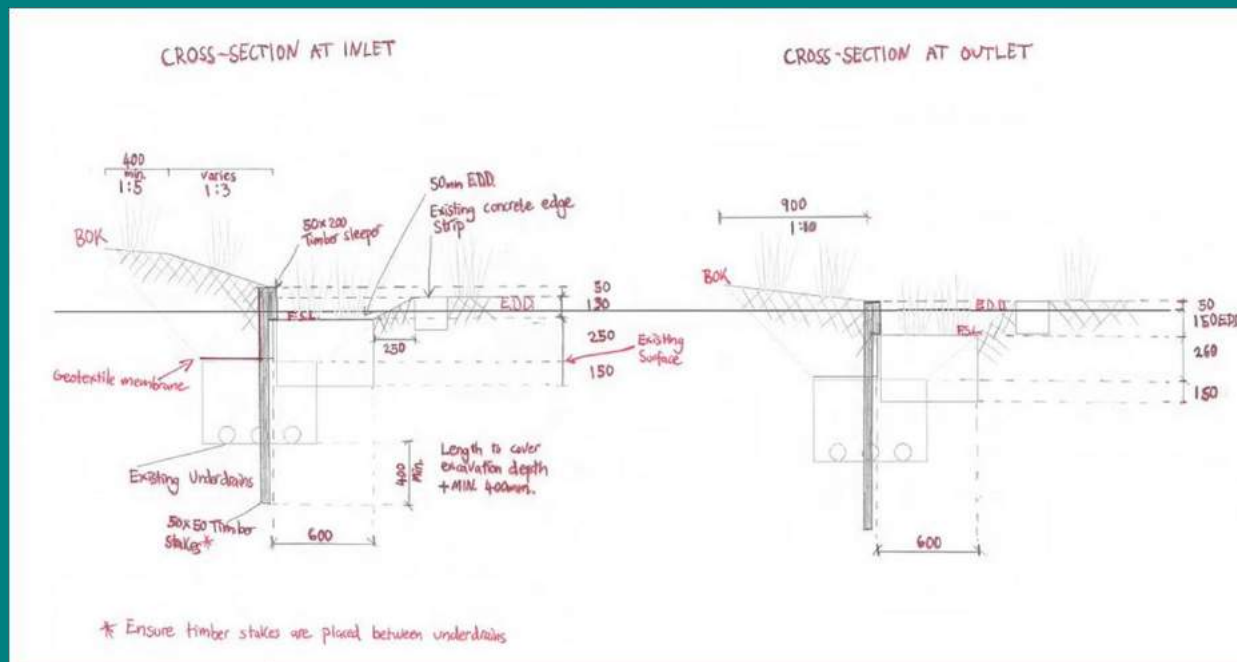


**Resident Safety Complaints!**

# Case Studies

## Cruz Court Raingardens, Yarra Glen

- Cross-sectional re-design
- Designed to meet resident needs with nature strip



## **Case Studies**

### Cruz Court Raingardens, Yarra Glen



- Inlet retrofit for ease of maintenance

## Case Studies

### Cruz Court Raingardens, Yarra Glen



Before

# **Case Studies**

## Cruz Court Raingardens, Yarra Glen



After

# **Case Studies**

## **Cruz Court Raingardens, Yarra Glen**

**Before**



# **Case Studies**

## Cruz Court Raingardens, Yarra Glen



**After!**



# **Case Studies**

## Honourable Mentions

# **Honourable Mentions**

## Traffic Safety



# **Honourable Mentions**

## Traffic Safety



# Honourable Mentions

## Traffic Safety





# Thank You

Questions

?



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