The good, bad and ugly of WSUD assets after construction in a growth area Council

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Overview

- Why did Hume do this?
- What did we do, how did we do it and who did it?
- What did we learn?
- What happens now?

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Introduction

- 54 WSUD systems
- 108 individual WSUD assets
- 82 GPTs
- mostly developer constructed – planning scheme clauses 56 and 22.19

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Background

- Key action from integrated water management plan
- Prioritise performance from existing assets ahead of investing in new assets

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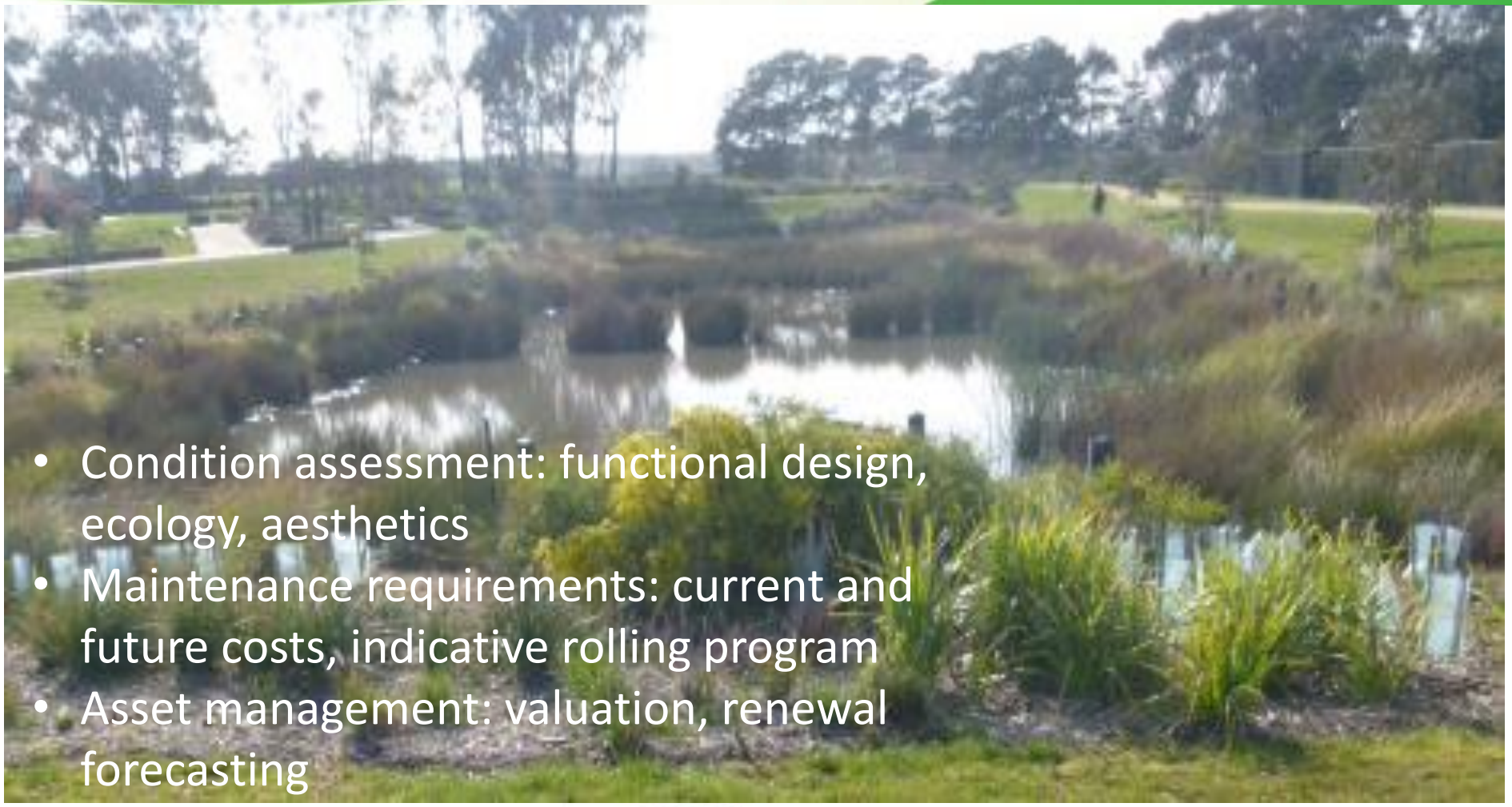
Evaluation methodology



- Condition assessment: functional design, ecology, aesthetics
- Maintenance requirements: current and future costs, indicative rolling program
- Asset management: valuation, renewal forecasting

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Outcomes

- Photos, treatment type, size, location, catchment info (GIS)
- Capacity building: on-site training (not just maintenance staff)
- Asset rectification: prioritised and costed program of works

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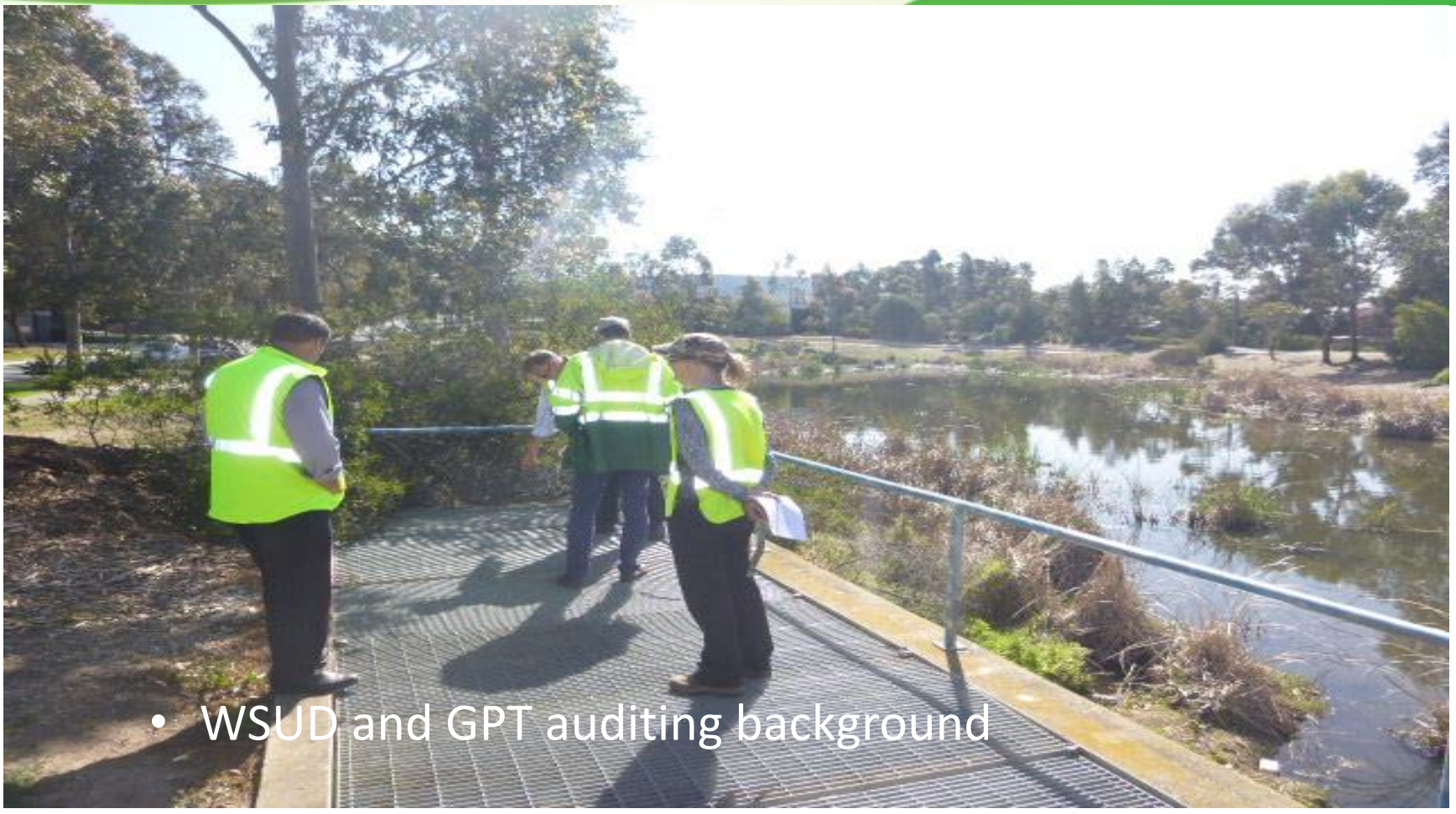
WSUD & GPT audit



- WSUD and GPT auditing background

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WSUD audit data sheet

Data and Asset Condition Summary - Performa

DATA SHEET

Audit Date				
Project Number :	**W1**			Description defines the primary element (some features
Project Type :	2	PRIMARY ASSET →	1	*Sediment Basin in isolation*
			2	*Sediment Basin to Treatment Wetland*
	4 Treatment wetlands			*Bio retention system (in road reserve)*
Project Description :			3	
			4	*Bio retention system (in car park, park or equiv.)*
	9 Trinity Blvd Attwood			*Swale system (in road reserve)*
Location:			5	
Melway Ref:	**5 H4**		6	*Swale system (in car park, park or equiv.)*
			7	*Retarding Basin*
Design Data			8	*GPT*
Who installed	Developer	assumed		
Designed				
Constructed	2005			
Design Intent 1.	**5 wetlands**			
Design Intent 2.				
Catchment area	**32**	**ha (or less)- DEPI web site**		
Catchment Development	**Residential**			
Total asset area (including batters etc.)	**2.1**	**ha (local park area)**		*1600, 500,1500,320 from west to east*
Asset treatment area	**3700**	**m² (council spreadsheet)**		
Position in treatment train	First and second - sediment pond to wetland?			
Access Provisions	No real access to wetland			
Maintenance frequency				
Maintenance regime to date				
Last maintained				
or issue in regard to maintenance	Sediment deposition and cleanout (sediment will deposit here)			
Major risks in regard to long term sustainability				
Replanting Required	Provision of sediment pond with current access and dewatering provisions ($20000)			
Reset/Reconstruction of asset				
Works which could extend life	Sediment removal and sediment pond resetting			
Works which could help improve performance				

Audit Assessment Sheet — Calculated by Spreadsheet
Proforma — Input by User

This sheet is used to: Assign an "audit" score so that this asset can be compared to other "like" assets
Assess the condition of an asset against performance criteria

AUDIT SHEET

Project Number :				
Project Type :		Insert number reference: →	1	*Sediment Basin*
			2	*Treatment Wetland*
Project Description :			3	*Receiving Body Wetland*
			4	*Pond*
Location:			5	*Bio retention system - linear (in road reserve)*
Melway Ref:			6	*Bio retention system - linear (in park or equiv.)*
			7	*Bio retention system - rain garden (in road reserve)*
Design Data			8	*Bio retention system - rain garden (in park or equiv.)*
Design Intent		**(Assumed)**	9	*Grassed Swale (in road reserve)*
Catchment area		**ha**	10	*Grassed Swale (in park or equiv.)*
			11	*Vegetated swale (in road reserve)*
			12	*Vegetated swale (in park or equiv.)*
			13	*GPT*

Overall Weighted Score = 0.0 (Weights all Project Objectives)
A high score represents a well performing asset

Scores out of 10 (1 = low performance, 10 = high performance) - see recommendations below

	1. Assessment of Asset Design and Planning (Civil/Landscape Design)	2. Overall asset condition (civil construction)	3. Assessment of WSUD Water Quality Objectives	4. Assessment of Ecological/Landscape Benefits	5. Assessment of Safety Issues (Public and Council)	6. Assessment of Maintenance Provisions	7. Assessment of Maintenance occurred to date	8. Assessment of Asset Long Term sustainability
Score - see below	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Weighting	15%	10%	15%	10.0%	15.0%	10.0%	10.0%	15.0%
100%								

Maintenance Priority Assessment = 10.0 (Score = 10 minus overall score above, Weightings of 6, 7 and 8 magnified as below)
A high score represents a project identified as requiring immediate and/or ongoing maintenance to meet councils objectives

Scores out of 10 (1 = low performance, 10 = high performance) - see recommendations below

	1. Assessment of Asset Design and Planning (Civil/Landscape Design)	2. Overall asset condition (civil construction)	3. Assessment of WSUD Water Quality Objectives	4. Assessment of Ecological/Landscape Benefits	5. Assessment of Safety Issues (Public and Council)	6. Assessment of Maintenance Provisions	7. Assessment of Maintenance occurred to date	8. Assessment of Asset Long Term sustainability
Score - see below	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Weighting	5%	10%	5%	0.0%	10.0%	20.0%	25.0%	25.0%
100%								

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WSUD audit maintenance schedules

- Inspection forms
- Maintenance forms
- Improves Council maintenance of WSUD

4.1 WSUD INSPECTION AND MAINTENANCE FORM, SCHEDULE A – INSPECTION FORM

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WSUD Inspection and Maintenance Schedule A

Sediment Basins, Wetlands and Ponds

INSPECTION FORM

Additional copies to be photocopied if required

Asset Description	• Systems as defined below (See appendix A for data sheets) • Associated inlet and outlet structures • Associated grassed batters and bypass systems (if applicable)

SITE VISIT DETAILS

Circle if inspected

W1	W4	W5	W6	W7	W8
W9	W10	W11	W12	W13	W14
W15	W16	W17	W26	W27	W31
W32	W33	W34	W35	W36	W37
W38	W40	W49			

Site Visit Date _____

Site Visit By _____

Weather

4.2 WSUD INSPECTION AND MAINTENANCE FORM, SCHEDULE A – MAINTENANCE FORM

Hume City Council

WSUD Inspection and Maintenance Form, Schedule A

Sediment Basins, Wetlands and Ponds

MAINTENANCE FORM

Additional copies to be photocopied if required

Asset Description	• Systems as defined below (See Appendix A for data sheets) • Associated inlet and outlet structures • Associated grassed batters and bypass systems (if applicable)

Circle if maintenance activity occurred

W1	W4	W5	W6	W7	W8
W9	W10	W11	W12	W13	W14
W15	W16	W17	W26	W27	W31
W32	W33	W34	W35	W36	W37
W38	W40	W49			

Date:

Site visit by:

Weather:

ROUNTINE MAINTENANCE – CALENDER

- Routine maintenance of the sediment ponds and wetlands should occur in **March and November** each year in response to any issues identified in the inspection form
- Maintenance should occur following any major flood event or water quality complaint, and completion of an Inspection Form.

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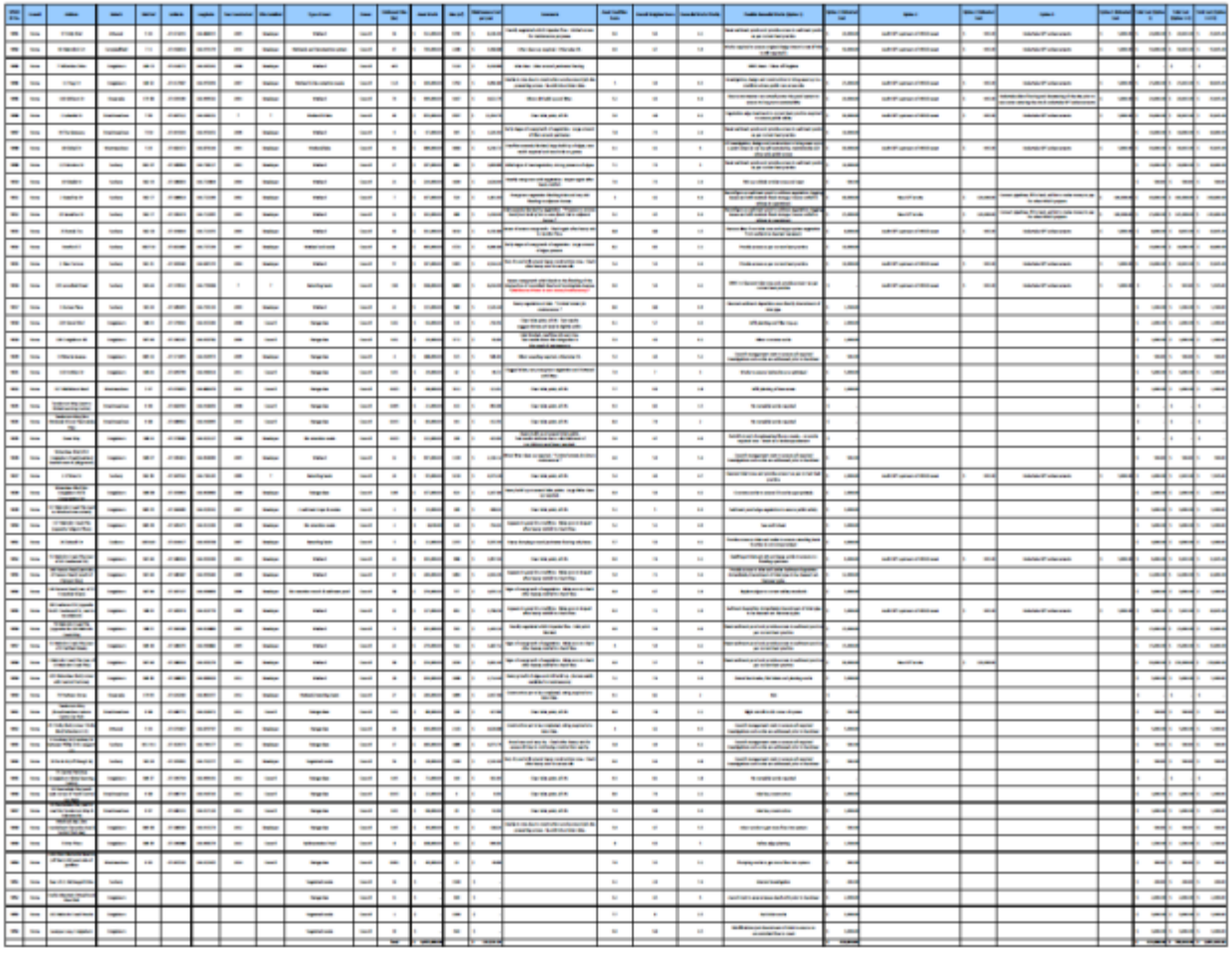
WSUD audit asset summary

- WSUD asset information
- Audit results
- Primary treatment upstream (yes/no)
- WSUD asset value
- Rectification works and costs
- Prioritisation list



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GPT audit data sheet & report

Humes

Humegard Unit Data Sheet

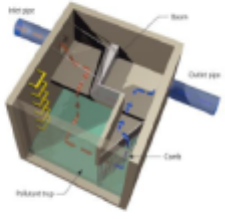
W1; 9 Trinity Boulevard, Attwood

Owner:	Hume City Council
Address:	1079 Pascoe Vale Road
	Broadmeadows, VIC 3056
Contact Person:	Anthony Koch
Phone:	
Email:	Anthonyk@hume.vic.gov.au
Mobile:	
Humes Rep:	Ivan Saric
Phone:	03 9360 3888
After Hours:	1300 361 601

Unit Name:	Humeguard
Unit Model:	HG 18
Unit Address:	9 Trinity Boulevard, Attwood
Site:	Opposite 14 Trinity Boulevard
Truck Instruction:	Park on road or nature strip next to device
Keys:	screws and Bolt latch only (phillips head req'd)
Lid Type:	aluminium
Lid Size:	1.2m x 0.9m
Emptying Method(s):	Suction
Date Operational:	
Catchment area	23 hectares

Technical Data	HG 18	
Screen width	1500	mm
Screen height	1200	mm
Overall height internally	3400	mm
Overall width externally	2100	mm
Sump width internally	1800	mm
Sump length	1800	mm
Sump Height	1400	mm
Sump total volume @ 100% full	2.3	m^3
Density of solid material (drained)	1000	kg/m^3
Estimate weight of full sump	2.3	tonne

Depth from Lid to Pollution	Volume m^3	Weight Tonnes	Percent Full
2.0 m = Top of Screen			More than 100%
2.7 m = Top of Sump	2.3	2.3	100%
2.8 m	2.0	2.0	90%
2.9 m	1.8	1.8	80%
3.0 m	1.6	1.6	70%
3.1 m	1.4	1.4	60%
3.1 m	1.1	1.1	50%
3.1 m	0.9	0.9	40%
3.2 m	0.7	0.7	30%
3.3 m	0.5	0.5	20%
3.3 m	0.2	0.2	10%
3.4 m = Bottom of Sump	0.0	0.0	0



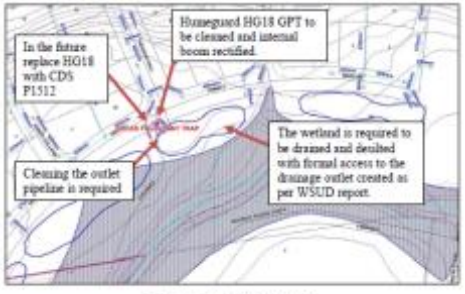
Any site specific Issues: steep slope upstream will result in high velocity flows

W1 – 9 Trinity Boulevard, Attwood

Address	**9 Trinity Boulevard (opposite 64 Haddon Hall Drive)**
Device Model	Humeguard HG18
Trap Number	53,348
Melway Reference	5 H4
Site Details	Access at Trinity Boulevard. 1200x900mm hinged aluminium lid, between wetland and road.
GIS Catchment area	23 hectares
Catchment details	Residential
Incoming pipe size	750mm
Estimated annual catchment pollutant volume	18 tonnes (0.8 tonnes per hectare per annum)
Device Status at Dec 2014	Non-Operational, device 300% full
Estimated GPT Asset Value	$60,000
Device comments in relation to catchment area and pollutant volume	The device under sized for a 23 hectare catchment,750mm pipe and steep upstream gradient. However the device CANNOT work in backwater of any kind. The device has a sump storage of 2.3m^3 so cleaning 6 times per year should be expected.
Rectification works required	Yes: 1. Clean GPT 2. New lid 3. Fix internal boom

The boom has wedged in place and will not rise and it will let all the low flows bypass the treatment. Its bent and broken and may not be able to be fixed

The culprit for causing the boom to wedge… A nicorette pack!



Concept plan of works required

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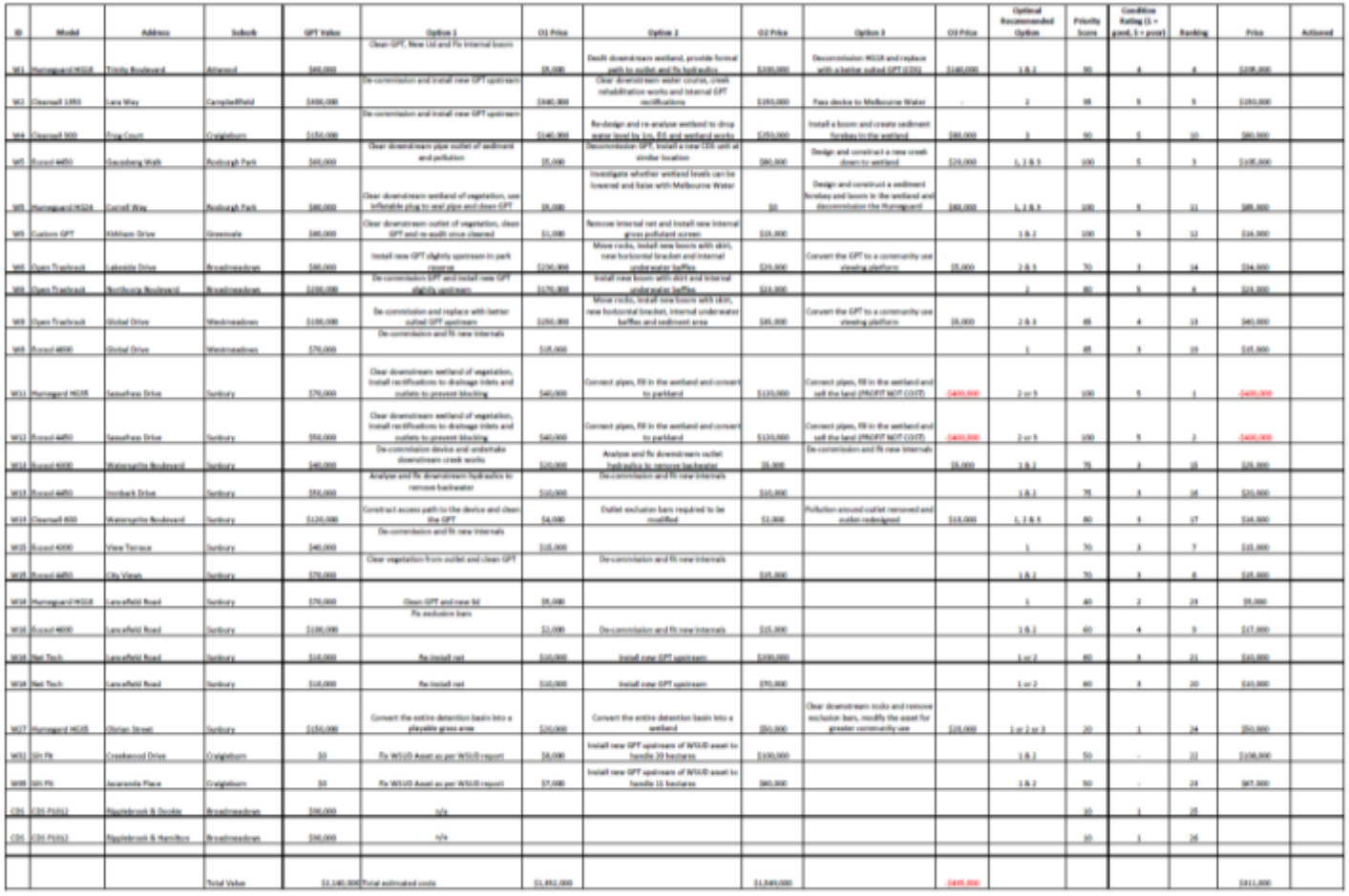
GPT audit rectification & prioritisation sheet

- GPT asset Information
- Audit results and asset value
- Rectification works and costs
- Prioritisation



ID	Model	Address	Suburb	GPT Value	Option 1	O1 Price	Option 2	O2 Price	Option 3	O3 Price	Optimal Recommended Option	Priority Score	Condition Rating (1 = good, 5 = poor)	Ranking	Price	Actioned
W1	Humegard HG18	Trinity Boulevard	Attwood	$60,000	Clean GPT, Raise Lid and Fix Internal boom	$5,000	Desilt downstream wetland, provide formal path to outlet and fix hydraulics	$100,000	Decommission HG18 and replace with a better suited GPT (CDS)	$140,000	1 & 2	90	4	4	$105,000	
W2	Clearwell 1850	Lara Way	Campbellfield	$400,000	De-commission and install new GPT upstream	$160,000	Clear downstream water course, creek rehabilitation works and internal GPT rectifications	$150,000	Pass device to Melbourne Water	-	2	88	5	5	$150,000	
W4	Clearwell 900	Frog Court	Craigieburn	$150,000	De-commission and install new GPT upstream	$140,000	Re-design and re-analyse wetland to drop water level by 1m, fill and wetland works	$350,000	Install a boom and create sediment forebay in the wetland	$60,000	1	90	5	10	$60,000	
W5	Ecosol 4x450	Gausberg Walk	Roxburgh Park	$60,000	Clear downstream pipe outlet of sediment and pollution	$5,000	Decommission GPT, Install a new CDS unit at similar location	$80,000	Design and construct a new creek down to wetland	$20,000	1, 2 & 3	100	5	3	$105,000	
W5	Humegard HG24	Carnet Way	Roxburgh Park	$60,000	Clear downstream wetland of vegetation, use inflatable plug to seal pipe and clean GPT	$5,000	Investigate whether wetland levels can be lowered and liaise with Melbourne Water	$0	Design and construct a sediment forebay and booms in the wetland and decommission the Humegard	$60,000	1, 2 & 3	100	5	11	$65,000	
W5	Custom GPT	Kirkham Drive	Greenvale	$60,000	Clear downstream outlet of vegetation, clean GPT and re-audit once cleared	$1,000	Remove internal net and install new internal gross pollutant screen	$15,000			1 & 2	100	5	12	$16,000	
W6	Open Trashrack	Lakeside Drive	Broadmeadows	$60,000	Install new GPT slightly upstream in park reserve	$150,000	Move rocks, install new boom with skirt, new horizontal bracket and internal underwater baffles	$25,000	Convert the GPT to a community use viewing platform	$5,000	2 & 3	70	3	14	$34,000	
W6	Open Trashrack	Northcorp Boulevard	Broadmeadows	$100,000	De-commission GPT and install new GPT slightly upstream	$170,000	Install new boom with skirt and internal underwater baffles	$13,000			2	80	5	6	$13,000	
W8	Open Trashrack	Global Drive	Westmeadows	$100,000	De-commission and replace with better suited GPT upstream	$150,000	Move rocks, install new boom with skirt, new horizontal bracket, internal underwater baffles and sediment area	$35,000	Convert the GPT to a community use viewing platform	$5,000	2 & 3	65	4	13	$40,000	
W8	Ecosol 4800	Global Drive	Westmeadows	$70,000	De-commission and fit new internals	$15,000					1	40	3	19	$15,000	
W11	Humegard HG45	Sassafras Drive	Sunbury	$70,000	Clear downstream wetland of vegetation, install rectifications to drainage inlets and outlets to prevent blocking	$40,000	Connect pipes, fill in the wetland and convert to parkland	$120,000	Connect pipes, fill in the wetland and sell the land (PROFIT NOT COST)	-$400,000	2 or 3	100	5	1	-$400,000	
W11	Ecosol 4x450	Sassafras Drive	Sunbury	$50,000	Clear downstream wetland of vegetation, install rectifications to drainage inlets and outlets to prevent blocking	$40,000	Connect pipes, fill in the wetland and convert to parkland	$120,000	Connect pipes, fill in the wetland and sell the land (PROFIT NOT COST)	-$400,000	2 or 3	100	5	2	-$400,000	
W13	Ecosol 4200	Watergate Boulevard	Sunbury	$40,000	De-commission device and undertake downstream creek works	$20,000	Analyse and fix downstream outlet hydraulics to remove backwater	$5,000	De-commission and fit new internals	$5,000	1 & 2	75	3	15	$25,000	
W13	Ecosol 4x450	Ironbark Drive	Sunbury	$50,000	Analyse and fix downstream hydraulics to remove backwater	$10,000	De-commission and fit new internals	$10,000			1 & 2	75	3	16	$20,000	
W13	Clearwell 600	Watergate Boulevard	Sunbury	$120,000	Construct access path to the device and clean the GPT	$4,000	Outlet exclusion bars required to be modified	$1,000	Pollution around outlet removed and outlet redesigned	$10,000	1, 2 & 3	80	3	17	$16,000	
W15	Ecosol 4200	View Terrace	Sunbury	$40,000	De-commission and fit new internals	$15,000					1	70	3	7	$15,000	
W15	Ecosol 4x450	City Views	Sunbury	$70,000	Clear vegetation from outlet and clean GPT		De-commission and fit new internals	$15,000			1 & 2	70	3	8	$15,000	
W16	Humegard HG18	Lancefield Road	Sunbury	$70,000	Clean GPT and new lid	$5,000					1	40	2	21	$5,000	
W16	Ecosol 4800	Lancefield Road	Sunbury	$100,000	Fix exclusion bars	$1,000	De-commission and fit new internals	$15,000			1 & 2	60	4	9	$17,000	
W16	Net Tech	Lancefield Road	Sunbury	$10,000	Re-install net	$10,000	Install new GPT upstream	$100,000			1 or 2	80	3	21	$10,000	
W16	Net Tech	Lancefield Road	Sunbury	$10,000	Re-install net	$10,000	Install new GPT upstream	$70,000			1 or 2	60	3	20	$10,000	
W17	Humegard HG35	Dorian Street	Sunbury	$150,000	Convert the entire detention basin into a playable grass area	$20,000	Convert the entire detention basin into a wetland	$50,000	Clear downstream rocks and remove exclusion bars, modify the asset for greater community use	$20,000	1 or 2 or 3	20	1	24	$50,000	
W31	Stn Pit	Creekwood Drive	Craigieburn	$0	Fix WSUD Asset as per WSUD report	$8,000	Install new GPT upstream of WSUD asset to handle 20 hectares	$100,000			1 & 2	50	-	22	$108,000	
W38	Stn Pit	Jacaranda Place	Craigieburn	$0	Fix WSUD Asset as per WSUD report	$7,000	Install new GPT upstream of WSUD asset to handle 11 hectares	$80,000			1 & 2	50	-	23	$87,000	
CDS	CDS P5012	Applebrook & Double	Broadmeadows	$60,000	n/a							10	1	25		
CDS	CDS P5012	Applebrook & Hamilton	Broadmeadows	$60,000	n/a							10	1	26		
			Total Value	$2,140,000	Total estimated costs	$1,892,000		$1,540,000		-$400,000					$811,000	

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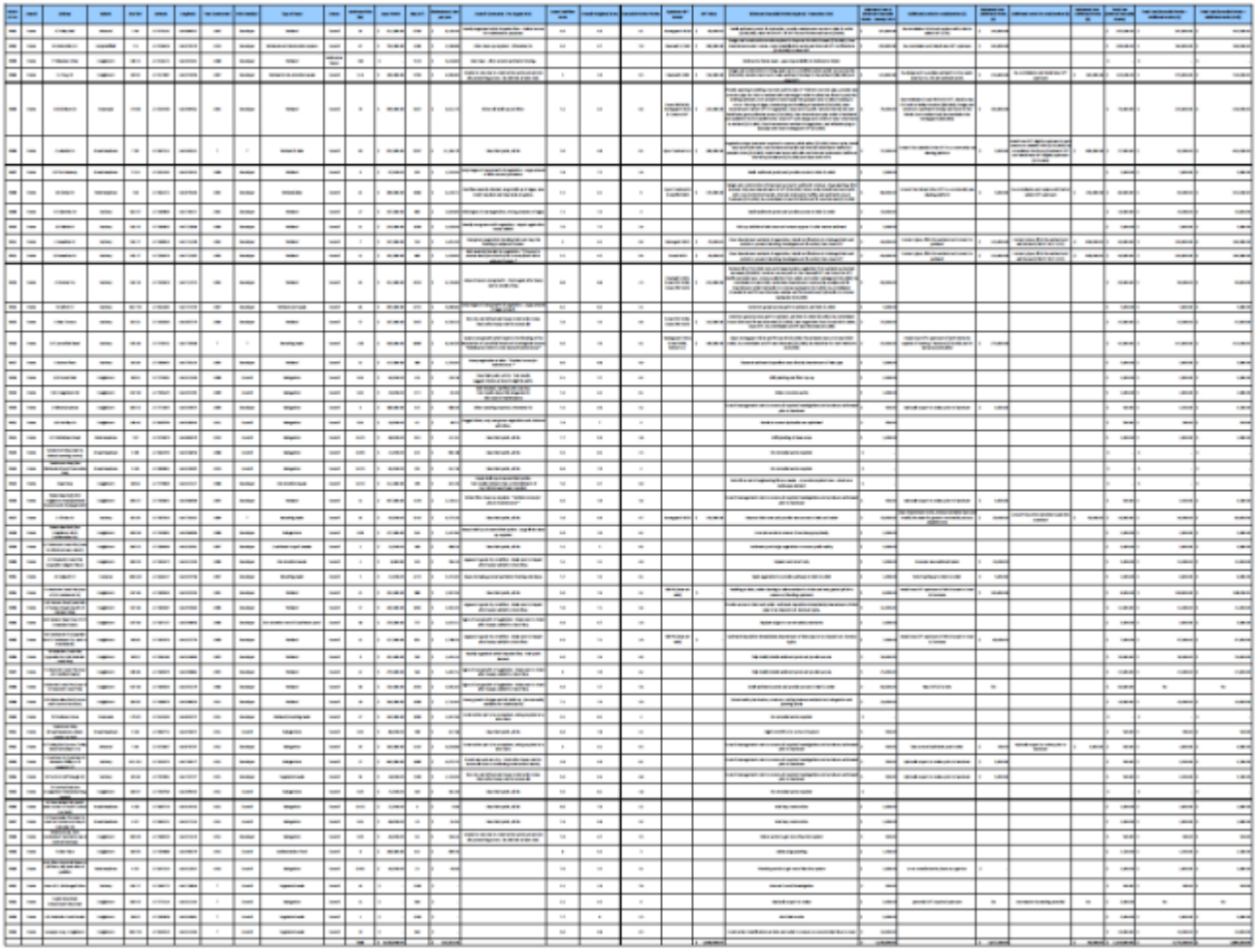
WSUD & GPT audit rectification & prioritisation sheet

- Combined WSUD & GPT asset data
- Combined audit results
- Total asset value
- Combined rectification works & costs
- Combined prioritisation list



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The good - wetlands





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The bad - wetlands






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The ugly - wetlands






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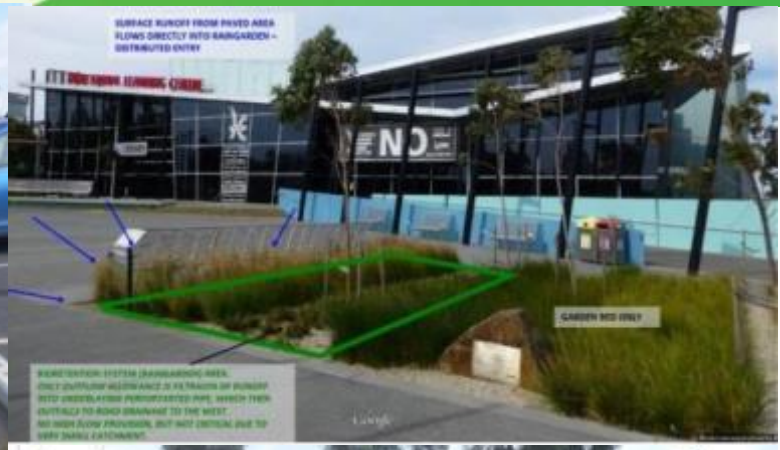
The good - raingardens



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The bad - raingardens

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The ugly - raingardens

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The good - ponds

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The bad - ponds

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The ugly - ponds






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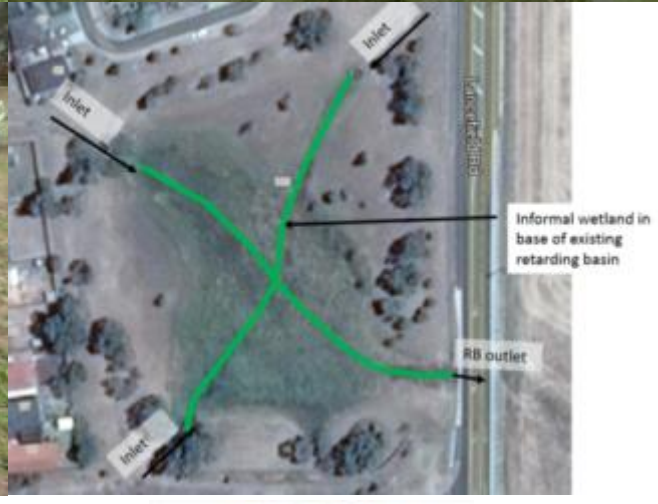
The good – detention basins



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The bad – detention basins

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The good - GPTs

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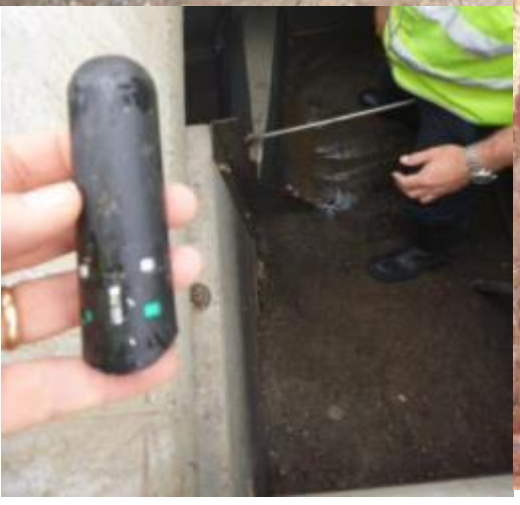
The bad - GPTs



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The ugly - GPTs






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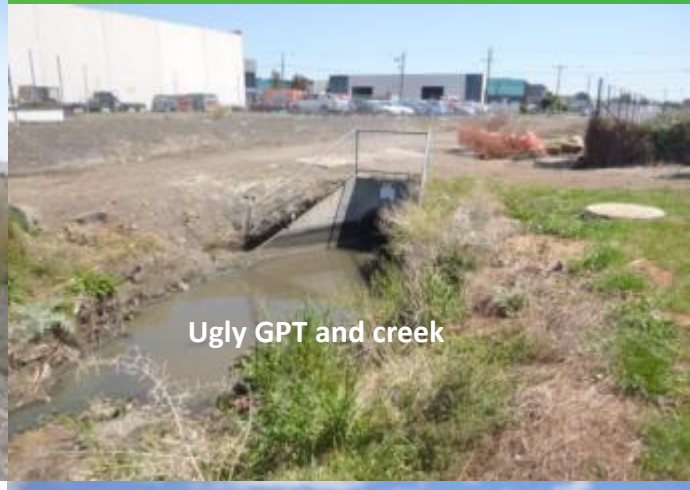
The good, the bad and the ugly all at once!



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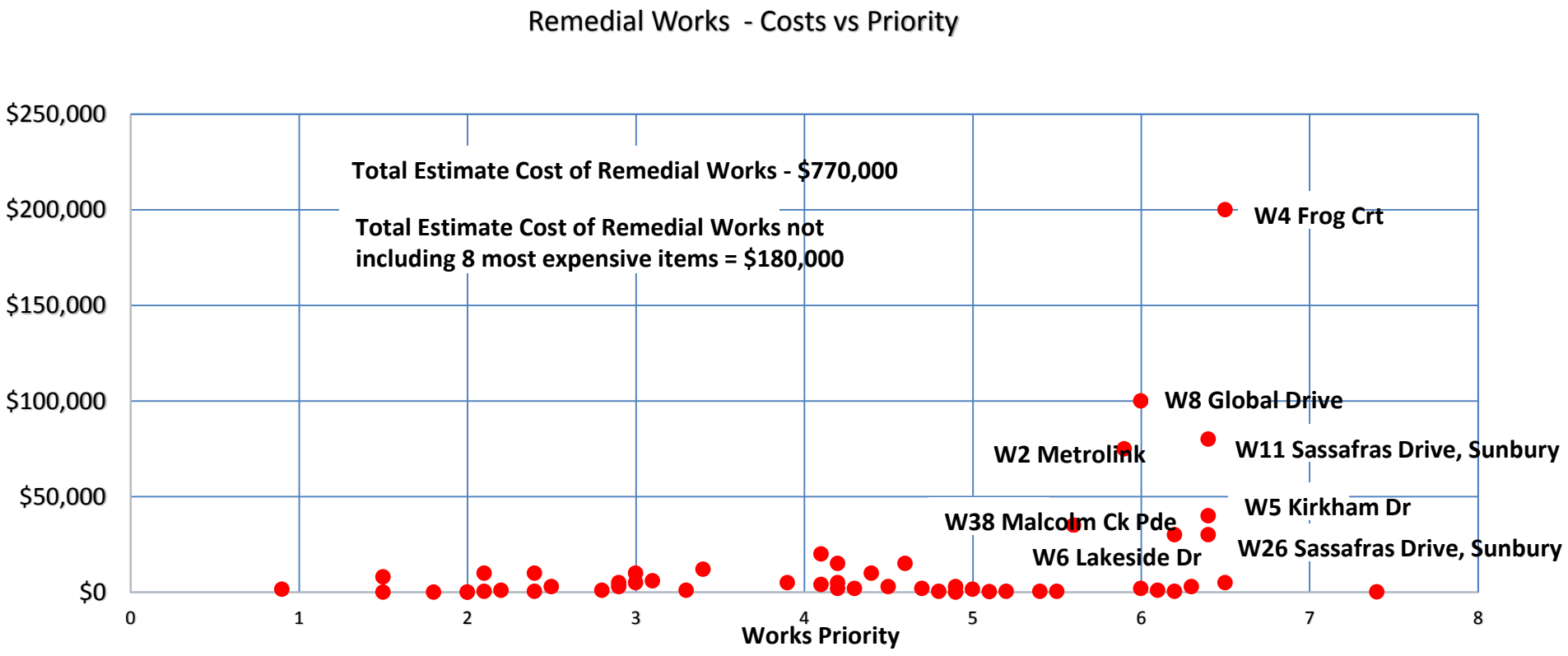
Results



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WSUD rectification works – from this…

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WSUD rectification works – to this

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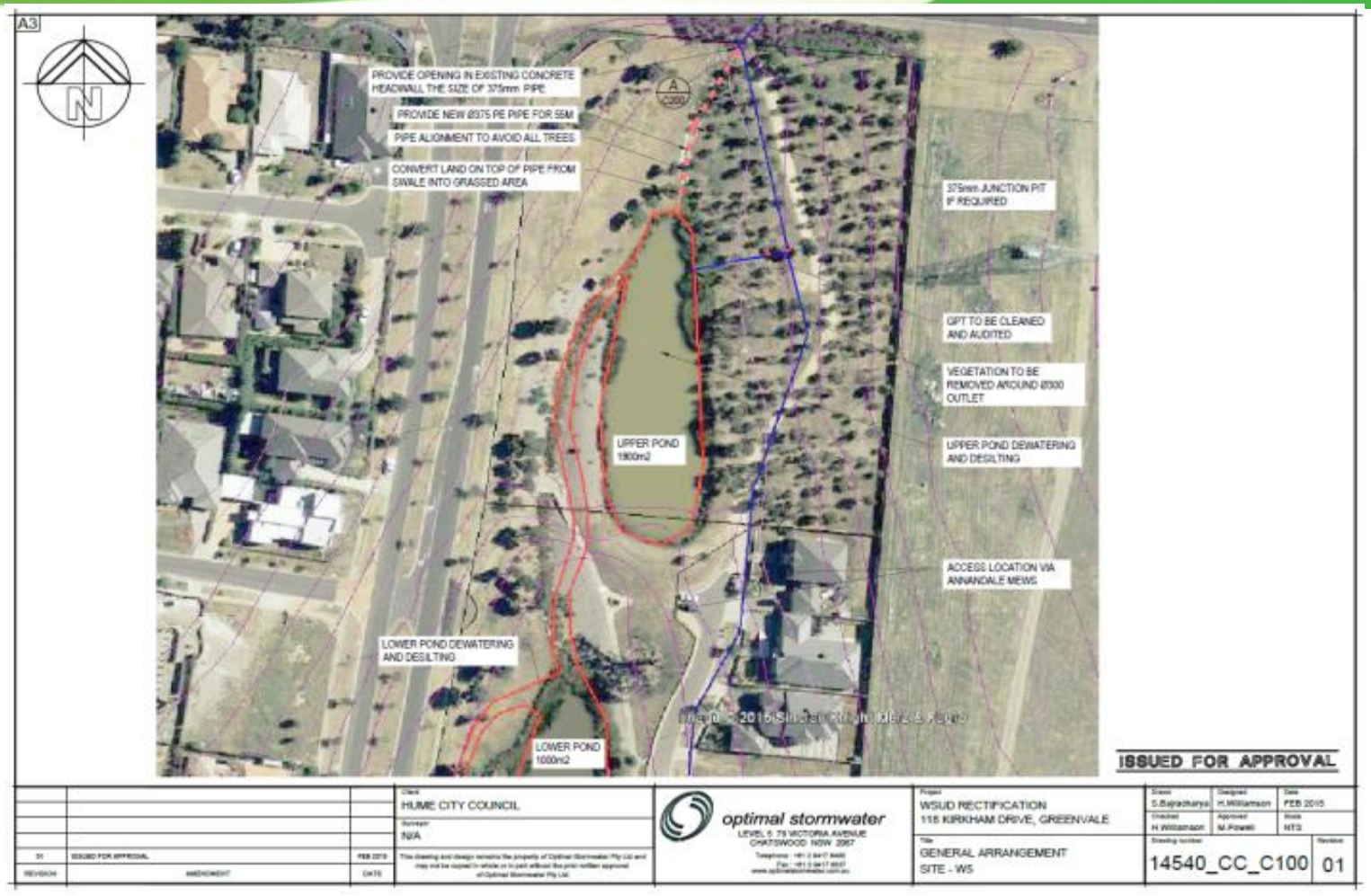
WSUD rectification works – with this



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WSUD rectification works – from this…

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WSUD rectification works – with this

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WSUD rectification works – from this

W12 Sassafras Drive, Sunbury

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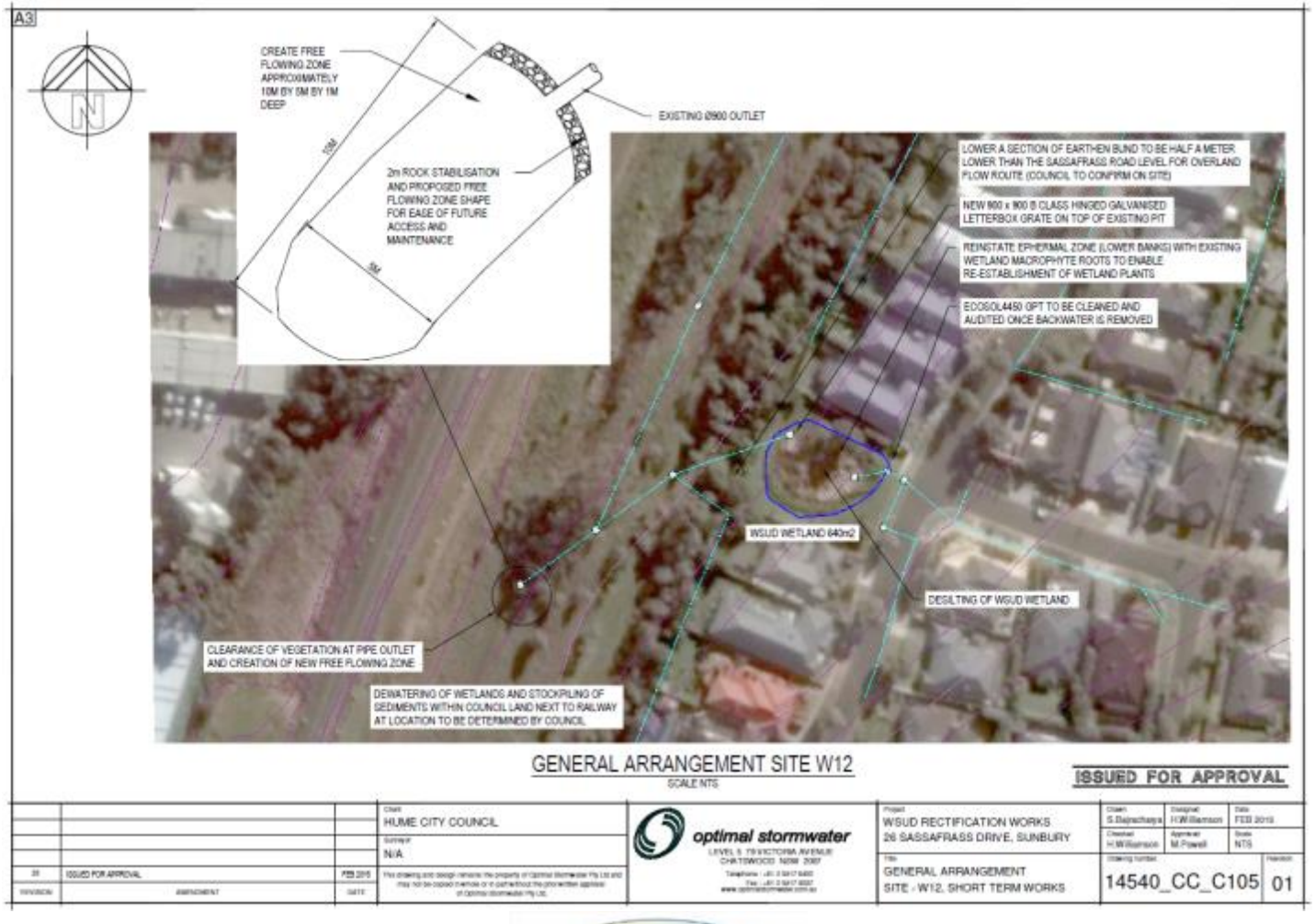
WSUD rectification works – with this



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Summary & Questions






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