All The Things We Learnt – Dandenong Council Stormwater Quality Audit

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Acknowledgements

- Mohammed Khan – City of Greater Dandenong
- Bertrand Salmi – City of Greater Dandenong > Water Technology
- Trang Tran – City of Greater Dandenong > Energy Industry
- Martin Wong – City of Greater Dandenong > City of Port Phillip
- Murray Powell – Optimal Stormwater

- Melbourne Water's Living Rivers Program

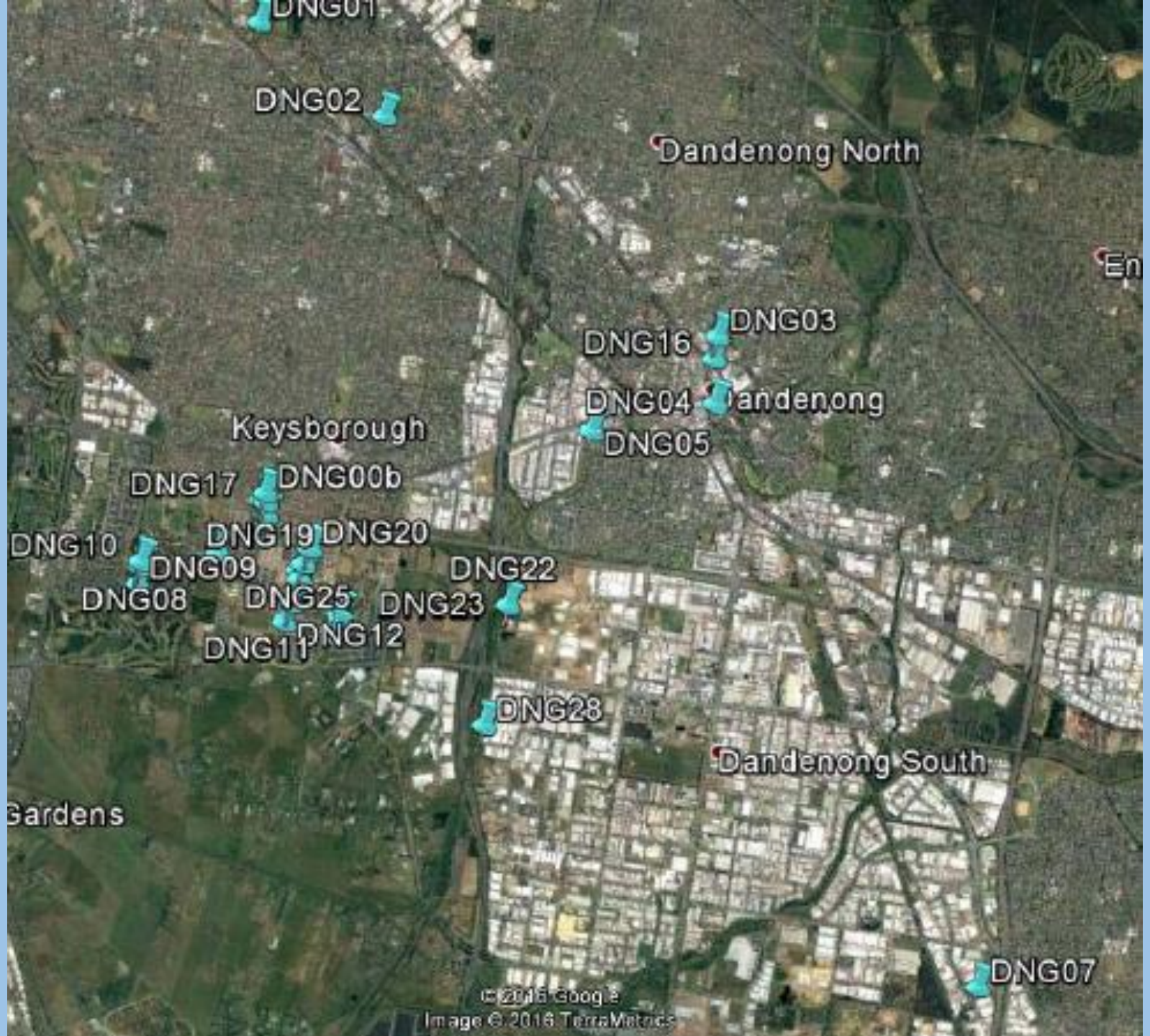
Background

- “A comprehensive condition assessments of Council owned Gross Pollutant Trap (GPT) and wetland assets to allow CGD to proactively plan for the maintenance and/or capital replacement and renewal of Council assets”

- 32 GPT Assets

- (15 CleansAlls, 13 CDS Units, 3 Ecosols, 1 Humegard)

- 2 Wetland Assets


DNG01
DNG02
Dandenong North
DNG03
DNG16
DNG04
Dandenong
DNG05
Keysborough
DNG17
DNG00b
DNG10
DNG19
DNG20
DNG09
DNG22
DNG08
DNG25
DNG23
DNG12
DNG11
DNG28
Dandenong South
Gardens
DNG07
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Whats the problem

- Clow Street CDS blocked up to 900mm causing backwater on the pipe network and odour issues . Pollution is not able to be treated when the device is full behind the screens

Whats the problem

- Clow St CDS – there is no access into the roof of the diversion chamber at the location shown so that behind the screens can be suction cleaned to remove pollution that has likely been there for 20 years. Once behind the screens is cleaned, flows can be treated and odour likely improved.

Whats the problem

- Example of CDS full behind the screens – 200% full behind the screens and no treatment occurring. Cleaning behind the screens is a must for every CDS unit and must be specified in a cleaning tender

Whats the problem

- Flinders St CDS – collapsible weirs permanently open, evidence of pollution build-up blocking the upstream pipes, no low flow bypass – requires new solid weir and CDS m3 storage increasing for large catchment

Whats the problem

- Backwater on CDS at Arkwright Drive and CleansAll at Cafardi Blvd and making the devices difficult to clean unless the backwater is removed..

Whats the problem

- Monash Drive CleansAll – backwater on device but device can be basket lifted, however pollution is on the wrong side of the weir..

Whats the problem

- Dandenong Ecosols – generic Ecosol problems however outlet must be cleared for them to work, however they wont work well unless rectified

Whats the problem

- CleansAlls undersized for the catchment areas – tide lines as proof of blocked pipelines and basket cleaning should be suction cleaning instead

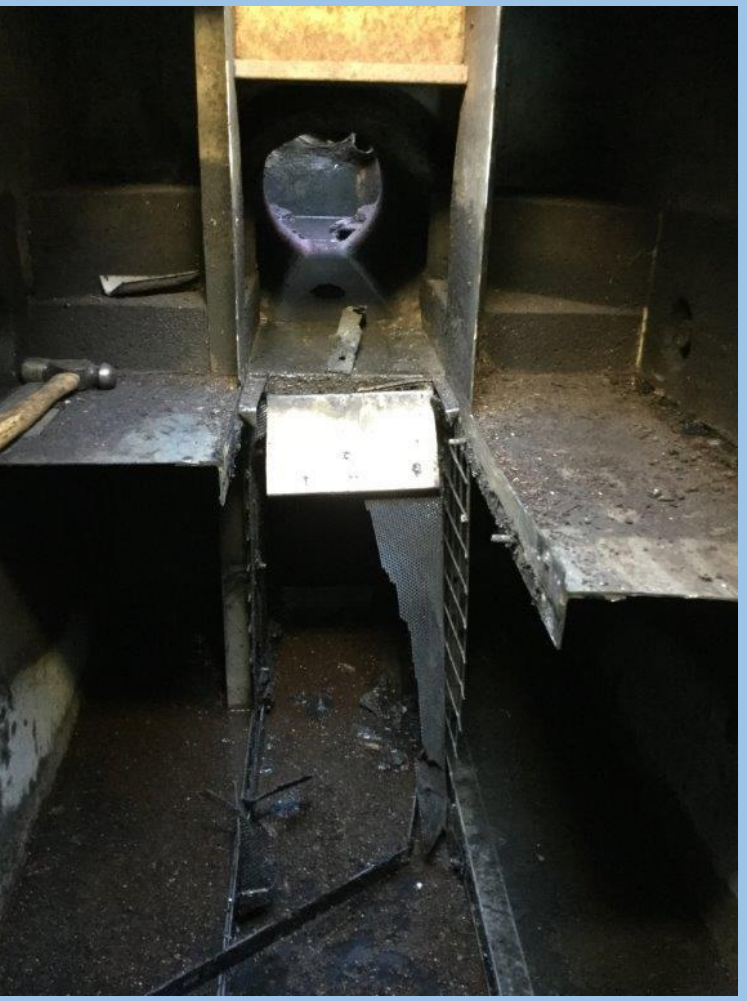
Whats the problem

- CDS weir height too low – will lose pollutants and must be raised

Whats the problem

- Arkwright Drive CDS – there is not a CDS swirl lid over the top of the device – it is a 900 x 900 gatic lid and this cannot be used for grab cleaning. As the device has backwater, it cannot be suction cleaned and must be grab cleaned. To do this, a new 2m diameter circular lid is required and the square gatic lid removed.

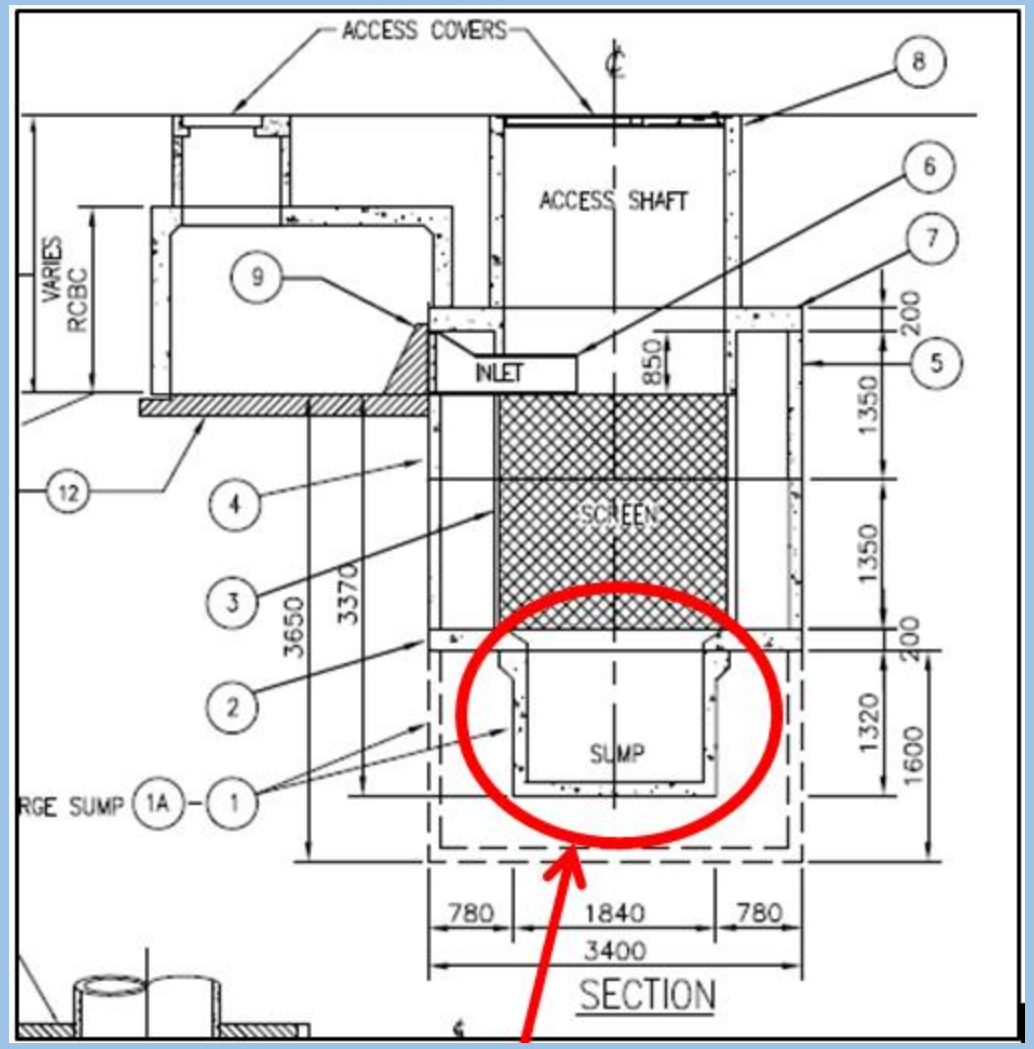
Whats the problem, and the solution (Ecosols)

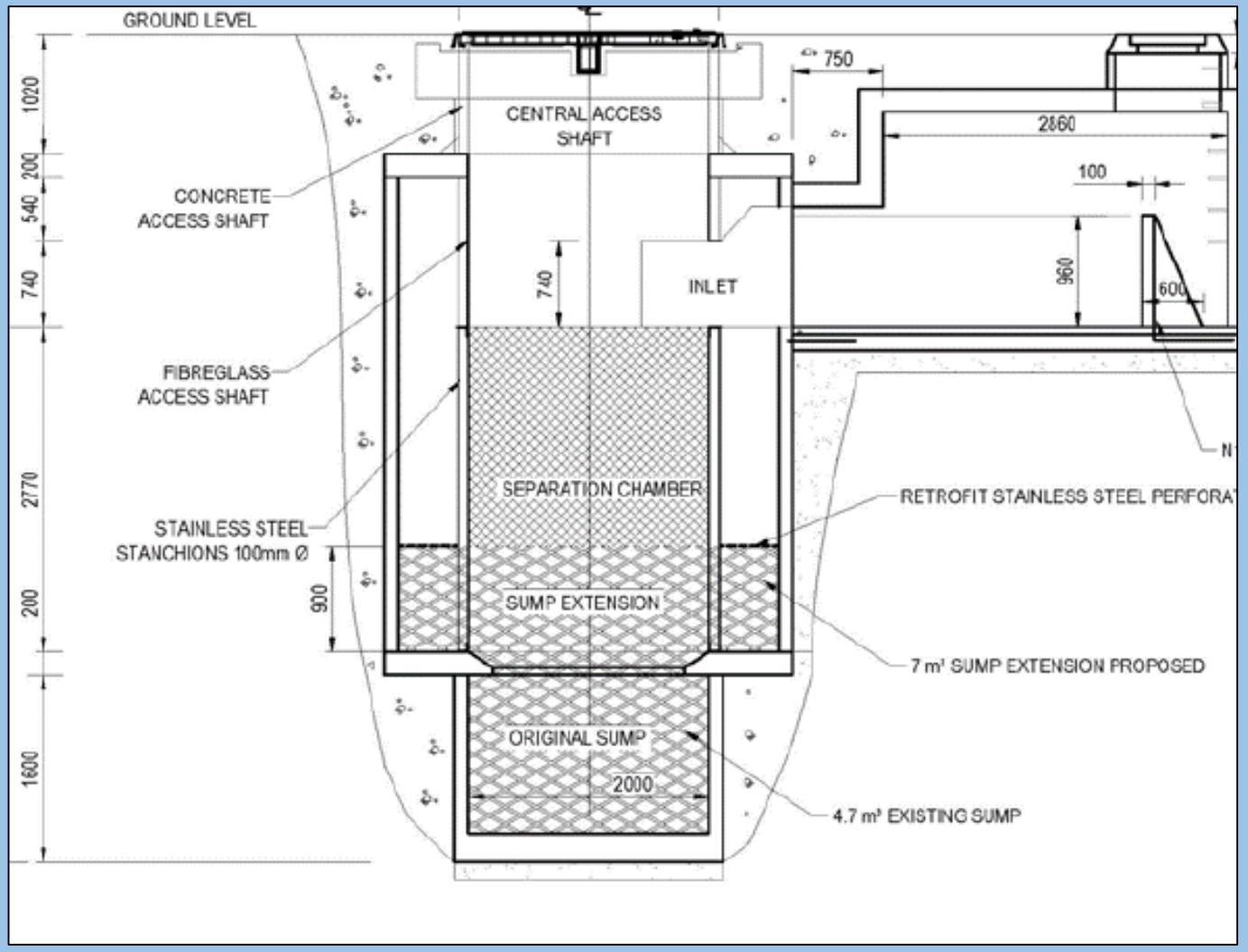


Whats the problem and the solution(CDS circular lid)

Whats the problem and the solution (weir raising)

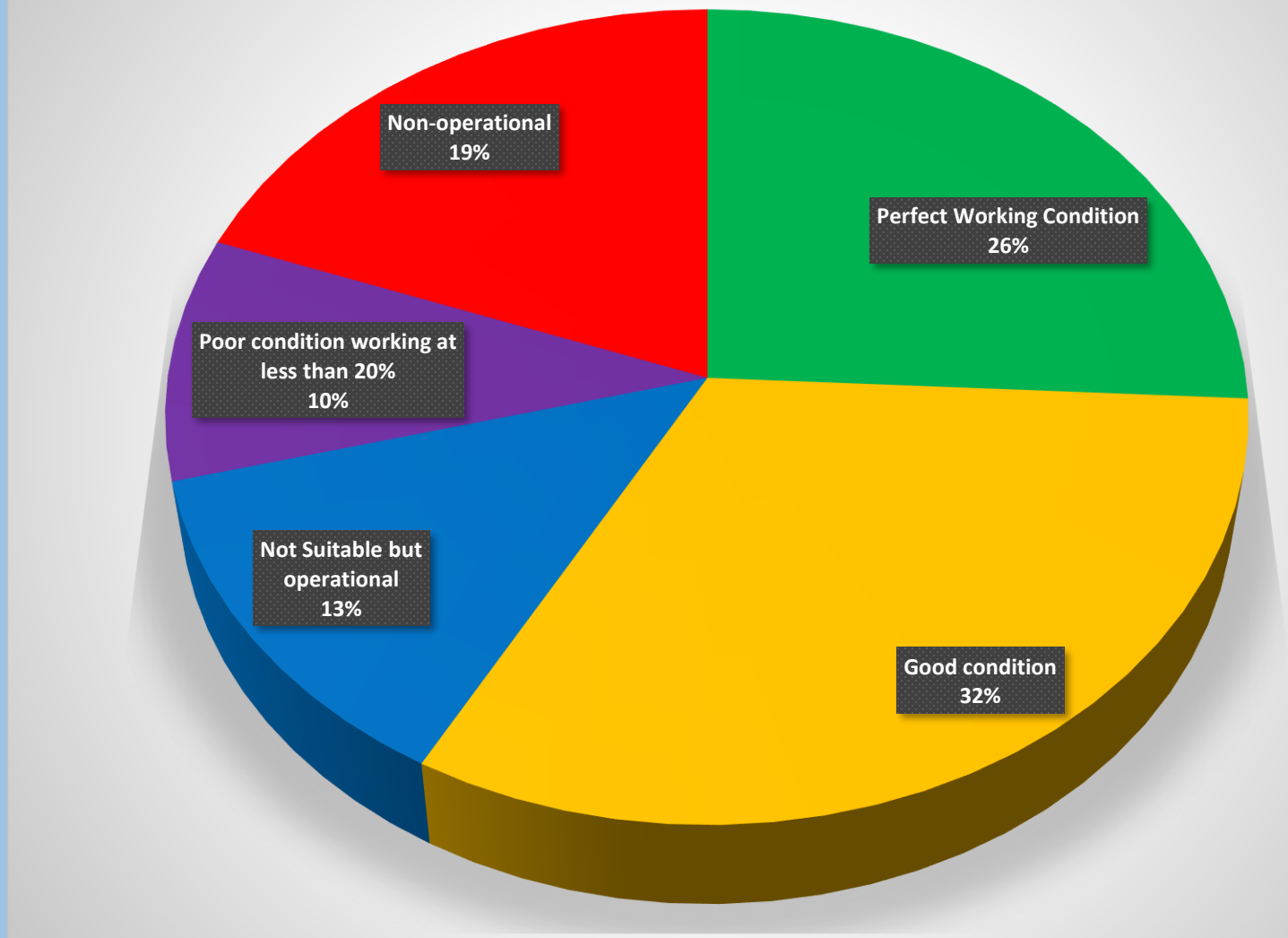
Whats the problem and the solution(CDS extra m3)



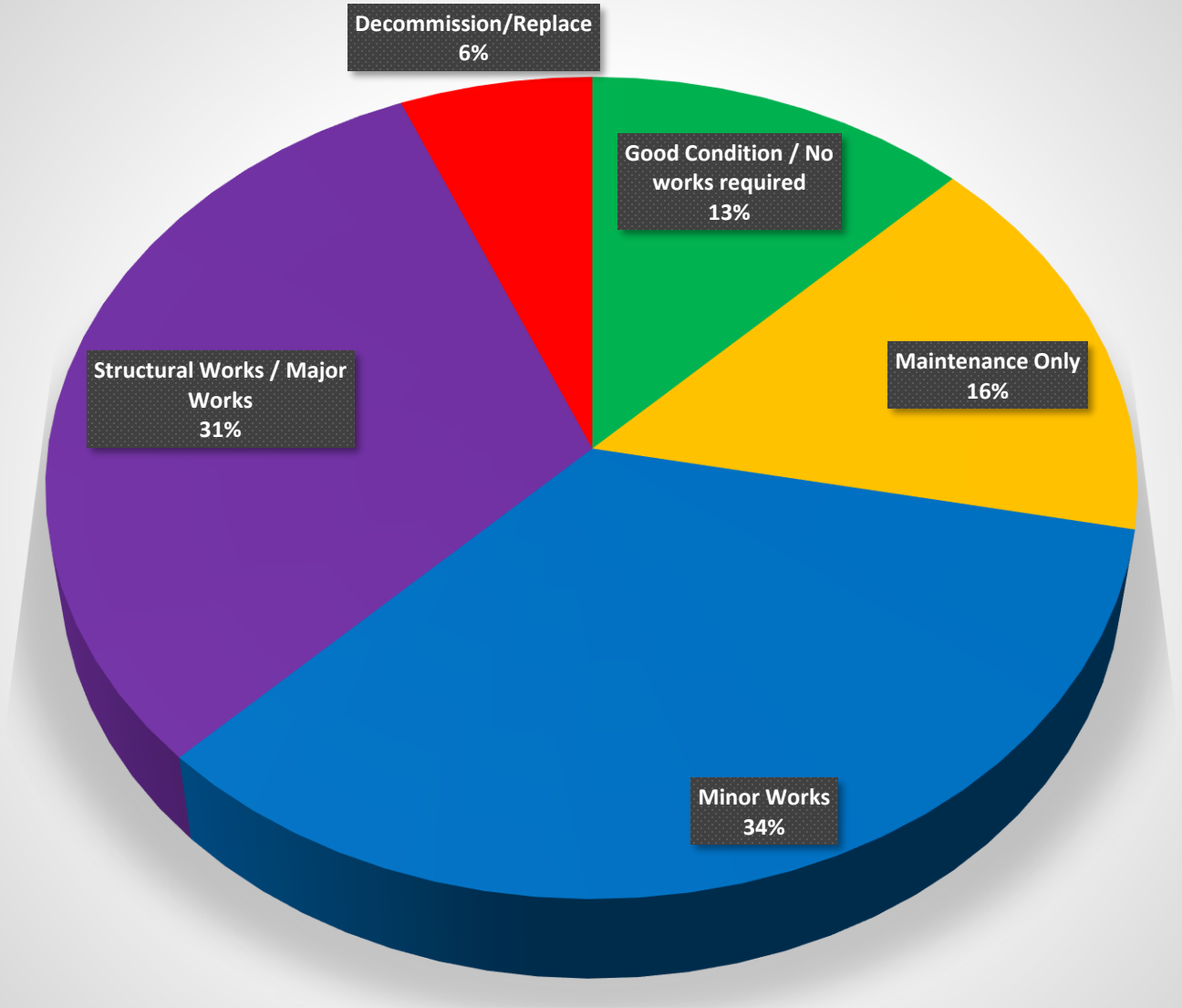


Whats the problem, and the solution (CleansAll lid)

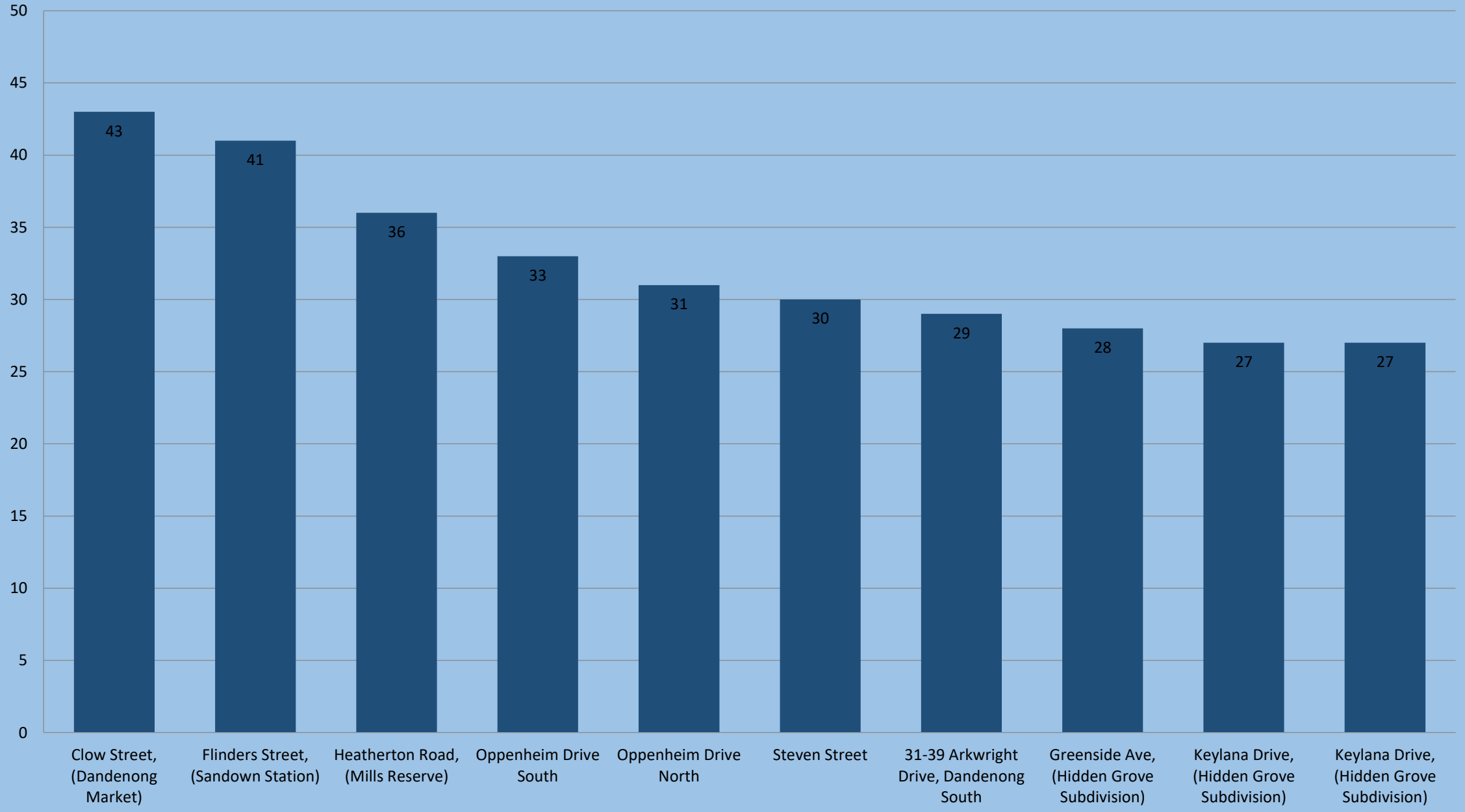
GPT Condition Rating



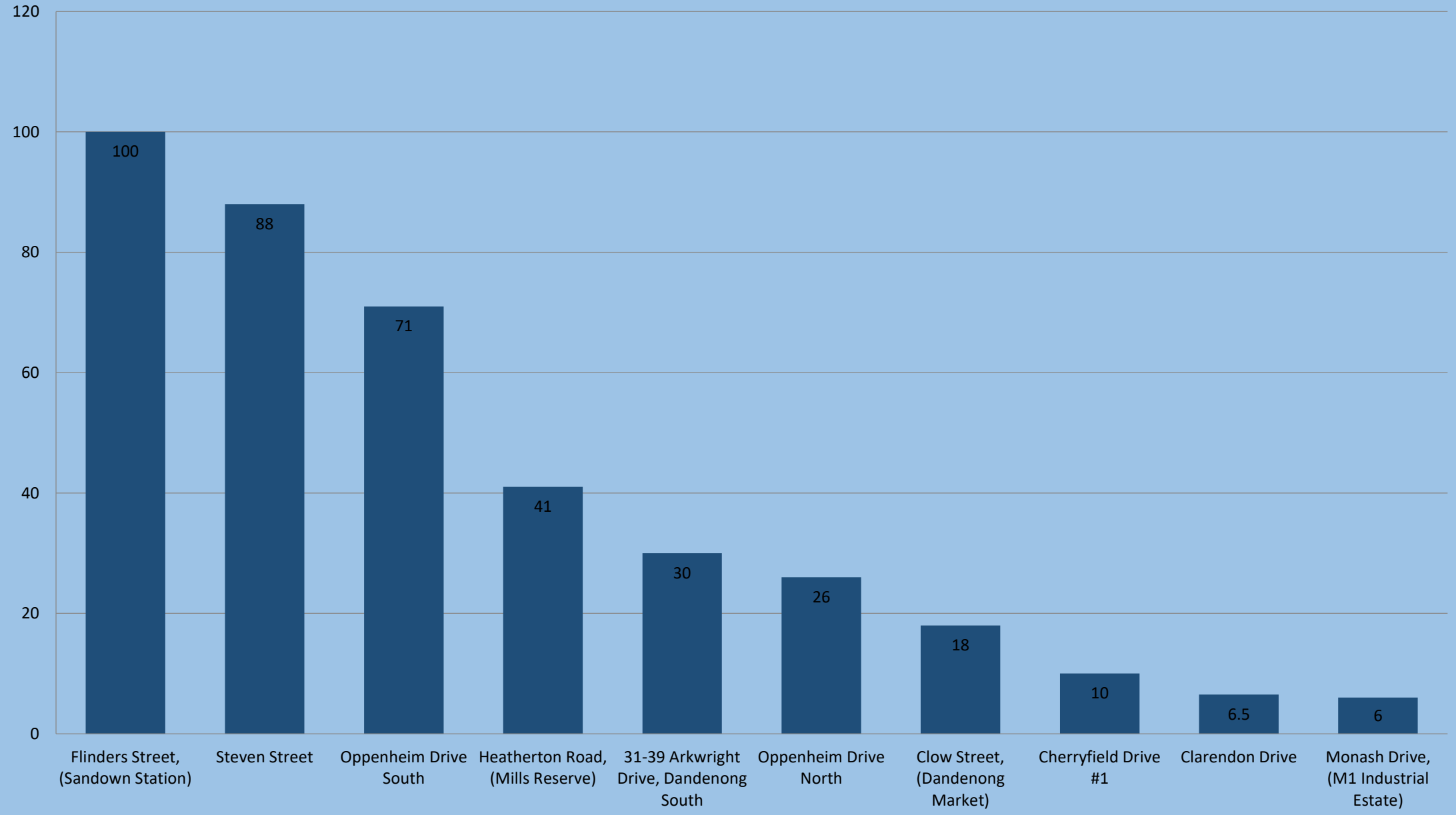
GPT Rectification Category



Highest Priority GPTs by Matrix Prioritisation Rating



GPT Priorities by Catchment Area



GPT Audit Summary

- Total GPT Value = $3.7M
- Replacement cost = $4.1M
- Rectification Options 1 = $69,000 (minor maintenance works)
- Rectification Options 2 = $239,000 (minor civil works)
- Rectification Options 3 = $1,283,000 (major civil works)

- Catchment area treated = 408 hectares
- Estimated annual pollutants = 471 tonnes/year
- Total GPT storage volume = 60m3
- Cleaning frequencies recommended accordingly

Rectifications

- Council undertook rectification designs for 6 priority sites
- 3 x Ecosols to be converted to baffle traps to have increased storage volume, improved ease of cleaning and decreased maintenance frequency
- 3 x CDS Units to be rectified to have increased storage volume, improved pollution capture and retention and decreased maintenance frequency
- Scheduled 10 year program of works


Georgia
Trina
Prospect Terrace
The Panorama
Keylana Dr
Keylana Dr
Greenside Cres
Greenside Cres
Marriott Dr
The Strand
The Strand
Greenside Cres
36-18 Greenside Cres
Keysborough VIC 3173
-38.004725, 145.151265


Clear sediments from outlet
to remove backwater
Remove internals and
install new baffle
Greenside Cres
Greenside Cres
Greenside Cres
24

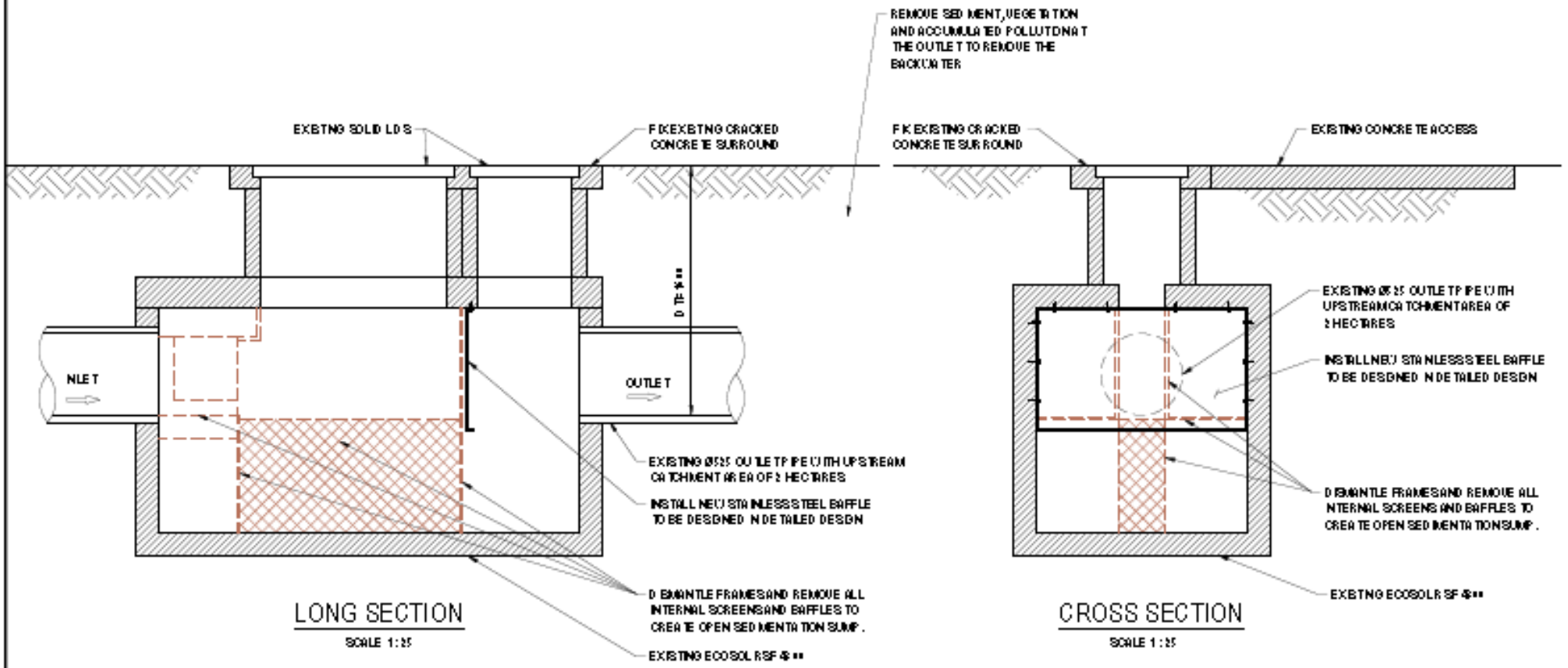

Clear sediments at outlet
to lower backwater
Remove internals and
install new baffle
The Panorama
Keylana Dr
Keylana Dr


Keylana Dr
Keylana Dr
Keylana Dr
Keylana Dr
Remove internals and
install new baffle
Clear sediments from outlet
to remove backwater
Greenside Cres
Greenside Cres

A3

LEGEND

EXISTING CONCRETE



LONG SECTION

SCALE 1:25

CROSS SECTION

SCALE 1:25

RECTIFICATION WORKS REQUIRED

1. REMOVE SEDIMENT, VEGETATION AND ACCUMULATED POLLUTIONA TOUTLET TO REMOVE BACKWATER
2. DECOMMISSION AND RETROFIT DEVICE INTO A BAFFLE TRAP GPT THAT IS EASIER TO CLEAN, MAINTAIN AND TRIPLE THE POLLUTION STORAGE CAPACITY

SCALE 1:25

CONCEPT

			Client: DANDENONG COUNCIL	optimal stormwater LEVEL 5 10 VICTORIA AVENUE CHATSWOOD NSW 2067	Project: GPT RECTIFICATION KEYLAN A DRIVE A (RSF 4300)	Drawn: D Tran; Designed: H Williamson; Date: Nov 2017
			Surveyed: N/A			Checked: S Rajachoraya; Approved: M Powell; Scale: As shown
01	ISSUED FOR CONCEPT	NOV 2017			Title: SECTION	Drawing number: 16942_SK_C203; Revision: 01
REVISION	AMENDMENT	DATE				

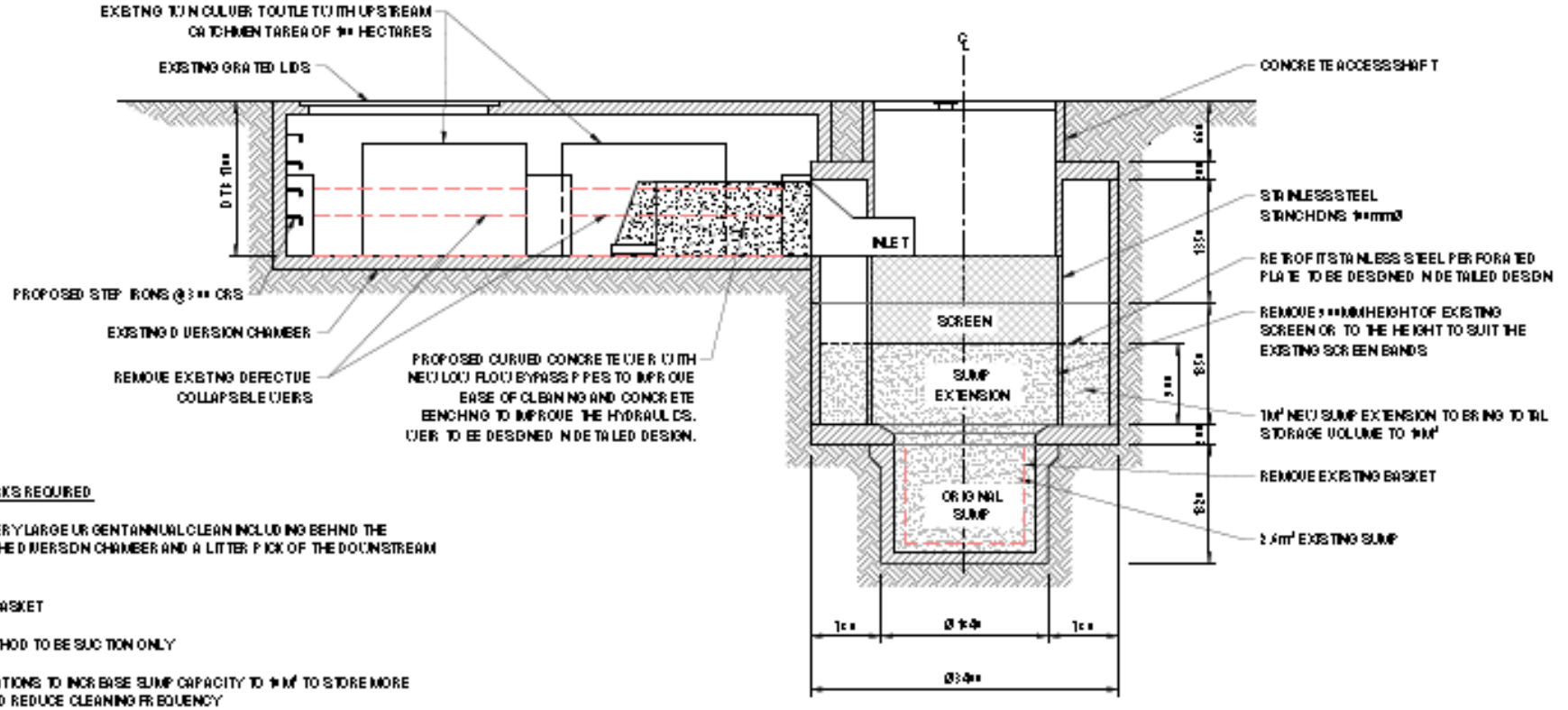
Flinders Street 100 hectares

A3

LEGEND

CAST-IN-SITU CONCRETE

EXISTING CONCRETE



SECTION

SCALE 1:50

RECTIFICATION WORKS REQUIRED

1. UNDERTAKE VERY LARGE OR GENTANNUAL CLEAN INCLUDING BEHIND THE SCREENS, IN THE DIVERSION CHAMBER AND A LITTER PICK OF THE DOWNSTREAM CREEK
2. REMOVE THE BASKET
3. CLEANING METHOD TO BE SUCTION ONLY
4. GPT RECTIFICATIONS TO INCREASE SUMP CAPACITY TO *M³ TO STORE MORE POLLUTION AND REDUCE CLEANING FREQUENCY
5. REPLACEMENT OF THE COLLAPSIBLE WEIRS WITH A SOLID CONCRETE WEIR TO BE DESIGNED IN DETAILED DESIGN, MINIMUM TO THE HEIGHT OF THE CDS INLET, INSTALL BENCHING TO IMPROVE THE HYDRAULICS, STEP IRONS IN DIVERSION CHAMBER TO IMPROVE ACCESS AND INSTALL A LOW FLOW BYPASS PIPE AND CAP.

0 1000 2000 3000 4000 5000mm

1000 600 200

SCALE 1:50

CONCEPT

Client: DANDENONG COUNCIL	Project: GPT RECTIFICATION FLINDERS STREET (CDS 2013R)	Drawn: D.Yan	Designed: H.Williamson	Date: Nov 2017
Surveyor: N/A		Checked: S.Rajachoriya	Approved: M.Powell	Scale: As shown
01 ISSUED FOR CONCEPT	Title: SECTION	Drawing number: 16942_SK_C200		Revision: 01

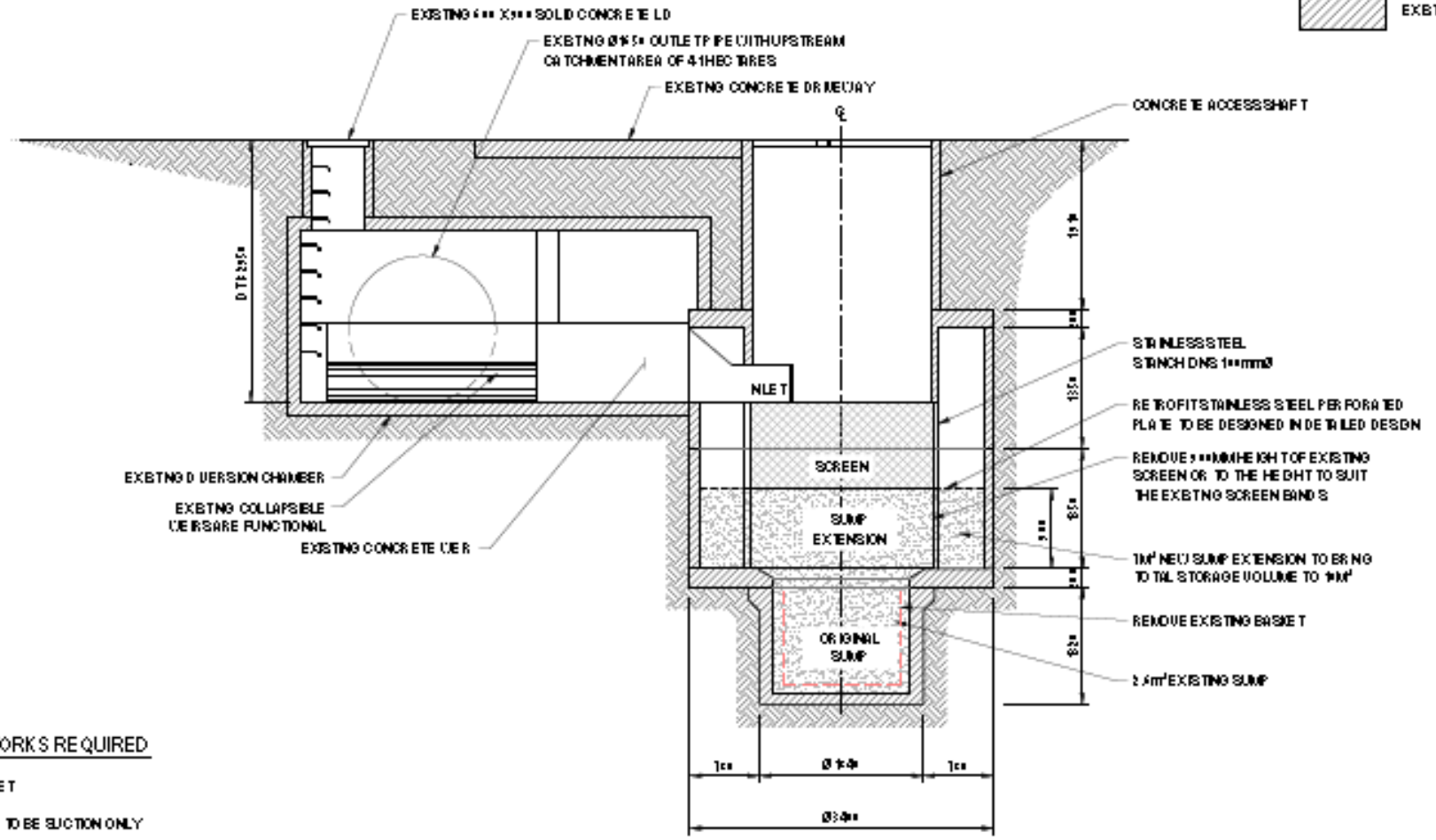
optimal stormwater
LEVEL 5 704 VICTORIA AVENUE
CHATSWOOD NSW 2067

Heatherton Road 60 hectares

A3

LEGEND

EXISTING CONCRETE



SECTION

SCALE 1:30

RECTIFICATION WORKS REQUIRED

1. REMOVE THE BASKET
2. CLEANING METHOD TO BE SUCTION ONLY
3. GPT RECTIFICATIONS TO INCREASE SUMP CAPACITY TO 1M³ TO STORE MORE POLLUTION AND REDUCE CLEANING FREQUENCY

0 1000 2000 3000 4000 5000mm

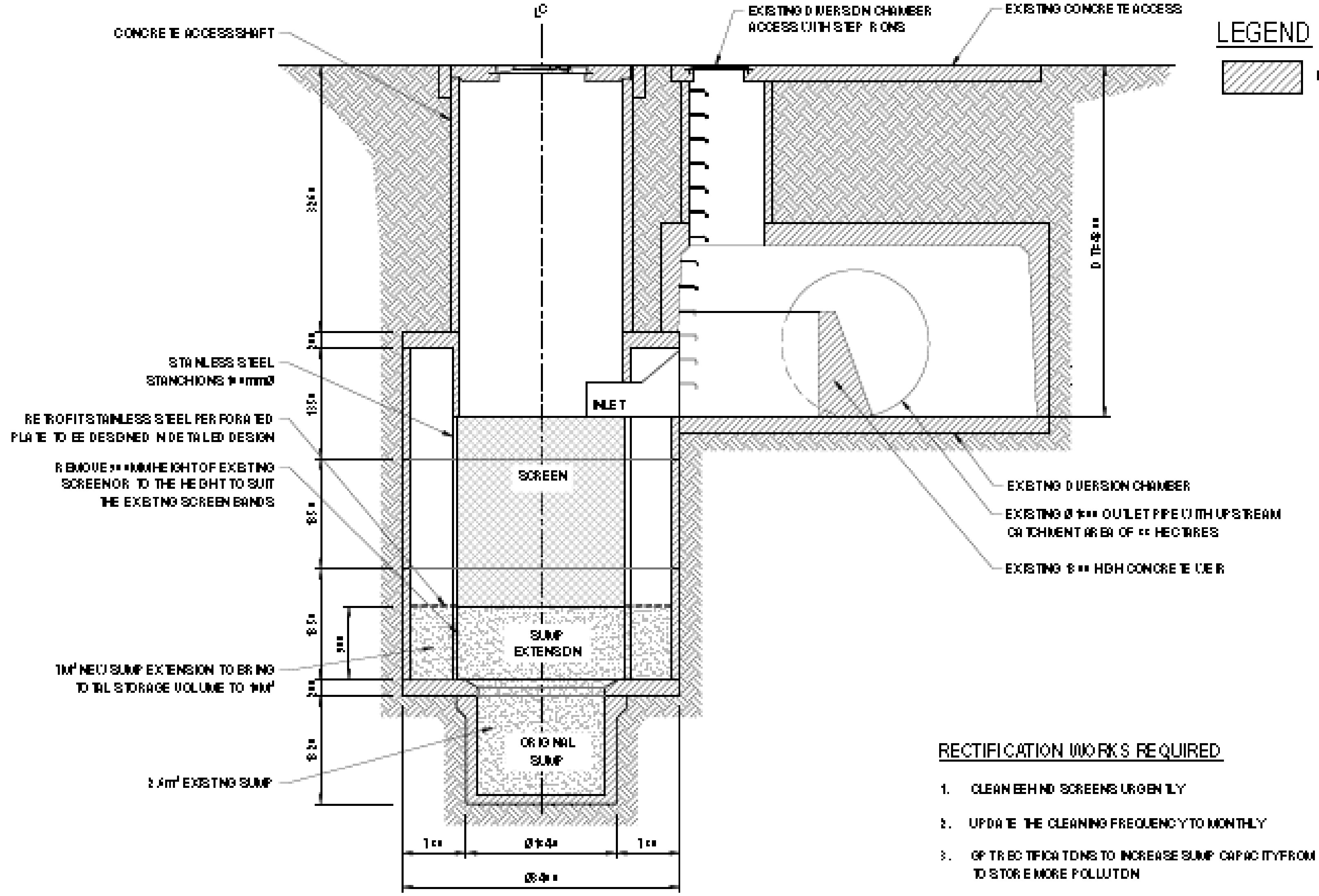
SCALE 1:50

CONCEPT

			Client: DANDENONG COUNCIL	optimal stormwater LEVEL 5 10 VICTORIA AVENUE CHATSWOOD NSW 2067	Project: GPT RECTIFICATION HEATHERTON ROAD (CDS 2015R)	Drawn: D.Tran	Designed: H.Williamson	Date: Nov 2017
			Survey type: N/A			Checked: S.Rajachanya	Approved: M.Powell	Scale: As shown
01	ISSUED FOR CONCEPT	HW/MP			Title: SECTION	Drawing number: 16942_SK_C201		Revision: 01
REVISION	AMENDMENT	DATE						

Steven Street 88 hectares

A3



LEGEND

EXISTING CONCRETE

RECTIFICATION WORKS REQUIRED

1. CLEAN BEHIND SCREENS URGENTLY
2. UPDATE THE CLEANING FREQUENCY TO MONTHLY
3. GPT RECTIFICATIONS TO INCREASE SUMP CAPACITY TO STORE MORE POLLUTION

SECTION

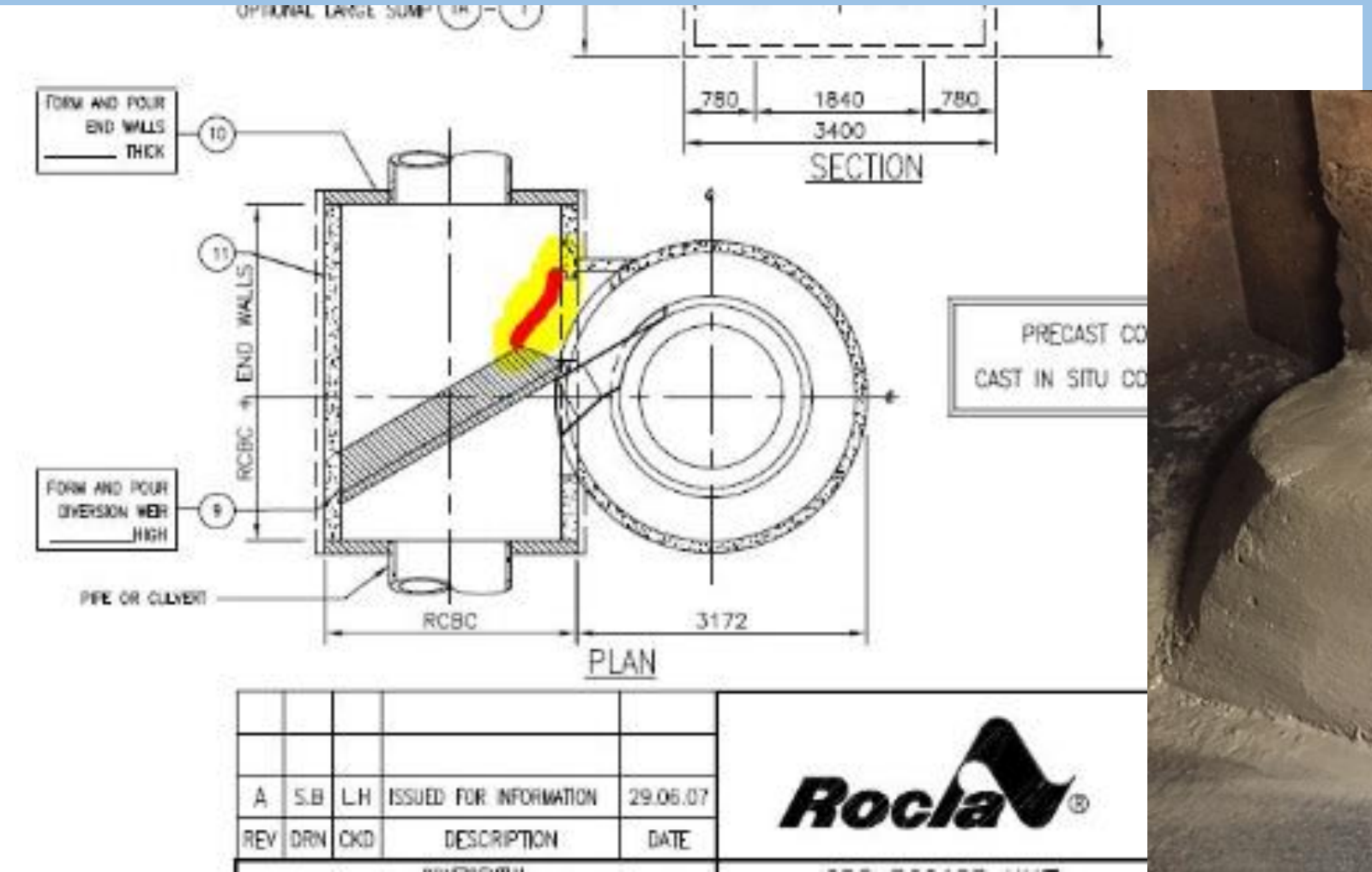
SCALE 1:50

CONCEPT

Client	DANDENONG COUNCIL
Surveyor	N/A
	ISSUED FOR CONCEPT

optimal stormwater

Project	GPT RECTIFICATION STEVEN STREET (CDS 2028L)
Title	SECTION
Drawn	D. Tan
Designed	H. Williamson
Date	Nov 2017
Checked	S. Bajracharya
Approved	M. Powell
Scale	As shown
Drawing number	16942_SK_C202
Revision	01


780
1840
780
3400
SECTION
FORM AND POUR
END WALLS
THICK
10
11
RCBC
END WALLS
FORM AND POUR
DIVERSION WEIR
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PIPE OR CULVERT
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3172
PLAN
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So, what have we learnt?

- No#1 criteria: don’t flood anyone!
- Approx 1 tonne or 1 cubic meter per hectare per year
- Storage volume to cater for 3 month cleaning
- Cleaning contractors like to decant all the silts back!
- Don’t believe glossy brochures or proprietor (conflict of interest)
- Flowrate is only ONE PARAMETER, and nowhere near the most important parameter for GPT selection.

Common Maintenance Faults

- CDS Units: not fully cleaning the large sumps
- CDS Units: not inspecting behind the screens or diversion chambers on a yearly basis
- Cleansalls: not removing the basket (gets buildup underneath)
- Cleansalls: not suction cleaning sediment sump
- Ecosols: not inspecting or cleaning the rear sump area
- Ecosols: not jetting and sucking behind the screens.
- Humegards: not checking and clearing the moving weir
- Humeceptors: not inspecting the inlet downpipe
- Stormceptors: not getting inside to inspect

Maintenance Triggers

- CDS Units: when the sump is full
- Cleansalls: when the basket is blocked or half full
- Humegards: when the comb is blocked or half full
- Ecosols: when the screens are blocked or half full
- Ecosols: when the back sed sump is ¼ full
- Trashracks: when the racks are blocked or area in front of racks is half full
- Nets: when the nets are ¼ full
- Skijumps: when water ponds for more than a day, and mesh half blocked
- Stormceptors: when inlet area is ¼ full or coellescer ½ blocked
- Booms: if 10m long, trigger when 5 meters square of floatables

More Common Maintenance Faults

- Pool scooping the surface is NOT cleaning it
- Don’t know how deep it is, or how big the sump is
- Not inspecting diversion chambers
- Not inspection device inlets and screens
- Not inspecting and cleaning behind screens
- Not unblocking direct filter screens
- Not inspecting downstream for backwater impacts
- Not cleaning Ecosols (5 steps) every second time!
- Cleaning 3 devices and “averaging/guessing” the results
- Not opening and greasing all lids

Common corrective actions

- GPT audit to identify all issues
- If maintenance issues, speak to cleaners directly
- Write a cleaning spec for each device, so everyone knows exactly what is expected
- Council to audit/check after the cleaners have been (at least once per year)
- Suction behind CDS screens
- Remove all cleansall baskets and suction clean entire device
- 5 step cleaning process for Ecosols
- Suction clean pit baskets (bad WHS to try and lift out the pollution)
- Understand a REGULAR clean and an ANNUAL clean

A focus on trashracks

- Monitoring required weekly/fortnightly
- Unblocking using pitchfork or rack or spade weekly/fortnightly
- Visit the day before the ensure trashrack not holding water
- Remove into a pile and allow to drain dry
- Pooled water on galvanised mesh causes it to corrode fast
- Vertical racks SOOOO much better than horizontal or mesh

- Clean up environment downstream

Disposal of waste and water

- Decant water to Council grassed/vegetated area if possible
- Only decant downstream if no other option
- Remove then replace water back into the GPT
- Cant discharge it to sewer
- Council to create a “decant bio basin” in Penrith?

- Pollution to landfill or “recycling”
- Total Drain Cleaning have new recycling facility

Upgrades and Rectifications

- Undersized, blocks rapidly, poor access, etc

- Many ways to upgrade, only limited by $$$$$
- Difficult (but not impossible) to upgrade most proprietary GPTs
- Trashrack performance, proportional to rack aperture and rack area. Therefore enlarge rack area
- NO MESH, only vertical racks. Minimise cross supports, and only have them on the back
- Post supports to be set in concrete or whole pad behind the rack
- Use flat concrete stub walls infront of rocks at trashracks

Upgrades and Rectifications

- Site weeding and veg management to prevent backwater and making the site “attractive” minimises illegal dumping. If it looks like a tip, people will treat it like one.
- Access and hardstand maintenance areas, very important
- Some lids too heavy
- Some devices just too small, expand or replace
- Primary sediment sumps to extra storage
- Sequential trashracks if manual or suction cleaning
- Treatment train or multiple devices

Questions