

# GEOFABRICS®

**ecoAID®**

Underground Stormwater  
Management





# ecoAID<sup>®</sup> OVERVIEW

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ecoAID<sup>®</sup> is an underground modular stormwater system used for detention, infiltration or harvesting stormwater runoff. The system also provides stormwater treatment by utilising a 'Catch-All-Row' (C-A-R) as an internal gross pollutant and sediment trap. The dual function of stormwater collection and treatment allows the engineer to optimise the drainage layout by minimising the number of manhole pits, with the added benefit of omitting the need for external gross pollutant and sediment traps.

The ecoAID<sup>®</sup> chamber system can provide both primary and secondary treatment through the removal of gross pollutants and sediment via

physical screening, sedimentation and filtration techniques. The ecoAID<sup>®</sup> system is easily maintained from street level via the C-A-R utilising a Jet-Vac cleaning unit with a high pressure hose.

ecoAID<sup>®</sup> is an exceptionally strong and robust water storage and treatment system that is capable of being used under public roads, car parks, sports fields and public open space. This provides the engineer with opportunities to save valuable land space and protect natural waterways from the damaging effects of pollution from both new and existing developments.





The ecoAID® system is manufactured in Australia and is a proven cost effective alternative to imported systems. Local manufacture not only supports the Australian manufacturing industry, it also provides shorter product lead times and a financial boost to the local economy.

Each ecoAID® chamber weighs only 15kg allowing for safe and easy installation on site. Contractors are able to install ecoAID® quickly and efficiently meaning system installation times are reduced, therefore saving on cost.

ecoAID® can be installed in a single or double layer configuration to meet project specific requirements.

ecoAID® has been used throughout Australia on many types of projects including:

- ✓ High end commercial developments
- ✓ Residential and sub-division
- ✓ Local and State government projects including schools and hospitals
- ✓ New sports fields for water harvesting
- ✓ Drainage under public roads
- ✓ Open sump conversions into Public Open Space

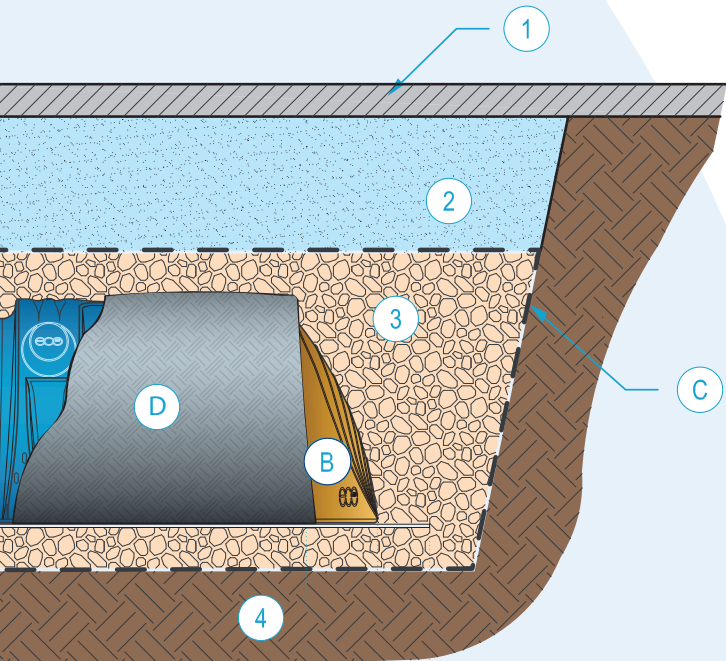




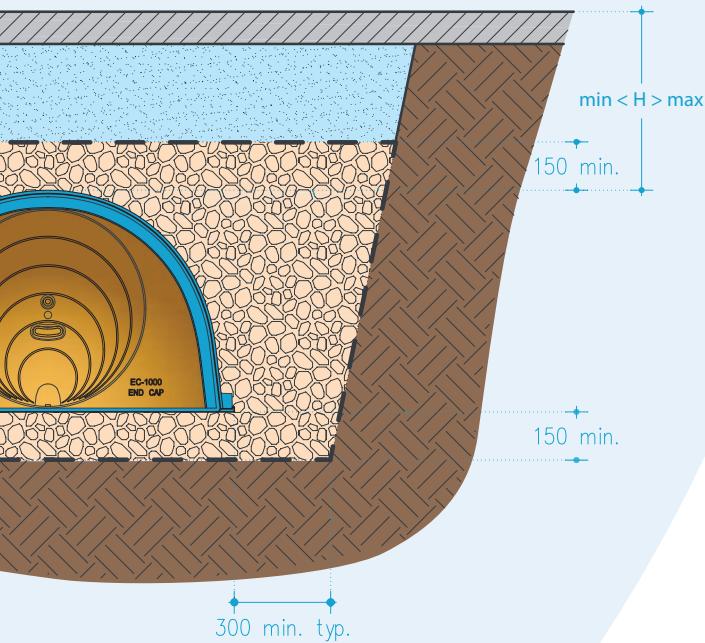


ecoAID®

# Technical Data



150mm typically



Chamber Volume (m <sup>3</sup> )	0.516m <sup>3</sup>
Min Installed Storage (incl. 150mm rock bedding and cover layer) $p_s = 0.40$	0.822m <sup>3</sup>
Chamber Physical Length	1.00m
Chamber Installed Length	0.97m
Chamber Width	1.16m
Chamber Height	0.68m
Min Installed Storage Height (incl. 150mm rock bedding and cover layer)	0.98m

## LEGEND:

- A. ecoAID® EC1000 Chamber
  - B. ecoAID® EC1000 End Cap
  - C. bidim® A24 non-woven geotextile surround
  - D. bidim® Filter Wrap (over C-A-R)
  - E. 40kN Woven geotextile (along base of C-A-R)
1. Finished surface layer as specified by design engineer
  2. Backfill material as specified by design engineer
  3. 20-50mm  $\varnothing$  drainage rock/RCC/scoria
  4. Subgrade
  5. 150mm – 625mm  $\varnothing$  (OD) inlet pipe
  6. Connecting pipe network
  7. Manhole inlet structure
  8. 100mm – 150mm  $\varnothing$  optional inspection/ventilation pipe
  9. 100 – 150mm  $\varnothing$  optional lateral equalisation pipes

\* The rock component provides additional storage and its porosity (typically 40%) is used when calculating the tanks overall storage capacity.

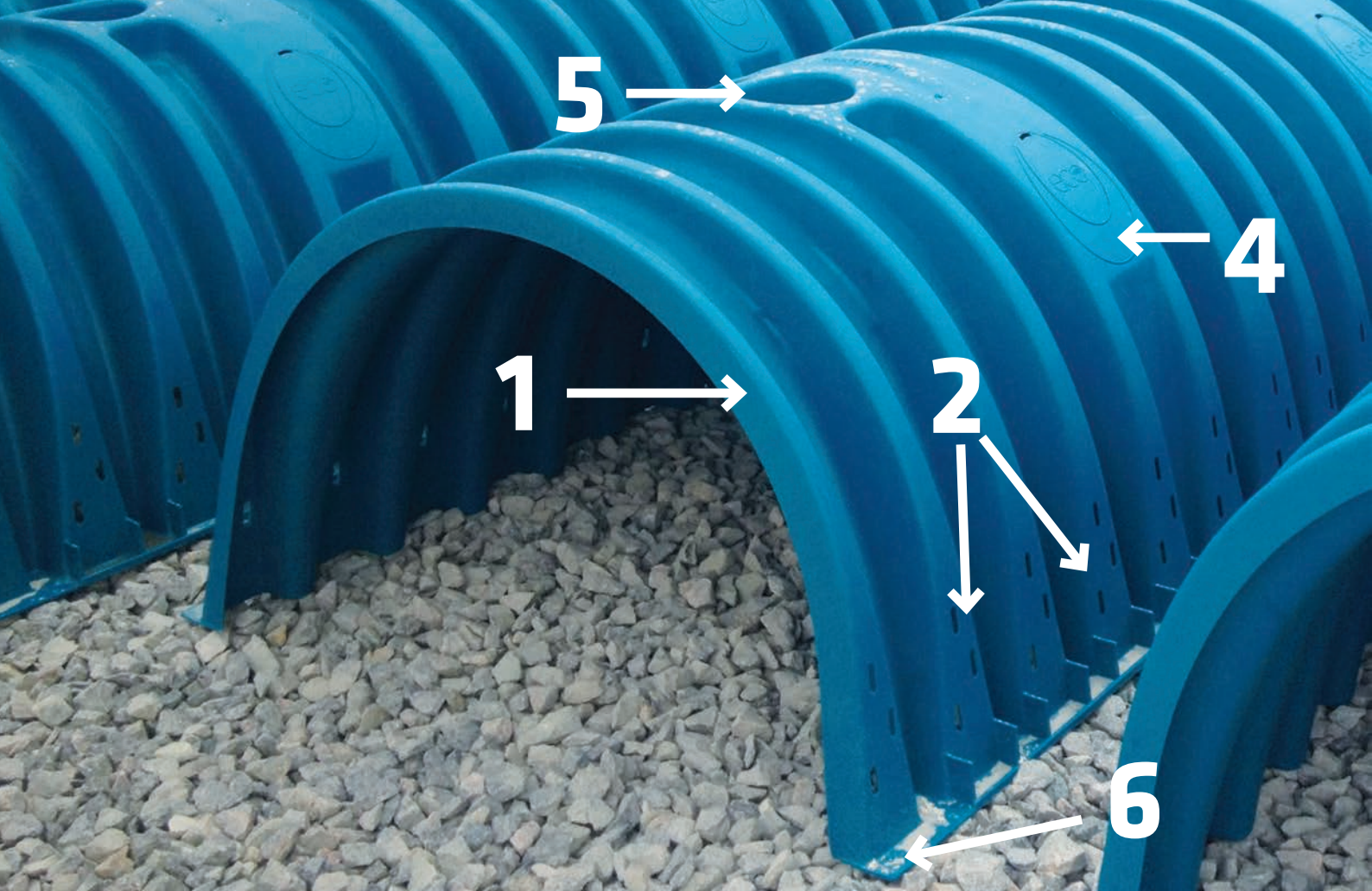
\* The ecoAID® system can be installed in a single or double layer configuration.

\* Please refer to our ecoAID® standard detail drawings for more information.

ecoAID® COVER REQUIREMENTS		
NOT SUBJECT TO VEHICLE LOADING <i>eg - Public open space</i>	H <sub>min</sub>	H <sub>max</sub>
	300	2500
SUBJECT TO VEHICLE LOADING		
<i>not in roadway</i>	450	2500
<i>in sealed roadway</i>	600	2500
<i>under unsealed roadway</i>	750	2500

■ minimum required values    ■ maximum allowable values





## KEY FEATURES & BENEFITS

- 1** **Corrugated Arch Design** – incorporating a true parabolic inner profile for optimum load-shed via soil arching, with boxed-out corrugations providing arch stiffness and rigidity ensuring structural integrity over the system’s 100 year+ design life.
- 2** **Six slots per corrugation** – Reducing chamber emptying time.
- 3** **End Cap to close out row** – Flat end cap base design ensuring no rotation of end cap and chambers occurs when backfill material is placed. The end caps have cut out guides accommodating pipe inlets up to 625mm outside diameter.
- 4** **Moulded side entry ports (100mm Ø or 150mm Ø)** – Integrated lateral pipe ports allowing side entry lot connections directly into the ecoAID system and also used to aid system equalisation and water distribution.
- 5** **Moulded vertical entry ports (100mm Ø or 150mm Ø)** – Integrated vertical pipe ports to accommodate breather pipes for system ventilation, inspection access and used for water extraction pipes on stormwater harvesting applications.
- 6** **Keyed feet with stiffeners** – The flat keyed feet of the chambers are locked into place by the embedment aggregate preventing movement during backfill placement and compaction.
- 7** **Each chamber weighs only 15 kg** – Can be installed by one person ensuring safe and rapid installation.
- 8** **Single or double layer configuration** – Can be designed and installed in two layers to increase effective volume.



# STORMWATER QUALITY AND TREATMENT

## 'Catch-All-Row' (C-A-R)

The ecoAID® system utilises a stormwater treatment device called a 'Catch-All- Row'. The C-A-R retains gross pollutants, sediment and other contaminants whilst allowing clean water to enter into adjacent rows before infiltrating into the surrounding soil or being discharged downstream. The C-A-R row is connected to the inlet pit and provides a large volume for sedimentation and solid deposition (*figure 1*). This in turn enhances the capabilities of stormwater treatment and greatly extends the maintenance return intervals.

The C-A-R acts as a primary and secondary treatment measure by removing gross pollutants and sediments including total suspended solids (*figure 2*). The C-A-R can also be used in conjunction with traditional treatment measures as part of a wider external treatment train to further improve the stormwater quality entering into local waterways.

## Geotextiles

Stormwater entering into the ecoAID® system is filtered by a woven geotextile (*figure 3*) which is laid along the base of each C-A-R and then ex-filtrates into the stone bedding. Additional filtration and exfiltration of stormwater occurs via the chamber slots which are surrounded with a bidim® non-woven geotextile along the entire length of the C-A-R (*figure 3*).

## Unique features of C-A-R

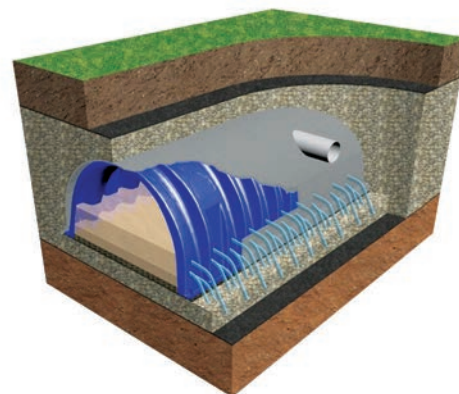
- ✓ Large filtration area – each chamber has a large surface area which permits filtration of stormwater through the bottom woven geotextile.
- ✓ Large sediment storage volume – greatly extending maintenance return intervals.
- ✓ Serviceable due to unimpeded access for cleaning.

## Modelled in MUSIC

The ecoAID® system (i.e. C-A-R) can be modelled in MUSIC and therefore the redundancy of additional GPTs in certain conditions can be demonstrated – although in some circumstances the use of additional filter media or 3rd party devices may be required to meet nutrient load reduction targets.



(figure 1)



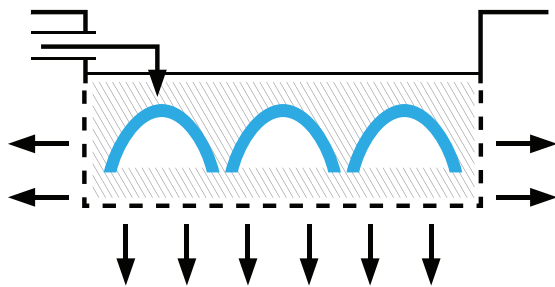
(figure 2)



(figure 3)



## Infiltration



Infiltration tanks play an important role in Water Sensitive Urban Design (WSUD) by aiding modern stormwater construction practices and providing a 'sustainable' solution which protects the environment and takes advantage of natural site features and minimises any detrimental impact on the water cycle.

There are many environmental and economic benefits associated with onsite infiltration including reducing peak stormwater flows, reducing the quantity of stormwater runoff, reducing stormwater drainage capital costs and improving stormwater quality.

The ecoAID<sup>®</sup> system can be used to control stormwater at 'source' by managing stormwater run-off from paved areas, impermeable roof tops, rainwater tank overflows and soft landscaped areas. Runoff from each of these sources can be directed

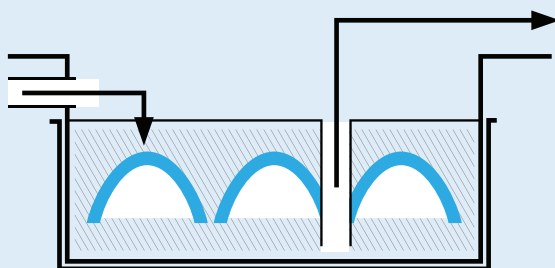


by pipes and overland into the ecoAID<sup>®</sup> system where the stormwater is temporarily stored before infiltrating back into the natural ground.

In order to improve the quality of stormwater run-off before infiltration takes place, ecoAID<sup>®</sup> utilises an internal treatment device called the 'Catch-All-Row'. The C-A-R effectively cleans and filters run-off water by preventing gross pollutants and fine to coarse sediments from entering the storage rows of the ecoAID<sup>®</sup> tank.

In addition to improving stormwater quality, the large infiltration surface area provided by the base and side walls of the ecoAID<sup>®</sup> system greatly enhances soakage response and system emptying times ensuring local design requirements are achieved.

## Harvesting



Stormwater harvesting involves collecting, treating, storing and re-using stormwater runoff from urban areas and is considered to be a viable and cost effective alternative to using local town water supplies. The typical stages of any stormwater harvesting schemes are:

- Harvest (stormwater is collected from the source)
- Treat (to reduce pathogen and pollution levels)
- Store (to retain stormwater for re-use)
- Distribute (stormwater is distributed to the area of use)



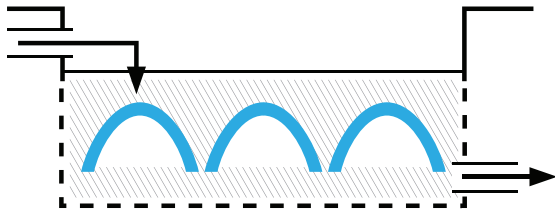
## Harvesting continued

The ecoAID® system used in conjunction with a suitable liner system is an ideal solution for collecting, retaining and distributing treated stormwater for re-use in irrigation and toilet flushing applications on new sporting facilities, industrial complexes, new schools and hospital developments.

ecoAID® is compatible with scoria, a light volcanic rock that plays a valuable role in algae buildup whereby a bioactive film on the scoria contributes to the removal of nitrogen and phosphorous. After initial gross pollutant, sediment and nutrient removal via ecoAID's® 'Catch-All-Row' and scoria rock, further treatment takes place through the use of bio retention gardens, sand filters and UV disinfection (removal of bacteria and viruses) before being pumped to its area of use.



## Detention



Traditional philosophy of stormwater management is to collect and dispose of stormwater runoff via a piped conveyance system as effectively and efficiently as possible in order to prevent flooding of properties and local streets. However, urbanisation and the increase in new developments means this method of stormwater management is no longer sustainable as it puts an ever increasing burden on existing drainage infrastructure and often leads to a number of environmental and economic issues.

To help alleviate these problems the ecoAID® stormwater management system can be designed and constructed as a stormwater detention tank (with or without an impermeable liner) to meet both permissible site discharge and site storage requirements by acting as a water storage tank and releasing this water into the local drainage network at a controlled rate.

ecoAID® can also be used as part of a stormwater quality and treatment management plan by providing primary or secondary treatment measures in the form of a proprietary 'Catch-All-Row' which deals with both gross pollutants and a high percentage of total suspended solids (TSS).





# STRUCTURAL

ecoAID® is an exceptionally strong system that can withstand high loading conditions (live & dead loads). The system draws its strength by distributing loads from above into the surrounding rock via soil arching.

The ecoAID® chamber system has been designed, manufactured and structurally tested in accordance with **ASTM F2787** (Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers). As per ASTM F2787 ecoAID® has been designed and independently **assessed using finite element analysis** (FEA) and has **undergone full scale field testing** to validate model results. In addition, ecoAID® has been load tested to the Australian standard **AS 5100.2** (Bridge Design Code) meaning ecoAID® is suitable to be installed under Australian roads and car parks.

## ecoAID® is designed manufactured and tested to ASTM F2787.

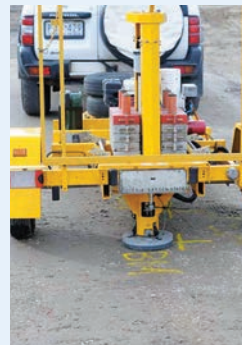
- Is made from injection moulded virgin polypropylene (PP) co-polymer with high impact and creep resistance, and UV-stabilised masterbatch resin.
- Has been independently assessed using FEA (ASTM clause 5.5 & 6.1).
- Has undergone full scale field testing to validate structural results (ASTM clause 9.1).
- Has been assessed using 100 year creep values (elastic modulus E) for both short term live loads and long term dead loads.
- Exceeds the following serviceability requirements (deflection limits).
  - ✓ Localised buckling of chamber walls
  - ✓ Tensile strength of chamber walls
  - ✓ Global buckling of chamber walls
  - ✓ Foundation material stresses
  - ✓ Subgrade material stresses
- Has been load tested to AS 5100.2

## What does AS 5100.2 mean?

- ✓ Australian factored design wheel loads to a very high standard.
- ✓ ecoAID® can accommodate M1600 moving axle loads of 16 tonne per axle (1.8 Live Load FoS)
- ✓ ecoAID® can accommodate W80 wheel loads of 8 tonne per wheel (1.8 Live Load FoS).
- ✓ ecoAID® can accommodate tyre contact pressures up to 800 kPa over an area of 0.1m<sup>2</sup> @ 600mm cover.
- ✓ ecoAID® exceeds AS3996 Class D rating for carriageways of roads & areas open to commercial vehicles.
- ✓ ecoAID® has considered short term live loads and long term dead loads within in service conditions.

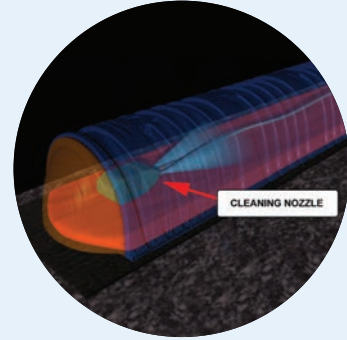
It is extremely important for any underground stormwater collection system to be designed, manufactured and tested to a recognised standard as this protects the end user and ensures the system is suitable for use under Australian roads and car parks.

Please request a copy of our 'ecoAID® EC-1000 Stormwater Chamber Analysis' report for more details.





# MAINTENANCE & INSPECTION



To minimise OH&S risks the inspection procedure is carried out from the surface via the access structure connected to the 'Catch-All-Row' or from the vertical inspection pipe. The inspections are visual and will verify the depth of pollutant built up within the row.

The maintenance procedure is carried out with the Jet-Vac process which utilises a high pressure water hose. The pressure of the nozzle propels the hose to the end of the C-A-R while jetting and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole sump and vacuumed.

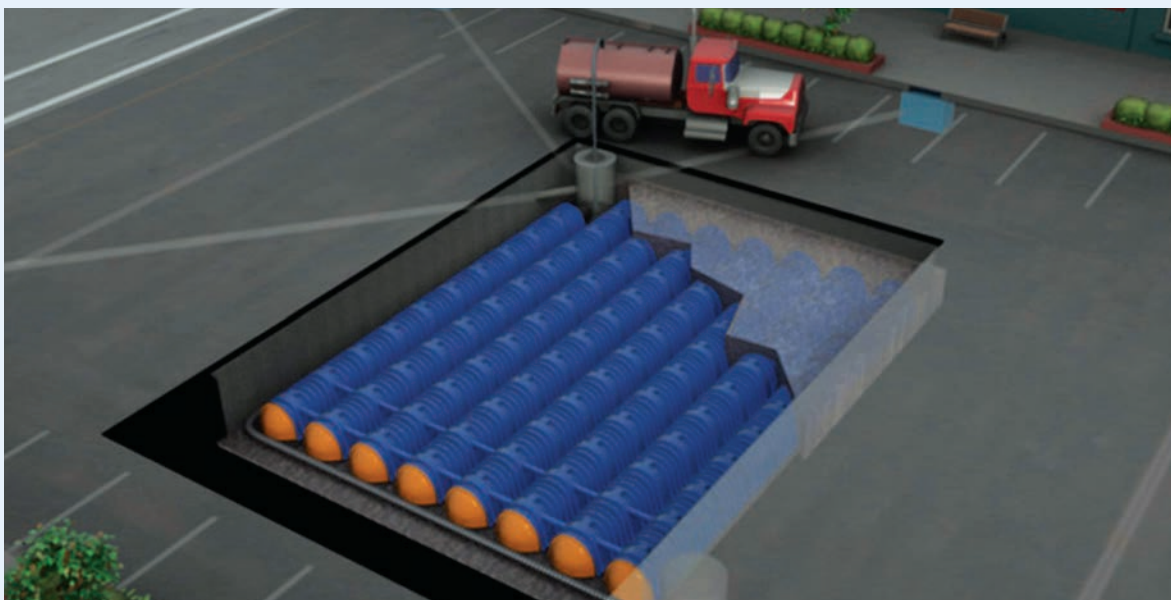
A maintenance schedule needs to be established for each individual location based upon site specific variables such as:

- Type of land – industrial, commercial, residential
- Anticipated pollutant load
- Percent imperviousness
- Climate

An accurate maintenance interval can be determined by regular, logged inspections, recommended at no more than 6 monthly intervals initially.

## Reducing maintenance costs

The environmental benefits of solids removal are well documented, however the more effective a system is at removing contaminants and solids the more often it will need to be cleaned – yes? Well, not necessarily. It also depends on the volume available for sedimentation and solids deposition. ecoAID® enables the designer to maximise this volume and extend the maintenance return interval, so you spend less time and money cleaning out.





## ENVIRONMENTAL

### 100% RECYCLABLE

The system is 100% recyclable and has been load tested with recycled crushed construction waste for the rock drainage media, potentially diverting many tonnes away from landfills.

### AUSTRALIAN MANUFACTURED

ecoAID® is manufactured in Australia at a state-of-the-art ISO 9001 accredited manufacturing facility featuring low energy consumption and servo-hydraulic plant with energy savings between 20 and 80%.

### LOW CARBON FOOTPRINT AND CARBON MILES

With ecoAID® being manufactured in Australia, the 'carbon miles' are lower than imported systems. The stacking and transportation efficiency makes ecoAID® chambers a sound environmental choice compared to oversize round pipe or concrete tanks in detention and infiltration applications.

### LONG SERVICE LIFE

ecoAID® is manufactured using injection moulded UV stabilised virgin polypropylene ensuring it meets its 100 year+ in service design life. The storage is serviceable due to unimpeded access to the 'Catch-All-Row' for cleaning and maintenance from the ground surface level, so storage volume is not lost over time.

## TECHNICAL SUPPORT

Geofabrics are able to provide technical support to design engineers, architects, developers and contractors. Our technical hub can provide information relating to application suitability, system sizing, design specifications and full CAD design suggestion drawings. Feel free to contact us directly using the details below, or visit our website where additional general and technical information is available.

## GEOFABRICS.CO

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