

Permeable Paving



The Concept

The concept of Ecopave® permeable paving is already well established in many countries where development threatens already over-stretched drainage and river systems. As more land is developed and covered with impervious surfaces, our stormwater and river systems are under increasing pressure to manage the high volumes of surface run-off now entering them and the potential for downstream flooding is higher.

As an alternative to conventional paving (which concentrates water and pollutants within the existing drainage systems) the ECOPAVE® ecological paving series encourages water to infiltrate through the pavement surface and substructure to the ground below.

Features

ECOTRIHEX®

Cost effective

Environmentally sensitive

Pedestrian friendly

Honing options

Custom colours

Benefits

Type A interlocking system.
Permits water to drain through the surface into the layers below.
Compatible with Adbri Masonry's TRIHEX® interlocking pavers.
Similar load bearing capabilities to other interlocking pavers.

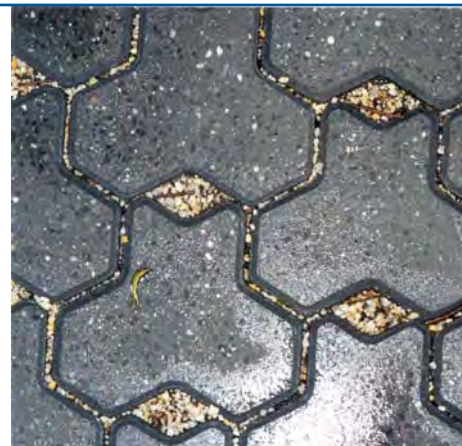
Reduces the need for costly underground retention systems.
Reduces the need for additional surface drainage.
Reduces the load on existing drainage systems.
Minimal maintenance costs.

Maintains air and water supplies to trees and landscaped areas.
Helps restore and maintain the natural water table.
Alleviates drainage, downstream flooding and pollution problems.
Controls surface run-off that can lead to soil erosion.
Moisture evaporation from the base course is reduced.

By utilising ECOTRIHEX® Pavers with TRIHEX® Pavers, designers can integrate pedestrian and permeable areas seamlessly together.
Litter, including leaves, is easily swept from the pavement surface.
Pavement profile provides good pedestrian comfort and an attractive and functional pavement.

Both shapes can be honed to create an interesting terrazzo effect.

For large projects, colours outside of the standard range may be manufactured.
Contact your local representative for details.



The Product What is it?

ECOTRIHEX® permeable pavers are type A interlocking pavers as determined by CMAA T44: Concrete Segmental Pavements - Guide to Specifying.

Manufactured using high quality materials to comply with AS4455, ECOTRIHEX® permeable pavers offer the aesthetic qualities demanded by specifiers in conjunction with the durability required of pavements and roads.

ECOTRIHEX® permeable paving system consist of permeable surface overlaying permeable base and sub-base materials. By modifying well established paving shapes Adbri Masonry has produced a pavement surface that creates small openings along the joints or have enlarged joints. These joints are filled with a uniform gravel to create drainage voids through the pavement surface.

Research from the University of NSW has shown that ECOTRIHEX® permeable paving with 2-5mm gravels as the bedding and jointing material can allow rainfall intensities of 900L/sec/ha to be accepted.

Because the ECOTRIHEX® system is based on well-proven segmental paving shapes and are laid on a fully engineered sub-structure, they provide the superior structural performance of conventional interlocking segmental pavers.



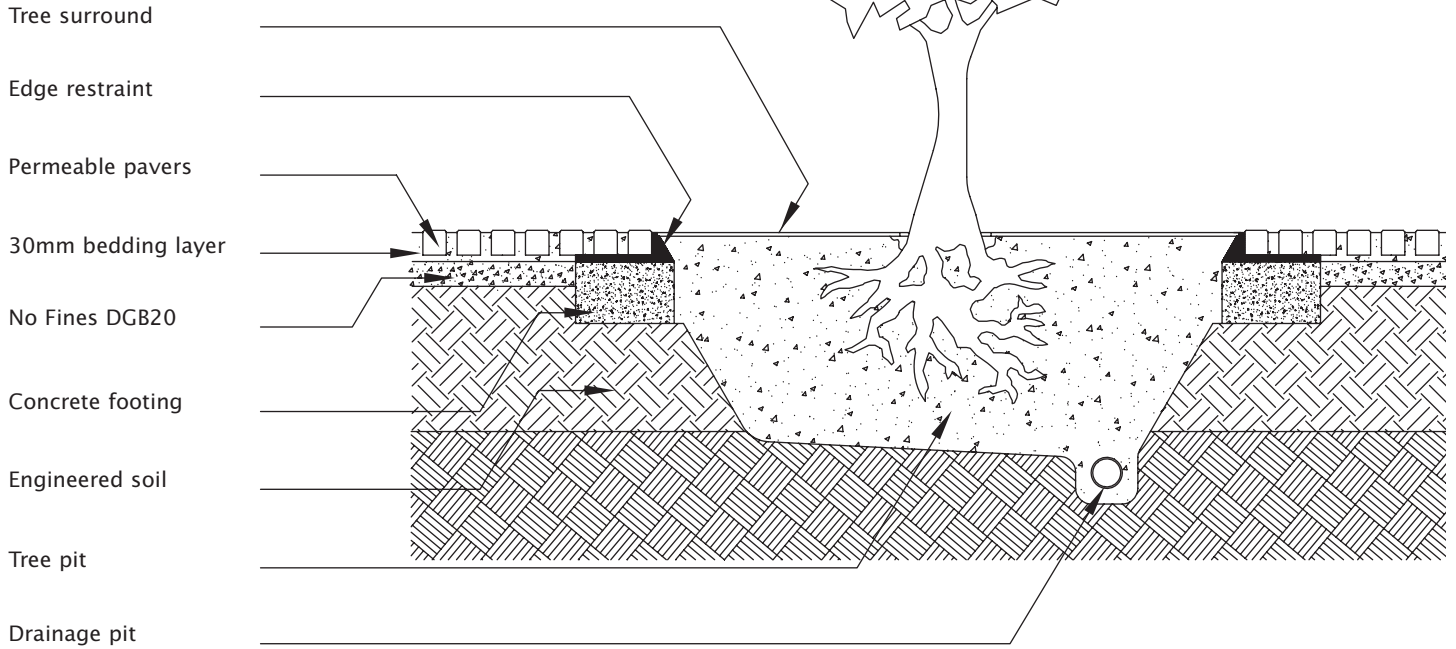


Paver: Ecotrihex® **Colour:** Ebony **Finish:** Honed Custom Aggregate



- Car parks
- Public areas subject to pedestrian traffic
- Tree surrounds
- Stormwater retention
- Roads and roadside parking
- Surface run-off control
- Dedicated wash areas
- Paved areas for residential units and cluster housing

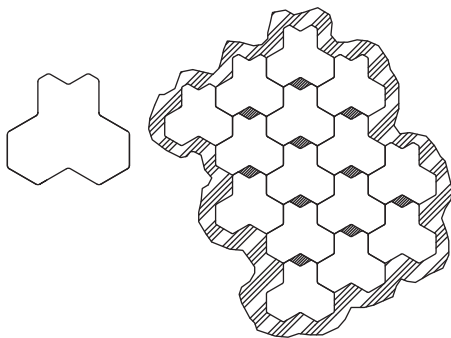
Mature Tree and Paving Arrangement



ECOTRIHEX® Permeable Pavers

Cutting options at header course.

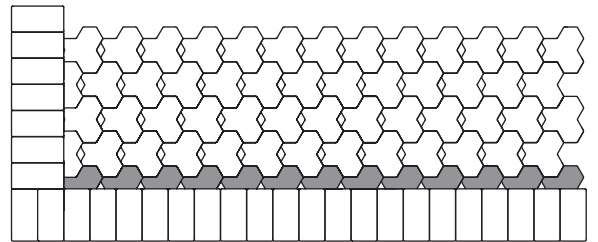
When cutting pavers for vehicular traffic we do not recommend cuts of less than half a paver be used.



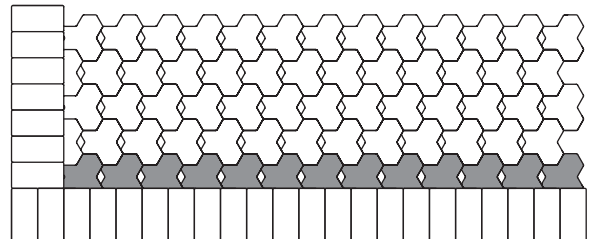
Drainage voids
2-5 aggregate

Bedding layer
5mm aggregate

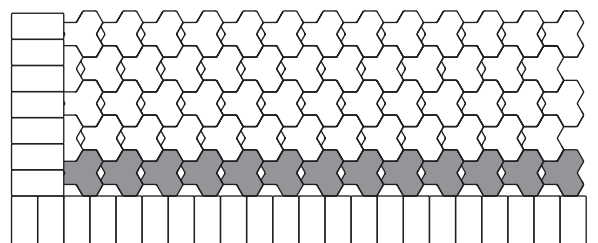
Option 1



Option 2



Option 3



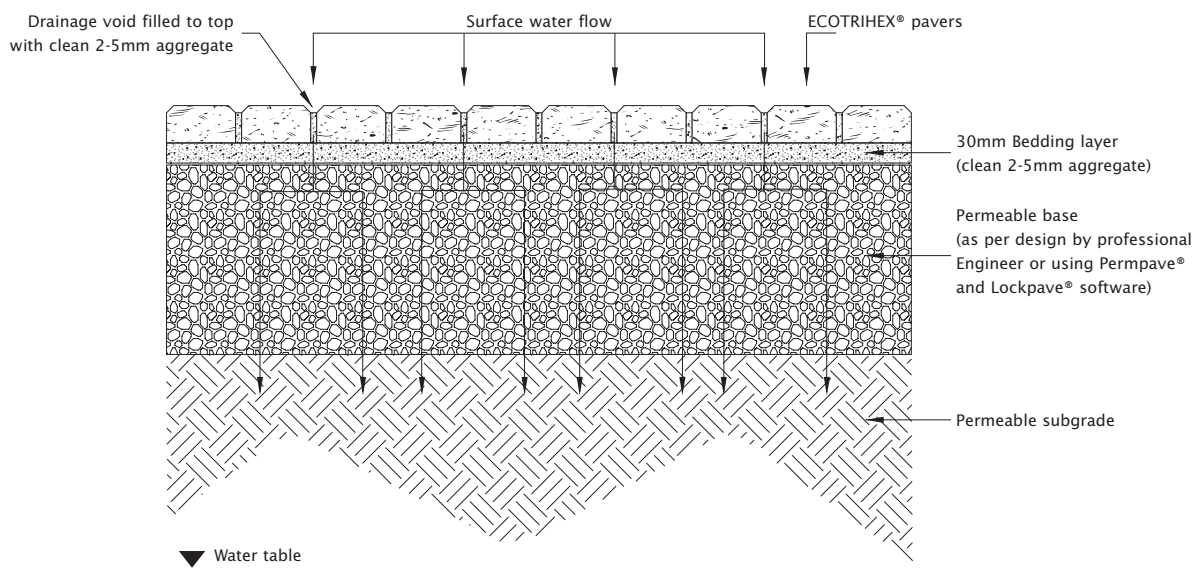


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Some Examples of Possible Base Course Drainage Design are:

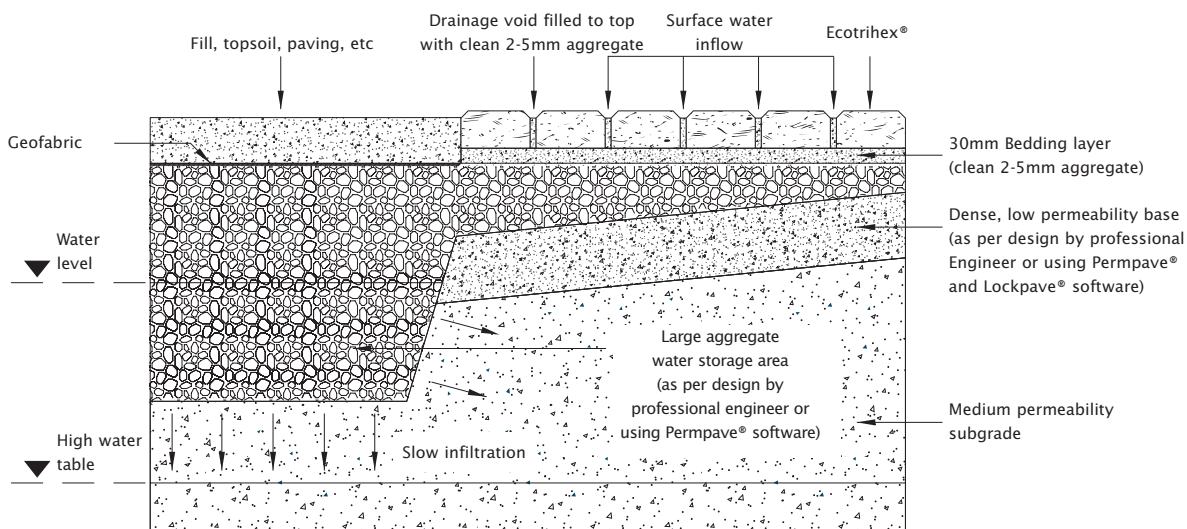
01: Direct Drainage into Permeable Subgrade

On permeable soils, the permeable paving system is placed on a permeable base that allows infiltrated water to flow directly into the subgrade under the paving.



02: Temporary Storage and Slow Filtration into Medium Permeability Subgrade

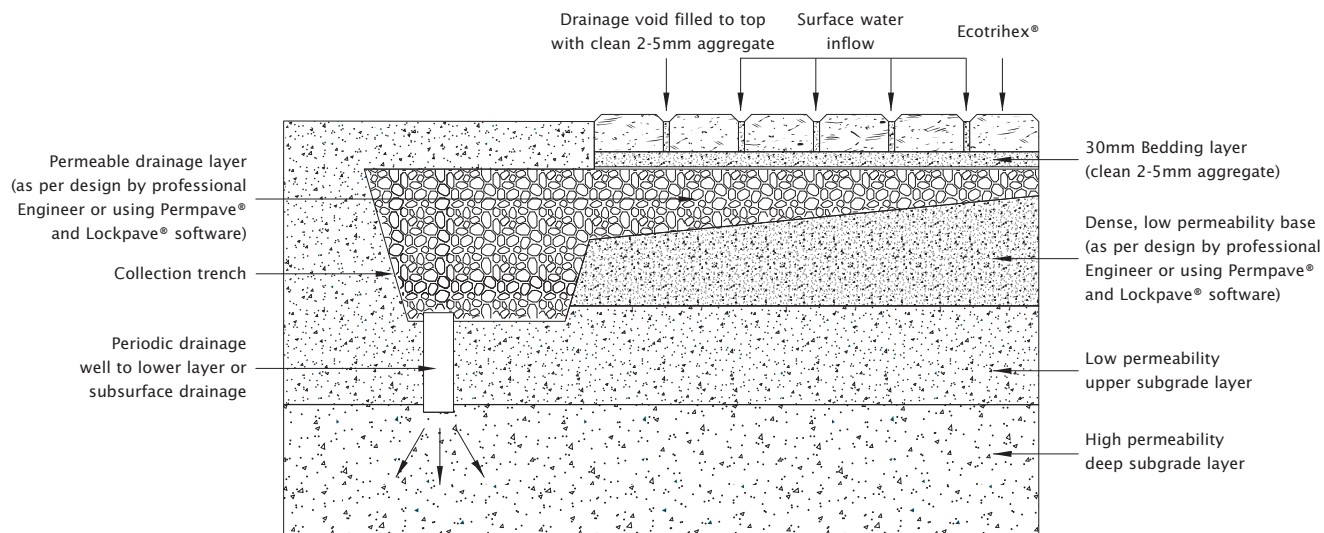
On less permeable soils, the permeable paving system is placed on a permeable drainage layer that may overlay a dense, low permeability base and sub-base (as needed). Infiltrated water is then drained to an infiltration system that stores and gradually infiltrates collected stormwater.



These simple examples are just the beginning. They can be combined with each other and with other stormwater control methodologies to provide the solution needed. Because of the superior structural performance, you as the designer decide what is needed for each location, knowing that Adbri Masonry permeable paving systems provide the same structural performance as conventional interlocking pavers.

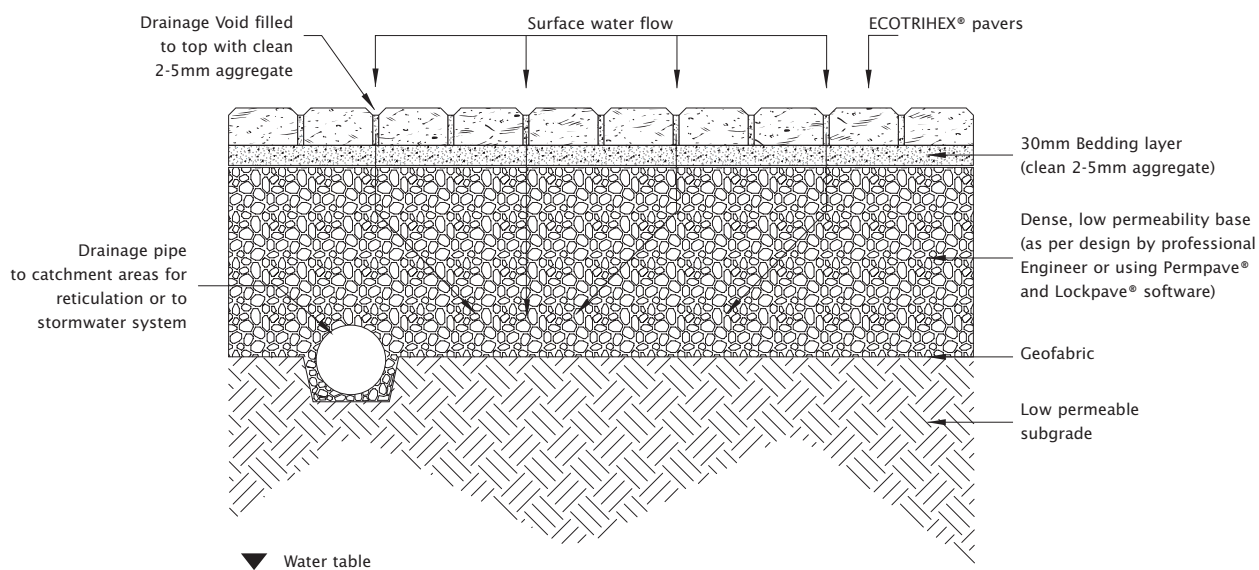
03: Drainage to a Highly Permeable Subgrade

In some areas, low permeability soils are situated over permeable layers at depth. Dense low permeability base and sub-base courses let water flow to a trench that has periodic drainage wells to the deeper layer. If water quality permits it may be possible to re-use the infiltrated water during dry conditions.



04: Collection and Disposal of Infiltration to Retention or Stormwater System

A few soils and sites will permit no infiltration. In these locations, the infiltrated stormwater is stored within the base and sub-base layers, to be collected by drainage pipes and eventually passed into the stormwater system.



Notes: Always check filter criteria between layers.
Use geotextile filters as needed.

Methods of Construction

One of the great advantages of Adbri Masonry's ECOTRIHEX® permeable paving system is that it is a Type A interlocking pavers and thus can be constructed in a manner similar to other segmental pavements with the exception of extra allowance for drainage.

The design and sizing of permeable pavement will depend on the purpose of the pavement and the traffic loadings expected. The Concrete Masonry Association of Australia (CMAA) publishes software for hydrology and hydraulic design, Permpave® and software for pavement thickness design, Lockpave®. Other paving guideline documents, T44 Concrete Segmental Pavements - Specification Guide; T45 Concrete Segmental Pavements - Design Guide for Residential Accessways and Roads and T46 Concrete Segmental Pavements - Detailing Guide are also available by download from the website, www.cmaa.com.au. Additional information on permeable paving including design, construction and maintenance guides, case studies and FAQ's can be found at www.paving.org.uk and also www.icpi.org.

The pavement consists of the soil subgrade, geotextiles where needed, aggregate base and/or sub-base layers as needed, bedding layer, the pavers and the aggregate in the drainage voids and joints. Soils with low infiltration rates may also need drainage pipes at the bottom of drainage layers. As a minimum the drainage should use methods such as those shown in Data Sheet 10 of the CMAA document T46 Concrete Segmental Pavements - Detailing Guide.

Site Works

One of the most critical aspects of the construction of permeable pavements is the prevention of sediment entering any permeable base layers and the pavement surface during construction. Installing silt traps and temporary drainage to divert run-off, and staging the excavation and construction of the pavement until after general works are complete can make the difference between a pavement that infiltrates adequately or inadequately.

Geotextiles

Geotextiles are used in most permeable pavement applications. Fine particles can become suspended in water and the purpose of the geotextile is to act as a filter between layers with different amounts of fine material. For example, a geotextile can prevent fine soil particles migrating into a drainage layer. Some geotextiles can also increase the strength and/or drainage capacity of the pavement.

Subgrade

The soil subgrade should be compacted to attain sufficient load bearing support and minimise subsidence (especially for pavements that are to take vehicular traffic and can be designed using the Permpave® and Lockpave® software available from the CMAA website - www.cmaa.com.au. This may affect the infiltration capacity of the soil but is tolerable if this loss of infiltration capacity is considered in the design of the pavement and drainage.

Base

The aggregate base thickness is determined by the need to store and infiltrate a certain amount of stormwater and by the need to support traffic. The crushed aggregates used can be slightly modified road authority fine crushed rock with improved void ratio or a free draining no-fines aggregate.

This material is compacted to the design specifications which will depend on the expected loadings. Combinations of standard and no-fines aggregate can be used and may be established to achieve the necessary load bearing support.

Bedding Layer

The bedding layer consists of a clean durable aggregate that is sized between 2mm and 5mm.

This size provides very good drainage capacity while maintaining the interlocking capacity. A material of this type typically has an effective porosity of 35-40%.

When placed over a permeable base the bedding layer need only be 30mm thick (after compaction). When placed over an impermeable base, the bedding layer provides the drainage and its thickness may be increased up to 75mm to increase storage.

Paver Installation

The pavers are laid as per standard pavers in the specified pattern. The ECOTRIHEX® permeable paving system has spacing nibs that allow a close fit between pavers while maintaining a suitable joint width.

For trafficable pavements, cut pavers should be no smaller than one third of the full unit size. Once the pavers are placed, the paver layer is compacted with one pass of a vibrating plate compactor before the joints are filled.

The 2mm-5mm aggregate is then swept into the drainage voids and joints until they are filled. The excess aggregate is swept off the surface and the paver layer is then compacted again. This process must be repeated until the drainage voids are fully compacted which could require several passes.

Edge Restraints

All segmental pavements require an edge restraint and we recommend those of the type shown in Data Sheet 3 of the CMAA document T46 Concrete Segmental Pavements - Detailing Guide.

Paver: Trihex **Colour:** Charcoal **Finish:** Standard



Adbri Masonry
Permeable
4th Edition Victoria

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