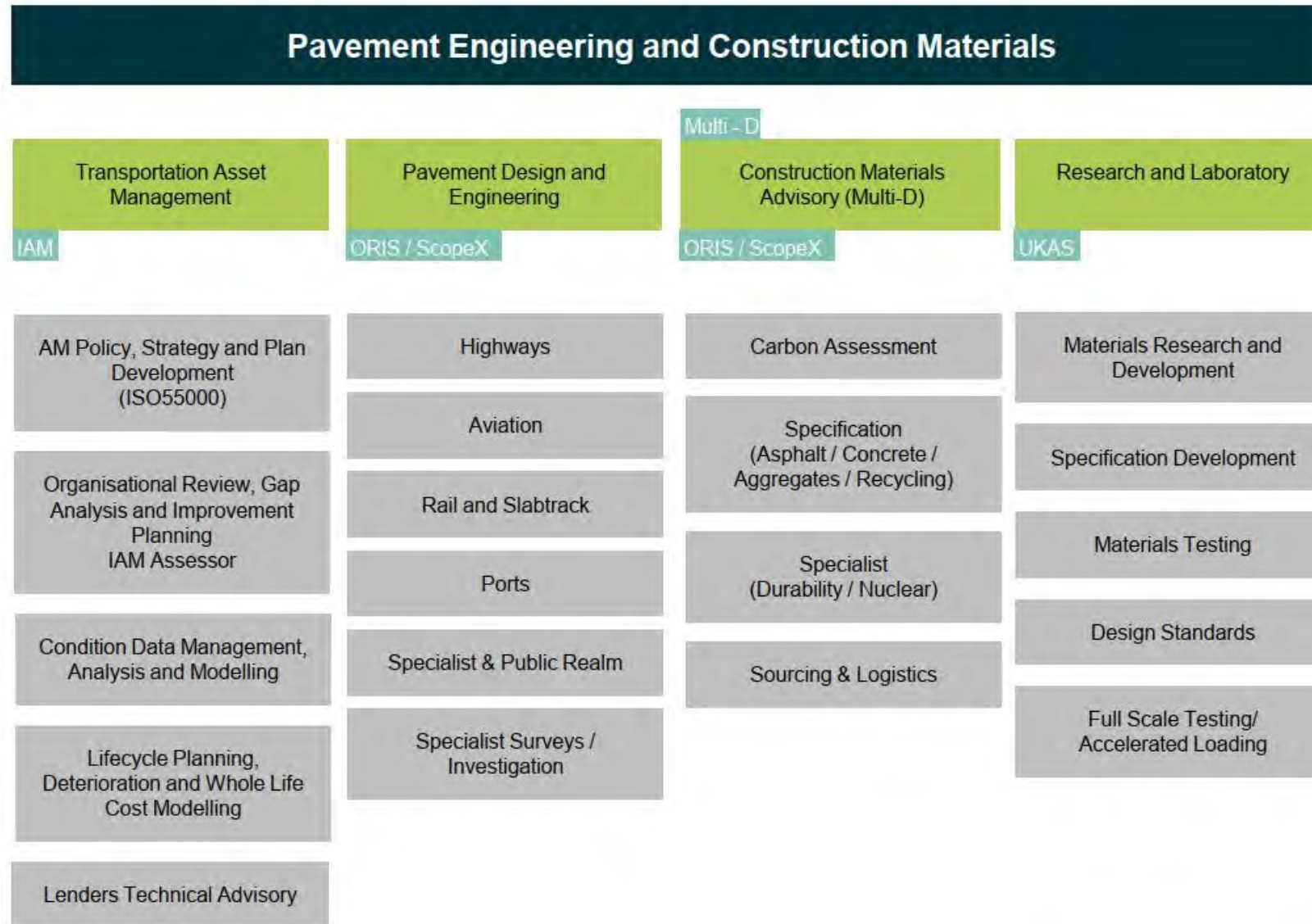
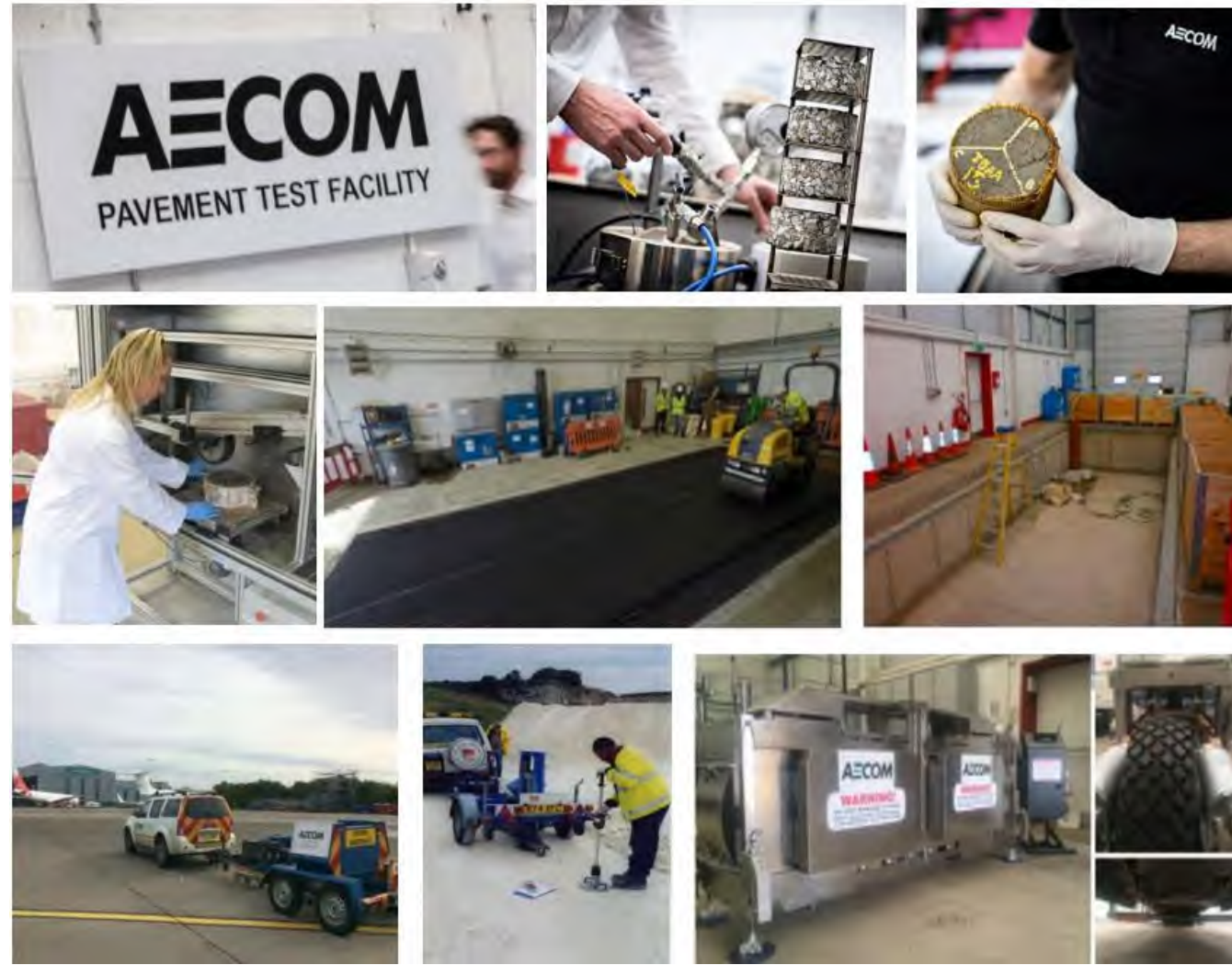


# Capability Chart



# AECOM Pavement Engineering and Construction Materials - What we do

- Multi skilled resource with flexibility and competencies to work cross sector: Roads, Airports and Ports
- Cutting edge investigation, survey and data collection techniques
- Pavement design, monitoring and evaluation
- UKAS accredited lab including pavement test facility
- Materials performance and design expertise
- Transfer of research into practice
- Asset management and whole life cost assessment for linear infrastructure
- Specification updates / rewrites (National Highways, DfT)



# Construction Materials, Research and Laboratory - Capabilities



**MATERIALS CONSULTATION**



**LABORATORY TESTING**



**STANDARDS & SPECS**



**DURABILITY ASSESSMENTS**



**RESEARCH & DEVELOPMENT**



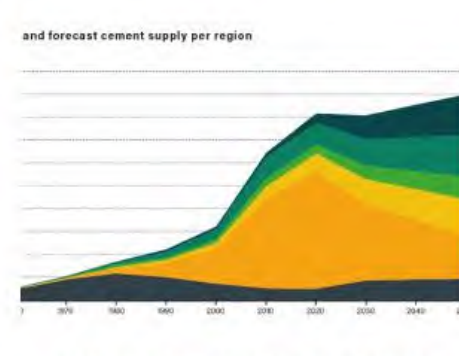
**MATERIAL TRIALS**



**CARBON ASSESSMENTS**



**CONSTRUCTION SUPERVISION**



**STATE OF THE INDUSTRY**



**FAILURE INVESTIGATIONS**

# Example Projects



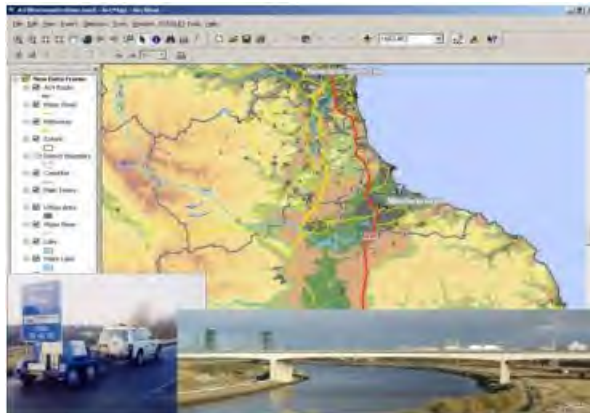
**Athens Airport Pavement Design**



**National Highways Concrete Pavement Asset Management and Whole Life Cost**



**Defence Infrastructure – Guide to Airfield Pavement Maintenance**



**A19 DBFO Full Asset Management Support**

MANUAL CONTRACT DOCUMENTS FOR DESIGN WORKS  
VOLUME 1 SPECIFICATION FOR DESIGN WORKS

Section	Title	Page
1.1	General	1
1.2	Design and Construction	1
1.3	Design and Construction	1
1.4	Design and Construction	1
1.5	Design and Construction	1
1.6	Design and Construction	1
1.7	Design and Construction	1
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1.99	Design and Construction	1
2.00	Design and Construction	1

**SHW / DMRB Specification updates / rewrites**



**Whole Life Cost Model – Reflective cracking solution using Accelerated Pavement Testing**

LEARN ABOUT OUR CONCRETE ROADS PROGRAMME AND MORE! NATIONALHIGHWAYS.CO.UK

## The Road to Circular Economy

### Recycling Concrete Arisings from Life Extension Works on UK Concrete Roads

Dr. Anna Chaliadou, James Ferrari, Luke Edwards and Michael Ambrose

LEARN ABOUT SUSTAINABLE LEADERSHIP, DIGITAL, AND MUCH MORE AT AECOM.COM

The Concrete Roads Programme is part of a billion-pound renewal and maintenance strategy for concrete roads across England, which represent approximately 4% of the Strategic Road Network and will be implemented over the next 25 years. AECOM was commissioned by National Highways to research the recycling of concrete arisings from its life extension works into precast concrete products that can be utilised back into the road network.

**SUSTAINABILITY**  
The adopted methodology was informed by carbon assessment of various recycling scenarios. It also revealed carbon gains from the recycling of the concrete fines.

**NETWORK ASSESSMENT**  
Pre-screening of the arisings via rigorous testing to evaluate the suitability from various sites for use as crushed concrete aggregates (CCA). Bitumen content and the presence of plastic separation membrane can hinder the production and CE marking of CCA.

**CCA PRODUCTION CE MARKING**  
Processing trials at a full-scale recycling facility took place to produce CCA from the road network.

**Figure 1: Summary of feedback processes to produce CE marked CCA for precast concrete production**

Property	Limiting values	Results
Compressives	55%	55%
Water Absorption	NA	95%*
Flakiness	15%	22%
Fracture show	NA	2.50%
LA	40%	44%
Fines	5%	3%
MoD	14%	1%
AV	13.3%	23%
Free	140kN	110kN
AD	NA	0.02%
Chlorides	NA	0.004%

**Table 2: CCA grading of trial mixes**

Section	Percentage	%
40/80	58	8.0%
20/40	178	18.4%
10/20	145	14.9%
4/10	130	13.3%
0/4	188	19.4%
0/2	185	19.0%
Clear	8	0.2%

**LAB TRIALS**  
Mix designs were based on two pre-cast linear products; drainage systems and pipes. Self-compacting and semi-dry concrete mixes were trialled, CCA replacement at 100% with slight adaptations in the concrete mix design was proven feasible with only minor impact to strength.

**PROTOTYPING**  
Prototype production of full scale precast concrete products to be installed on the road network. The partnering pre-cast facility is currently undertaking work on the manufacturing of prototype drains and pipes based on our lab trials.

**CARBON ASSESSMENT**  
ORIS performed a carbon analysis of different recycling and product manufacturing scenarios.

**NEXT STEPS**  
Investigate suitability of the fine CCA as cement replacement and treatment methods to enhance reactivity. Test cementitious materials blends as per EN 197-6 and aim for 100% coarse and fine CCA concrete.

# Adoptable Concrete Block Permeable Pavements.

Midland Highways Alliance

Presented by:

Jamie Gledhill, Engineering Technical Manager



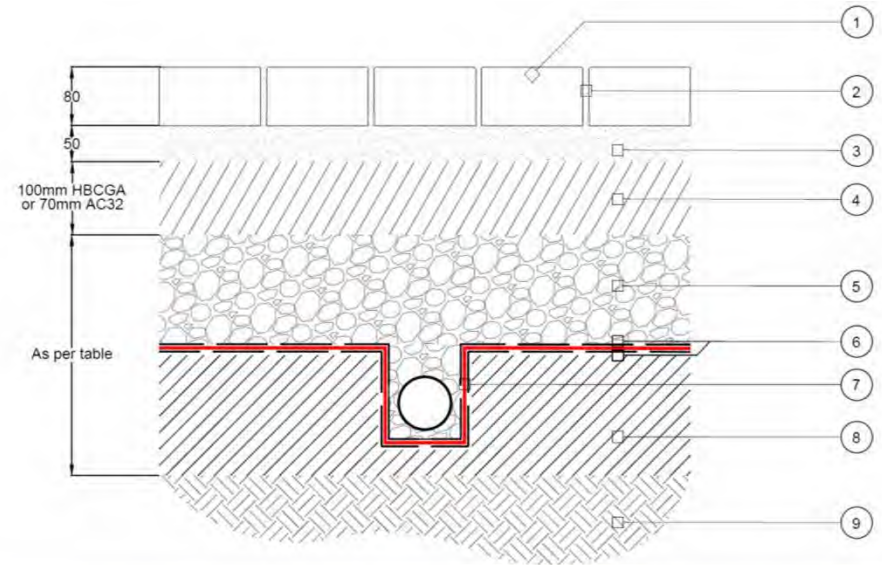
# Concrete Block Permeable Pavements



## SuDS Source Control.

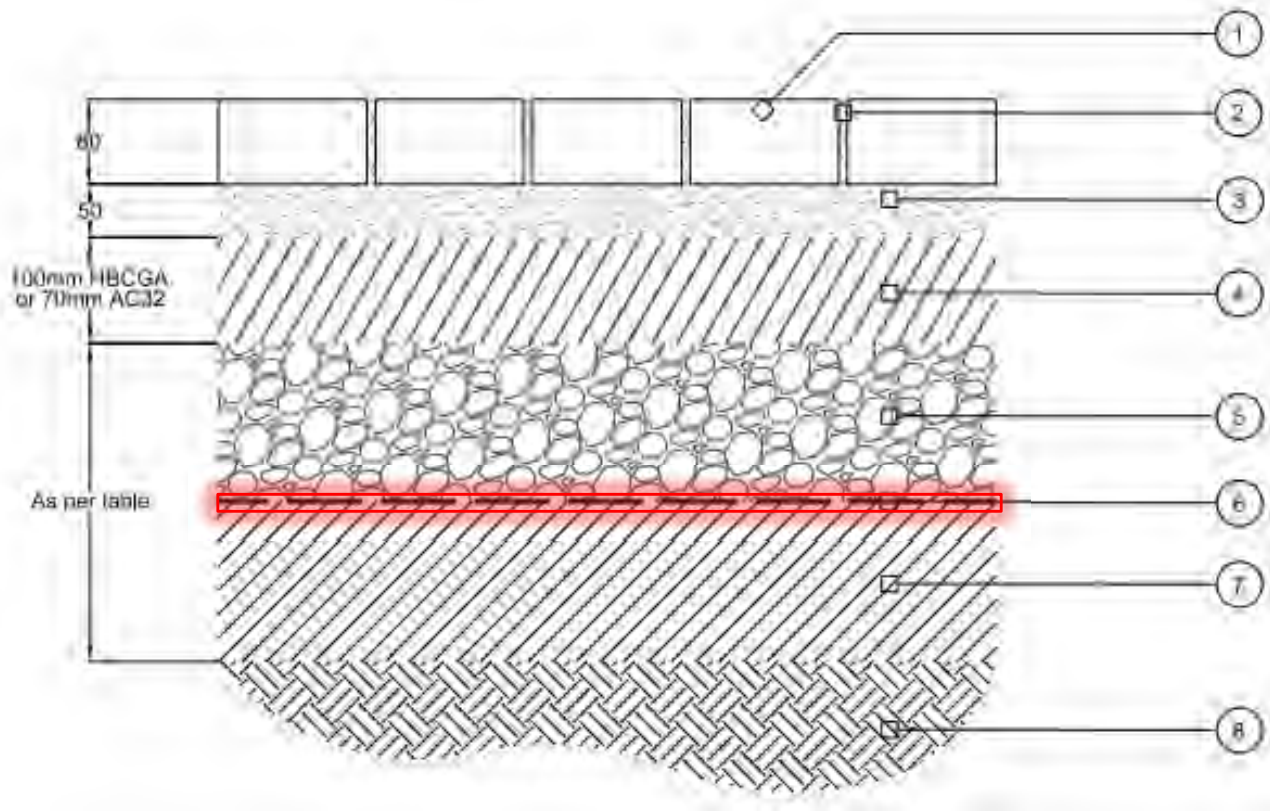
- Functional hard-wearing trafficable pavement.
- Source Control – Self draining surface through joints.
- Stand alone source control or part of management train.
- Everyday rain management, 1<sup>st</sup> 5mm of a storm event.
- Multi functional application.
  - No additional land take.
  - Hard surface for trafficking needs.
  - Self draining.
- Two stages of Water Treatment
  - (SuDS For Roads – SuDS Working Group)
  - SEPA (Scottish Environmental Protection Agency)
- Only form of trafficable source control to improve water quality having proven long-term performance.

# Design & Installation of modular permeable pavements



- BS 7533-103: 2026. Structural & Hydraulic design of modular permeable pavements.
- Design for 3 Types of System
  - System A – Full Infiltration
  - System B – Partial Infiltration
  - System C – No Infiltration
- Amended traffic categories – Now 9, up to 30 msa.
- Improved specification for component parts.
  - New material for sub base – Type 3
  - Specification for geotextiles and membranes.

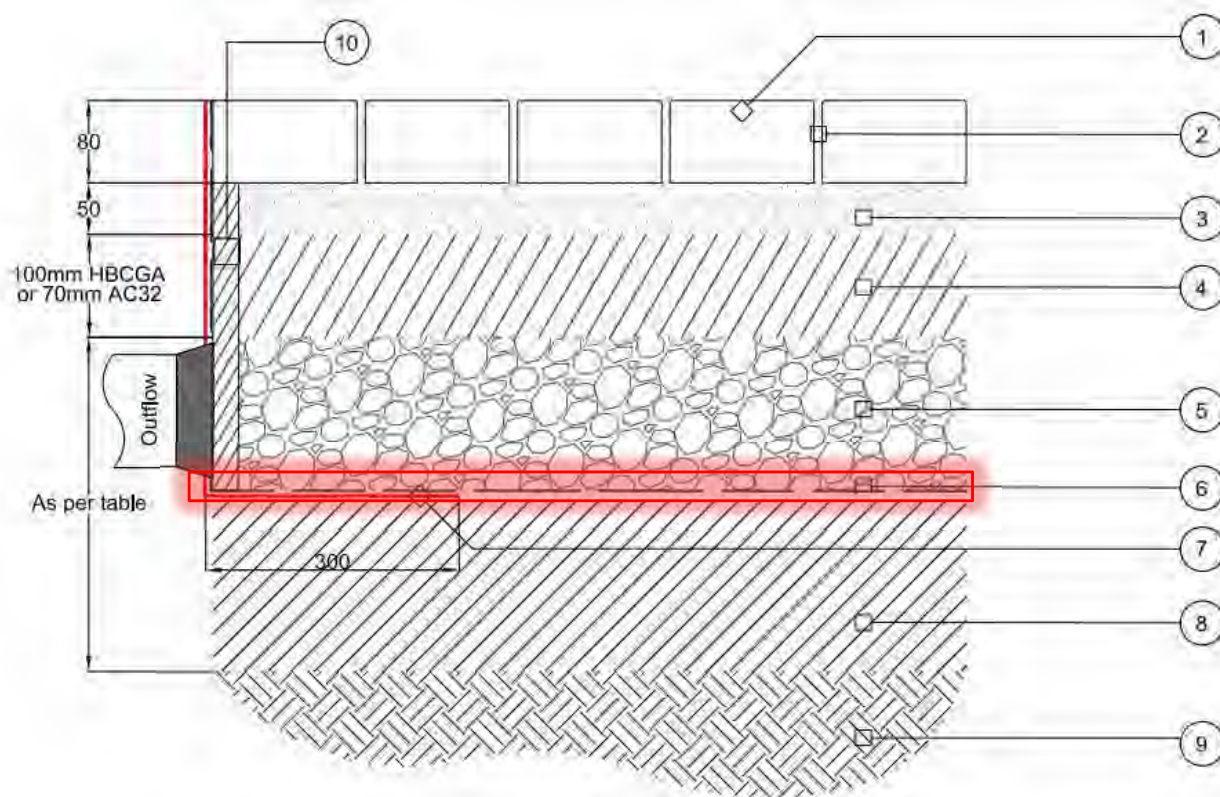
# System A – Full Infiltration.



## Type A System – Traffic Category 5

- Some temporary retention of the surface water occurs in the sub-base layer. This eventually infiltrates back to ground with zero discharge from the pavement.
- Coefficient of the ground must be greater than  $10^{-6}$ .
- Not used if groundwater within 1m of formation.
- Not used if contaminants present within the sub-grade.

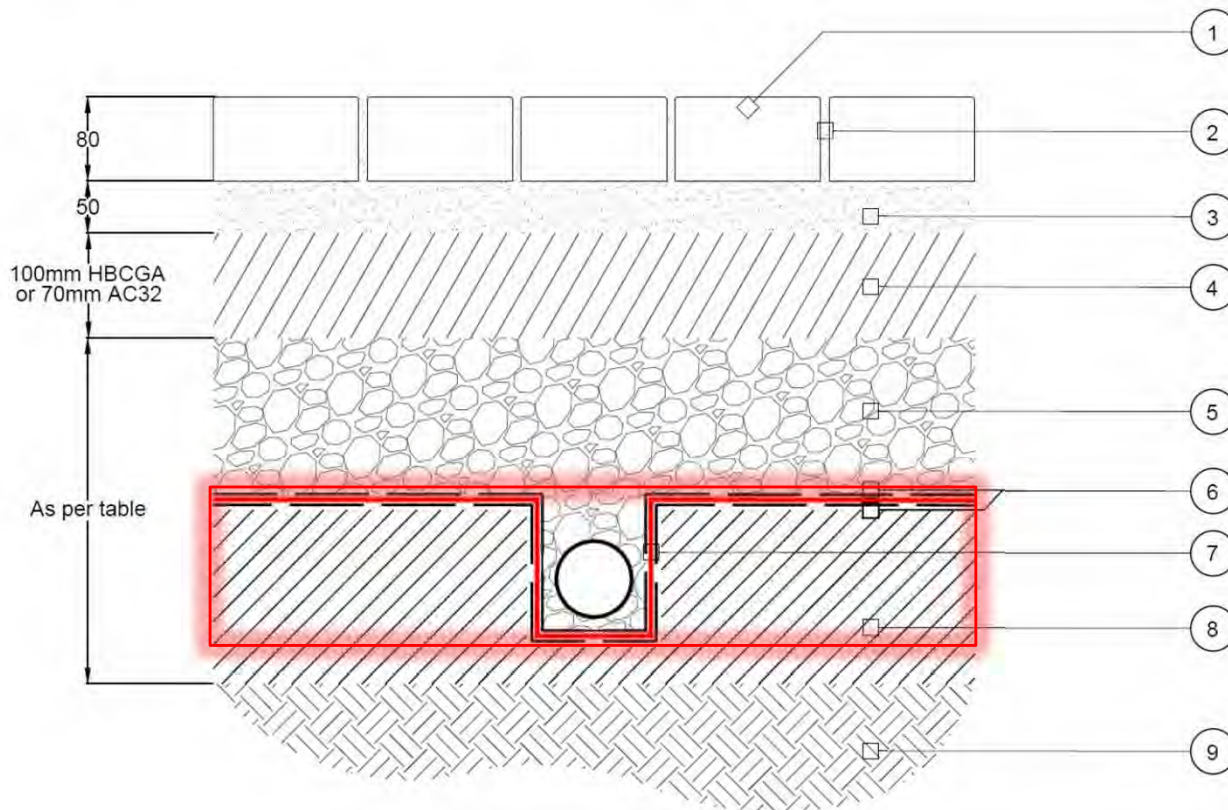
# System B – Partial Infiltration.



## Type B System – Traffic Category 5

- Some temporary retention of the surface water occurs in the sub-base layer. This eventually infiltrates back to ground with zero discharge from the pavement.
- Coefficient of the ground must be greater than  $10^{-6}$ .
- Not used if groundwater within 1m of formation.
- Not used if contaminants present within the sub-grade.

# System C – No Infiltration.



## Type C System – Traffic Category 5

- Used where ground coefficient is worse than  $10^{-6}$
- Maximise interception, allow water to soak into the sub-grade wherever possible with main discharge through piped outlet.
- Use impermeable liner if there are geological issues.
  - Weak ground.
  - Certain rock, (gypsum/chalks)
  - Contaminants.
  - Water table within 1m of formation.

## 4-20mm GCA – 0/40 Type 3



- Performs Hydraulically & Structurally.
- Grading to Table A1 BS 7533-103: 2026.
- Crushed Rock.
- Minimum 30% Porosity.
- Percolation rate of at least 40,000 mm/h.

## AC32 HDM base 40/60 des



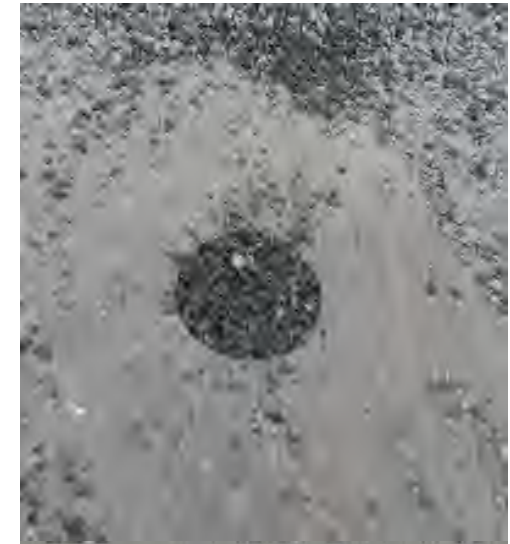
- Used from Traffic Category 5 and upwards (<math><0.05\text{msa}</math>)
  - Car parks or pedestrian areas receiving occasional commercial vehicular trafficking.
- AC32 40/60 used as a temporary overrun through construction of the site.
- Checked for structural integrity prior to surfacing.

## AC32 HDM base 40/60 des



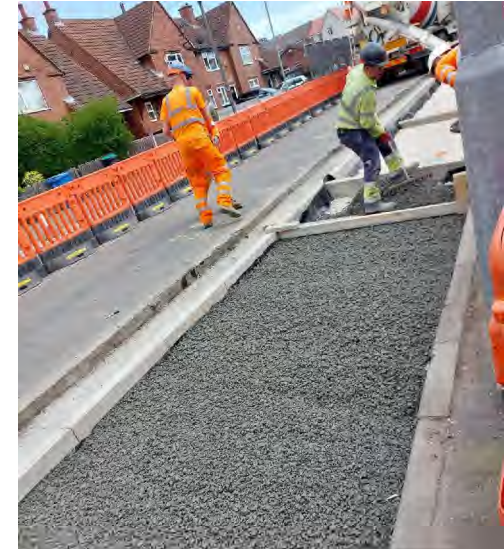
- AC32 40/60 can be core drilled or punched.
- Marked up on a 750mm orthogonal grid.

## AC32 HDM base 40/60 des



- AC32 40/60 can be core drilled or punched.
- Marked up on a 750mm orthogonal grid.
- 75mm hole core drilled through to the CGA Sub-base.
- Hole can be filled with either 4-20mm CGA or the 2-6.3mm laying course.

## HBCGA – Hydraulically Bound CGA



- Open graded 4-20mm CGA can also be stabilized with cement to form the roadbase.
- The amount of cement is typically 170 kg/m<sup>3</sup>, with a water content sufficient to produce an even coat of viscous mortar over the CGA.
- Minimum depth 100mm installed in maximum 150mm layers.

## 2-6.3mm Laying Course & Jointing Material



- Screeded at a 50mm thick layer.
- 2-6.3mm Grading to Table A2 BS 7533-103: 2026.
- No Fines.
- Percolation rate of at least 20,000 mm/h.

## Permeable Concrete Block Paving



- Used up to trafficking category 9 less than 30 msa.
- Important to use a block with a structural interlocking nib.
- Topping of the joints after 3-6 months maximises both hydraulic and structural performance.

## Detailing & Laying Pattern



- Use stretcher or soldier course against kerb edge.
  - A nib is required against the kerb to mitigate spalling.
  - Use inboard cutting to remove small cuts from the parameter of the pavement.
- 45 Deg or 90 Deg laying pattern provide the strongest interlock on heavily trafficked areas

# Permeable Paving Design

## Structural Design.

### Ground Conditions

- Evaluate the ground strength
  - What is the CBR?
- If below 5% CBR we need to improve by adding a capping layer .

### Traffic Loading.

- How many Million Standard Axles or what is the typical application?
- Take into consideration construction traffic, may this be greater than the final application traffic loading?
- Are dynamic or impact loadings being introduced to the pavement? If so the design trafficking must be increased.

## Hydraulic Design.

### Determine System Type.

- System A (Full infiltration) B (Partial Infiltration) C (No Infiltration).
- Ground Permeability
- Ground pollution, groundwater within 1m of formation, slopes.

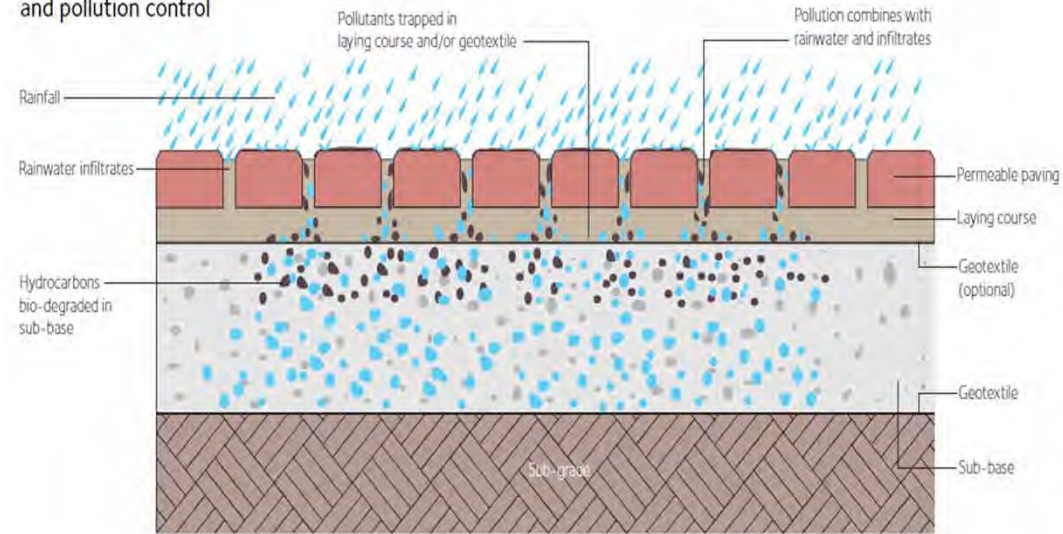
### Determine Volume of Water to be Attenuated..

- Rainfall Zone & FEH.
- Return period.
- Climate change%.
- Discharge rates to sewers.
- Roofs & adjacent areas 2:1 ratio.

# Pollution Control

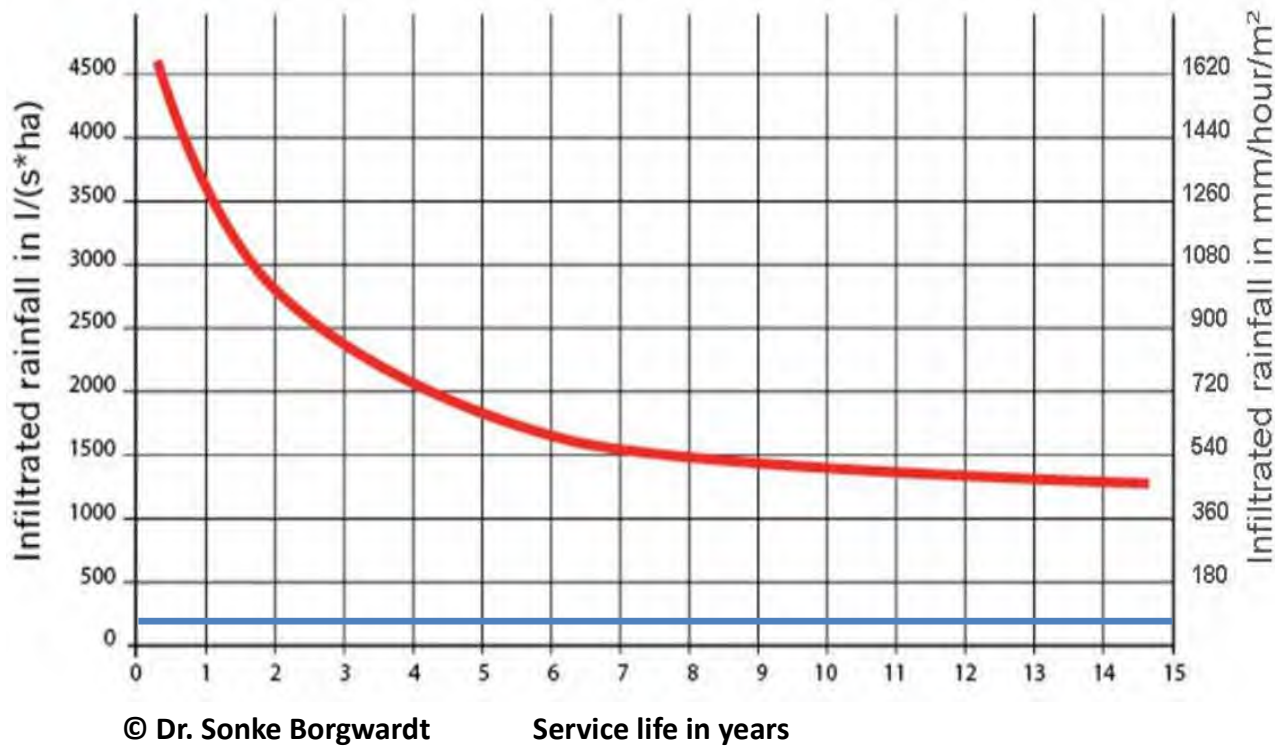


Permeable paving runoff and pollution control



- Ciria C609, 2004
  - Total Suspended Solids: 60–95%
  - Total Hydrocarbons: 70–90%
  - Total Phosphorous: 50–80%
  - Total Nitrogen: 65–80%
  - Total Heavy Metals: 60–95%
- CBPP provides 2 levels of water treatment.

# Joint clogging.



## Long-term in-situ infiltration performance of concrete block permeable pavements.

- 8<sup>th</sup> International Conference on Concrete Block Paving 2006.
- Pavements of various ages & traffic applications.
- Uses of a 2-6.3mm chipping in the joint.
- Pavements with NO maintenance plan in place.
- Unmaintained pavements the upper 20mm of the joint may fill with sediment & silt.

# Joint clogging – test results.



## Consistent efficiency: Assessing the long term hydraulic performance of Concrete Block Permeable Paving joints

surface permeability of 4265 mm/h when tested to BS DD 29:1996.

A separate service trench runs down the left-hand side of the carriageway and is constructed using standard paving over the un-cured CBM section, this conveys the surface water across the surface of the standard paving into the adjacent permeable pavement. This scheme has had a risk based maintenance plan in the past five years and is still performing as expected with some joint being low on jointing material and some joints starting to fill with detritus and moss.

At the outset of the testing there are no signs of surface water standing on the pavement or flushing lines to specific areas and there have been no call outs by residents to maintain the pavements.

Three areas were selected on the pavement for the tests to be completed which had varying degrees of joint clogging and weed growth.

**Position 1** – This area selected on a level section of the pavement to the end of a hammerhead, the joints had moderate clogging with detritus and moss, some of the 2-8.3mm permeable chipping could be seen.

Timings for the test were as follows:

Prewet: 103 seconds  
Test: 162 seconds  
infiltration rate: 1,132 mm/h

**Position 2** – Was selected on a slight slope to the bottom left-hand side of the hammer head, the joints had moderate clogging with moss, some weed growth. Aggregate had dropped within the joint and some of the 2-8.3mm permeable chipping could be seen.

Timings for the test were as follows:  
Prewet: 140 seconds.



**Position 3** – This was selected to the edge of the pavement adjacent to a vegetated bed. The joints of the block paving showed moderate signs of clogging with detritus and moss.

Timings for the test were as follows:  
Prewet: 133 seconds  
Test: 225 seconds  
infiltration rate: 815 mm/h

Brett Landscaping observations

At both sites testing was undertaken Brett Landscaping has identified that surface water infiltrates through the 'dropped' and 'clogged' joints. The use of a risk based maintenance plan, and as the pavement has not been swept in this period, has not had an adverse effect on the CBPP performance.

The design infiltration rate of the surface of a pavement is to be calculated at 125% of the initial rate when the pavement is newly installed.

As this flow rate for the Omega Flow was 4,125 mm/h then the design infiltration rate shall be 427 mm/h

The average flow rate for the 3 tests done to each of the 2 pavements are as follows:

- Pavey Field's Crescent (1,893 mm/h)
- Rubwith View: 1,099 mm/h

These are both well in excess of the 10X requirement for the design infiltration rate.

The use of our Omega Flow on these pavements has also provided a greater level of structural integrity and elastic modulus to the pavement surface over permeable blocks which rely solely on the use of a large risk to provide the required firm joint to infiltrate surface water through. The use of the unique 'male' and 'female' interlocking ribs to the Brett Flow range of products has maintained the interlock and contact between the individual units which has locked them together allowing the applied load to be transferred to the adjacent blocks even when the level of jointing material has been reduced through settlement and consolidation.

**Further recommendation**

While a lack of maintenance will not deteriorate the performance of CBPP systems Brett Landscaping does recommend to clients, developers, and local authority teams who are adopting CBPP through a section 26 agreement that maintenance is required to be undertaken both in the early life of the pavement and throughout its working life.

It is good practice, for at the point of handover of the pavement from the developer, the pavement is swept to remove any detritus or weed growth. At this point, usually 12 to 18 months into use, this flexible pavement will have received the anticipated levels of trafficking, which it has been designed for, and the 2-8.3mm jointing material will have consolidated and settled within the joints.

Doing this will reduce the requirement for more in-depth future maintenance.

It is common to see that the joints of the pavement having dropped, by around 10 to 20mm, dependant on the area within the pavement and levels of trafficking.

Brett Landscaping recommend that a specific maintenance programme be put into place for both the early life of the pavement along with

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Brett Landscaping & Building Products,  
Safety Road, Raylow-upon-Solent, Lymington, Hampshire, LE13 8LJ,  
Customer Support: T: 0335 03 89 519; E: info@brettlanscaping.co.uk



## Consistent efficiency: Assessing the long term hydraulic performance of Concrete Block Permeable Paving joints

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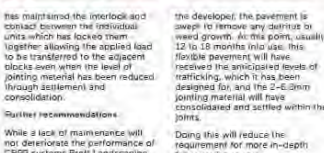
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## Testing with ASA – ASTM C1781/C1781M-13.

- Recognised American Standard for surface infiltration.
- Up to 1000m2 3 test are to be carried out.
- Site infiltration rate is taken as the average of the 3 tests.
- Site 1 (8 years) = 1,593 mm/h infiltration
- Site 2 (15 years) = 1,099 mm/h infiltration

# Finally – Maintenance

- Use blocks with a structural interlocking nib with fully topped joints to ensure;
  - Maximum structural integrity.
  - Continued levels of infiltration .

- Blocks with oversized nibs and a reduction of compliant jointing material can lead to;
  - Loss of structural interlock.
  - Increased risk of premature clogging of the joint.

- Withing the 1<sup>st</sup> 3-6 months of trafficking, identify areas where there is a reduction in jointing material .
- Sweep the areas and fill any open joints to the surface of the block.
- Proprietary joint stabilizing solutions can be applied to the surface of the pavement to retain jointing aggregate.

- Design using methodology within BS 7533-103: 2026.
- Detailing to the parameter of the pavement with the use of a concrete block with structural interlocking nibs
- Follow the 3-6 month initial maintenance programme.





# Any Questions?

Presented by:

Jamie Gledhill, Engineering Technical Manager

E: [Jamie.gledhill@brett.co.uk](mailto:Jamie.gledhill@brett.co.uk)

M: 07484 000825

# Kiacrete

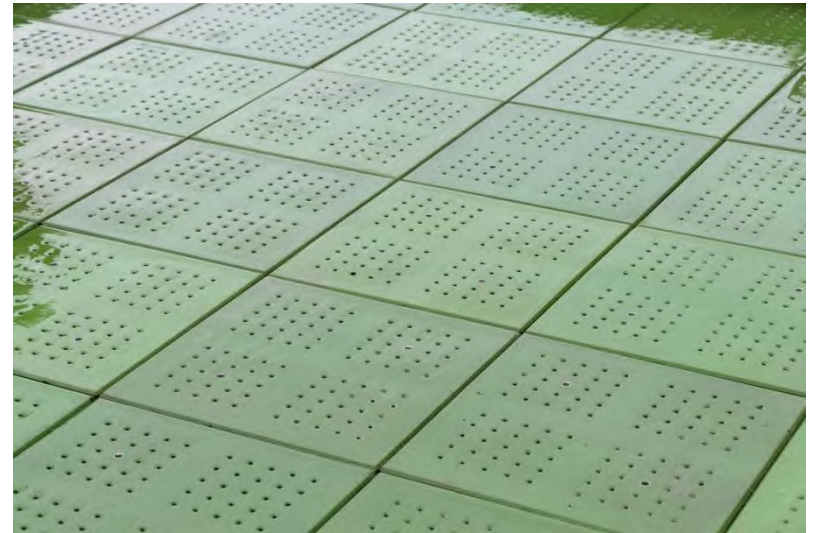
A climate resilient  
permeable pavement

Dr Alalea Kia ([alalea.kia@imperial.ac.uk](mailto:alalea.kia@imperial.ac.uk))

UKRI Future Leaders Fellow

Royal Academy of Engineering Associate Research Fellow

Resilient Sustainable Infrastructure Group Lead, [www.rsig.co.uk](http://www.rsig.co.uk)



Thank you for listening



Dr Alalea Kia ([alalea.kia@imperial.ac.uk](mailto:alalea.kia@imperial.ac.uk))

UKRI Future Leaders Fellow

Royal Academy of Engineering Associate Research Fellow

Resilient Sustainable Infrastructure Group Lead, [www.rsig.co.uk](http://www.rsig.co.uk)



# IMPERIAL

## Surface water flooding and impact of climate change

- Impermeable surfaces in the built environment lead to increased surface water flooding
- According to the EA, 83% of properties in areas at high risk of surface water flooding are in areas with likely flood depths <30cm
- Climate change will increase the number of properties in high risk of surface water flooding by 66% between 2040-2060
- There is an urgent need to develop sustainable solutions to tackle surface water flooding and its negative impacts



# IMPERIAL

## Impact of wet weather on safety

- Surface water flooding is a significant safety issue with:
  - Splash and spray reducing road users' visibility
  - An increased likelihood of skidding due to hydroplaning
- 21% of road accidents are weather related, with 70% occurring on wet pavements and 46% happening during rainfall (Federal Highway Administration)



## Permeable pavements

- Offer a solution to climate change by allowing surface water to slowly drain through the pavement surface
- The water captured either slowly infiltrates into the soil below or into the drainage network, depending on the soil conditions
- Important and cost-effective, sustainable drainage systems
- Primarily used in low-traffic environments

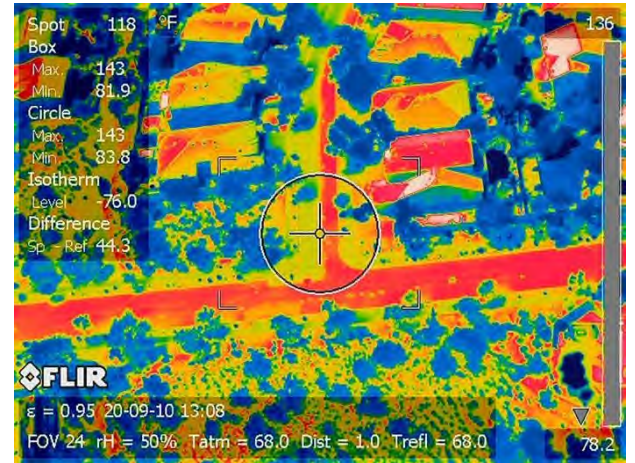


*Conventional permeable concrete pavement cross-section*

# IMPERIAL

## Benefits of permeable pavements

- Drain surface water and stormwater runoff leading to improved wet weather safety and potential to reduce combined sewer overflows
- Capture pollutants, improving stormwater and groundwater quality
- The water captured can be used to reduce non-potable water demand, or recharge groundwater and reduce drought
- Reduce the urban heat island effect through reduced pavement temperature and cooling the urban environment



# IMPERIAL

## Common permeable pavement types

- The most commonly used permeable pavement surfaces are:
  - Permeable concrete (also known as pervious concrete)
  - Permeable asphalt
  - Permeable interlocking block paving
- Annual run-off volume reductions of 50-100% have been observed
- Even if the underlying soil is poor draining, permeable pavement systems can reduce peak flows by >90% and surface run-off volumes by 43%



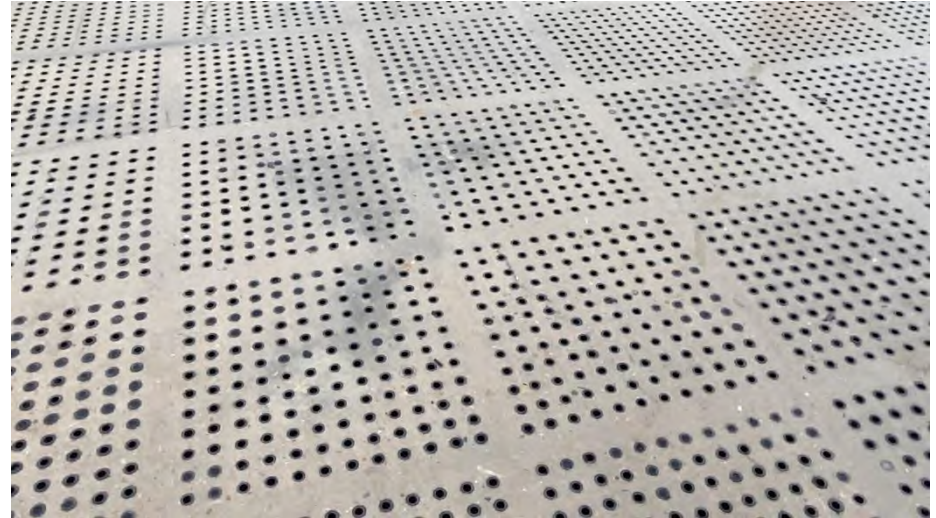
*Permeable asphalt*



*Permeable interlocking block paving*

## Kiacrete – a new type of permeable pavement surface

- A new take on pavement surfaces
- A concrete pavement with direct drainage channels to the subbase and subgrade layers below
- Kiacrete's permeability can reach up to 5 cm/s
- If the bottom of an Olympic-sized swimming pool was made of Kiacrete, it would fully drain it in 70 seconds



# IMPERIAL

## High durability and strength

- Both laboratory and real-world performance have shown Kiacrete to be clogging and freeze-thaw resistant
- Kiacrete has a long service-life with minimal maintenance requirements
- Kiacrete's load-bearing capacity is 90% of an equivalent solid slab



## High skid resistance

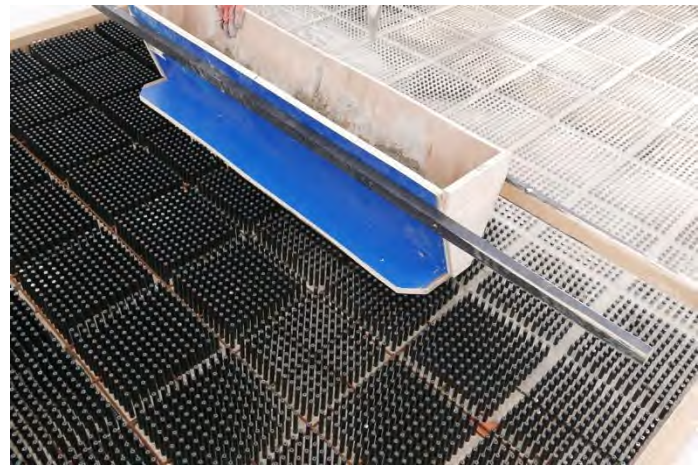
- Measured using the British Pendulum Test in the laboratory and ‘in the field’
- Kiacrete has improved wet condition skid resistance compared to conventional ‘as cast’, ground and brushed impermeable concrete surfaces
- Kiacrete has similar wet condition skid resistance compared to conventional grooved concrete surfaces



# IMPERIAL

## On-site delivery

- Kiacrete can be cast in-situ or delivered as precast units
- In-situ construction uses permanent formwork made from recycled plastic
- Precast units have plastic-free drainage channels



# IMPERIAL

## White City field site

- A 9 m<sup>2</sup> field site was constructed at Imperial's White City Campus in summer 2020
- The site was deployed as cast-in-place
- It was exposed to 3 years of real-world weather conditions before its demolition for the campus redevelopment



# IMPERIAL

## Long-term performance

- Real-world permeability was measured on a regular basis and showed excellent long-term drainage performance
- The Kiacrete field site did not have puddles or flooding, while other parts of the campus with conventional pavement surfaces and drainage had water ponding/flooding issues



# IMPERIAL

## Liverpool cycleway site

- A 12 m<sup>2</sup> cycleway was constructed in Liverpool city centre for the City council in March 2025
- 48x steel reinforced precast green pigmented Kiacrete slabs were manufactured offsite
- These slabs were laid directly onto 150 mm deep Permavoid geocellular tanks that are connected to the drainage network





WARNING  
WATER

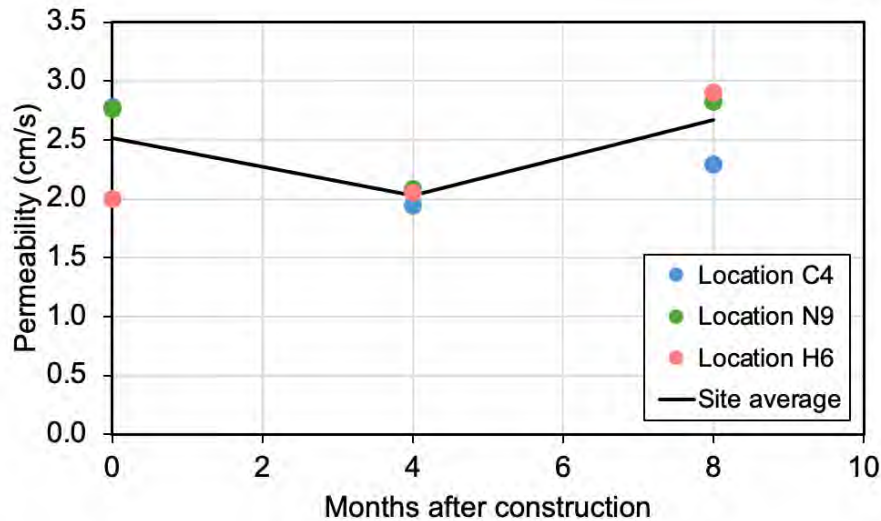
RENTALS

JCB

Q-FIT



## Liverpool cycleway site permeability



The measured onsite permeability following construction in March 2025 showed the site permeability remained the same

## Excellent wet weather performance



A comparison between the Kiacrete cycleway and a traditional impermeable asphalt cycleway in Liverpool during wet weather

## Benefits over conventional pavements

- Compared to traditional impermeable pavements, Kiacrete has:
  - The ability to quickly drain surface water with a high permeability, leading to improved wet weather safety
  - A longer service-life with lower maintenance requirements compared to asphalt surfaces



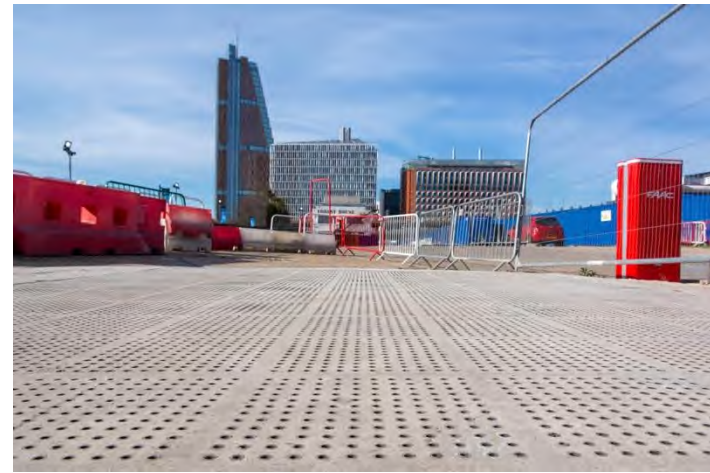
## Contributions towards net-zero

- Kiacrete has significant global environmental benefits and will contribute towards achieving net-zero carbon by 2050, through:
  - a) Reduced emissions from:
    - Material savings
    - Longer service-life than traditional asphalt surfaces
  - b) Water reuse
  - c) Decreased urban heat island effect

# IMPERIAL

## Concluding remarks

- Surface water flooding is a significant safety issue and will get worse with climate change
- Kiacrete is a new permeable pavement that has high permeability, durability, strength and skid resistance
- The in-situ version performed well over its three years duration at White City
- A precast system has been developed, has a high load-bearing capacity and a site has been delivered in Liverpool
- Kiacrete can help achieve net-zero in the built environment





# COLAS SOLUTIONS

## 2025



# CONTENTS

- 1 INTRODUCTION TO COLAS**
- 2 KEY MARKET TOPICS**
- 3 ENABLING A CIRCULAR ECONOMY**
- 4 ROAD LIFE CYCLE AND COLAS SOLUTIONS**
- 5 CARBON TEAM**
- 6 COLAS DIGITAL SOLUTIONS**



# 1. INTRODUCTION TO COLAS



50  
Countries



**No. 1**  
BITUMEN buyer in  
the world

3000



Materials, production  
& recycling units  
around the world



**TOP 5**  
RECYCLER  
Globally - all sectors

€13.2  
BILLION

**60,000**  
PROJECTS  
EVERY YEAR



**57,000**  
EMPLOYEES

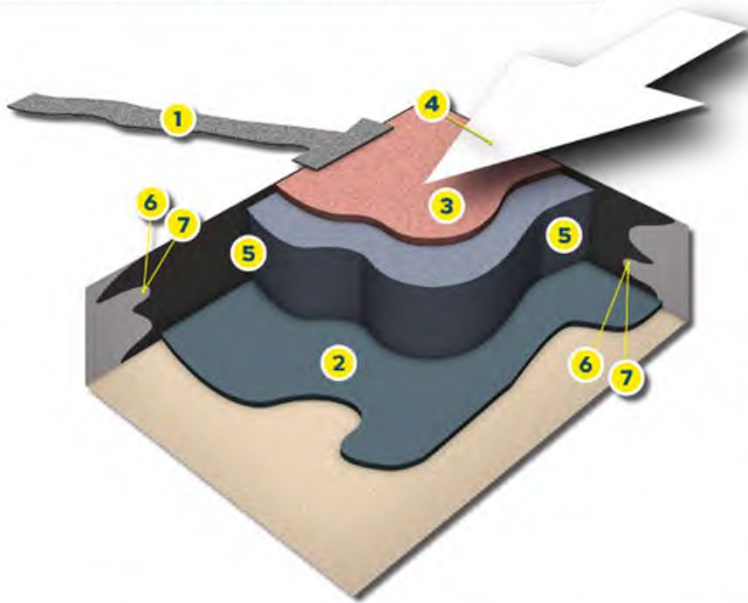


**COLAS GLOBALLY**



C2 - COLAS GROUP INTERNAL: Employees and partners who need to know.

# REINSTATEMENTS



## 1 Overbanding



**Colstrips & GripRoll**  
Easy to apply BBA HAPAS approved overbanding.



**Jointgrip OB**  
Hot applied anti-skid overbanding.



**Gripstrip**  
Easy to apply overbanding rolls.

## 2 Bondcoats

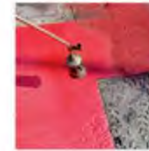


**Leotak**  
Conventional bitumen emulsion.



**Colbond 50**  
Polymer modified bitumen emulsion.

## 3 Anti-Skid Surfacing



**Anti-skid Sheets**  
Resin bonded solutions and coloured thermoplastic anti-skid sheets with bauxite.

## 4 Thermoplastic Road Markings



**Thermoplastic Road Markings**  
Easy to apply preformed markings.

## 5 Cold-Lay Patching Materials



**Colpatch**  
BBA HAPAS approved cold lay permanent patch repair material.



**Bitucrete**  
Cold lay surfacing material for footways.

## 6 Vertical Joint Sealant - Hot



**H4 Polymer**  
Enhanced hot applied sealant.



**H4**  
Hot applied sealant.



**H4**  
Hot applied sealant.

## 7 Vertical Joint Sealant - Cold



**Bitukold Standard**  
(Brushing)



**RS Bitukold**  
(Pouring)



**Colspray**  
(Aerosol)

# URBALITH

THE HIGHLY-AESTHETIC,  
PERMEABLE REFERENCE



# URBALITH



## INTRODUCTION

Urbalith is a range of permeable pavements, with natural appearance and 100% recyclable under the same conditions as conventional asphalt mix. It is designed to comply with specifications for a lower impact on people and the environment. This means that Urbalith can be used in SSSIs and Natural zones.

Urbalith's natural look and the fact that it doesn't require expansion joints make it highly aesthetic, which allows it to be used on classed or architectural sites.

Urbalith is made from a cold mix of aggregates and an innovative transparent organic-mineral binder, making it an integral part of Colas' eco-friendly approach:

- Unlike resin, Urbalith contains no volatile organic compounds (VOCs)
- Suitable for Pedestrianised areas, Cycle paths, Car parks, Nature-sensitive sites etc



# URBALITH VARIANTS



## INTRODUCTION

The standard Urbalith range includes two main variants:

- Urbalith (standard) - Designed for soft/low-traffic uses (paths, cycleways, landscaped areas)
  - High permeability ( $\approx 3\text{--}5$  cm/s, depending on design) [solutions-colas.com]
- Urbalith C - A more trafficable version for light vehicles and parking areas Lower but
  - Still significant permeability ( $\approx 1\text{--}1.5$  cm/s) [solutions-colas.com]

This pavement is particularly well suited for soft traffic. Its high permeability can be adapted as required (3 to 5 cm/s). Its carbon footprint is average 55% lower than that of a deactivated concrete reference solution (taking into account production and laying).



# PACKAGING AND PRODUCT OPTIONS



Ochre  
beige



Salmon  
pink



Anthracite  
grey



C2 - COLAS GROUP INTERNAL: Employees and partners who need to know.



## URBALITH BINDER

Organo-mineral binder,  
Cold-formulated and  
water based  
No heavy metals,  
No Organic solvents,  
No Endocrine disruptors



## USE CASES

Pedestrian walkways

Cycling facilities

Schools

Parks and natural areas

Urban renewal projects

Greenways

Building esplanade

Car parks

Shared lanes

Housing developments

City centers

Along coastlines, watercourses and rivers

In the vicinity of listed historic buildings and monuments,

Developments where asphalt and cement-based products are prohibited,

Combating urban heat islands (albedo > 0.33).



## MORE THAN 1,000,000M2 LAID SINCE 2012

Urbalith can be applied:

- Manually: straight edge, rake, trowel.
- Mechanically: paver (smooth screed, without vibration or heating#)

Compaction

- Compaction must be carried out without vibration to prevent any loss of cohesion.
  - Large areas: light double-roller, type VT 100.
  - Small areas: smoothing with a small PVC roller to embed the aggregate

Tools and equipment are cleaned simply with water,

Conventionally applied 2 to 5 cm thick, depending on the support and the traffic



# CUSTOM-MADE ACCORDING TO CUSTOMERS' PREFERENCES



## CASE STUDIES



Martinique – 1 500m<sup>2</sup> from  
Marseille bigbags to Fort-de-  
France

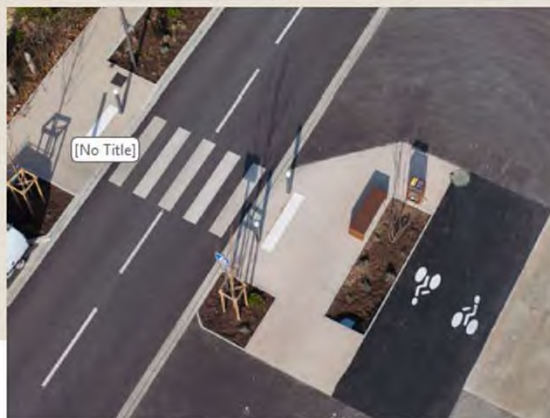


# CUSTOM-MADE ACCORDING TO CUSTOMERS' PREFERENCES

## CYCLABLE PATHS – AVIGNON, FRANCE



Liant: Aqualib - Urbalith  
Surface: 3600 m<sup>2</sup>  
Date: 2025



## WHERE DOES THE WATER GO? (SYSTEM BEHAVIOUR)

URBALITH relies on the underlying pavement system to store and dissipate water

Surface infiltration Water passes through URBALITH in seconds or less No surface runoff (in design condition)

Storage in permeable sub-base

Typically open-graded aggregate (Type 3) Void content  $\approx 30\text{--}40\%$  Provides temporary storage capacity. Example: 100 mm sub-base  $\rightarrow \sim 30\text{--}40 \text{ L/m}^2$  storage

Final dissipation (two main routes)

- a) Infiltration to ground (SuDS) Water slowly percolates into soil (Depends on subgrade permeability)
- b) Controlled drainage / Perforated pipes / outfalls - Water released to network at controlled rate



## PERMEABILITY COMPARISON: URBALITH VS ASPHALT

URBALITH delivers orders-of-magnitude higher permeability than conventional pavements

Surface type	Permeability (m/s)	Relative to dense asphalt	Functional behaviour
<b>Dense asphalt</b>	$\sim 10^{-9}$	1x	Impermeable (runoff only)
Poor/porous asphalt	$\sim 10^{-7}$ to $10^{-3}$	$10^2$ – $10^6$ x	Partial infiltration
<b>Porous asphalt</b>	$\sim 10^{-3}$ to $10^{-2}$	$10^6$ x	Designed drainage layer
<b>URBALITH</b>	<b><math>\sim 10^{-2}</math> (3–5 cm/s)</b>	<b><math>10^5</math>–<math>10^7</math>x</b>	Free-draining surface

URBALITH is not just “more permeable” — it represents a fundamentally different hydraulic behaviour, allowing water to pass through the surface almost instantly.



# TECHNICAL AND ENVIRONMENTAL CHARACTERISTICS

<b>Product Name</b>	<b>Urbalith</b>
Intended Uses of the Product (as per applicable harmonized technical specification and manufacturer's declaration).	Surface coating particularly well for soft mobility traffic (pedestrians, cyclists, etc.).
Manufacturing sites	Continuous or discontinuous, mobile or stationary, concrete plants.
Recommended Coating Thickness	3.0 – 3.5 cm
Binder name	Aqua-Lib
Binder content	4 %
Mixing Temperature	Cold mix (ambient temperature)
Setting mechanism	Dehydration (Water evaporation)
Petrographic analysis aggregates used	Limestone

Apparent density (MVa)	1 750 to 1 900 kg.m <sup>-3</sup>
Typical density: MVRe	2 600 to 2 650 kg.m <sup>-3</sup>
Void ratio	30 – 35 %
Drainability - Percolation rate	1.0 to 4.0 cm.s <sup>-1</sup>
Permeability Coefficient	1.0 x 10 <sup>-4</sup> to 2.7x10 <sup>-5</sup> m.s <sup>-1</sup>
Runoff coefficient	0 %
Compressive strength (NF EN 131286-41)	> 2.5 MPa ( <i>after 7 days</i> )
Indirect tensile strength (NF EN 131286-42)	> 0.5 MPa ( <i>after 7 days</i> )
Elastic modulus (NF EN 131286-43)	3 000 to 5 000 MPa
Static puncture resistance	> 340 N.cm <sup>-2</sup>
Rutting resistance	rut depth < 0.5% after 100,000 cycles
Albedo	0.30 to 0.50