

**FIX CONCRETE CORROSION.  
FOR GOOD.**



**Markham Global working with Kier Construction, deliver a zero-maintenance, guaranteed concrete deck protection for Gloucestershire County Council's new mobility hub.**

Reinforced concrete decks exposed to atmospheric conditions and vehicular traffic, requiring robust protection against water and chloride ingress and deterioration. The primary need was a durable waterproofing solution that protected the concrete from environmental damage, accommodating winter de-icing salts, and requires minimal maintenance to ensure the decks remained functional through all seasons, for many years to come.

**FAST-TRACK PROGRAM**

Concrete is waterproof from Day 1, no further phase of coating application works required.

**NOT DELAYED BY WEATHER**

Our system isn't affected by the weather – if you can pour concrete then we can protect it.

**COST-EFFECTIVE**

Typical reduction of at least 50% compared to a surface coating/membrane.

**ZERO-MAINTENANCE**

Hydrogel waterproofing is an internal system, not subject to surface wear or general weathering and therefore does not require any future re-application.

**25 YEAR WARRANTY**

Guaranteed to give full waterproofing protection for a minimum of 25 years.



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## APPLICATION FOCUS

### BACKGROUND TO THE PROJECT & CLIENT

**Over 23,000m<sup>2</sup> of concrete was treated by Markham, spread across 3 decks and the ground floor.**

Arle Court is a new build, 3-storey Mobility Hub, and is a key part of the multi-million pound Golden Valley Development, which aims to create a 'garden community', integrating hi-tech business, residential and leisure uses with a digital-focused business park Cyber Central at its heart.

The development is expected to become a major economic driver for Cheltenham and the surrounding area.

With a modern contemporary look the facility will provide passengers with:

100 Electric Vehicle (EV) charging points (the largest non-bookable charging location in the country)

9 designated disabled parking bays (located on the ground floor, including 2 spaces with EV charging)

12 designated parent and child bays (located on ground floor, including 2 spaces with EV charging)



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## **THE PROBLEM**

### **PROJECT CHALLENGES & REQUIREMENTS**

The project involved constructing multiple reinforced concrete decks, which would be subjected to harsh environmental conditions. These decks would face constant atmospheric exposure and heavy vehicular traffic, making them vulnerable to water ingress and deterioration.

To ensure the decks remained safe for public use, the client needed a durable waterproofing solution that could withstand aggressive weather and winter maintenance.

The solution should be capable of being implemented in a fast-track program and should not be delayed by weather conditions.

Zero maintenance was also a key requirement, ensuring the least possible disruption to public services and minimal operating costs for the owner.

A 25-year warranty would also be essential to provide long-term assurance of the solution's performance.



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## THE TRADITIONAL APPROACH AND ITS LIMITATIONS

Traditionally, concrete decks have been protected with a surface membrane, or asphalt. Both options have inherent challenges, including the following:

### ADHESION PROBLEMS

Poor adhesion to the concrete substrate can result in delamination, compromising the waterproofing effectiveness.

### DURABILITY ISSUES

Surface membranes can be prone to wear and tear from constant vehicular traffic, leading to frequent maintenance and reduced lifespan.

### UV DEGRADATION

Exposure to ultraviolet (UV) light can cause some membranes to degrade over time, reducing their protective capabilities.

### CRACKING & SURFACE DAMAGE

Despite its durability, mastic asphalt can still develop cracks and surface damage due to thermal movement and heavy vehicle loads, leading to water ingress.

### MAINTENANCE CHALLENGES

Repairs to asphalt surfaces can be labor-intensive and disruptive, often requiring sections of the car park to be closed during maintenance activities.

### WEATHER-RELATED DELAYS

Rain, snow, and high humidity can interfere with the curing process, preventing the protective coating from adhering properly. Strong winds can also disrupt the application process and cause the coating to dry unevenly.

### COSTLY

Both options tend to be very costly solution to implement.

These limitations highlight the need for an alternative solution that offers a reduced application time, greater durability and ease of maintenance to effectively protect multi-storey car park decks.



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## THE TOP-TECT SOLUTION OVERCOMING THE CHALLENGES

This system waterproofs the concrete itself, combining MARKHAM's advanced colloidal silica hydrogel treatments with delayed-swell gaskets and sawing/sealing of construction and contraction joints, for a robust, three-pronged approach.

This method eliminates the need for traditional membrane systems, making it a cost-effective and time-saving single-source solution, supported by a comprehensive warranty.



### SWELLABLE WATER STOP GASKET

Installed onsite before each pour stage, our delayed-swell waterstop gasket ensures the tightest possible seal to all edge details, columns and penetrations.



### HYDROGEL SPRAY TREATMENT

Applied to the top surface, as soon as the concrete is foot-traffic safe. Assists with curing and ensures the highest level of waterproofing.



### HYDROGEL ADMIXTURE

Introduced to the concrete at the batching plant, to provide both internal waterproofing and drying shrinkage reduction.



### SAW CUTTING & FLEXIBLE SEALANT

Provides sealed construction and contraction joints, offering the needed flexibility within the structure, whilst ensuring our waterproofing guarantee.

EASE OF DESIGN & CONSTRUCTION  
REDUCED COSTS  
DURABILITY & PROTECTION

FULL PERFORMANCE WARRANTY  
IMPROVED FINAL FINISH  
ELIMINATION OF MEMBRANES



## CLIENT BENEFITS

### THE RESULTS ACHIEVED



#### BUDGET

##### Significant Savings

By opting for this solution, the client achieved substantial cost savings compared to the original specified solution.

This means more funds can be allocated to other critical areas of the project, enhancing overall project value and efficiency.



#### PROGRAM

##### Weather-Independent Application

Unlike traditional methods that require prolonged dry weather, this solution can be applied regardless of weather conditions.

This ensures that the project stays on schedule, avoiding costly delays and ensuring timely completion.



#### PROTECTION

##### Long-Lasting Waterproof Barrier

The internal system creates a robust waterproof barrier throughout the entire slab.

Unlike surface treatments that can wear down over time, this barrier remains effective, providing consistent protection against water damage and extending the lifespan of the structure.



#### ASSURANCE

##### 25-Year Waterproofing Warranty

The system comes with a comprehensive 25-year warranty from a single source.

This long-term assurance gives clients peace of mind, knowing that their investment is protected and that any potential issues will be covered.



#### ENVIRONMENT

##### Low Environmental Impact

Aquron is certified as VOC-free and has a significantly lower CO<sub>2</sub> footprint per square meter of protected concrete compared to traditional methods.

This makes it an eco-friendly choice, contributing to sustainability goals and reducing the project's overall environmental impact.



**FRIARTON BRIDGE**  
Perth, Scotland

AQURON 7000 colloidal silica hydrogel treatment was selected as an alternative to cathodic protection.

This provided not only protection of the steel reinforcing, but also the concrete itself to provide durable, corrosion-resistant concrete for this vital safety element of the bridge.



**WATER TREATMENT PLANT**  
Invercarnie, Scotland

The contaminating environment of water works is very challenging for concrete.

In this project, hydrogel treatments were applied during construction to give durability from day one.



**DIRFT<sub>3</sub> MSCP**  
Daventry, UK

Buckingham Group chose to use Markham's TOPTECT system on the new build DIRFT MSCP.

All penetrations in the decks and upstands were sealed with CONQOR 47B waterstop gasket to provide a fully waterproofed (zero-maintenance) deck solution.