



Green Street multi-storey car park, Jersey

Located in St Helier, Jersey, Green Street multi-storey car park spans five levels, with 670 parking spaces. The in-situ concrete car park was refurbished for the Government of Jersey as part of a £2.3 million contract. Martyn Lewis of Concrete Repairs Limited (CRL) reports.

The refurbishment of Green Street multi-storey car park was undertaken as part of an ongoing maintenance programme carried out for the Government of Jersey and was funded by revenue generated from user parking charges. CRL had already refurbished two other car parks for the States of Jersey – Pier Road and Sand Street. Green Street was the third and most challenging structure to be renovated. The repair work was carried out over a 34-week period, completing in October 2019.

Green Street multi-storey car park provides parking spaces for shoppers, tourists and commuters in St Helier, Jersey's capital. The structure is attached to the States of Jersey Police HQ and throughout the refurbishment it was crucial that there was minimal disruption and that the car park remained operational 24/7. To comply with these criteria, during the course of the project, it was only allowed to close one level of the car park at a time. The overall objective of the refurbishment was to transform the structure into a safe, vibrant parking facility, while improving the look and feel of the car park and providing improved electric vehicle

charging bays and additional disabled parking bays.

Repaired

Green Street multi-storey car park had previously been repaired and protected by CRL in 1999–2000 when extensive structural repairs were carried out, coatings applied and an impressed current cathodic protection (ICCP) system installed. As a testament to the high standard of the works carried out in 1999–2000, minimal maintenance had been required since that refurbishment and this phase of works was only needed to bring the car park up to current-day standards.

The overhaul was mainly required as the existing deck and wall coatings had exceeded their life expectancy and to maintain protection of the concrete structure, now needed to be overcoated, or stripped off and renewed where necessary. Other typical problems were parking spaces being lost due to water ingress through the soffit dripping onto and marking vehicles parked below, perimeter metal fencing corroding (due to the location of the car park in a marine environment), and the existing lighting and lightning systems being dated and failing.

Above: Split-level ramps.

Above left: Typical level complete.

CAR PARKS

The project involved a complex, fast-moving programme with vehicle circulation routes and pedestrian areas refurbished during off-peak times. This necessitated the use of high-quality, rapid-curing materials. There were three segments to the works: internal car parking deck areas, communal staircases and external façade elevations.

Noise

As with all construction works, noise was an issue. Due to the proximity of the car park to offices it was still necessary to encapsulate the working areas with acoustic hoarding and protective sheeting to keep the noise levels to a minimum. To ensure noise never went above an acceptable level, regular assessments were carried out.

The main activities carried out on this project were as follows:

- concrete delamination surveys
- water suppressed media shot blasting and pressure washing (to remove existing coatings)
- extensive concrete repairs to decks, soffits, columns and walls
- application of an anti-carbonation coating to all concrete surfaces
- mechanical movement joint installation
- deck joint sealant replacement
- application of anti-slip waterproof deck coatings
- application of lines markings and information symbols
- replacement of the existing cathodic protection system with a new innovative impregnation waterproof solution
- back propping and new bearing pad installation

- upgrading of the lighting system to LED
- replacement of the existing lightning system with a modern wireless system
- drainage survey, repairs and additional installation to prevent ponding water.

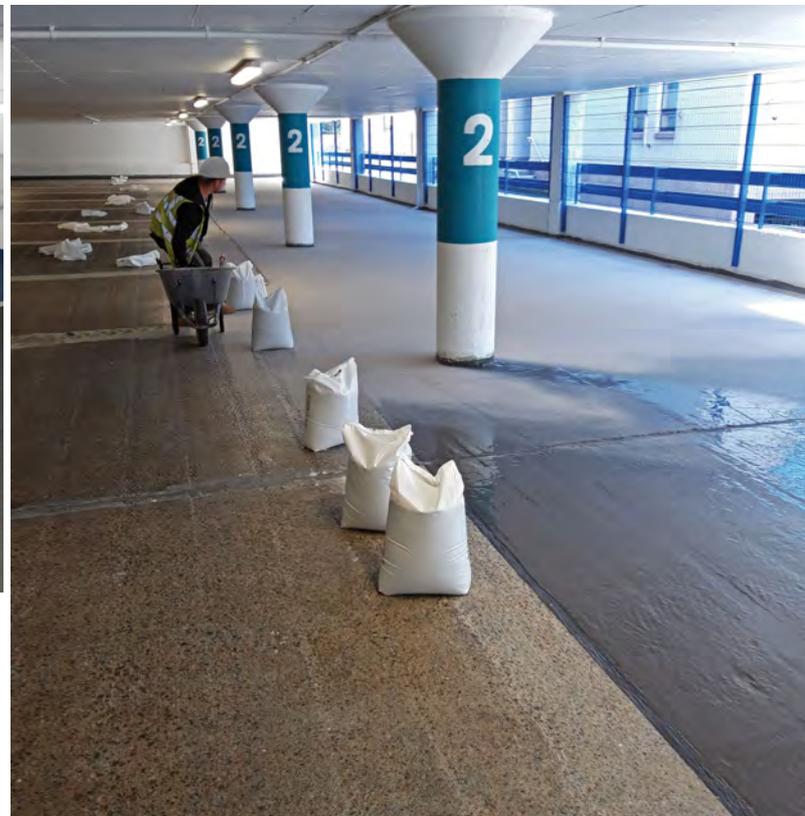
Due to the use of sea-dredged aggregates in the initial construction of the car park and the marine environment of Jersey, the concrete structure had a high chloride content. This had been controlled by the installation of an ICCP system 20 years ago. However, with the need to remove the existing decking that was integral to the cathodic protection system, protecting the deck meant that a new strategy needed to be introduced.

“All the concrete decks were prepared by planing and enclosed captive shot-blasting surface preparation to remove existing coatings and prepare the decks for the new anti-slip waterproof coatings.”

After extensive testing and research, a hydrogel treatment was specified. The hydrogel works by penetrating into the concrete elements (the defective coatings had to be removed first) and transforming all moisture within the substrate into a semi-solid hydrogel throughout the porosity network. This process physically binds any free chlorides within the hydrogel to prevent corrosion inducement. The Aquaron materials incorporated the hydrogel treatment with a migrating corrosion



Above: Final cleaning of decking.
Right: Preparation work for application of deck coating.



CAR PARKS

inhibitor (MCI) to add to the natural passivation of the reinforcing steel. Following the surface preparation process to decks and the water blasting of perimeter parapets and walls, the hydrogel treatment and the MCIs were applied to all concrete decks, internal and external parapets, and walls.

All the concrete decks were prepared by planing and enclosed captive shot-blasting surface preparation to remove existing coatings and prepare the decks for the new anti-slip waterproof coatings. This was followed by the application of a partially reinforced heavy-duty, rapid-curing Triflex PMMA waterproofing decking system incorporating a quartz anti-slip finish. This layer of material protects the decks and ramps from water ingress, chlorides, chemical attack and heavy traffic, as well as the extremes of weather on the top exposed deck. The Government of Jersey has been able to brand its car parks using a colour-coded scheme within the Triflex surfacing, with clearly defined parking bays and walkways leading pedestrians to the newly refurbished staircases.

In order to keep costs down, as well as reduce waste, excess quartz was swept up and recycled for future use, providing a saving of 25 tonnes of quartz. The use of a rapid-curing PMMA, coupled with the use of fast-curing line markings and symbols, enabled all high traffic areas to be handed over within just hours of application, helping to reduce the time parking spaces were out of use.

Structural works

Structural works were also carried out to a previous new extension on level five, where poor detailing around the movement joint was leading to cracking of the structure. A number of beams were propped back to the ground floor to allow the release and separation of sections of the structure, and new bearings were introduced to newly formed corbels to allow the structure at the movement joint to move freely.

A new mechanical expansion joint was

installed to the deck of level five, between the old and new decks, including a waterproofing interface. In addition, two pedestrian staircases and the external façade areas concrete and metal balustrading areas were carefully cleaned, repaired and coated. Each level of the car park was colour coded for ease of identification by using different colours on the columns and the staircases.

Spirit of co-operation

Ross Fearnley, Government of Jersey project manager, says, "This project was tendered using an NEC3 Option A contract. This form of contract requires all parties to act 'in a spirit of mutual trust and co-operation', to provide the highest level of quality and finish to the end user. By working closely with CRL with open communication and an equal ambition to deliver a great project, we were able to overcome issues in a timely and cost-effective manner. This enabled the project to finish on programme, despite much larger areas of repair being required, as well as additional structural works to replace bearing pads on an upper floor.

"The waterproof colour scheme deck coatings have been adopted throughout Jersey car park refurbishments and provide clear areas of traffic, parking and pedestrian segregation, while providing future protection to the structure. Carrying out these types of operations safely, while keeping the car park open to the public, required close co-operation between the site management team and the client. CRL accomplished this and, where inconvenience to the public was unavoidable, dealt with it in a professional and courteous manner."

CRL was able to use innovative engineering solutions to deliver cost savings for the delivery of this scheme and any future ongoing maintenance. The internal and external concrete frame has been extensively repaired and treated to enhance its durability, improve aesthetics, increase personal safety, and meet the client's objectives of upgrading and increasing the life of its structure. ■

Examination of original deck.



Preparing for handover of another level.

