GRAVITY
CONSULTING
ENGINEERS

**Former Nestle Factory Hayes**

**Canteen Block – Response to Conservation Comments – Cathodic Protection**

**07/11/2022**

## Introduction

This report has been prepared in order to address comments from London Borough of Hillingdon in relation to our previous demolition report W1965_R001, and the findings of GBG's investigation report 5049, in relation to the potential use of cathodic protection in order to prolong the life of the structural steel frame of the former canteen block.

The GBG report suggested cathodic protection as a means of limiting further corrosion of the steelwork. The Demolition Report concluded that demolition and re-building of the façades would be needed in order to provide a long-lasting and durable structural solution.

## Cathodic protection

An impressed current cathodic protection system would involve running a DC current through the structural steel frame, which would be connected to a sacrificial anode. This system would act to reduce further corrosion of the steel frame, with the steel frame linked via electric current to the anode, thereby creating an electrochemical cell, which encourages corrosion of the sacrificial material instead of the structural steelwork.

Cathodic protection systems have been employed successfully for many years for pipelines and offshore oil platforms, and in more recent years in buildings.

It is worth noting that a cathodic protection system would help to reduce future corrosion, however would not address any existing corrosion that has already occurred in the structure.

The GBG report states that "*The installation of an impressed current cathodic protection system within the masonry could reduce the future levels of corrosion of the embedded steel and also reduce the regularity of future repairs".* Whilst this statement is correct, it does not give the full picture in relation to the amount of demolition and re-building works that would still be required.

As noted in the demolition report, a typical section through the façade has a series of rendered brick spandrel panels supported on perimeter steel beams as well as concrete lintels over the windows, as shown in Figure 1 overleaf.

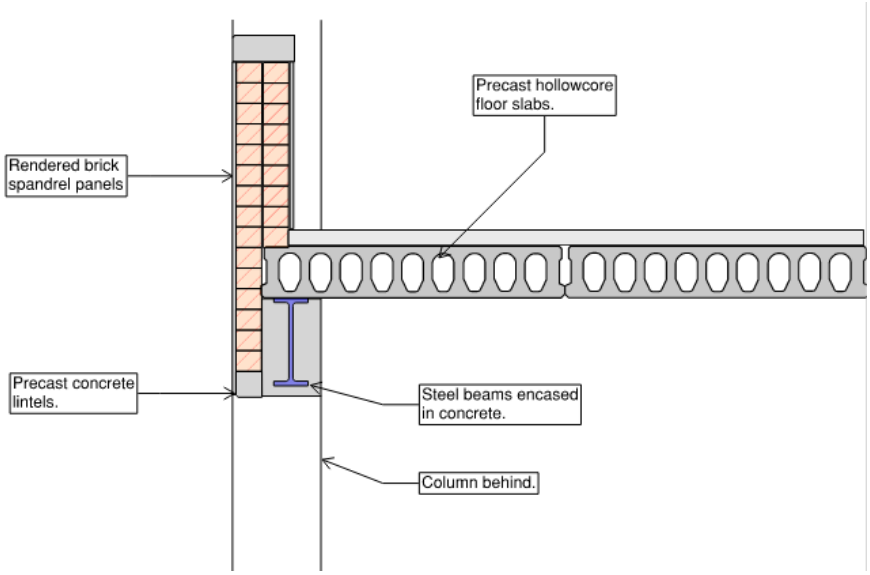


*Figure 1: Indicative section through façade.*

As also discussed in the demolition report, the concrete lintels are in poor condition and will need to be replaced. As these lintels support the spandrel panels, this would require the rebuilding of the spandrel panels. Figure 2 below is a photo of the south façade, showing the deterioration of the concrete lintels. The majority of the lintels have severe spalling of the concrete on the underside, as a result of the expansive forces created by the corrosion of the embedded steel bars, which has resulted in the reinforcing bars being exposed on the underside of the lintels. In one case, a reinforcing bar was observed hanging down from the lintel, as shown below. These lintels would all need to be replaced, resulting in the re-building of the spandrel panels.


*Figure 2: Image of south elevation showing lintel deterioration*

There are also several large vertical cracks at column locations, as discussed in the demolition report. These cracks would need to be addressed by locally re-building and stitching the brickwork.

**Conclusions**

Whilst impressed current cathodic protection exists as a method for reducing the future corrosion of the steel frame, this does not detract from the fact that the façade in general, including structurally supporting elements such as lintels, is in poor condition, requiring widespread and extensive repair and re-building.

We do not consider a façade retention scheme to be realistically feasible as a means of preserving the existing building fabric due to the amount of demolition and rebuilding that would be required irrespective of whether an impressed current cathodic protection system were employed to protect the steel frame.