AngellThompson

Consulting Structural Engineers & Surveyors

Angell Thompson & Partners Ltd
12a High Street
Banstead
Surrey SM7 2LJ

Tel: 01737 360136
Fax: 01737 360521
info@angellthompson.com
www.angellthompson.com

STATEMENT IN SUPPORT OF LISTED BUILDING APPLICATION

IN RELATION TO

UNDERPINNING AND STABILISATION WORKS TO REAR VAULTS

AT

10 NEW SQUARE
LINCOLN'S INN
LONDON
WC2A 3TL

STATEMENT PREPARED BY

S D PEARSON BSc CEng MIStructE
ANGELL THOMPSON & PARTNERS LTD

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INTRODUCTION

10 New Square is a substantial historic terraced masonry building constructed in the mid - 1690's. The main terrace, including basement, consists of five stories, whilst to the rear and bounding Serle Street there is a central two-storey rear projection with adjacent basement light wells. To the right hand side of this two-storey section an infill area has been developed and this currently accommodates the ladies cloakroom. To the rear of the two-storey projection and basement light wells / wc is a row of arched vaults which are predominantly sited beneath the pedestrian pathway but encroach slightly under the main road – Serle Street.

Following a burst water main in Serle Street the property owners recorded damage to the rear vault's structure and accordingly the property building insurers were appointed to investigate further. I was then instructed by the buildings insurers appointed Loss Adjusters, Crawford & Co to carry out site investigations to both report on causation and provide recommendations for repair and / or stabilisation. Because of the Grade II* listing status of the property, listed building consent will be required for the proposed stabilisation works and this discussion / statement is in support of the proposed works and will provide a detailed rationale of the need for the type of stabilisation works proposed.

DISCUSSION

The cause of subsidence to the rear of the vaults is predominantly saturated substrata resulting in consolidation of this wet ground by loads imposed from the structure. Essentially the vault foundations are approximately 200mm – 400mm deep with little or no corbel brick spread. The immediate bearing stratum is a very wet black and grey sandy silty fill, typically terminating between 800mm and 1.6m onto a probably dense ballast. The source of water causing local ground softening may have been the burst water main in Serle Street although this has not been positively proven. The water main has supposedly been repaired but recently holes have opened up in the road which are acting as sump points for rainwater. We shall need a guarantee in due course that both the water main has been repaired and the road surface properly reinstated to allow normal run-off to rainwater gullies.

With regard to the damage to the vaults this is explained in pictorial form on Drawing 10142D/02 attached. Essentially the load-bearing retaining/rear wall to the vaults has moved in a downward direction together with the rear section of the spine walls between the first and second, and second and third vaults respectively. This main seat of movement is clearly indicated on the basement plan. Each of the elevations shown on the drawing details the various crack patterns and all of these are consistent with the downward movement within the zone / seat of movement. In addition to the downward vertical movement the rear walls are bulging inwards, especially to the central vault, to the point where temporary propping has been installed.

The damage has visually worsened over the past 12 – 18 months and with the very poor ground conditions present, it is certain that continuing movement will take place. Locally the ground has virtually no load-bearing capacity and therefore the loads from the subsiding walls should be transferred onto the dense ballast layer at depths between 800mm and 1.6m beneath vault floor level.

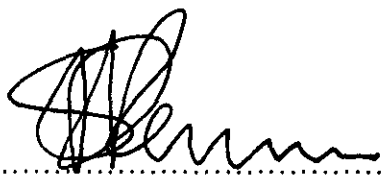
The easiest way to accommodate this will be to install mass concrete beneath the underside of the foundation bearing onto the ballast. This form of stabilisation is known as mass-concrete underpinning. Other forms of stabilisation which may be available are not suitable or practical on this occasion, predominantly due to a very tight working environment and the very poor ground conditions present. An alternative method of stabilisation is mini-piling but there is insufficient room to accommodate a rig to install the piles. Other methods of ground stabilisation are available such as the proprietary 'Uretek' system which injects expansive polymers into the ground to consolidate and stabilise the ground. However on this occasion the soil is too wet, saturated and unstable for the polymers to be effective.

Therefore the adoption of mass-concrete underpinning is the most sensible and appropriate solution and will have the added benefit that the ground floor slabs can be reinstated and suspended off the edge of the concrete underpinning again preventing any further movement. The proposed works are detailed on drawing 10142D/01 also attached.

One complication with any form of underpinning is the poor stability of the rear vault walls, especially to the centre vault. Therefore, with these walls it will be necessary to install a sacrificial concrete facing to provide stability to the wall prior to undermining / underpinning in short sections. We have considered other methods of working here but none would be sufficiently robust to ensure stability and safety to the operatives during the underpinning operation.

CONCLUSION

The damage to the vaults / retaining walls is severe and in view of very recent movement temporary shoring / propping has been organised to avoid further deterioration and possible collapse. If stabilisation works are not undertaken the walls will continue to deteriorate and mass-concrete underpinning / stabilisation is considered the most appropriate way to proceed



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