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Dear Richard

Re: OPINION OF BASEMENT IMPACT ASSESSMENT FOR 11 ROSSLYN HILL, LONDON NW3 5UL

Further to your instruction, we have now completed our initial review of the ground movement and groundwater aspects of the Basement Impact Assessment (BIA) relating to your neighbours' proposed basement construction adjacent to your building and this letter forms our report on the review.

1.0 INTRODUCTION

1.1 Brief

Geotechnical and Environmental Associates Limited (GEA) has been instructed by Air Studios (Lyndhurst) Limited to undertake an initial review of the geotechnical and groundwater aspects of a BIA for proposed basement at a neighbouring site, namely No 11 Rosslyn Hill. Concerns have been raised in respect of the potential impact of the proposed basement on the Grade II* listed Lyndhurst Hall which is in use as an orchestral recording studio. This report provides an initial review of the BIA and raises items of concern where the submission does not appear to satisfy the requirements of Camden Planning Guidance CPG4¹.

1.2 Proposed Development

The development site is adjacent to Lyndhurst Hall and comprises the Grade II listed No 11 Rosslyn Hill in the Fitzjohn and Netherhall conservation area of the London Borough of Camden (LBC) which is understood to comprise a three-storey building with a single-storey basement.

The proposed redevelopment is understood to comprise the retention of the existing listed building and the construction of two new basements. The eastern basement is located south of 11 Rosslyn Hill and comprises a two-storey basement with a swimming pool and plant room that extends to a depth of roughly 8 m whilst to the west of No 11 is a slightly smaller single-storey basement that extends to a depth of roughly 5 m and is only 1.0 m laterally from Lyndhurst Hall.

Contiguous and secant bored piled walls are proposed to support the excavation and reinforced concrete lining walls are proposed within the piled walls.

¹ London Borough of Camden (2013) Camden Planning Guidance (CPG) 4: *Basements and lightwells*

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1.3 Documentation

A BIA has been prepared by Alan Baxter and Associates (ABA), referenced 1693/10/FN/fn and dated 24th March 2015. The BIA includes a Ground Investigation by Ground Engineering Limited, referenced C13469 and dated March 2015. A number of building sections and elevations by Thomas Croft Architects Limited have also been provided along with calculations by ABA within the appendix.

2.0 REVIEW OF THE BASEMENT IMPACT ASSESSMENT

2.1 Qualifications and Procedure

This review has been undertaken by Martin Cooper, a Chartered Civil Engineer (CEng) and Member of the Institution of Civil Engineers (MICE) with over 25 years of experience in the geotechnical industry and specific experience of the design and construction of bored pile walls close to listed buildings. The review has been undertaken in conjunction with Steve Branch, a Chartered Geologist (CGeol) specialising in engineering geology and geotechnical engineering for over 28 years with specific extensive knowledge and experience of the ground and groundwater conditions in the London Borough of Camden (LBC).

The reviewers have authored a significant number of Basement Impact Assessments in the locality and act as independent auditors for LBC.

2.2 Overview

Detailed design will need to be undertaken together with monitoring before, during and after construction by a reputable contractor and a structural appraisal of Lyndhurst Hall will need to form part of the baseline study. Some of these issues are within the remit of a structural engineer, but GEA has been appointed to provide initial opinion in respect of the ground movement analysis and the groundwater flow aspects of the BIA.

2.3 Ground Movements

Ground movements may be considered to take place during four discrete phases of the basement construction work. In the first instance, the installation of piles will cause settlement around the piles. Secondly, the excavation within the bored pile walls will cause movement of the pile walls into the excavation and settlement of the ground surface retained behind the walls. Thirdly, the excavation of soil down to the basement level will cause heave due to the unloading of soil removed and finally long term swell of the formation will take place as pore water pressures recover to long-term equilibrium.

At this site a very simplistic pile design approach has produced a rudimentary design and been used to predict ground movements on the basis of the approach of CIRIA C580. Unfortunately the analysis undertaken is considered inadequate for this site where excessive ground movements would have a significant impact on Lyndhurst Hall.

The following is considered to be the minimum requirement to demonstrate that Lyndhurst Hall would be protected.

1. Structural assessment of Lyndhurst Hall as required in Section 2.41 of CPG4. The delicate vaulted large span Victorian ceiling suggests that this building would be more sensitive to ground movements than, for example, a three-storey house but no such assessment has been included within the BIA.

2. Whilst a construction sequence has been included within the BIA this is a brief overview of the site operations rather than a detailed stage by stage plan of excavation. A formalised sequence should therefore be set out whereby all excavation stages are defined by level and extent.
3. From the sketches provided, consideration does not appear to have been given to the temporary works that would be required to maintain the stability of Lyndhurst Hall while the piling platform is prepared.
4. A single trial pit has been excavated to determine the nature and depth of the foundations of Lyndhurst Hall's southern elevation. It is considered essential that further information is gathered in respect of the foundations along that elevation.
5. Items 2, 3 and 4 above should be used to inform a pile design. A simply supported beam model is considered wholly inadequate as there is no recognition of the surcharges imposed by the foundations of Lyndhurst Hall. An authentic pile design is required that incorporates the stages of construction, propping forces and levels and incorporates the long term case where the soil parameters will be different from those used in analysis of the short term works. Such a design will provide a pile toe level, bending moment and shear force envelopes and, most importantly, a prediction of wall deflections. It is considered that this level of sophistication in pile design is justified in the sensitivity of the retained structure and that a design undertaken using widely available software such as perhaps Wallap or Frew is recommended.
6. The predicted movements would be used to inform the assessment of wall stiffness category such that the most appropriate CIRIA C580 ground movement curves can be used to predict the movements outside the basement.
7. The unloading forces and any potential reloading of a basement raft or floor slab should be used to predict the maximum heave movements within and surrounding the basement and lines representing sensitive structures can be used to provide a better prediction of movements and damage. These movements should then be compared with the degrees of acceptable strain deriving from Item 1 above to determine if the proposed design is acceptable. If not then a different propping arrangement or stiffer piles will be required.
8. Whilst monitoring is briefly mentioned in Section 5.6 of the BIA, there is no indication of what this might comprise. The BIA is considered deficient in this respect and, as a minimum, inclinometers placed within wall piles and precise levelling and 3D monitoring of Lyndhurst Hall should be specified. In addition, given the sensitivity of Lyndhurst Hall to ground movements, the BIA should also provide details of the mitigation measures that will be in place in case the monitoring indicates movements in excess of those predicted.
9. Clause 2.61 of CPG4 notes that the council will seek a management plan for demolition and / or construction where basements are proposed adjacent to a listed building. The requirements are presented in detail in Section 8 of CPG6²; at this stage it is not considered that these requirements have been met.

2.4 Groundwater Flow

The BIA provides an indication of the perceived ground water flow across the site within the made ground and above the London Clay. It surmises that groundwater flows in a roughly southeasterly direction and is probably about right. However groundwater has been measured as shallow as 0.5 m but the measures do not appear sufficient to address this, particularly in the temporary works to prepare the piling area close to Lyndhurst Hall.

² London Borough of Camden (2011) *Camden Planning Guidance (CPG) 6: Amenity*

Further, the basement closest to Lyndhurst Hall is shown to be a contiguous bored pile wall which seems rather at odds with shallow groundwater conditions. This will mean that there will be a requirement for dealing with shallow groundwater inflows and measures should be proposed for dealing with groundwater inflows and ensuring that pumping does not result in settlement of the adjacent structure. We would also suggest that consideration should be given to whether there is a risk of loss of fine material between the piles.

It is considered that the potential impact of the basements on groundwater flow require further thought.

3.0 SUMMARY

Our review has found that the BIA has not taken adequate cognisance of the presence of Lyndhurst Hall which is immediately adjacent to one of the proposed basements. As such it has not adequately assessed the impacts of the basement which is the key aim of a BIA as set out in CPG4. It is important to note that the burden to demonstrate that a scheme does not adversely impact other interests is upon the developer's professional team. We consider that it falls short in this respect.

We trust that the foregoing comments are sufficient for your needs. We would be pleased to discuss our comments in more detail if required and to provide any additional assistance that may be necessary.

Yours sincerely

GEOTECHNICAL & ENVIRONMENTAL ASSOCIATES



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