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Dear Alex

**Re: AUDIT OF BASEMENT IMPACT ASSESSMENT FOR 168 HAVERSTOCK HILL,
LONDON NW3 2AT (2014/6736/P)**

Further to your instruction, we have now completed our audit of the Basement Impact Assessment (BIA) relating to the proposed basement construction at the above site 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 London Borough of Camden (LBC) to undertake an independent audit of a BIA for the above site and an assessment of the completeness of the submission in satisfying the requirements of Camden Planning Guidance 4.

Specifically LBC has requested that GEA provide an opinion on whether:

1. *The submission contains a Basement Impact Assessment, which has been prepared in accordance with the processes and procedures set out in Camden Planning Guidance 4 (2013).*
2. *The methodologies have been appropriate to the scale of the proposals and the nature of the site.*
3. *The conclusions have been arrived at based on all necessary and reasonable evidence and considerations, in a reliable, transparent manner, by suitably qualified professionals, with sufficient attention paid to risk assessment and use of conservative engineering values/estimates.*
4. *The conclusions are sufficiently robust and accurate and are accompanied by sufficiently detailed amelioration/mitigation measures to ensure that the grant of planning permission would accord with DP27, in respect of*

- a. maintaining the structural stability of the building and any neighbouring properties*
- b. avoiding adversely affecting drainage and run-off or causing other damage to the water environment and*
- c. avoiding cumulative impacts on structural stability or the water environment in the local area.*

In addition, LBC specify the following requirements of the assessor because of criticisms and concerns raised by neighbours in respect of this proposal and another close by:

- 5. *Raise any reasonable concerns about the technical content or considerations of the submission which should be addressed by the applicant by way of further submission, prior to planning permission being granted. In this case it would need to be apparent that the submission so deficient in some respect that the three conclusions (points 4a-c above) cannot be guaranteed without further information at this stage. Please clearly denote the precise information (if any) that would be required to satisfy 4a-c.*
- 6. *Raise any relevant and reasonable considerations in respect of the structural integrity or condition of the neighbouring properties which may be unknown or unaccounted for by the submission or which would benefit from particular construction measures or methodologies in respect of the development following a grant of permission for the development. Please clearly denote what such conditions should entail.*

1.2 Proposed Development

The site comprises No 168 Haverstock Hill which, in May 2015, is understood to comprise a four-storey semi-detached building with a lower ground floor formed as a semi-basement and lightwells to the front (southwest) and side (southeast). The lower ground floor level is understood to have been extended to the rear of the building in 2004/5 along with a lowered garden terrace and a single storey extension.

The proposed redevelopment is understood to comprise the construction of a single-storey basement beneath the lower ground floor level which will extend over the entire footprint of the existing building, extension and garden terrace. In addition a swimming pool is proposed for the central section of the rear part of the basement and will extend by a further storey.

1.3 Documentation

A BIA has been prepared by Knapp Hicks & Partners Limited, referenced 32399/R/001/RJM Basement Impact Assessment (BIA) & Site Investigation Report for 168 Haverstock Hill, London NW3 2AT dated October 2014.

2.0 AUDIT OF THE BASEMENT IMPACT ASSESSMENT

2.1 Qualifications and Procedure

This audit 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 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.

The review has been carried out by reviewing the BIA in the light of the following documents:

- Camden geological, hydrogeological and hydrological study; Guidance for subterranean development, Issue 01, November 2010 ('The Arup report')
- Camden Planning Guidance, basements and lightwells, CPG4, 2013.
- Camden Development Policy DP27: Basements and lightwells

2.2 Overview

The requirements of a BIA are set out in CPG4 and fully detailed in Section 6 of the Arup Report. A BIA requires five Stages, as follows:

- Stage 1 – Screening
- Stage 2 – Scoping
- Stage 3 – Site Investigation and study
- Stage 4 – Impact assessment
- Stage 5 – Review and decision making (undertaken by LBC).

The Contents page of the BIA by Knapp Hicks and Partners only lists the site investigation and screening stages as being included in the report and Section 4 refers to the results of the screening process.

The BIA is authored by Richard Moore, a Chartered Geologist, but no reference is made to the author's credentials with respect to the qualification requirements detailed in CPG4. Further there has apparently been no involvement from a Chartered Civil Engineer. It is therefore concluded that the report does not meet the requirements in this respect.

The first stage of the BIA methodology is screening, where matters of concern are investigated and the requirement for a full BIA is established. Three main issues are required to be considered: surface flow and flooding, slope stability, and subterranean flow. Each of these issues is covered by a separate screening flowchart (included as Figures 1 to 3 in CPG4) to assist the screening process, whereby a series of questions are posed regarding the site and the proposed development. In "Section 3 – Basement Impact Assessment (Stage 1 Screening)" the Knapp Hicks document refers to a Basement Impact Assessment being required under CPG4 but again only refers to the BIA being a screening report.

2.3 Stage 1 - Screening

The Screening section of the Knapp Hicks report provides answers to the questions included in all three of the CPG4 Screening Assessment flowcharts.

All of the questions in Section A, the Surface flow and flooding flowchart, have been answered 'No'. It is considered that these responses and the justification comments are appropriate.

Within Section B, the Subterranean (groundwater) flow screening flowchart only Question 1b is answered 'Yes' with the remaining questions answered 'No'. It is considered that these answers and their respective justification comments are appropriate. Question 1b asks whether the proposed basement will extend beneath the water table surface. The site investigation information has been used to inform this answer as groundwater was encountered within the two boreholes advanced and was measured in a single subsequent monitoring visit. The BIA concludes that groundwater is present as a perched body at the head of the London Clay.

Section C considers the Slope stability screening flowchart and answers 'Yes' only to Questions 13 and 14. The comments that justify the 'No' answers to the remaining questions are considered to be reasonable. Of note is Question 10 where the groundwater considerations are developed, mitigation measures are set out and further investigation is recommended. Question 13 refers to significant increases in the differential depth

The conclusions of the screening stage are considered to be appropriate and recommendations are made by Knapp Hicks as to how such a basement may be formed through conventional underpinning.

There is, however, no formal scoping stage and the ground investigation is barely sufficient to design foundations with soil strength parameters having been derived only from pocket penetrometer testing. In fairness, further investigation has been recommended by Knapp Hicks and we concur that this should be undertaken in order to inform the design and confirm the suitability of the proposed construction method.

No construction sequence has been put forward and no depth or sizing of the underpins has been given, merely the comment that they will bear within the London Clay. It follows therefore that no ground movement analysis has been undertaken and the degree of damage to adjacent buildings has not been predicted. For complete clarity, Section 2.30 of CPG4 requires that 'The engineering interpretation will require calculations of predicted ground movements and structural impact to be provided'.

On the basis of the above the report falls short of satisfying the requirements of CPG4 and further work is required.

2.4 Further Information Required

The BIA document reviewed provides a barely adequate description of the topographical and environmental setting of the site. It includes a thorough screening assessment but only makes a small number of comments in respect of the potential impacts of those items and does not follow the formalised process set out in CPG4 through scoping and impact assessment.

There is no evidence of input from a Chartered Civil Engineer.

The following items, whilst not forming an exhaustive list, are considered to be essential in forming a properly reasoned and justifiable basement impact assessment.

- Detail of the proposed basement and swimming pool in terms of levels.
- A complete Basement Impact Assessment, completed by appropriately qualified personnel in accordance with CPG4.
- A clear and logical progression through the later stages of the BIA, including data from additional site investigation, with further monitoring of groundwater levels, to inform the assessment stage of the BIA.
- Formulation of a detailed construction methodology and sequence.
- An assessment of ground movements resulting from the basement construction, including an assessment of damage category and proposals for monitoring and mitigation as necessary.
- An assessment of effects on groundwater and any required mitigation measures.

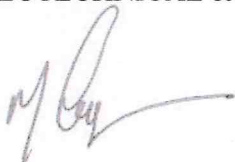
3.0 SUMMARY

Our review has found that the BIA report is not sufficient, does not provide a sufficient assessment of the impacts of the proposed basement and needs to be rewritten in the light of a detailed construction methodology informed by the recommended additional site investigation.

We trust that the foregoing comments are sufficient for your needs. Plainly, further work is required but 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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