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Town Hall
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Dear Nanayaa

Re: AUDIT OF BASEMENT IMPACT ASSESSMENT FOR 6 ANTRIM GROVE, NW3 4XR (2014/3835/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:

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 is located on the northwestern side of Rochester Road, roughly mid-way between its junction with Haverstock Hill and Antrim Road. The proposed development comprises the construction of a single storey basement beneath the existing semi-detached two-storey and loft property. Conventional reinforced concrete underpinning of existing walls is surmised to be the favoured construction method including the underpinning of the party wall with the adjoining 4 Antrim Grove.

1.3 Documentation

The BIA has been prepared by Knapp Hicks and Partners Limited (KHL), referenced 6 Antrim Grove London NW3 4XR Basement Impact Assessment (BIA) and Site Investigation Report, and dated June 2014. It includes architect's drawings and sections, a conceptual model of the ground conditions and adjacent properties and the findings of the KHL site investigation. In addition a small number of site photographs and Thames Water sewer records are appended to the BIA.

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 CPG4 flow chart processes and making additional comment on the sufficiency or inadequacy of information provided where necessary.

2.2 Overview

The BIA is considered to have followed the procedures and protocols of CPG4, however there are items that do not appear to fulfil its requirements and a number of clarifications are required to address inadequacies in the information provided. These are discussed in more detail below and referenced by the section number in the BIA.

2.3 Author Qualification

The KHL BIA was written by M K Richardson, whose credentials are not listed and then checked and approved for issue by Richard Moore, an Associate of KHL who is a Fellow of the Geological Society (FGS) and a Chartered Geologist (CGeol).

Section 2.11 of CPG4 requires that the professionals undertaking a BIA have qualifications that are relevant to the matters being considered. In this respect there is no evidence that the land stability assessment has had input from a Chartered Civil Engineer specialising in ground engineering. CPG4 also requires the input of a "hydrogeologist" who is CGeol. On this basis we would assume that Richard Moore has sufficient relevant experience to fulfil this role, but perhaps for completeness this could be clarified.

In addition, the surface water and flooding part of the assessment should be undertaken by either a Chartered Civil Engineer or a Chartered Water and Environment manager (CWEM) as required in Section 2.45 of CPG4. There is no evidence of a person with such qualifications having provided input to this part of the assessment.

2.4 Setting of the site

The topographical, geological and hydrogeological settings are discussed in Section No 1 and within Section 2 which summarises the findings of the site investigation. These two sections are considered to adequately define the site and its context although there are some shortcomings in the site investigation as set out below.

2.4.1 Site Investigation

The site investigation, summarised in Section 2, comprised a single open-drive borehole referred to as Window Sample No 'WS-1' that was advanced to a depth of 7.4 m, together with three trial pits manually excavated to a maximum depth of 1.8 m. CPG4 refers to the LBC Guidance for Subterranean development study authored by Arup[1] which provides a framework for the methodology for assessing the impact of basements within the borough. Section 7.2.2 of the guidance recommends a minimum of three boreholes or trial pits to determine groundwater flow direction. For this site, whilst the protocols set out in the Arup report have not been followed, it is considered unlikely that further boreholes would indicate different information but in the absence of monitoring standpipes there is no evidence to support that supposition.

A number of shortcomings in the site investigation have been identified and these are as follows. A simple log has been provided for WS-1 although there is no record of who logged the strata. Other than simple soil descriptions there are no photographs of the trial pits and a simple sketch is supplied only for Trial Pit No 3. It does not appear that the pits have confirmed the nature and depth of the foundations of the existing property; this is considered to be a major shortfall in consideration of designing underpins. The text of the investigation also indicates that desiccation has not been found but the shear strength and natural moisture content profiles from 1.5 m to 3 m in WS-1 suggest otherwise. Further, the London Clay is described as 'stiff to very stiff' but the SPT 'N' values suggest strengths more consistent with 'firm to stiff'.

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1 Arup (2010) *Camden geological, hydrogeological and hydrological study* London Borough of Camden Guidance for Subterranean Development

2.5 Development Proposals

The development proposal is summarised in Section 1 and shown on a series of drawings within Appendix A of the BIA.

2.6 Basement Impact Assessment

The BIA is set out such that the screening stage is dealt with in Section 3 but thereafter the BIA does not clearly follow the screening – scoping – investigation – impact assessment process. It is noted that the first paragraph of that section refers to CPG4 having been adopted in April 2011. The current issue is dated September 2013 and it should be clarified that this is the document that KHL have been using. Later on the same page Appendices E and F of CPG4 are referred to where in these should be referenced as the appendices for the Arup document.

The screening stage flowcharts are included within Section 3 and notes beneath each of the three tables are provided to justify the responses recorded against each question.

Although not defined as such, it appears that Section 4, entitled Results of the Screening Process is in actual fact a combined scoping and assessment stage. There does not appear to be a formalised presentation of the assessment of the impact of the proposed basement; instead a number of recommendations are made as to how the basement 'should' rather than 'will' be constructed. In this sense the BIA is considered to be rather vague and whilst many of the recommendations are correct there is not considered to be sufficient detail at this stage in the process.

2.6.1 Surface Flow and Flooding

The screening table for surface flow and flooding is included as section 3A of the BIA and we are generally in agreement with the answers. However whilst the sedum roof will offset some of the new basement roof area, if there is an increase in the ratio of impermeable to permeable surfacing, albeit 'marginal', it should be quantified, taken forward to the scoping stage and its potential impact assessed in accordance with CPG4. Notwithstanding these comments, the findings appear to be generally acceptable.

2.6.2 Groundwater Flow

Considerations in respect of subterranean groundwater flow are set out in Section 3B and the conclusions drawn seem appropriate in that the only 'yes' refers to the proposed excavation extending below the water table surface. It is noted that groundwater was not encountered within the site investigation element of the BIA but reference is made to observations of groundwater ingress during the construction of basements at other properties very close by. These ingresses are considered by KHL to represent pockets of perched groundwater from shallow soils that are referred to as Head Deposits in Section 2 and River Terrace Gravels in Appendix A for Window Sample No 1. On this basis the groundwater flow should be carried forward to the scoping stage and requires further investigation and assessment. However monitoring of groundwater levels has not been undertaken so the comments are made only on the basis of observations in adjacent developments. It would therefore have been prudent for additional monitoring to be carried out in the period leading up to construction and particularly during the wetter winter months.

Despite the comments above however there appears to be a fundamental misjudgement of the purpose of the assessment, in that the objective of the BIA is to ascertain the impact of the new basement upon the groundwater rather than the impact of the groundwater upon the basement.

2.6.3 Ground Stability

Land stability is discussed in Section 3C of the BIA and the answers to the 14 questions in the flowchart largely seem appropriate; however there are a number of points for which further information of clarification is required. Question No 7 refers to seasonal shrink /

swell movements and given the recorded presence of trees and highly shrinkable London Clay at shallow depth, the assertion that there is no impact in this regard is considered questionable. As noted in Section 2.4.1 there is doubt over whether desiccation has been proved or not and it is considered more appropriate that the impact of seasonal shrink / swell movements should be addressed. Question Nos 10 and 11 refer to groundwater and it appears that monitoring information has been drawn from the investigation of adjacent properties rather than this one as monitoring standpipes do not appear to have been installed at this site. That being said, the comment is made by KHL that dewatering through sump pumping is likely to be required and recommendation is made for trial holes to establish inflow rates. The responses to Question Nos 12 and 13 refer to the protection of adjacent properties and the road. KHL note that the party wall to No 4 Antrim Grove will need to be underpinned but there is no statement that defines how the basement is to be constructed.

The scoping stage in the assessment of stability impacts should follow on from Question No 13 where the excavation will significantly increase the differential depth of foundations to adjacent properties. A conceptual site model of the ground conditions is provided and is useful in demonstrating how the adjacent properties and ground conditions fit together. However, the absence of a construction methodology and any sort of outline design mean that the requirements of Paragraph 2.30 of CPG4 have not been met. That section refers to an engineering interpretation requiring "calculations of predicted ground movements and structural impact" to be provided. It is acknowledged that if undertaken with care and attention by a reputable contactor then ground movements arising from the underpinning of such a property are likely to remain very small and cause damage that is within the limits acceptable to LBC. However the excavation of a basement such as this will also cause heave of the underlying London Clay. The assessment of the effects of such heave should form part of the BIA. Once again, the purpose of the ground movement assessment is to determine the impact of the new basement upon the adjoining properties and this has not been carried out.

3.0 SUMMARY

Our review has found that the Basement Impact Assessment for the proposed development does not provide an adequate assessment of the impact of its construction.

Whilst it has been undertaken generally in accordance with the processes of CPG4, in that the screening and scoping stages have essentially been carried out, the assessment of the impact of the basement has not been adequately completed. Appendix F of the Arup document details the potential impacts that might result from the construction of such a basement.

It is worth stating, once again, that the purpose of the BIA is to demonstrate how the potential impacts of constructing a basement like this may be mitigated through appropriate construction methodology.

This BIA has not properly considered the impacts of the proposed basement and has not provided sufficient detail of the construction methodology that could mitigate the impacts and allow safe development. On that basis, it cannot be confirmed that the proposed construction will not adversely affect surrounding the built and natural environment.

It is recommended that the BIA is resubmitted in due course following the development of a construction methodology including temporary works proposals, groundwater monitoring data and an assessment of the potential ground movements, all in accordance with CPG4 and the Arup document.

We trust that the foregoing comments are sufficient for your needs and we would be pleased to discuss the findings in more detail if required and to provide any additional assistance that may be necessary. We will be happy to discuss outstanding matters directly with Knapp Hicks and Partners if you think that would assist the Council with the process.

Yours sincerely
GEOTECHNICAL & ENVIRONMENTAL ASSOCIATES

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