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South Lodge
London NW3 1BL

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12727-83
Revision: D1

July 2018

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1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith was instructed by London Borough of Camden, (LBC) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for the South Lodge (planning reference 2018/2219/P). The basement is considered to fall within Category C as defined by the Terms of Reference.

1.2. The Audit reviewed the Basement Impact Assessment for potential impact on land stability and local ground, and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures.

1.3. CampbellReith was able to access LBC's Planning Portal and gain access to the latest revision of submitted documentation and reviewed it against an agreed audit check list.

1.4. The BIA has been prepared by Site Analytical Services (SAS). It is accepted that the BIA authors' credentials are satisfactory.

1.5. The planned scheme involves and neighbours grade II listed buildings, which are located within the Camden Conservation Area.

1.6. An appropriate site investigation, proportionate with the development proposals, has been conducted.

1.7. It has been confirmed that the basement is to be founded approximately 3m below ground level within sandy clay. Groundwater inflows may potentially be encountered during basement excavation and contingency measures to control these should be allowed for.

1.8. The basement structural solution proposed by the engineer comprises RC underpins and an RC slab at basement level.

1.9. A Ground Movement Assessment (GMA) has been carried out to identify potential ground movement during and post construction. The structural proposals appear to address the effects of the anticipated movement.

1.10. The GMA concluded that the damage to the neighbouring structures, due to basement construction, is anticipated to be no worse than Burland Category 2.

1.11. A movement monitoring strategy relating to all structures and infrastructure is recommended by the BIA during construction and this should be implemented.

1.12. It is accepted that the surrounding slopes to the development site are stable; and the development will not impact on the hydrology, wider hydrogeology of the area and is not in an area subject to flooding.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 29 May 2016 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for the South Lodge, Camden Reference 2018/2219/P.

2.2. The Audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.

2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within

- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Camden Planning Guidance (CPG): Basements.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water
- Local Plan 2017, Policy A5 Basement

2.4. The BIA should demonstrate that schemes:

a) maintain the structural stability of the building and neighbouring properties;

b) avoid adversely affecting drainage and run off or causing other damage to the water environment;

c) avoid cumulative impacts upon structural stability or the water environment in the local area

and evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.

2.5. LBC's Audit Instruction described the planning proposal as *"replacement of existing rear extension with new extension at ground and basement levels"* and *"lowering of existing floor level in part of existing basement"* and confirmed that the basement proposals involve a grade 2 listed building located within Hampstead Conservation Area.

2.6. CampbellReith accessed LBC's Planning Portal on 19 June 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA)
- Planning Application Drawings consisting of

  Location Plan

  Existing Plans and Elevations

  Proposed Plans and Sections
- Planning, Design and Access Statement
- Heritage Appraisal Report
- Arboriculturalist Impact Assessment
- Structural Engineering Report and Subterranean Construction Method Statement

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Although not specifically described in the BIA, the report front sheet suggests the company directors and consultants have satisfactory qualifications.
Is data required by Cl.233 of the GSD presented?	Yes	
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	BIA and drawings
Are suitable plan/maps included?	Yes	See BIA Appendices and structural engineer's report.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes/Yes	BIA 3.2 and Table 2
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA 3.6
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes/Yes	BIA 3.5
Is a conceptual model presented?	Yes	BIA 6.3
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA 4.1
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes/Yes	BIA 4.1

Item	Yes/No/NA	Comment
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes/Yes	BIA 4.1
Is factual ground investigation data provided?	Yes	Appendix A
Is monitoring data presented?	Yes	Groundwater monitoring data provided in BIA 3.3
Is the ground investigation informed by a desk study?	Yes	SAS report reference 17/27399 and BIA 1.2
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	No information on adjacent or nearby basement provided.
Is a geotechnical interpretation presented?	Yes	BIA Appendix A
Does the geotechnical interpretation include information on retaining wall design?	Yes	BIA Section 6.7
Are reports on other investigations required by screening and scoping presented?	No	
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	It appears from the Engineer's drgs. that the neighbouring property comprises a basement
Is an Impact Assessment provided?	Yes	BIA Section 8
Are estimates of ground movement and structural impact presented?	Yes	BIA Appendix B
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	

Item	Yes/No/NA	Comment
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	
Has the need for monitoring during construction been considered?	Yes	Structural Engineering Report and Subteranean Construction Method Statement section 9; BIA sections 1.4, 7.3
Have the residual (after mitigation) impacts been clearly identified?	Yes	BIA section 7.2
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	A GMA has been carried out and presented – BIA Appendix B
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	BIA Section 7.2
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	BIA Section 7.2
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	BIA Appendix B, Table 4.4
Are non-technical summaries provided?	Yes	Non-technical summaries have been included for every BIA section.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Site Analytical Services Ltd (SAS) and the individuals concerned in its production are likely to have suitable qualifications.

4.2. The Planning and Design and Access Statement, as well as the Heritage Appraisal report identified that the property "is located within the Hampstead Conservation Area" and is grade II listed (jointly with neighbouring 1 East Heath); "the garden walls and gates of both properties are also Grade II listed".

4.3. A structural engineering report has been prepared by ElliotWood (EW). The report presents the basement structural solution, along with the sequence of construction works. The proposed redevelopment plans involve "replacing the existing non-original extension, adding a new basement and lowering some of the existing basement slab levels". The basement construction is proposed to comprise RC underpins, propped by a new 275mm thick ground floor suspended flat slab in the permanent condition. The structural proposals indicate the basement extension slab to be 250mm thick rising to 350mm thick towards the wall perimeter.

4.4. As part of the BIA, a Ground Movement Assessment has been prepared by Fairhurst on behalf of SAS. This report looked at possible structural and ground movement that may occur during and post construction of the proposed development. It is to be noted that no calculations, relating to the basement structural design, have been included as part of the BIA. These are required to demonstrate the structural feasibility of the basement retaining structure.

4.5. The ground investigation was based on 1 exploratory borehole to a depth of 15m and a 6m deep window sample. In addition, 7 trial pits were excavated to a maximum depth of 1.5m below ground level to expose the existing foundations.

4.6. The BIA has identified that the new single storey basement extension will be founded at approximately 3m below ground level (bgl) in deposits of the Claygate Member, which comprises a mixture of sand deposits and clay. Overlying the Claygate Member is the made ground, which extended to a maximum depth of 1m bgl, according to the BIA. London Clay, predominantly comprising stiff silty sandy clay, was found to be underlying the Claygate Formation from approximately 6.7m to the maximum depth investigated of 15m bgl.

4.7. The BIA indicates that groundwater was recorded at a depth of 2.51m bgl within the standpipe placed in the exploratory borehole (BH1) and 3.62m within the standpipe placed in Window Sample 1 (WS1) as part of the site investigation. It also advises that variations in groundwater level may occur due to seasonal effects and changes in drainage conditions. The assessment reports that no groundwater was encountered in any of the trial pits excavates as part of the site investigation. The same document suggest that groundwater inflows, at a low rate of

seepage, may be encountered during basement excavation and the contractor makes allowance for contingency plans to deal with these.

4.8. The BIA makes reference to the NHBC Standards chapter 4.2, which deals with foundations within zones of influence of tree roots. The report indicates that the soil samples tested were identified to "have a low permeability and a medium susceptibility to shrinkage and swelling movements with changes in moisture content". The BIA suggests that the foundations may need to be taken deeper "should they be within the zones of influence of both existing or recently felled trees and any proposed tree planting".

4.9. The Arboricultural Impact Assessment Report (AIAR), prepared as part of the BIA, comments on the condition of the existing trees and recommends that trial pits are undertaken to confirm the extent or absence of tree roots. In addition, the report recommends that a Full Arboricultural Method Statement with Tree Protection Plan is prepared ahead of construction. The AIAR concludes that minor root pruning may be required, during trial pit excavation, and these would need to be agreed with the Local Authority. In addition, the report states that the basement proposals will have no or very limited impact on the existing trees.

4.10. The GMA, prepared as part of the BIA, has given consideration to the potential heave pressure and ground movement that is anticipated to occur upon basement excavation. The results of the heave assessment are presented in the report, which recommends that the " basement retaining walls, slabs and internal RC load-bearing walls and columns are designed to support the heave and settlement movements predicted". The structural proposals by EW make reference to heave protection board, which is anticipated to be installed under the suspended 250mm thick new basement extension slab.

4.11. The GMA discusses the predicted horizontal and vertical ground movements and their impact on the adjacent structures. It reports that the anticipated damage to the neighbouring buildings, due to the proposed development, is expected to correspond to Category 0 (negligible) and 1(very slight) within CIRIA C760. It is worth noting that the GMA is based on the assumption of adequate propping to excavation walls at all times. The GMA also indicates that variation in the quality of workmanship and propping to basement excavation may affect the assessment results. It recommends that movement monitoring of party walls and party wall junctions/return walls is carried out during the construction stage and appropriate trigger levels set.

4.12. The report by EW identifies that development falls within the scope of the Party Walls Act 1996 and "procedures of the act will be dealt with in full by the Employer's Party Wall Surveyor".

4.13. The BIA indicates that the proportion of impermeable (hardstanding) surface will increase from approximately 332m2 to 360m2, equivalent to approximately 8.4% increase. However, the BIA concludes that "overall the surface water flows will not materially change in response to the

small increase in hardstanding" and no additional mitigation measures such as SUDS are necessary. It should be noted that approval for changes to surface water discharge may be required from other parties.

4.14. It is accepted that there are no slope stability concerns regarding the proposed development and it is not in an area prone to flooding

4.15. It is accepted that the site has a low flooding risk from surface water, sewers and groundwater.

5.0 CONCLUSIONS

5.1. The BIA and Structural Engineering report have been carried out by firms of engineering consultants using individuals who possess suitable qualifications.

5.2. The proposed development involves and neighbours grade II listed buildings and is located in the Hampstead Conservation Area.

5.3. The engineering report indicates RC underpins, propped by a new 275mm suspended flat slab at ground level, for the basement construction. A 250mm thick rising to 350mm slab is proposed at basement level. The design assumes a high stiffness propping system to be used at all times during construction.

5.4. A GMA has been carried out with the results showing the potential damage, caused by the basement construction, to adjacent properties is negligible or very slight.

5.5. The BIA reports that the basement will be founded approximately 3m blg within the Claygate Formation. Groundwater inflows may potentially be encountered during basement excavation and contingency measures to control these should be allowed for.

5.6. The BIA gives consideration to existing trees on site and discusses potential impact on foundation design.

5.7. The Arboricultural Report identifies the condition of the trees and advises on the preparation of a Full Arboricultural Method Statement and Tree Protection Plan before construction; it is understood that no trees are proposed to be felled and the basement proposals are unlikely to affect the existing trees.

5.8. Both the BIA and the Structural Engineering report recommends that a movement monitoring of all structures and infrastructure is employed during construction. It is noted that a condition survey of the neighbouring properties before construction has not been discussed in the BIA, but it is anticipated that this would be included as part of the Party Wall Award.

5.9. The GMA discusses potential heave pressures and ground movement during and post construction and recommends that the structural proposals give consideration to these. The structural design appears to indicate heave protection board below the basement slab to deal with heave effects.

5.10. Despite the minor increase in impermeable areas, it is accepted that the development does not have a detrimental impact on the overall site hydrogeology and hydrology.

5.11. It is accepted that the surrounding slopes are stable and the site is located outside surface water flood risk areas.

Appendix 1: Residents' Consultation Comments

None available

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	Retaining wall design calculations to demonstrate the feasibility of the retaining wall structure	Open	
2	Stability	Movement monitoring of party walls to be secured via planning condition.	N/A	N/A

Appendix 3: Supplementary Supporting Documents

None

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