CampbellReith
consulting engineers

251 Goldhurst Terrace, London, NW6 3EP

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-47

Revision: D1

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Campbell Reith Hill LLP
Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

T:+44 (0)20 7340 1700
F:+44 (0)20 7340 1777
E:london@campbellreith.com
W:www.campbellreith.com

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Project Partner	E M Brown, BSc MSc CGeol FGS
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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 251 Goldhurst Terrace, London, NW6 3EP (planning reference 2016/6697/P). The basement is considered to fall within Category B 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 Basement Impact Assessment (BIA) has been carried out by ADS Consultancy. Evidence should be provided that the BIA was assessed by appropriately qualified engineers as per the requirements of CPG4.

1.5. It is proposed to form the basement structure by mass concrete underpins to the existing perimeter walls with a new reinforced concrete bearing slab. The underpins are proposed to be constructed in 1.0m sections in a typical staggered underpinning sequence.

1.6. Outline structural calculations for the basement retaining wall, basement slab and foundations are required to demonstrate the viability of the proposals, including soil properties and assumed water levels. Temporary propping details are required based on the structural designs requested. A construction sequence with an indicative bay sequence with sketches is also requested. Dimensioned drawings are not presented and these should be included in the BIA to provide clarity on the proposed development.

1.7. An outline construction programme should be provided.

1.8. The BIA has confirmed that the proposed basement will be founded in London Clay. An indicative assessment of the likely heave pressures is required, including any associated mitigation measures.

1.9. A quantitative Ground Movement Assessment (GMA) is required to satisfy the requirements of CPG4. Mitigation measures are required where predicted damage is Burland Category 1 or greater, and the impact should then be reassessed, if applicable.

1.10. A monitoring strategy for adjoining structures should be established before the work starts, which may include condition surveys, trigger levels linked to the GMA and appropriate contingency measures.

1.11. The presence of water at the site is unknown. It is recommended that the presence of groundwater be established and that any necessary mitigation measures be proposed in the BIA. The impact of the development on the wider hydrology should be established.

1.12. A Flood Risk Assessment should be provided with mitigation measures proposed to address the effects of flooding and confirmed to be acceptable by an appropriately qualified Hydrogeologist/ Engineer.

1.13. It is accepted that the surrounding slopes to the development site are stable.

1.14. It is accepted that the site is not located within the catchment area of the Hampstead Heath pond chain.

1.15. Queries and requests for further information are summarised in Section 4 and Appendix 2.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 19 January 2017 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 251 Goldhurst Terrace, London, NW6 3EP.

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) 4: Basements and Lightwells.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.

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;

d) 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 "Basement excavation with front lightwell and sunken terrace with steps for access to the rear; various alterations to the rear elevation including the increase in height of the existing ground floor projection with terrace at the first floor level, privacy screen and timber balustrade; rear dormer, all to dwellinghouse (Class C3)".

2.6. The Audit Instruction also confirmed that the basement proposal does not involve a listed building nor does the site neighbour any listed buildings.

2.7. CampbellReith accessed LBC's Planning Portal on 30 January 2017 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) dated January 2017 by ADS Consultancy,
- Design and Access Statement dated December 2016 by GML Architects,
- Planning Statement dated December 2016 by Martin Robeson Planning Practice (MRPP),
- Construction Traffic Management Plan (CTMP) not dated by MRPP,
- Ground Investigation Report dated October 2016 by Ground & Water Geotechnical and Environmental Consultants
- Planning application drawings by GML Architects consisting of:

  Existing Plans (dated December 2016)

  Proposed Plans (dated December 2016)

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	CEng, no Hydrogeologist/Hydrologist credentials provided.
Is data required by Cl.233 of the GSD presented?	No	Outline construction programme to be provided. Utility infrastructure within the zone of influence to be confirmed.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	No	Impact on hydrogeology is unknown due to no groundwater monitoring being performed.
Are suitable plan/maps included?	Yes	BIA Drawing Appendix.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	BIA Drawing Appendix.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Section 4.3.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Partially	BIA Section 4.1. Question 1 has been modified, and Question 3 and 6 are answered incorrectly.
Is a conceptual model presented?	Yes	Ground Investigation Report, although presence of groundwater was not established.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	Not performed.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	No	Not performed.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	Not performed.
Is factual ground investigation data provided?	Yes	Ground Investigation Report.
Is monitoring data presented?	No	
Is the ground investigation informed by a desk study?	Yes	BIA Section 4.0.
Has a site walkover been undertaken?	Unknown	
Is the presence/absence of adjacent or nearby basements confirmed?	No	
Is a geotechnical interpretation presented?	No	Ground Investigation Report. Geotechnical parameters as per GSD Appendix G3 required.
Does the geotechnical interpretation include information on retaining wall design?	No	No retaining wall design presented, including soil stiffness or shear strength parameters.
Are reports on other investigations required by screening and scoping presented?	Yes	Site investigation, included within BIA.
Are the baseline conditions described, based on the GSD?	No	Groundwater levels unknown and soil parameters not presented.
Do the base line conditions consider adjacent or nearby basements?	No	As per above. To be addressed in the Ground Movement Assessment (GMA). Refer to CIRIA C580.

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	No	
Are estimates of ground movement and structural impact presented?	No	No GMA presented.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	As per above.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	No mitigation measures are considered.
Has the need for monitoring during construction been considered?	No	
Have the residual (after mitigation) impacts been clearly identified?	No	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	GMA required.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	No	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	No	GMA required to confirm.
Are non-technical summaries provided?	No	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by ADS Consultancy. The authors are not identified and there is no evidence that the BIA was assessed by appropriately qualified engineers as per the requirements of CPG4.

4.2. The existing property is located at 251 Goldhurst Terrace and comprises a three-storey semi-detached residential property including an existing basement beneath the entire building footprint.

4.3. The BIA and Ground Investigation Report has identified that on site ground conditions comprise a variable depth of Made Ground (0.60m to 1.12m thick) underlain by Head Deposits (0.30 to 1.20m thick) and London Clay from 1.60 to 1.80m bgl. The proposed basement will therefore be founded in London Clay.

4.4. The scheme consists of the demolition of the existing lower ground floor to the existing basement/cellar level and constructing a new basement at a slightly lower level with lightwells at the front and rear of the property. Dimensioned drawings are not presented and these should be included in the BIA to provide clarity on the proposed development.

4.5. It is proposed to form the basement structure by mass concrete underpins to the existing perimeter walls with a new reinforced concrete bearing slab. The underpins are proposed to be constructed in 1.0m sections in a typical staggered underpinning sequence. Although this is an acceptable methodology using established techniques, there is no evidence presented that indicates how the design will resist lateral earth pressures, or that surcharge pressures and lateral water pressure has been considered.

4.6. Structural designs are not presented in the BIA. Outline structural calculations for the basement retaining wall, basement slab and foundations are required to demonstrate the viability of the proposals, including soil properties and assumed water levels.

4.7. Although temporary propping and associated bracing is discussed in the Construction Methodology of the BIA no details are provided. Temporary propping details are therefore requested and should be based on the structural designs to be carried out, as 4.6. A construction sequence with an indicative bay sequence with sketches is also requested.

4.8. It is accepted that the basement will be founded in London Clay. However, given the high volume change potential of the London Clay, an indicative assessment of the likely heave forces is required, and that any necessary mitigation measures are incorporated into the BIA.

4.9. A quantitative Ground Movement Assessment (GMA) is required. The engineering interpretation requires calculations of predicted ground movements and structural impacts to

be provided. A Damage Category Assessment as per CIRIA C580 is required to assess the effects that the construction of the proposed basement will have on both Goldhurst Terrace and adjacent properties. Furthermore, CPG4 requires mitigation measures to be considered where predicted damage of Burland Category 1 or greater is predicted, and for the impacts to be then reassessed, if applicable.

4.10. A programme of monitoring the adjoining structures should be established before the work starts, which may include condition surveys, and this should be incorporated in the BIA. The monitoring strategy should include trigger levels linked to the GMA and appropriate contingency measures.

4.11. The screening for subterranean (groundwater) flow has not been carried out.

4.12. The screening for surface flow and flooding contains incorrect responses, and these should be addressed (See items 4.14 and 4.15 below).

4.13. In relation to the above, 'yes' responses identified during the screening exercise do not appear to have been carried forward to scoping stage. This should be explicitly performed in the BIA and it should be ensured that all aspects identified during the screening stage are adequately addressed.

4.14. From the architectural drawings presented it appears that the basement footprint will extend further into the rear garden increasing the proportion of hard surfaced areas. The lightwells at the front and rear of the property will likely further increase the proportion of hard surfaces. The answer presented for Question 3 within Section 4.1 of the BIA is therefore incorrect (Surface flow and flooding). The increase in impermeable area across the site should therefore be addressed with suitable mitigation measures to offset the impacts of the development presented in the BIA. Drainage proposals in line with CPG4 Section 3.51 should be provided.

4.15. According to Figure 15 of the Arup Guidance for Subterranean Development, Goldhurst Terrace was subject to surface water flooding in 1975 and 2002, and the is site located within the Goldhurst Local Flood Risk Zone, as defined by LBC. The answer presented for Question 6 within Section 4.1 of the BIA is therefore incorrect (Surface flow and flooding). A Flood Risk Assessment should be provided with mitigation measures proposed to address the effects of flooding.

4.16. Although no groundwater was encountered during the ground investigation, there is no evidence that groundwater monitoring was performed. Consequently the presence of water at the site is unknown. It is recommended that the presence of groundwater be established

and that any necessary mitigation measures be proposed in the BIA in the event of water being present.

4.17. No known tunnels or railway lines are located within the vicinity of the site. The presence of utility infrastructure within the development's zone of influence should be confirmed and damage impacts assessed, as applicable.

4.18. It is acknowledged that no trees will be removed due to the proposed development.

4.19. The BIA has shown that the surrounding slopes to the development are stable.

4.20. It is accepted that the site is not located within the catchment area of the Hampstead Heath pond chain.

5.0 CONCLUSIONS

5.1. The Basement Impact Assessment (BIA) has been carried out by ADS Consultancy. Evidence should be provided that the BIA was assessed by appropriately qualified engineers as per the requirements of CPG4.

5.2. The basement structure proposed is an acceptable methodology using established techniques, although there is no evidence presented that indicates how the design will resist lateral earth pressures, or that surcharge pressures and lateral water pressure has been considered.

5.3. Structural designs are not presented in the BIA. Outline structural calculations for the basement retaining wall, basement slab and foundations are required to demonstrate the viability of the proposals, including soil properties and assumed water levels.

5.4. Temporary propping details are required based on the structural designs requested. A construction sequence with an indicative bay sequence with sketches is also requested.

5.5. Dimensioned drawings are not presented and these should be included in the BIA to provide clarity on the proposed development.

5.6. An outline construction programme should be provided.

5.7. It is accepted that the basement will be founded in London Clay. An indicative assessment of the likely heave pressures is required, including any associated mitigation measures.

5.8. A quantitative Ground Movement Assessment (GMA) is required. CPG4 requires mitigation measures to be considered where predicted damage exceeds Burland Category 1 and for the impact to be reassessed.

5.9. A monitoring strategy for adjoining structures should be established before the work starts, which may include condition surveys, trigger levels linked to the GMA and appropriate contingency measures.

5.10. The Screening and Scoping process has not been completed properly. Refer to Sections 4.11 to 4.15 for further details.

5.11. The presence of water at the site is unknown. It is recommended that the presence of groundwater be established and that any necessary mitigation measures be proposed in the BIA. The impact of the development on the wider hydrology should be established.

5.12. A Flood Risk Assessment should be provided with mitigation measures proposed to address the effects of flooding and confirmed to be acceptable by an appropriately qualified Hydrogeologist/ Engineer.

5.13. It is accepted that the surrounding slopes to the development site are stable.

5.14. It is accepted that the site is not located within the catchment area of the Hampstead Heath pond chain.

5.15. Queries and requests for further information are summarised in Appendix 2. Until the additional information required is presented, the BIA does not meet the criteria of CPG4.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format	BIA Author qualifications.	Open	
2	BIA format	Works programme not provided. Outline duration to be provided.	Open	
3	Hydrology	Responses to Surface flow and flooding screening to be reviewed.	Open	
4	Hydrology	Mitigation measures / SUDS assessment as per CPG4 3.51.	Open	
5	Hydrology	Flood Risk Assessment required.	Open	
6	Hydrogeology	Subterranean (groundwater) flow screening flowchart to be completed.	Open	
7	Hydrogeology	Groundwater monitoring to be conducted and mitigation measures to be proposed as required.	Open	
8	Stability	Outline structural calculations for the basement retaining wall, basement slab and foundations are required to demonstrate the viability of the proposals, including soil properties and assumed water levels. Geotechnical parameters as per GSD Appendix G3 to be provided.	Open	
9	Stability	Construction sequence to be described in the text with sketches illustrating each stage and temporary works propping scheme to be provided. Dimensioned drawings required to provide clarity on the proposed development	Open	

10	Stability	Ground Movement Assessment and Structural Impact Assessment to be performed. Appropriate mitigation measures to be considered as required.	Open	
11	Stability	Condition survey and monitoring programme to be commissioned for both the existing and neighbouring properties.	Open	
12	Stability	Assessment required, and mitigation of, likely heave pressures. This would inform the floor slab design.	Open	
13	Hydrology, hydrogeology and stability	'Yes' responses identified in the screening stages to be carried forward to scoping stage and explicitly presented in BIA.	Open	

Appendix 3: Supplementary Supporting Documents

None

London

Friars Bridge Court
41- 45 Blackfriars Road
London, SE1 8NZ

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Surrey

Raven House
29 Linkfield Lane, Redhill
Surrey RH1 1SS

T: +44 (0)1737 784 500
E: surrey@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

Bristol

Wessex House
Pixash Lane, Keynsham
Bristol BS31 1TP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com

UAE

Office 705, Warsan Building
Hessa Street (East)
PO Box 28064, Dubai, UAE

T: +971 4 453 4735
E: uae@campbellreith.com