

Whitestone House
London, NW3 1EA

Basement Impact Assessment
Audit

For
London Borough of Camden

Project Number: 12336-44
Revision: D1

May 2016

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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 Whitestone House, London NW3 1EA (planning reference 2015/2645/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 proposed development is the substantial demolition of the existing property, to be rebuilt with extensions to the existing footprint to the side and rear, and the construction of a single level of basement beneath an existing lower ground floor and beneath part of the rear garden. The basement will primarily be formed at 6.50m below ground level with a small section related to a new swimming pool extending to 8.00m bgl.
- 1.5. The proposed development lies within a Conservation Area and is adjacent to, and shares a Party Wall with, a Grade II listed building, Gangmoor.
- 1.6. The BIA has been prepared by Geotechnical and Environmental Associates Ltd. The authors' qualifications are in accordance with LBC's requirements.
- 1.7. A desk study broadly in accordance with the GSD Appendix G1 has been provided. However, the appendices should be provided for review.
- 1.8. An adequate ground investigation has been undertaken and an interpretation provided. However, inconsistent references to BH3 and BH4 should be clarified.
- 1.9. Outline structural proposals have been prepared, including construction sequence, temporary works requirements and recommendations for contractors in regards to dealing with perched groundwater. Outline bored pile wall information should be provided and should be used to undertake a preliminary ground movement assessment. Similarly, a preliminary methodology, sequence and temporary propping arrangement should be provided.
- 1.10. A ground movement assessment should be presented, to include calculations / methodology and an impact assessment in line with the Burland Scale, along with an identified zone of influence of the proposed development. Within the zone of influence foundation depths and

existing basements should be indicated, and listed structures should be identified. The GMA should be in accordance with CPG4 Section 3.

- 1.11. The BIA discusses the requirement for survey and monitoring of nearby structures during construction. For structures along the Party Wall, the monitoring should be agreed under the Party Wall Act.
- 1.12. Longer term monitoring is recommended to understand winter groundwater levels and the impact on/of the basement.
- 1.13. It is accepted that the proposed development will have negligible impact on slope stability provided that the Contractor follows best practice and the recommendations of the Structural Engineer.
- 1.14. A surface flow and flooding assessment has been carried out, but the BIA states that it should not be relied upon until assessed by an appropriately qualified engineer. This section appears to have been completed comprehensively and the author's qualifications appear adequate. However, the BIA cannot be deemed to be complete if the author believes further assessment is necessary.
- 1.15. Subject to receiving and reviewing the additional supporting information requested, it is likely that the proposed development will not impact upon slope stability.
- 1.16. Subject to receiving and reviewing the additional supporting information requested, it is likely that the proposed development will not impact upon the wider hydrological or hydrogeological environments.
- 1.17. Queries and matters requiring further information or clarification are summarised in Appendix 2.
- 1.18. Until the missing information is provided, it is not possible to conclude that the criteria contained in CPG4 and DP27 have been met.

2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 7th April 2016 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Whitestone House, London NW3 1EA, Camden Reference 2015/2645/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) 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; and,
 - 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: "*Substantial demolition and rebuild of existing four storey dwellinghouse and excavation of single storey basement for additional car parking and swimming pool. Erection of single storey enclosure to house car lift at ground floor level. Installation of three dormer windows to front roofslope*".
- 2.6. CampbellReith accessed LBC's Planning Portal on 22 April 2016 and gained access to the following relevant documents for audit purposes:

- Desk Study & Basement Impact Assessment (ref J14136, Issue 1) dated 20 October 2014 by Geotechnical & Environmental Associates Limited.
- Basement Impact Assessment Structural Proposals & Suggested Construction Sequence including Appendix A (Existing Engineering Drawings) and Appendix B (Proposed Structural Scheme Drawings and Outline Construction Sketches) (ref 140050/KH/TA, Revision P1) dated February 2015 by Alan Conisbee and Associates Limited.
- Location Plan, Site Layout Plan, Existing Plans and Elevations, Proposed Plans and Sections, Basement Car Park Sketch, Demolition Plans dated between 6 July 2013 and 26 November 2015 by Bentheim Design and Jonathan Freegard Architects.
- Design and Access Statement dated April 2015 by Bentheim Design and Jonathan Freegard Architects.
- Construction Management and Logistics Plan dated April 2015 by Jonathan Freegard Architects.
- Arboricultural Impact Assessment Report and Outline Method Statement (ref JFA/WSH/AIM/01) dated 15th July 2014 by Landmark Trees Ltd.
- Relevant correspondence with interested parties provided by LBC (as per Appendix 1).

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The author's qualifications are in accordance with CPG4 guidelines for all sections.
Is data required by Cl.233 of the GSD presented?	Yes	A desk study broadly in line with the GSD Appendix G1 has been provided. However, reference is made to appendices that have not been provided for review.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	
Are suitable plan/maps included?	No	Mapping from the Desk Study appendices should be provided for review.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	No	Mapping from the Desk Study appendices should be provided for review.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	However, pending additional review of Desk Study appendices.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	However, pending additional review of Desk Study appendices.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	However, pending additional review of Desk Study appendices. Additionally BIA states requirement for additional review by qualified engineer.

Item	Yes/No/NA	Comment
Is a conceptual model presented?	Yes	However, site development elevations appear confused and should be presented clearly, with levels in the BIA text and Structural Proposals in agreement with levels presented on the drawings / sketches.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	However, pending additional review of Desk Study appendices.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	However, pending additional review of Desk Study appendices.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	However, pending additional review of Desk Study appendices. Additionally BIA states requirement for additional review by qualified engineer.
Is factual ground investigation data provided?	Yes	However, pending additional review of Desk Study appendices
Is monitoring data presented?	Yes	However, the monitoring was undertaken in summer and longer term monitoring over the winter months should be undertaken. References to BH3 and BH4 to be clarified.
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	A single level basement is indicated to be present in the nearby property Bell Moor. Lower ground floors are indicated in the adjoining Gangmoor and The Cottage.
Is a geotechnical interpretation presented?	Yes	

Does the geotechnical interpretation include information on retaining wall design?	Yes	Examples of safe working loads for 300mm diameter piles with various founding depths have been provided for internal piles. Retaining wall pile diameter, length and spacing should be provided. These are not discussed in the Structural Proposal.
Are reports on other investigations required by screening and scoping presented?	No	Desk study appendices to be provided.
Are baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Single level basements / lower ground floors indicated in adjacent properties.
Is an Impact Assessment provided?	Yes	It should be noted that if long term groundwater monitoring indicates interaction with the basement then the impact assessment will need to be revised.
Are estimates of ground movement and structural impact presented?	No	No methodology or calculations have been provided.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	However, pending additional review of Desk Study appendices.
Has the need for monitoring during construction been considered?	Yes	Movement monitoring is discussed and recommended.
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	Ground movement assessment calculations should be provided. A zone of influence should be identified.

Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	The proposed basement is largely beneath current areas of hardstanding and additional run-off should not be expected. SUDS including attenuation tanks are proposed.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	However, pending additional review of Desk Study appendices.
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	No	A Ground Movement Assessment should be undertaken.
Are non-technical summaries provided?	Yes	Not specifically titled as such, but sufficient summary information is provided.

4.0 DISCUSSION

- 4.1. The BIA has been prepared by Geotechnical and Environmental Associates Ltd. The authors' qualifications are in accordance with LBC's requirements.
- 4.2. A desk study broadly in accordance with the GSD Appendix G1 has been provided for the proposed development. However, the appendices have not been presented. The appendices should be provided for review, including all historical map, Envirocheck and ground investigation information.
- 4.3. An adequate ground investigation has been undertaken. However, inconsistent references to BH3 and BH4 should be clarified, especially in regards to groundwater monitoring. A geotechnical interpretation and a conceptual model are presented.
- 4.4. The BIA indicates that the proposed basement construction will utilise bored pile retaining walls and localised traditional underpinning techniques. Structural information should be provided in more detail, as per guidance in CPG4 (Section 3) to indicate preliminary pile diameter, length and spacing, and should be used as a basis for undertaking a preliminary ground movement assessment. Similarly, a preliminary methodology, sequence and temporary propping arrangement should be provided in relation to the proposed underpinning works.
- 4.5. The proposed development is sited below what is currently developed or covered by hardstanding. As such the impermeable site area is unlikely to significantly change and consequently surface flow and flooding impacts will be negligible. The BIA recommends attenuation tanks and SUDS in line with current guidance to further mitigate potential impacts.
- 4.6. The proposed development is on the crest of an approximately 26° slope down to Hampstead Heath and the Vale of Health beyond. The excavation / construction will not alter the slope profile, nor will it impact existing tree and vegetation cover along the crest of the slope. The building loads will be transferred to deeper foundations, including piles, which should reduce any surcharge / lateral load on the slope itself and improve long-term stability of the slope.
- 4.7. The proposed development is within the catchment area of the pond chains on Hampstead Heath, and the closest pond, Whitestone Pond, is within 60m of the site. The groundwater level has been monitored during summer months at below the proposed basement slab level.
- 4.8. Additionally perched water has been identified in one of the boreholes. The BIA provides recommendations for longer term groundwater monitoring and that the contractor undertakes trial excavations and plans for contingency sump pumping as part of the temporary works. It is currently stated that the basement will not impact the wider hydrogeological environment.

However, should longer term groundwater monitoring indicate interaction with the proposed basement then the impact assessment will need to be revised.

- 4.9. A surface flow and flooding assessment has been carried out, but the BIA states that it should not be relied upon until assessed by an appropriately qualified engineer. This section appears to have been completed comprehensively and the author's qualifications appear adequate. However, the BIA cannot be deemed to be complete if the author believes further assessment is necessary.
- 4.10. A ground movement assessment (GMA) should be presented for review, including methodology / calculations, indicative zone of influence and the presence or absence of nearby basements, underground structures or listed buildings. The proposed development is within a conservation area and shares a Party Wall with a Grade II listed property, Gangmoor. As such, a GMA is required to address the potential impacts to the surrounding properties and plan appropriate mitigation, as required. The GMA should be undertaken as per guidance in CPG4 (Section 3).
- 4.11. Within the BIA text, site development elevations appear contradictory. For clarity of assessment the elevations should be presented clearly as a reference AOD, with levels in the BIA text and Structural Proposals in agreement with levels presented on the drawings / sketches.
- 4.12. Whilst example internal piled foundation information is presented, sufficient outline bored pile wall information should be provided to indicate preliminary pile diameter, length and spacing, and should be used to undertake a preliminary ground movement assessment. Similarly, a preliminary methodology, sequence and temporary propping arrangement should be provided in relation to the proposed underpinning works.
- 4.13. There will be a requirement for survey and monitoring of nearby structures during construction. Monitoring during construction is discussed and recommended within the BIA. A GMA should indicate the zone of influence during construction and structures within that zone should be monitored in line with recommendations of the Structural Engineer. For structures along the Party Wall, the monitoring should be agreed under the Party Wall Act.

5.0 CONCLUSIONS

- 5.1. The BIA has been prepared by Geotechnical and Environmental Associates Ltd. The authors' qualifications are in accordance with LBC's requirements.
- 5.2. A desk study has been provided for the proposed development. However, the appendices should be provided for review, including all historical map, Envirocheck and ground investigation information.
- 5.3. Inconsistent references to BH3 and BH4 should be clarified, especially in regards to groundwater monitoring. A geotechnical interpretation and a conceptual model are presented.
- 5.4. Longer term groundwater monitoring should be undertaken. Should this indicate interaction with the proposed basement then the impact assessment will need to be revised.
- 5.5. The proposed development should be clearly described and be consistent with supporting structural and architectural drawings. The site, foundation, ground conditions and groundwater levels should be presented as elevations AOD for clarity and consistency.
- 5.6. The BIA indicates that the proposed basement construction will utilise bored pile retaining walls and localised traditional underpinning techniques. Structural information should be provided to indicate preliminary pile diameter, length and spacing, and should be used as a basis for undertaking a preliminary ground movement assessment. Similarly, a preliminary methodology, sequence and temporary propping arrangement should be provided in relation to the proposed underpinning works.
- 5.7. The proposed development is within a conservation area and shares a Party Wall with a Grade II listed property, Gangmoor. As such, a GMA is required to address the potential impacts to the surrounding properties and plan appropriate mitigation, as required. The GMA should be undertaken as per guidance in CPG4 (Section 3).
- 5.8. There will be a requirement for survey and monitoring of nearby structures during construction. For structures along the Party Wall, the monitoring should be agreed under the Party Wall Act.
- 5.9. Subject to receiving and reviewing the additional supporting information requested, it is likely that the proposed development will not impact upon slope stability.
- 5.10. A surface flow and flooding assessment has been carried out, but the BIA states that it should not be relied upon until assessed by an appropriately qualified engineer. This section appears to have been completed comprehensively and the author's qualifications appear adequate. However, the BIA cannot be deemed to be complete if the author believes further assessment is necessary.

- 5.11. Subject to receiving and reviewing the additional supporting information requested, it is likely that the proposed development will not impact upon the wider hydrological or hydrogeological environments.
- 5.12. Queries and matters requiring further information or clarification are summarised in Appendix 2.
- 5.13. Until the additional information is provided, it is not possible to conclude that the criteria contained in CPG4 and DP27 have been met.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Solomons	Vale of Health Society	12/01/2016	Objection – multiple concerns as to the impact of the basement on the adjacent slopes and wider hydrogeology / hydrology.	Refer to section 4 of audit report.
Permutt	Bell Moor Management Company, NW3, 1DY	07/01/2016	Objection – adjacent building suffered water / flood damage and concern is that basement will create increased flood risk and structural damage to their own basement garage.	Refer to paragraphs 4.7-4.9 of audit report.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	BIA	The desk study appendices should be provided for review, including all historical map, Envirocheck and ground investigation information.	Open	
2	BIA	References to BH3 / BH4 to be clarified, especially in regards groundwater monitoring.	Open	
3	Hydrogeology	Longer term groundwater monitoring to be carried out, including over the winter months. Revise impact assessment if groundwater interacts with proposed basement.	Open	
4	Land Stability / Hydrogeology	Site development elevations should be presented clearly, with levels in the BIA text and Structural Proposals in agreement with levels presented on the drawings / sketches.	Open	
5	Land Stability	Structural methodology should provide additional retaining wall information, such as a likely range of pile diameters, lengths and spacings. Similarly, a preliminary methodology, sequence and temporary propping arrangement should be provided in relation to the proposed underpinning works.	Open	
6	Land Stability	Ground movement calculations should be provided for review. Nearby basements should be identified. A zone of influence should be identified. The presence of nearby Listed structures should be identified.	Open	

7	Hydrology	The BIA should confirm that the assessment has been carried out by sufficiently experienced engineers or provide additional review by a suitable author.	Open	
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Appendix 3: Supplementary Supporting Documents

None

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