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consulting engineers

73 Goldhurst Terrace
London, NW6 3HA

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13693-45
Revision: F1

4th November 2022

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	May 2022	Comment	NSkb-13693-45-180522-73 Goldhurst Terrace.doc	NS	KB	KB
F1	November 2022	For Planning	NSkb-13693-45-031122-73 Goldhurst Terrace_F1.doc	NS	ME	KB

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Document Details

Last saved	03/11/2022 11:58
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Project Number	13693-45
Project Name	73 Goldhurst Terrace, London
Planning Reference	2021/5834/P

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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 73 Goldhurst Terrace (planning reference 2021/5834/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 (BIA) 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 comprises the construction of a single-level basement beneath the majority of the existing building, and a lightwell extending into the front garden.

1.5. The qualifications of the individuals involved in the production of the BIA are in line with Camden's guidance.

1.6. Screening and scoping assessments are presented, supported by desk study information.

1.7. The site investigation confirmed that the basement will be founded in the London Clay. Groundwater monitoring and excavation trials are recommended in the BIA to inform dewatering during construction.

1.8. As the site is in a critical drainage area a Flood Risk Assessment (FRA) has been presented. The FRA recommends mitigation measures to be adopted against the risk of sewer flooding.

1.9. The BIA states that as there will not be an increase in hardstanding, the flood risk from surface water in the area will not increase as part of the development.

1.10. Geotechnical parameters are presented and used in the preliminary structural calculations.

1.11. An outline structural proposal and associated drawings are included in the BIA. Underpinning is to be carried out in bays not exceeding 0.8-0.9m width. The underpins will be propped in the temporary condition and supported by the basement and ground floor slab in the long term.

1.12. A Ground Movement Assessment (GMA) and damage assessment are provided to demonstrate that ground movements and consequential damage to neighbouring properties will be within the LBC's policy requirements.

1.13. The result of the preliminary damage assessment suggests that damage to neighbouring properties will be within Category 1 of the Burland Scale, which is within the limits set by the Council.

1.14. The BIA recommends condition surveys to be undertaken as part of the Party Wall Agreements and recommends a project specific monitoring regime and Action Plan to be put in place, which will delineate lines of responsibility, monitor trigger levels and appropriate mitigation measures.

1.15. Based on the revised submission it can be confirmed that the BIA meets the requirements of Camden Planning Guidance: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 15 March 2022 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 73 Goldhurst Terrace, London, NW6 3HA, planning reference 2021/5834/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:

- Camden Local Plan 2017 - Policy A5 Basements.
- Camden Planning Guidance (CPG): Basements. January 2021.
- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.

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 "*Extension of existing basement level with front and rear lightwell; infill rear extension and retention of rear dormer*".

2.6. CampbellReith accessed LBC's Planning Portal on 12 May 2022 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment & Ground Movements by Paca Geotechnical Engineering Ltd, ref: A704.21, rev. 2 dated 14 February 2022.
- Design and Access Statement by Unknown, revision unknown, not dated.
- Architectural Drawings by Basement Consulting Ltd:
  - GOLD-21-01 A (dated October 2021)
  - GOLD-21-02 A (dated October 2021)
  - GOLD-21-03 A (dated October 2021)

- GOLD-21-04 A (dated October 2021)
- GOLD-21-05 A (dated October 2021)
- GOLD-21-06 A (dated October 2021)
- GOLD-21-07 A (dated October 2021)
- GOLD-21-08 A (dated October 2021)
- GOLD-21-09 A (dated October 2021)

- Planning Consultation Responses as detailed in Appendix 1.

2.7. Subsequent to the initial audit report submitted in May 2022, CampbellReith gained access to the following relevant documents in October 2022:

- Basement Impact Assessment by GEA Ltd, ref: J22200, rev. 0 dated 4 October 2022.
- Structural Calculations and Drawings by Paca Geotechnical Engineering Ltd, ref.:A704.21, rev. 2 dated July 2022
- Amended Architectural Drawings by Basement Consulting Ltd:
  - GOLD-22-01 (dated July 2022)
  - GOLD-22-02 (dated July 2022)
  - GOLD-22-03 (dated July 2022)
  - GOLD-22-04 (dated July 2022)
  - GOLD-22-05 (dated July 2022)
  - GOLD-22-06 (dated July 2022)
  - GOLD-22-07 (dated July 2022)
  - GOLD-22-08 (dated July 2022)
  - GOLD-22-09 (dated July 2022)

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The hydrogeology assessment has been reviewed by professional with suitable qualification.
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	
Are suitable plan/maps included?	Yes	Architectural plans and Groundsure report.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Architectural plans have been amended to include basement finished floor level. Discrepancy on the formation level has been clarified.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.2 of the BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.1 of the BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.3 of the BIA.
Is a conceptual model presented?	Yes	Section 7 of the BIA. Discussion on groundwater conditions has been included.
Land Stability Scoping Provided?	Yes	Section 4 of the BIA.

Item	Yes/No/NA	Comment
Is scoping consistent with screening outcome?		
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 of the BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 of the BIA.
Is factual ground investigation data provided?	Yes	Ground Investigation Report.
Is monitoring data presented?	No	Groundwater monitoring not undertaken.
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	As part of the ground investigation.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Section 9.1. of the BIA. Neighbouring properties are assumed to have similar cellar to applicant site.
Is a geotechnical interpretation presented?	Yes	Section 8.0 of the BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	FRA has been included in the BIA.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Neighbouring properties are considered to not have a basement.

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	Part 4 of the BIA.
Are estimates of ground movement and structural impact presented?	Yes	Section 5 of the BIA.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	
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	Section 11.2 of the BIA.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Residual impacts are considered to be negligible.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Damage will be limited to Cat.1 of the Burland Scale.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	A Flood Risk Assessment has been presented.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	As above.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	
Are non-technical summaries provided	No	However, conclusions and recommendations of the BIA are clearly understandable.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Paca Geotechnical Engineering Limited. A new BIA undertaken by GEA Limited was presented as part of the revised submission. The qualifications of the individuals involved in the production of the BIA meet the requirements of CPG Basements.

4.2. The site is occupied by a three-storey terraced property with both a rear and front garden. Below part of the living at ground floor, there is a small basement/cellar, accessed internally via a ladder. The building shares party walls with No. 71 and No. 75 Goldhurst Terrace which are understood to not have a basement. The property is not listed.

4.3. The proposed development has been amended to comprise the construction of a single-level basement beneath most of the footprint of the house and into part of the front garden to create a lightwell.

4.4. The amended architectural drawings indicate the basement will extend to a depth of c. 3.30m bgl at the front garden and c. 3.60m bgl at the rear garden.

4.5. The screening and scoping assessments are presented in the GEA BIA and are informed by desk study information. Most relevant figures/maps from the ARUP GSD and other guidance documents are referenced within the BIA to support responses to screening questions.

4.6. A site investigation was undertaken by Ground and Water Ltd in October 2019. Site works comprised one exploratory borehole to a maximum depth of 8.45m bgl and hand dug foundation inspection pits to a maximum depth of 0.50m below cellar level. Made Ground of thickness of 0.70m was found on top of the London Clay Formation which extended to the bottom of the borehole. The hand pits proved the base of existing foundation to be at c. 0.50m below cellar level and 0.30m below ground level.

4.7. Groundwater was not encountered in the borehole during drilling. A standpipe was installed but it is understood that no groundwater monitoring has been undertaken. The ground investigation report states that groundwater fluctuations may occur and that exact groundwater levels may only be determined through long term groundwater monitoring. The BIA states that perched water is likely to be encountered during the basement excavation, which should be dealt with sump pumping and recommends groundwater monitoring to be undertaken for as long as possible prior to construction and trial excavations may be considered to assess the extent and volume of inflows of groundwater to be expected during the basement excavation.

4.8. The site has a very low risk of flooding from surface water; however, it is in a Local Flood Risk Zone. A FRA has been presented and identified the presence of a moderate sewer flooding risk. The FRA recommends that a positive pumped device and a non-return valve should be fitted to protect the property from sewer flooding. The BIA states that as there will not be an increase in

hardstanding, the flood risk from surface water in the area will not increase as part of the development.

4.9. Geotechnical parameters to be adopted in the basement design and ground movement calculations have been presented in the BIA. The BIA indicates an indicative value for the bearing capacity (110kPa) which is considered appropriate and has been used in the preliminary retaining wall calculations.

4.10. An outline construction method and stages are presented in the BIA and structural drawings submitted. Underpinning below the existing perimeter wall, in bays not exceeding 0.8-0.9m width, is proposed to form the new basement. The excavation will be supported by trench sheets and struts. The underpins will be propped in the temporary condition and supported by the basement and ground floor slab in the long term. It is understood a single lift is proposed for each underpin.

4.11. A Ground Movement Assessment (GMA) and damage assessment are provided in the GEA BIA to demonstrate that ground movements and consequential damage to neighbouring properties will be within the LBC's policy requirements.

4.12. The software XDisp and Pdisp have been used in the analysis and a depth of excavation between 3.30m and 3.60m bgl, as indicated in the architectural drawings, has been assumed.

4.13. The GMA follows the guidance provided in CIRIA C760. While the C760 approach is intended for piled embedded retaining wall, it can be cautiously applied to underpinning schemes assuming high standards of works control. The XDisp analysis includes a modified ground movement curve to ensure that movements in the range that are typically expected for underpinning works are predicted; 5mm to 10mm horizontally and vertically.

4.14. It is stated in Section 10.1.1 of the BIA that the 5mm to 10mm range of movement is a requirement set by CampbellReith. It should be noted that this range of movement for underpinning has not been chosen by CampbellReith but is based on underpinning industry experience and observations and is considered to reflect the appropriately conservative approach required by a BIA in accordance with CPG Basements.

4.15. A plan detailing the geometry of the excavation in relation to neighbouring structures and walls has been presented in the GMA. All the walls within the zone of influence of the basement have been analysed. The GMA anticipates a maximum Category of Damage of 1 according to the Burland Scale, which is within the allowable limits. No significant impacts are predicted on the highway.

4.16. The BIA indicates that trees are not proposed to be removed as part of the development. However, if the proposals change and any trees proposed to be removed, then it is recommended that a preliminary quantitative assessment following Chapter 4 of the NHBC

guidance is undertaken to demonstrate that tree removal will not adversely affect the stability of neighbouring properties.

4.17. The GEA BIA recommends condition surveys to be undertaken as part of the Party Wall Agreements and recommends a project specific monitoring regime and Action Plan to be put in place, which will delineate lines of responsibility, monitor trigger levels and appropriate mitigation measures.

5.0 CONCLUSIONS

5.1. The hydrogeological assessment has been reviewed by individuals holding the required qualifications.

5.2. Formation level and FFL are now clearly stated in the BIA and architectural drawings to avoid discrepancies.

5.3. Screening sections contain all the questions presented in the CPG. Scoping and impact assessment have been updated accordingly.

5.4. Recommendations for groundwater monitoring and excavation trials have been included in the BIA.

5.5. A Flood Risk Assessment has been presented, with preliminary SUDS proposals.

5.6. Geotechnical parameters have been presented and used in the preliminary structural calculations.

5.7. A new Ground Movement Assessment (GMA) has been presented as per paragraphs 4.11 to 4.15 of this audit and demonstrates that damage to neighbouring properties will not exceed Burland Category 1 (Very Slight).

5.8. The BIA indicates that trees are not proposed to be removed as part of the development. However, if the proposals change and any trees proposed to be removed, then it is recommended that a preliminary quantitative assessment following Chapter 4 of the NHBC guidance is undertaken to demonstrate that tree removal will not adversely affect the stability of neighbouring properties.

5.9. A ground movements monitoring strategy is recommended to be developed at a later stage.

5.10. Queries and requests for information are summarised in Appendix 2. Considering the additional information presented, the BIA meets the requirements of Camden Planning Guidance: Basements.

Appendix 1: Residents' Consultation Comment

Residents' Consultation Comments

Only residents' consultation comments relevant to this audit have been considered and are discussed as follows:

Surname	Address	Date	Issue raised	Response
Jillian Anderson	Unknown	13/03/22	Hydrogeology, hydrology/flood risk	See Section 4.7. – 4.8.
Sarah Campbell	Unknown	13/03/22	Land stability	See Section 4.11. – 4.15.
Frances Hindle	75E Goldhurst Terrace	12/03/22	Land stability, hydrology/flood risk	See Section 4.7. – 4.8. and 4.11. – 4.15
Natalie Spitzer	71 Goldhurst Terrace	13/03/22	Land stability, hydrology/flood risk	See Section 4.11. – 4.15., 4.8.
Vivien Stern	Unknown	13/03/22	Hydrology/flood risk	See Section 4.8.
Prudence Fletcher	75/77 Goldhurst Terrace	12/03/22	Land stability	See Section 4.11. – 4.15.
John Campbell	Unknown	13/03/22	Land stability	See Section 4.11. – 4.15.
Kelly Bamford	Unknown	11/03/22	Hydrology/flood risk	See Section 4.8.
Sasha Levy	Unknown	02/03/22	Hydrology/flood risk	See Section 4.8.
Joseph Corbett	Unknown	10/03/22	Hydrology/flood risk	See Section 4.8.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format	Hydrogeological assessment to be reviewed by individuals holding the required qualifications	Closed – See Section 4.1.	28/10/2022
2	BIA format	Formation level and FFL should be clearly stated in the BIA and architectural drawings to avoid discrepancies.	Closed – See Section 4.4.	28/10/2022
3	BIA format	Screening sections do not contain all the questions presented in the CPG. These should be included and the scoping and impact assessment updated accordingly.	Closed – See Section 4.5.	28/10/2022
4	Hydrogeology	Recommendations for groundwater monitoring should be included in the BIA.	Closed – See Section 4.7.	28/10/2022
5	Hydrology	A Flood Risk Assessment should be presented.	Closed – See Section 4.8.	28/10/2022
6	Land stability	Geotechnical parameters assumed in the calculation of the bearing capacity should be revised.	Closed – See Section 4.9.	28/10/2022
7	Construction Sequence	Structural drawings showing the construction sequencing should be provided.	Closed – See Section 4.10.	28/10/2022
8	Land stability	GMA assessment to be revised, including consideration of the impact to the highway identified in the screening assessment and any utilities therein.	Closed – See Section 4.11. – 4.15.	28/10/2022
9	Land stability	An outline assessment considering any tree removal and following the NHBC guidance should be presented.	Closed – See Section 4.16.	28/10/2022
10	Land stability	Trigger values should be reviewed as part of the GMA revision.	Closed – See Section 4.17.	28/10/2022

Appendix 3: Supplementary Supporting Documents

None

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