

16 Frognal Gardens
London, NW3 6UX

Basement Impact Assessment
Audit

For
London Borough of Camden

Project Number: 12985-22
Revision: F2

January 2020

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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 16 Frognal Gardens, London, NW3 6UX (planning reference 2018/2440/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 site has approximately rectangular shape and comprises two blocks of garages and tarmac paved area. The proposed development involves demolition of one garage block and construction of a three storey residential building including a basement.
- 1.5. The revised BIA reports have been produced by professionals that possess suitable qualifications according to Camden Planning Guidance Basements (CPG).
- 1.6. Amendments to Screening and Scoping assessments have been presented. Whilst some inconsistencies still exist between documents, it is accepted that the previous audit queries have been addressed.
- 1.7. Utilities information is presented in the revised submissions.
- 1.8. Geotechnical and outline structural information is presented.
- 1.9. A brief construction method statement, an outline construction programme, an outline plan for the proposed basement construction method, and indicative retaining wall calculations are presented in the revised BIA-S report.
- 1.10. During the site investigation, groundwater was encountered several metres below the proposed basement formation level. During subsequent monitoring, groundwater was not recorded within 1.0m of the proposed basement formation level. There will be no impact to the wider hydrogeological environment.
- 1.11. Considering the Applicant owns neighbouring 16a Frognal Gardens and 20 Holly Walk, the stability assessment has been revised to address only potential impacts to 18 Holly Walk. A maximum of Category 1 damage is predicted.

- 1.12. Movements to the highway and underlying utilities are assessed to be minimal. Notwithstanding this, ground and structural monitoring is proposed for neighbouring buildings and along the highway with appropriate trigger values and contingency actions to control the works.
- 1.13. There is no increase in impermeable site area as a result of the development. There will be no impact to the wider hydrological environment. A drainage scheme should be agreed with Thames Water and LBC.
- 1.14. Queries and requests for information are discussed in Section 4 and summarised in Appendix 2. Considering the revised submissions and clarification of ownership of adjacent structures, the BIA meets the requirements of CPG Basements.

2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 29 October 2018 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 16 Frognal Gardens, London, NW3 6UX (planning reference 2018/2440/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: Basements (CPG) (March 2018);
 - Camden Development Policy (DP) 27: Basements and Lightwells;
 - Camden Development Policy (DP) 23: Water;
 - Local Plan 2017: Policy A5 Basements.
- 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 *"Erection of two storey 3-bed dwelling house (C3) fronting Holly Walk with PV panels following demolition of existing garage block; recladding of garage block; associated hard and soft landscape works including provision of cycle and bin store"*.

- 2.6. The Audit Instruction also confirmed that no listed building is involved on site but there is a listed building on the opposite side of Holly Walk.
- 2.7. CampbellReith accessed LBC's Planning Portal on 9 November 2018 and gained access to the following relevant documents for audit purposes:
- "Structural appraisal" (SA), dated July 2018, job reference no. 180618, issued by Croft Structural Engineers;
 - "Ground investigation report and basement impact assessment for the site at 16 Frognal Gardens, London NW3" (GI), dated October 2018, report reference no. GWPR2777/GIR, V1.01, issued by Ground & Water Ltd;
 - "Basement Impact Assessment - Structural" (BIA-S), dated 8 October 2018, job reference no. 180618, issued by Croft Structural Engineers;
 - Planning application drawings dated January 2018, job reference no. J1505, issued by MICTEC Ltd, consisting of:
 - "Existing site plan", drawing no. EX1;
 - "Existing street elevation", drawing no. EX2;
 - "Existing section A-A", drawing no. EX3;
 - "Existing section B-B", drawing no. EX4;
 - "Existing section C-C", drawing no. EX5.
 - Planning application drawings dated May 2018, rev. A, issued by Peter Bernamont – Architect, consisting of:
 - "Proposed ground & lower ground plans", drawing no. FGH/6/01;
 - "Proposed upper floors plans", drawing no. FGH/6/02;
 - "Proposed east elevation & section X-X", drawing no. FGH/6/04;
 - "Proposed south elevation & section W-W", drawing no. FGH/6/05;
 - "Proposed west elevation & section Z-Z", drawing no. FGH/6/06;
 - "Proposed north elevation & section Y-Y", drawing no. FGH/6/07.
 - "Design and access statement including heritage statement", dated May 2018, reference no. FGH/6/DAH, rev. A, issued by Peter Bernamont - Architect.
 - Planning Comments and Responses.
- 2.8. CampbellReith issued a BIA audit report (rev. D1) on 26/11/2018 raising a number of queries on the above relevant documents.

- 2.9. The following revised reports and information were received from LBC on 2 January 2019, in response to the queries raised in the BIA audit report (rev. D1):
- "Ground investigation report and basement impact assessment for the site at 16 Frognal Gardens, London NW3" (revised GI), dated December 2018, report reference no. GWPR2777/GIR, V1.02, issued by Ground & Water Ltd;
 - "Basement Impact Assessment - Structural" (revised BIA-S), dated 21 December 2018, job reference no. 180618, issued by Croft Structural Engineers;
 - "Structural Monitoring Statement" (SMS), dated 21 December 2018, job reference no. 180618, issued by Croft Structural Engineers;
 - "Monitoring Plan", dated December 2018, job reference no. 180618, issued by Croft Structural Engineers.
- 2.10. CampbellReith issued a second BIA audit report (rev. D2) on 01/02/2019 raising a number of queries on the above revised BIA documents.
- 2.11. Subsequent communication was undertaken by email with the applicant's Engineer (Ground & Water Ltd) dated 08/03/2019, 15/03/2019, 20/03/2019 and 02/04/2019, which is attached in Appendix 3 of the previous F1 audit report.
- 2.12. The following revised reports and information were received in November 2019, in response to the queries raised in the BIA audit report (rev. F1):
- "Ground investigation report and basement impact assessment for the site at 16 Frognal Gardens, London NW3" (revised GI), dated November 2019, report reference no. GWPR2777/GIR, V1.03, issued by Ground & Water Ltd;
 - "Basement Impact Assessment - Structural" (BIA-S) Revision 3, dated 7th November 2019, job reference no. 180618, issued by Croft Structural Engineers;
 - "Structural Monitoring Statement" (SMS) revision 2, dated 7th November 2019, job reference no. 180618, issued by Croft Structural Engineers;
 - Structural Drawings SD10, SD15 and SD16 Revision 3, SD22 Revision 4, dated October to December 2018 job reference no. 180618, issued by Croft Structural Engineers.
- 2.13. The following revised reports and information were received in January 2020:
- Thames Water Asset Search dated 16th December 2019.
 - "Structural Monitoring Statement" (SMS) revision 3, dated 19th December 2019, job reference no. 180618, issued by Croft Structural Engineers;
 - Ground Movement Assessment 16 Frognal Gardens, job reference 60450, dated December 2019, issued by Ground and Project Consultants Ltd.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
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	Updated in revised submissions.
Are suitable plan/maps included?	Yes	Utilities plans provided in revised submissions.
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	
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Updated in revised submissions.
Is a conceptual model presented?	Yes	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Updated in revised submissions.
Is factual ground investigation data provided?	Yes	
Is monitoring data presented?	Yes	
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	
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	Updated in revised submissions.
Are the baseline conditions described, based on the GSD?	Yes	Updated in revised submissions.
Do the base line conditions consider adjacent or nearby basements?	Yes	Noted that the Applicant owns the adjacent 16a Frognal Gardens and 20 Holly Walk.
Is an Impact Assessment provided?	Yes	Updated in revised submissions.
Are estimates of ground movement and structural impact presented?	Yes	Updated in revised submissions.

Item	Yes/No/NA	Comment
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	Updated in revised submissions.
Has the need for monitoring during construction been considered?	Yes	Updated in revised submissions.
Have the residual (after mitigation) impacts been clearly identified?	N/A	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	The Ground and Project Report is considered to supersede previous assessments.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Updated in revised submissions.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	The Ground and Project Report is considered to supersede previous assessments.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

- 4.1. The comments of the F1 audit report are repeated in the following paragraphs.
- 4.2. The revised BIA reports consist of a "Ground Investigation and Basement Impact Assessment report" (revised GI) issued by Ground & Water Ltd, a revised "Basement Impact Assessment - Structural" report (revised BIA-S) and a "Structural Monitoring Statement" report (SMS), the latter reports issued by Croft Structural Engineers.
- 4.3. In addition a Ground Movement Assessment (GMA) in regard to neighbouring 18 Holly Walk has been undertaken by Ground and Project Consultants Ltd. This report is considered to supersede all previously dated GMA.
- 4.4. Subsequent to the previous audits, it has been confirmed that the Applicant owns the adjacent 16a Frognal Gardens and 20 Holly Walk. As such, potential damage impact assessments for these buildings have not been further audited.
- 4.5. The revised BIA reports have been produced by professionals that possess suitable qualifications according to Camden Planning Guidance Basements (CPG).
- 4.6. The site has an approximately rectangular shape and comprises two blocks of garages and a tarmac paved area. The proposed development involves the demolition of one garage block and construction of a three storey residential building including a basement.
- 4.7. Previous BIA submissions omitted Screening and Scoping sections for surface flow and flooding, and / or presented conflicting information in regards to development proposals. Amendments to Screening and Scoping assessments have been presented. Whilst some inconsistencies still exist between documents, it is accepted that the previous audit queries have been addressed.
- 4.8. Previous audits have requested further information in regard to utilities and underground infrastructure within the zone of influence of the proposed development. This information has now been presented.
- 4.9. The revised GI report indicates that the ground conditions consist of Made Ground up to 1m thick over Head Deposits over the Bagshot Formation at depth.
- 4.10. During the site investigation, groundwater was encountered several metres below the proposed basement formation level. During subsequent monitoring, groundwater was not recorded within 1.0m of the proposed basement formation level. There will be no impact to the wider hydrogeological environment.

- 4.11. In the revised submissions, geotechnical and outline structural information is presented broadly in accordance with the GSD Appendix G3. Reinforced concrete cantilevered retaining walls employing a 'hit and miss' method are proposed in the revised BIA-S to form the basement and the foundations of the proposed building.
- 4.12. A brief construction method statement, an outline construction programme, an outline plan for the proposed basement construction method, and indicative retaining wall calculations are presented in the revised BIA-S report.
- 4.13. Considering the Applicant owns neighbouring 16a Frognal Gardens and 20 Holly Walk, the stability assessment has been revised to address only potential impacts to 18 Holly Walk. A maximum of Category 1 damage is predicted. The assessment is considered reasonably conservative, predicting ground movements within the range expected considering the scale, depth and construction methodology adopted, and includes a check on slope stability for excavations close to the boundary with 18 Holly Walk.
- 4.14. Movements to the highway and underlying utilities are assessed to be minimal. Notwithstanding this, ground and structural monitoring is proposed for neighbouring buildings and along the highway with appropriate trigger values and contingency actions to control the works. The monitoring strategy should be implemented and closely supervised by the Engineer.
- 4.15. There is no increase in impermeable site area as a result of the development. There will be no impact to the wider hydrological environment. A drainage scheme should be agreed with Thames Water and LBC.

5.0 CONCLUSIONS

- 5.1. The revised BIA reports have been produced by professionals that possess suitable qualifications according to Camden Planning Guidance Basements (CPG).
- 5.2. Amendments to Screening and Scoping assessments have been presented. It is accepted that the previous audit queries have been addressed.
- 5.3. Utilities information is presented in the revised submissions.
- 5.4. Geotechnical and outline structural information is presented.
- 5.5. There will be no impact to the wider hydrogeological environment.
- 5.6. A maximum of Category 1 damage is predicted with regard to 18 Holly Walk.
- 5.7. Ground and structural monitoring is proposed for neighbouring buildings and along the highway with appropriate trigger values and contingency actions to control the works.
- 5.8. There will be no impact to the wider hydrological environment. A drainage scheme should be agreed with Thames Water and LBC.
- 5.9. Queries and requests for information are summarised in Appendix 2. Considering the revised submissions and clarification of ownership of adjacent structures, the BIA meets the requirements of CPG Basements.

Appendix 1: Residents' Consultation Comments

None pertinent to BIA

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Authors qualifications.	Closed	2/1/2019
2	BIA	Superseded references of CPG, CIRIA & BS.	Closed	2/1/2019
3	BIA	The different screening and scoping sections should be made consistent to each other or incorporated into one report.	Closed	November 2019
4	BIA	It is incorrectly mentioned (in the SA) that the site is located in London Clay.	Closed	November 2019
5	BIA	Contradictory information is presented about the proposed floor slab type.	Closed	November 2019
6	BIA	The latest version of the GI report should be referred to in the BIA-S report.	Closed	2/1/2019
7	BIA	Consistency is required across the BIA documents with regard to proposed excavation depths.	Closed	2/1/2019
8	BIA	The BIA-S report should be aligned to CPG with respect to acceptable damage levels.	Closed	2/1/2019
9	BIA	The "Type of Works" information presented in the revised BIA-S report and the SMS report should be amended to reflect the subject site and the proposed development.	Closed	January 2020
10	BIA	Information about 'front lightwells' and the distance to the nearest public highway presented in the revised BIA-S report should be clarified/amended.	Closed	November 2019
11	BIA	Incorrect references presented in the SMS report as discussed in Section 4 of this audit.	Closed	November 2019
12	Hydrology	Contradictory information about SuDS measures are presented in the revised BIA-S report.	Closed	January 2020
13	Stability & Hydrology	A desktop utilities survey is required.	Closed	January 2020
14	Stability	The answer to question 4 of the slope stability screening and paragraph 2.5 of the GI report should be amended.	Closed	2/1/2019

15	Stability	The calculation methodology of bearing capacity and the 'Limit Bearing Capacity' term should be clarified. The adopted values should be justified.	Closed	November 2019
16	Stability	The calculation methodology of heave and settlement should be clarified.	N/A	See Section 4
17	Stability	The GMA should assess the potential impact on all neighbouring structures and utilities, and include existing/proposed development loads, horizontal movements, long-term movements, and movements due to wall installation.	Closed	January 2020
18	Stability	Mitigation measures should be included in the GMA as required. The GMA should discuss mitigation measures for potential collapse of the sandy layers.	Closed	January 2020
19	Stability	A monitoring methodology informed by the GMA results should be provided.	Closed	January 2020
20	Stability	The BIA-S retaining wall calculations should take into account the GI report's proposed ground parameters.	Closed	2/1/2019
21	Stability	The risk of ground movement and any potential damage discussed in the revised BIA-S report should be assessed on the basis of the site-specific GMA results.	Closed	January 2020
22	Stability	The ground movement trigger levels suggested in the SMS report should be updated based on the outcome of the revised GMA.	Closed	January 2020
23	Stability	Monitoring points should be added along Holly Walk pavement and highway, and along the northern boundary garden wall.	Closed	January 2020

Appendix 3: Supplementary Supporting Documents

None

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