

Confidential

**44-46 Hampstead Lane,
London, N6 4LL**

Basement Impact Assessment Audit

For
London Borough of Haringey

Project No. 13979

Date
March 2023

Campbell Reith Hill LLP
15 Bermondsey Square
London
SE1 3UN

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

DOCUMENT HISTORY AND STATUS

Revision	Date	Purpose/ Status	File Ref	Author	Check	Review
D1	January 2023	Comment	13979-CRH-XX-XX-GE-R-44-46 Hampstead Lane	NS/ME	KB	KB
F1	March 2023	Planning	13979-CRH-XX-XX-GE-R-44-46 Hampstead Lane	NS	KB	KB

This document has been prepared in accordance with the scope of Campbell Reith Hill LLP's (CampbellReith) appointment with its client and is subject to the terms of the appointment. It is addressed to and for the sole use and reliance of CampbellReith's client. CampbellReith accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of Campbell Reith Hill LLP. Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of the document as a whole. The contents of this document are not to be construed as providing legal, business or tax advice or opinion.

© Campbell Reith Hill LLP 2023

Document Details

Last Saved	23/03/2023 10:45
Author	N Simonini, BSc MSc FGS
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	13979
Project Name	44-46 Hampstead Lane, London, N6 4LL
Revision	F1
File Ref	13979-CRH-XX-XX-GE-R-44-46 Hampstead Lane.DOCX

CONTENTS

1.0 Non-technical summary 4
2.0 Introduction 5
3.0 Basement Impact Assessment Audit Check list..... 8
4.0 Discussion 11
5.0 Conclusiosn 14

APPENDICES

- Appendix 1 Residents’ Consultation Comment
- Appendix 2 Audit Query Tracker
- Appendix 3 Supplementary Supporting Documents

1.0 NON-TECHNICAL SUMMARY

- 1.1 CampbellReith was instructed by London Borough of Haringey, (LBH) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for 44-46 Hampstead Lane (planning reference HGY/2022/2731).
- 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 LBH's policies and technical procedures, and following the London Borough of Camden (LBC) Planning Guidance: Basements, which is considered to provide a robust approach to impact assessment.
- 1.3 CampbellReith was able to access LBH'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 proposal includes the construction of a basement to a depth of c. 7.20m below ground level (bgl) below part of the footprint of the house.
- 1.5 Screening and scoping assessments are presented, supported by desk study information.
- 1.6 It has been demonstrated the qualifications of the individuals involved in the production of the land stability and hydrology assessment are in accordance with LBH guidance.
- 1.7 The BIA states that the site is at low and very low probability of flooding from all sources, and this is accepted. A Flood Risk Assessment has been undertaken and recommends the incorporation of suitable solutions to ensure the proposal will not increase the surface water flood risk.
- 1.8 Anticipated pile depths, propping requirements in the temporary case, and sequencing information have been presented in a structural engineer statement along with groundwater ingress mitigation measures.
- 1.9 Clarification on geotechnical parameters to be adopted in the detailed design has been presented, as detailed in Section 4.
- 1.10 The Ground Movement Assessment (GMA) has been revised in accordance with the comments raised as part of the original audit.
- 1.11 The BIA has demonstrated that an assessment regarding removal of trees is not necessary as existing neighbouring foundations are not within the zone of influence of those trees.
- 1.12 Queries and requests for information are summarised in Appendix 2. Considering the additional information presented, the BIA meets the requirements of LBH guidance on basements.

2.0 INTRODUCTION

2.1 CampbellReith was instructed by London Borough of Haringey (LBH) on the 18th of November 2022 to carry out an audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 44-46 Hampstead Lane, London, N6 4LL, planning reference HGY/2022/2731. It is noted that the old planning reference HGY/2021/2703 was wrongly mentioned in the previous revision of the audit D1. It is confirmed this revision has audited the BIA and associated documents and drawings for planning application HGY/2022/2731.

2.2 The audit reviewed the BIA for potential impact on land stability and local ground and surface water conditions arising from basement development. An audit of land quality/contamination issues has not been undertaken and is outside the scope of this report.

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

- Development Management DPD. July 2017.
- Draft Basement Development Guidance Note. June 2012.

2.4 The BIA should demonstrate that schemes:

- maintain the structural stability of the building, neighbouring properties and adjoining highways;
- does not increase flood risk to the property and nearby properties;
- avoid adversely affecting drainage and run off or causing other damage to the water environment;
- 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 and to make recommendations for the detailed design.

2.5 Although the site lies within the Haringey Council, the Screening and Scoping and consequent impact assessment procedure presented in the London Borough of Camden (LBC) Planning Guidance: Basements has been adopted in this audit as it is widely known and is considered to provide a robust approach to the issues of concern.

2.6 The site is within the Highgate Neighbourhood Area.

2.7 LBH's Audit Instruction described the planning proposal as *"Demolition of existing dwellings and redevelopment to provide a care home (Use Class C2); associated basement; side / front lightwells with associated balustrades; subterranean and forecourt car parking; treatment room; detached substation; side access from Courtenay Avenue; removal 4 no. trees; amended boundary treatment; and associated works"*.

2.8 CampbellReith accessed LBH's Planning Portal on the 2nd of December 2022 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report by GEA Ltd, ref.: J21167A Rev 1, dated February 2022.
- Pre-planning Geotechnical Assessment Report (including the BIA) by GEA Ltd, ref.: J21167 Rev 0, dated June 2021.
- Arboricultural Impact Assessment Report by Landmark Trees, ref: HVL/44HSL/AIA/01a, dated August 2021.
- Flood Risk Assessment & Drainage Strategy Report by Nimbus Engineering Consultants Ltd, ref.: C2567-R1-REV-A, dated August 2021.
- Structural Drawings by Michael Alexander Ltd including:
 - Drawing No. 01 to 07, Rev. P1 (including Basement, Lower Ground Floor and Ground Floor General Arrangement and Sections).
 - Proposed Excavation Sequencing (Drawing No. HSC-ST-22E-DRG-002, Rev. A).
- Existing and Proposed Architectural Drawings by Wolff Architects.
- Consultation responses.

2.9 Subsequent to the initial audit report, CampbellReith gained access to the following relevant documents:

- Email from GEA Ltd dated 24/02/23 including responses to CampbellReith queries presented in the D1 revision of the audit (attached in Appendix 3). The email contained the following attachments:
 - Planning Statement by Michael Alexander Ltd dated 13/02/23 including Engineering Statement and Outline Sequence of Construction.

- Additional geotechnical information such as annotated plot for ground model, undrained shear strength plot, additional sensitivity analysis including input and output from the software used.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The qualifications of the BIA authors have been demonstrated to comply with the guidance.
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	Outline structural proposal including outline sequence of works, temporary propping arrangements and groundwater control measures have been presented.
Are suitable plan/maps included?	Yes	All maps to support screening are included in the BIA.
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	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 5.0 of the BIA.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.1 of the BIA.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.1 of the BIA.

Item	Yes/No/NA	Comment
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.1 of the BIA.
Is factual ground investigation data provided?	Yes	Section 4.2 of the BIA. Considering the data provided it is understood that a site-specific ground investigation was undertaken.
Is monitoring data presented?	Yes	Section 5.4 of the BIA. Monitoring has been carried out on a single occasion to date.
Is the ground investigation informed by a desk study?	Yes	Section 2 of the BIA
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	However, the BIA acknowledges that the proposal will result in an increase of the differential depth of foundations relative to neighbouring properties.
Is a geotechnical interpretation presented?	Yes	Section 6.4.1 of the BIA. Clarification requested on the items in Section 4 of the previous audit revision has been provided by GEA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Presented in GEA email
Are reports on other investigations required by screening and scoping presented?	Yes	Outline Structural Proposal has now been presented. Structural drawings, GMA, FRA and Arboricultural Survey & Impact Assessment have been presented.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	No	Typology and depth of neighbouring foundations is unknown. However, assumptions made in the impact assessment on this regard are considered conservative

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	Section 6 of the BIA.
Are estimates of ground movement and structural impact presented?	Yes	Section 6 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	Further mitigation measures have been presented within the additional information.
Has the need for monitoring during construction been considered?	Yes	Section 6.5.2 of the BIA.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Additional information submitted confirms residual impacts to be negligible.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Section 6 of the BIA. Clarifications on the GMA have been presented.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	See FRA.
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	Section 6 of the BIA. A sensitivity analysis has been undertaken to demonstrate damages will be within Category 1.
Are non-technical summaries provided?	Yes	Executive Summary section of the BIA.

4.0 DISCUSSION

- 4.1 The BIA has been carried out by GEA Ltd. It has been demonstrated the individuals involved in the impact assessment hold the appropriate qualifications.
- 4.2 The site is rectangular in shape and occupied by No. 46 Hampstead Lane in the west and No. 44 in the east. Both properties include tarmac driveways to the front, with limited soft landscaping. Rear gardens are occupied by grass and trees and a swimming pool is located in the rear garden of No. 44. Both the buildings do not have any basement or partial basement at present. The closest neighbouring properties are detached houses at No. 42 Hampstead Lane to the east and No. 1 Courtney Avenue to the north. It is unknown whether neighbouring properties have basements.
- 4.3 The proposals include the demolition of both the existing buildings and construct a new single apartment building of up to four storeys in height, with a lower ground floor and basement level. The basement will extend to a maximum depth of 7.20m bgl, and the basement excavation will be supported by the installation of a piled embedded retaining wall.
- 4.4 Screening and scoping assessments are presented and 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.
- 4.5 Structural drawings, Flood Risk Assessment (FRA) and Arboricultural Survey & Impact Assessment has been presented. An outline structural proposal including construction sequence of works has also been presented.
- 4.6 A site-specific ground investigation was undertaken comprising four boreholes to a maximum depth of 8m bgl.
- 4.7 The ground investigation encountered a moderate thickness of Made Ground (0.5 to 2m bgl) over the Bagshot Formation (1.5m and 4.9m bgl), overlying the Claygate Member to the full depth of the site-specific ground investigation. Nearby deeper exploratory holes have been considered to complete the ground model. The bottom of the Claygate Member is found to be between 19.50m and 20.70m bgl, and it is underlain by London Clay proven to the full depth of the nearby GI at c. 25m bgl.
- 4.8 Groundwater was encountered during drilling at depths between 3.60m and 7.00 m bgl. Groundwater levels in standpipes have been monitored on a single occasion to date, at seven weeks after the completion of the GI, groundwater was recorded at depths between 2.50m and 6.80m bgl. As the proposed basement perimeter will be at a minimum distance of c. 4m from any nearby foundations, it is accepted in principle that the proposed development will not cause any adverse impact on groundwater flow in the wider hydrogeological environment. The Engineering Statement indicates that limited groundwater ingress shall be sealed with concrete back blinding or spray concrete and water will be collected in sumps and pumped from the site via settlement or filtration, if required.
- 4.9 The BIA states that the site is at low and very low probability of flooding from all sources, and this is accepted.

- 4.10 The geotechnical parameters used for the ground movement assessment are presented in the BIA. The geotechnical parameters have been presented/revised according to the comments raised in the D1 version of this audit, as detailed below:
- Allowable bearing capacities and retaining wall parameters have been provided and are considered reasonably conservative.
 - N-value SPT plot vs elevation have been presented along with the undrained shear strength derived from it for each natural stratum.
 - The Young's Modulus (E) values used in the heave and settlement calculation for the Bagshot Beds and Claygate Member have been calculated using a multiple of 600 and 750 times the Cu respectively. GEA state that they have experience in similar projects in the Haringey area and consider the relationship used appropriate for the site. In addition, a sensitivity check has been undertaken using lower E values to determine heave occurring within the basement perimeter as a consequence of the excavation.
- 4.11 The BIA states that the proposed development has a larger footprint than the existing building and as such there will be an increase in hardstanding area. However, this will be partially offset by the removal of an existing swimming pool and additional changes to the external landscaping. A Flood Risk Assessment (FRA) has been undertaken and recommends the incorporation of suitable SuDS solutions (i.e. permeable paving, green roofs and underground attenuation tanks) to ensure the proposal will not increase the surface water flood risk.
- 4.12 Structural drawings for the proposed basement are presented. The drawings indicate the use of a contiguous piled retaining wall to allow the excavation of the proposed basement. The lower ground floor will extend to the north outside the proposed basement perimeter. A contiguous embedded pile retaining wall is not proposed for those areas. The BIA states that diagonal braces will be used across the corners of the basement walls whilst props will be positioned at regular intervals along the walls of the basement. An engineering statement has also been presented including the anticipated embedded retaining wall pile depths, excavation stability control measures, propping requirements in the temporary and permanent case, and sequencing information.
- 4.13 A Ground Movement Assessment (GMA) of ground movements within and surrounding the excavation has been undertaken using XDisp and PDisp software. XDisp has been used to predict ground movements likely to arise from the construction of the proposed basement, including settlement and lateral movement of soil behind the proposed retaining walls. The analysis of potential ground movements within the excavation as a result of unloading the underlying soils has been carried out using PDisp.
- 4.14 The sensitive structures relevant to this assessment are considered to be the neighbouring property No 42 Hampstead Lane and the roads along Courtnay Avenue and Hampstead Lane.
- 4.15 The following clarification or revision has been provided within the additional information submitted regarding the GMA:
- PDisp and XDisp full input and output have been presented.

- The structural engineer confirmed that at this stage it is reasonable to assume a 12m long pile embedded wall, considering two levels of temporary lateral props (one at capping beam level and one at intermediate level. They also state that where contiguous piles are retaining a height of less than 3m and there are no structures in proximity (northern part), the piles shall not require temporary lateral propping.
 - It has been confirmed that the wall will be designed for lateral and vertical loads in the temporary and permanent condition. It is noted additional ground investigation may be required to inform detailed pile design.
 - Ground movements resulting from wall installation have been reduced compared to what is suggested by CIRIA C760. The ground conditions, construction methods, site controls and monitoring regimes adopted on this site have not been demonstrated to be fully comparable to the ones adopted in the case study mentioned in the Ball et al. case study. However, a sensitivity analysis adopting the original CIRIA C760 curves has been undertaken and results indicate max movements due to wall deflection to be 9mm and 15mm in the vertical and horizontal direction respectively.
 - It has been confirmed that Longwood House to the north of the site is not within the zone of influence of the basement.
- 4.16 The results of the Building Impact Assessment (including the sensitivity analysis) currently indicate damage to neighbouring structures will not exceed Burland Category 1 (Very Slight)
- 4.17 The BIA indicates that a monitoring strategy will be developed at a later stage and will be subject to discussions and agreements with the owners of the adjacent properties and structures. Contingency measures will be implemented if movements of the adjacent structures exceed the predefined trigger levels.
- 4.18 An arboricultural impact assessment has been presented and indicates numerous existing trees to be removed as part of the development. The BIA confirms that trees to be removed are not in the vicinity of neighbouring structures such that the removal works will not have any detrimental effect on neighbouring foundations.
- 4.19 A comment from Thames Water indicates the presence of underground assets within 15 metres of the site. The BIA confirms the asset is unlikely to be subject to significant ground movements due to the proposed development. This will need confirmation through consultation with Thames Water at the appropriate stage.

5.0 CONCLUSIONS

- 5.1 The qualifications of the individuals involved in the production of the BIA are in accordance with LBH guidance. Screening and scoping assessments are presented, supported by desk study information.
- 5.2 The proposal includes the construction of a basement to a maximum depth of 7.20m bgl below part of the footprint of the proposed house.
- 5.3 Clarification on geotechnical parameters for design has been provided as detailed in Section 4.
- 5.4 The BIA states that the site is at low and very low probability of flooding from all sources, and this is accepted. A Flood Risk Assessment has been undertaken and recommends the incorporation of suitable solutions to ensure the proposal will not increase the surface water flood risk.
- 5.5 An engineering statement undertaken by a structural engineer has been presented and includes pile depths, propping requirements in the temporary case, construction sequencing information and groundwater ingress mitigation measures.
- 5.6 The Ground Movement Assessment (GMA) has been revised, and further information provided as described in Section 4.
- 5.7 The BIA demonstrated that the proposed removal of some of the existing trees will not adversely affect the stability of existing neighbouring foundations.
- 5.8 A comment from Thames Water indicates the presence of underground assets within 15 metres from the site. The BIA confirms the asset is unlikely to be subject to significant ground movements due to the proposed development. This will need confirmation through consultation with Thames Water at the appropriate stage.
- 5.9 Queries and requests for information are summarised in Appendix 2. Considering the additional information presented, the BIA meets the requirements of Haringey Council Planning Guidance.

44-46 Hampstead Lane, London, N6 4LL
Basement Impact Assessment Audit

CampbellReith
consulting engineers

Appendix 1

Residents' Consultation Comment

[Residents' Consultation Comments](#)

Surname	Address	Date	Issue Raised	Response
Mullens Gurhy	Three Oaks	15/11/22	Structural Stability Flooding	See 4.11. – 4.18.

44-46 Hampstead Lane, London, N6 4LL
Basement Impact Assessment Audit

CampbellReith
consulting engineers

Appendix 2

Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA Format	Hydrology and land stability assessment should be reviewed by qualified professionals as per LBH guidance.	Closed – See 4.1 – 4.4	March 2022
2	BIA Format	An engineering statement undertaken by a structural engineer should be presented to include anticipated embedded retaining wall pile depths, excavation control measures, propping requirements in the temporary case, and sequencing information. Groundwater ingress mitigation measures should also be presented.	Closed – See 4.5 & 4.12	
3	Hydrogeology	Details of mitigation measures to be implemented if groundwater is encountered during construction is required.	Closed – See 4.7	
4	Land Stability	Clarification regarding geotechnical parameters is required.	Closed – See 4.10	
5	Land Stability	The Ground Movement Assessment is to be revised and updated following the comments provided in Section 4.	Closed – See 4.13 to 4.15	
6	Land Stability	Assessment of the impact of tree removal on neighbouring properties is requested.	Closed – See 4.18	
7	Land Stability	Additional ground investigation may be required to inform pile design.	Note Only	
8	Third Party Consultation	A comment from Thames Water indicates the presence of underground assets within 15 metres from the site. The applicant should demonstrate that the proposed scheme will not affect the stability of any underground asset. Early liaison with the asset owner is encouraged to agree methods of assessment.	Note Only	

44-46 Hampstead Lane, London, N6 4LL
Basement Impact Assessment Audit

CampbellReith
consulting engineers

Appendix 3

Supplementary Supporting Documents

GEA e-mail correspondence



RE: 44-46 Hampstead Lane | BIA audit (P5104) Matthew Penfold to NicolaSimonini@campbellreith.com, Samuel.Uff@haringey.gov.uk, KatharineBarker@campbellreith.com 24/02/2023 11:36
Cc "allen@smplanning.com", "Steve Branch", "Stuart@smplanning.com", "Cliff Willis", "John McSweeney"

2 Attachments



J21167A - Information for CR Audit.zip P5104 44-46 Hampstead Lane, London N6 4LL_MA Planning Statement 230213.pdf

Nicola,

Further to your email below and recent conversation with your colleague, Katherine Barker, we have carried out a review of the audit report for the site and can provide the following comments, which we have listed with respect the numbering in Section 5 of the audit.

5.1 & 5.2 (see also comments in Section 4.4) – We can confirm that the land stability and surface water screening assessments were checked by suitably qualified individuals, namely Martin Cooper (a BEng in Civil Engineering, a chartered engineer (CEng), member of the Institution of Civil Engineers (MICE), and Fellow of the Geological Society (FGS), who has over 20 years' specialist experience in ground engineering) and Rupert Evans (a hydrologist with more than ten years consultancy experience in flood risk assessment, surface water drainage schemes and hydrology / hydraulic modelling. Rupert Evans is a Chartered Environmentalist, Chartered Water and Environmental Manager and a Member of CIWEM). However, as LBH does not have specific requirements in this respect (previous guidance having been withdrawn), only the main author and supervising engineer were listed on the report, as this has been sufficient on many previous projects in the area.

5.4 (see also comments in Section 4.10) – Provision of this information did not form part of our project brief, but can be added to our report, if required. However, the allowable bearing capacity and retaining wall parameters are confirmed in the table below.

Spread Foundations	<p><i>Groundwater is likely to be encountered within the basement excavation and it may not be possible to adopt spread foundations below the water table, although this will depend on the basement support system and the extent to which a water-tight excavation is maintained at formation level.</i></p> <p><i>Spread foundations excavated from basement level to bear within the stiff clay or medium dense to dense sands of the Claygate Member may be designed to apply a net allowable bearing pressure of 150 kN/m² below the level of basement floor, provided that groundwater inflows can be sufficiently controlled.</i></p> <p><i>This value incorporates an adequate factor of safety against bearing capacity failure and should ensure that settlement remains within normal tolerable limits. The recommended bearing pressure takes account of the variable nature of the soils and any foundations should be nominally reinforced where they span clay or sand of the Claygate Member to protect against differential settlement.</i></p> <p><i>In the event that it is not possible to construct spread foundations due to groundwater inflows, piled foundations would provide a suitable foundation option.</i></p>																
Retaining Walls	<p><i>The following parameters are suggested for the design of the permanent basement retaining walls.</i></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Stratum</th> <th style="text-align: center;">Bulk Density (kg/m³)</th> <th style="text-align: center;">Effective Cohesion (c' – kN/m²)</th> <th style="text-align: center;">Effective Friction Angle (Φ' – degrees)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Made Ground</td> <td style="text-align: center;">1800</td> <td style="text-align: center;">Zero</td> <td style="text-align: center;">27</td> </tr> <tr> <td style="text-align: center;">Claygate Member</td> <td style="text-align: center;">1900</td> <td style="text-align: center;">Zero</td> <td style="text-align: center;">23</td> </tr> <tr> <td style="text-align: center;">London Clay</td> <td style="text-align: center;">1950</td> <td style="text-align: center;">Zero</td> <td style="text-align: center;">23</td> </tr> </tbody> </table> <p><i>Groundwater has been measured at levels of between 108.5 m OD and 107.5 m OD to date and is likely to be encountered within the lowest parts of the proposed basement excavations. Consideration should also be given to the risk of surface water building up within any made ground and clay soils behind the retaining walls unless adequate drainage can be incorporated to prevent such a build-up.</i></p> <p><i>At this stage, it is likely that the basement is designed with a water level assumed at a depth of 1m below ground level. However, it may be possible to review this requirement following additional investigation by means of trial excavations and further monitoring and the advice in BS8102:2009^[1] should be followed in this respect.</i></p>	Stratum	Bulk Density (kg/m ³)	Effective Cohesion (c' – kN/m ²)	Effective Friction Angle (Φ' – degrees)	Made Ground	1800	Zero	27	Claygate Member	1900	Zero	23	London Clay	1950	Zero	23
Stratum	Bulk Density (kg/m ³)	Effective Cohesion (c' – kN/m ²)	Effective Friction Angle (Φ' – degrees)														
Made Ground	1800	Zero	27														
Claygate Member	1900	Zero	23														
London Clay	1950	Zero	23														



Please find a copy of the SPT N60 vs depth / elevation plot attached, along with an annotated version which forms the basis of the ground model presented in Section 6.4.1. As per the comment in the report, the soil parameters used in this analysis are tabulated below, which have been estimated from the findings of the investigation of the site, the previous investigations on the adjoining and nearby sites, and assumed parameters interpreted from archive boreholes on the BGS database, and with particular respect the parameters adopted for the soil present at depth beneath the site, are based on a highly conservative estimate of the likely in-situ strength of these soils.

The relationship of $600C_u$ adopted for the clay soils of the Bagshot Beds and underlying Claygate Member has been successfully adopted and accepted on many previous projects in Harringay, including several recent sites to the north on Courtenay Avenue, all of which are near completion, and is therefore considered to be perfectly appropriate for this site. The higher relationship of $750C_u$ adopted for the underlying London Clay is also considered appropriate for soils likely to be present at depths of more than 20 m below existing ground level and which will therefore be subject to much smaller strains than the overlying clay soils of the Bagshot Beds and Claygate Member. However, a check has been undertaken adopting the lower relationship of $500C_u$ for all clay soils, the results of which are attached with the predicted movements summarised in the table below.

Location	Short-term Heave (excavation Phase)	Movement (mm)	
		Long-term Heave (post construction)	Total Heave
Centre of excavations	30 to 34	12	42 to 46
Edge of excavations	16 to 20	4	22 to 26

The P-Disp analysis indicates that, by the time the basement construction is complete, up to 30 mm to 34 mm of heave is likely to have taken place at the centre of the proposed excavation, reducing to around 16 mm to 20 mm at the edge of the excavations.

In the long term, following completion of the basement construction, a further 12 mm of heave is estimated as a result of long-term swelling of the underlying clay soils.

It is important to bear in mind that the results of the P-Disp analysis, which is based on an unrestrained excavation, do not take account of the mitigating effect of the existing structures, the stiffness of the proposed floor slabs and the contiguous pile walls, which in reality will combine to restrict potential heave movements within the basement excavation. The movements predicted by the model at or just beyond the site boundaries are unlikely to be fully realised and should not therefore have a detrimental impact upon any nearby structures.

In order to mitigate the effects of heave on the new building, the basement could be designed to transmit heave forces into the wall piles or onto tension piles within the basement. If a compressible material is used beneath the slab, it will need to be designed to be able to resist the potential uplift forces generated by the ground movements. In this respect, potential heave pressures are typically taken to equate to around 50 % of the total unloading pressure, assuming a linear relationship between heave movement and the pressure applied to the underside of the slab, which in this case is taken to be inflexible. However, if there is some flexibility in the slab, this value would reduce as the slab deflects and it would be reasonable to assume that the heave pressure would reduce to around 35 % of the unloading pressure.

5.6 (see also comments in Sections 4.5 and 4.12 and second and third bullet points in 4.15) – An engineering statement has been provided by John McSweeney of Michael Alexander to address this comment and is attached to this email.

5.7 (see also comments in Section 4.15) - The full inputs & outputs of the assessment are attached. With respect the embedment assumed for the proposed piled wall, it would be normal practice at this stage to assume an embedment equivalent to no more than 50% of the retained height for the purpose of stability, such that the higher relationship of no less than 2/3 adopted in the assessment is already considered to be highly conservative and does not require further adjustment. This is also covered by Michael Alexander in there Engineering Statement (see attached), who have also confirmed that the function of the piled wall is to support the proposed excavations and that it will not be designed to carry any significant loading.

It is confirmed that Longwood House, to the north of the site, is at sufficient distance that it will not be affected by the proposed development.

A sensitivity analysis has been undertaken with default installation curves, the results of which are attached with the predicted movements summarised in the table below.

Phase of Works	Maximum Movements due to Wall Deflection (mm)	
	Vertical Settlement	Horizontal Movement
Combined movements from installation and subsequent excavation behind contiguous bored pile wall	8 to 9	14 to 15

The sensitivity analysis confirms a small increase in the vertical and horizontal movements of about 2 mm, and whilst the subsequent damage assessment does indicate a small increase in tensile strain on a number of the nearby structures, the predicted level of damage remains within acceptable limits.



5.8 (see also comments in Section 4.18) – We have now been provided with a copy of the Arboricultural Impact Assessment, which confirms the removal of a number of trees from the site. However, there are no trees being removed within the vicinity of the properties, most notably No 42 Hampstead Lane to the east, and following a discussion with the client and structural engineer, it can be confirmed that there will be no impact from these works on the foundations of this nearby structure.

5.9 (see also comments in Section 4.19) – This comment is note only. However, it is confirmed that the sewer is at such a distance that it is unlikely to be subject to movements of more than 1 mm and should not therefore require explicit assessment, although this will be confirmed through consultation with Thames Water at the appropriate stage.

We trust the above comments are of assistance and look forward to hearing from you in due course.

Regards,

Matt

<image002.jpg>

Geotechnical & Environmental Associates

Widbury Barn | Widbury Hill | Ware | SG12 7QE

<image003.jpg>

tel 01727 824666

<image004.png>

<image005.gif>

<image006.jpg>

mob 07725679945

matt@gea-ltd.co.uk

www.gea-ltd.co.uk

Also in Notts tel 01509 674888
and Manchester tel 0161 209 3032

The contents of this email and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom it is addressed. If you are not the intended recipient of this email you may not copy, forward, disclose or otherwise use it or part of it in any form whatsoever. If you have received this email in error please contact the sender immediately. The views herein do not necessarily represent those of the company.

From: NicolaSimonini@campbellreith.com <NicolaSimonini@campbellreith.com>
Sent: Friday, January 20, 2023 10:47 am
To: Samuel Uff <Samuel.Uff@haringey.gov.uk>
Cc: Anil Varma <a.varma@harrisonvarma.co.uk>; KatharineBarker@campbellreith.com
<KatharineBarker@campbellreith.com>
Subject: 44-46 Hampstead Lane BIA audit

Hi Samuel,

Please find attached our audit for the 44-46 Hampstead Lane BIA. There are some queries (see Appendix 2) on land stability, hydrogeology and BIA format that should be addressed by the applicant.

Kind regards

Nico Simonini
Senior Engineer

15 Bermondsey Square,
London
SE1 3UN

Tel +44 (0)20 7340 1700
Mob +44 (0)7977 221 235
www.campbellreith.com

If you have received this e-mail in error please immediately notify the sender by email and delete it and any attachments from your system.

This email has been sent from CampbellReith, which is the trading name of Campbell Reith Hill LLP, a limited liability partnership registered in England and Wales. Registered number, OC300082. Registered address: 15 Bermondsey Square, London, SE1 3UN. No employee or agent is authorised to conclude any binding agreement(s) on behalf of Campbell Reith Hill LLP with any other party by email unless it is an attachment on headed paper. Opinions, conclusions and other information in this email and any attachments which do not relate to the official business of Campbell Reith Hill LLP are neither given or endorsed by it. Please note that email traffic and content may be monitored.

As this e-mail has been transmitted over a public network the accuracy, completeness and virus status of the transmitted information is not secure and cannot be guaranteed. If verification is required please telephone the sender of the email.

This message has been scanned for malware by Websense. www.websense.com



[1] BS8102 (2009) *Code of practice for protection of below ground structures against water from the ground.*

Click [here](#) to report this email as spam.

London

15 Bermondsey Square
London
SE1 3UN

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

Bristol

Unit 5.03,
HERE,
470 Bath Road,
Bristol BS4 3AP

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

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

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

Campbell Reith Hill LLP. Registered in England & Wales. Limited Liability Partnership No OC300082
A list of Members is available at our Registered Office at: 15 Bermondsey Square, London, SE1 3UN
VAT No 974 8892 43