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8 Oakhill Avenue
NW3 7RE

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 13398-37
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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 8 Oakhill Avenue (planning reference 2020/1698/P). The basement is considered to fall within Category B as defined by the Terms of Reference.

1.2. The Audit reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures.

1.3. CampbellReith was able to access LBC's Planning Portal and gain access to the latest revision of submitted documentation and reviewed it against an agreed audit check list.

1.4. The Site Investigation & Ground Movement Assessment (GMA) Report (incorporating the BIA) and Construction Method Statement (CSM) have been prepared by consultants using individuals who possess suitable qualifications.

1.5. A utilities search has not been undertaken and is required.

1.6. The GMA and CSM are contradictory in regard to the basement proposals and this should be clarified.

1.7. The BIA has confirmed that the proposed basement will be founded within Claygate Member but justification should be provided for the strength and stiffness values assumed for the Claygate Member.

1.8. The BIA identified that groundwater will likely be encountered during basement excavation. A comment should be provided on suitable mitigation methods in the CSM.

1.9. The CSM discusses underpinning during construction with suitable temporary propping arrangements. The basement will be constructed with a reinforced concrete raft slab. Structural calculations are not provided and are requested to demonstrate structural stability.

1.10. A Ground Movement Assessment is provided which predicts damage to neighbouring properties no worse than Burland category 1. However, as discussed in Section 4, it is not accepted.

1.11. Ground movements have been determined during underpinning installation, excavation, basement slab construction, and for the long term, total ground movements. It should be clarified whether these movements are cumulative and what ground movements have been adopted to derive the damage category.

1.12. The site is located on a slope and a comment should be provided on how impacts to slope stability will be mitigated.

1.13. A movement monitoring strategy during excavation and construction is indicated and will be formalised during the Party Wall Award.

1.14. It is accepted that the development will not impact on the wider hydrology of the area and is not in an area subject to flooding.

1.15. The BIA states that the Claygate Member does not support significant volumes of water. However, clarification on the groundwater monitoring is required to confirm whether the basement will impact on subterranean flows.

1.16. It cannot be confirmed that the BIA complies with the requirements of CPG: Basements until the queries raised in Section 4 and Appendix 2 are addressed.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 3 August 2020 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 8 Oakhill Avenue, NW3 7RE (planning reference 2020/1698/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: Basements. March 2018
- 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 *"The formation of a basement level construction."*

The Audit Instruction confirmed 8 Oakhill Avenue does not involve, and is not neighbour to, listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 21st August 2020 and gained access to the following relevant documents for audit purposes:

- Construction Method Statement, Price and Myers , Ref 28373, Rev 1, February 2020;

- Site Investigation & Ground Movement Assessment Report, Geotechnical & Environmental Associates (GEA), Ref J19232, March 2020 (inc. BIA, Desk Study and Ground Investigation Report);
- Design and Access Statement, Carver Farshi, Ref 1901_DAS-Basement, April 2020;
- Planning Application Drawings consisting of:

  Location Plan, ref 1903_PL_010, April 2020;

  Site Survey, ref PL12174-01, May 2020;

  Existing Plans, Carver Farshi, ref 1903_EX_100, 1903_EX_101, 1903_EX_102, 1903_EX_103, 1903_EX_200, 1903_EX_201, April 2020;

  Proposed Plans, Carver Farshi, ref 1903_EX_020*, 1903_PL_100, 1903_PL_101, 1903_PL_300, April 2020.
- Planning Consultation Responses.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Section 1.3.2 GEA Site Investigation and Ground Movement Assessment (GMA) report.
Is data required by Cl.233 of the GSD presented?	No	Programme should be provided.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	GEA GMA Report.
Are suitable plan/maps included?	Yes	
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Carver Farshi plans. GEA GMA Report.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.1.2 GEA GMA report.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.1.1 GEA GMA report.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.1.3 GEA GMA report.
Is a conceptual model presented?	Yes	Section 5 GEA GMA report.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 GEA GMA Report.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 GEA GMA Report.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4 GEA GMA Report.
Is factual ground investigation data provided?	Yes	Appendix A GEA GMA Report.
Is monitoring data presented?	Yes	Section 5.4 GEA GMA Report.
Is the ground investigation informed by a desk study?	Yes	Section 2 GEA GMA Report.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	Assumed to be absent for ground movement calculations and this is accepted. Impact on subterranean flows to be confirmed.
Is a geotechnical interpretation presented?	Yes	Section 8 and 10 of the GEA GMA report. However, queries are raised as described in audit report section 4.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 8.1.1 GEA GMA report.
Are reports on other investigations required by screening and scoping presented?	N/A	
Are the baseline conditions described, based on the GSD?	No	Section 9 of the GEA GMA report. Utilities search not provided.

Item	Yes/No/NA	Comment
Do the base line conditions consider adjacent or nearby basements?	Yes	In respect of ground movement only - Section 9 of the GEA GMA report.
Is an Impact Assessment provided?	Yes	Parts 3 and 4 of the GEA GMA report.
Are estimates of ground movement and structural impact presented?	Yes	Provided Section 10 of the GEA GMA report, although justification required as described in audit report section 4
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	No	TBC after GMA updated.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	TBC after GMA updated.
Has the need for monitoring during construction been considered?	Yes	Section 11.2 TBC after GMA updated.
Have the residual (after mitigation) impacts been clearly identified?	Yes	TBC after GMA updated.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Measures to ensure stability are provided, however, queries are raised in audit report Section 4 in relation to the damage assessment.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	TBC after GMA updated.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	TBC after GMA updated.
Are non-technical summaries provided?	Yes	Section 13.3 of the GEA GMA report.

4.0 DISCUSSION

4.1. The Basement Impact Assessment, included as part of the Site Investigation & Ground Movement Assessment (GMA) Report has been carried out by engineering consultants Geotechnical & Environmental Associates (GEA) and the individuals concerned in its production have suitable qualifications. The Construction Method Statement has been carried out by Price & Myers. The author is a chartered structural engineer.

4.2. The LBC Instruction to proceed with the audit identified that the basement proposal does not involve a listed building, nor is it adjacent to listed buildings.

4.3. The property comprises a detached 3 storey building with no existing below ground structures. The front garden slopes steeply down to the south east, away from the building to an existing brickwork retaining wall that fronts the public pavement. Steps lead down from a rear patio to the rear garden, separated by a low retaining wall. The garden continues to slope downwards towards the north western boundary.

4.4. Historic maps show the site to be undeveloped with a stream located approximately 30m to the north of site, later culverted or covered in 1895.

4.5. A utilities search is not provided and is required.

4.6. The Price and Myers drawings show an existing single storey rear extension to be removed and replaced with a similarly sized extension that is indicated to be piled. It is understood that this is not part of the current application.

4.7. The proposed basement is described in the GMA as consisting of a single storey construction formed by lowering a part of the northern corner of the existing lower ground floor area by just over 2.5 metres and excavating to a basement formation level 3.5 metres below the existing finished floor level. The basement will be constructed as a reinforced concrete raft slab founding within the Claygate Member. No details of the store are given.

4.8. The basement construction sequence is indicated in the Price & Myers 'Construction Sequence'. The existing external walls are to be laterally propped prior to the removal of the existing ground floor. Basement retaining walls are to be formed using sequential mass concrete pins constructed in a hit and miss sequence with an internal reinforced concrete liner wall. A reduced dig and sequential mass concrete underpins will be installed underneath the existing external walls in a 'hit and miss' sequence. For the other walls sequential reinforced concrete pins (similar to the underpinning but not below an existing wall) will be constructed. Following completion of the underpinning, the bulk excavation will commence with lateral props installed across the basement excavation. The reinforced concrete ground bearing basement slab will be

designed to resist heave pressures. The ground floor slab will be cast to form an integral reinforced concrete box.

4.9. The BIA and Construction Method Statement are contradictory in regard to the basement proposals. The BIA refers to two areas of excavation, the basement and a storeroom. The Construction Method Statement refers to a basement excavation and a pumping chamber, the location of which is to be confirmed. The basement proposals should be clarified and the documents updated where necessary to accurately reflect the proposed scheme.

4.10. Structural calculations are not provided and are requested to demonstrate structural stability.

4.11. Screening and scoping assessments are presented, supported by desk study information. The relevant figures/maps from the Arup GSD and other guidance documents are referenced within the BIA to support responses to the screening questions and a ground investigation was undertaken.

4.12. The BIA has identified that Made Ground was encountered up to 1.50m bgl. The Claygate Member was encountered to 7.50m bgl and the London Clay was proven to a depth of 15.00m bgl. Ground water was struck between 1.00 and 9.80m bgl and monitored between 0.70 and 4.90m bgl. The BIA describes the Claygate Member as firm to stiff clay, however, reference to the exploratory hole records indicates it to be soft to firm to at least 3.00m bgl with a triaxial test result at 5m bgl also indicating it to be soft to firm. The formation level for the basement is anticipated to be at 3.50m bgl, consequently the strength of the bearing stratum requires confirmation.

4.13. The GMA provides a design bearing resistance of the Claygate Member of 125kPa. Noting the comments above about soil strength, this should be justified.

4.14. The presence of neighbouring basements or foundations have not been investigated however, for the damage assessment it is accepted that it is conservative to assume that neighbouring basements are not present and the properties have shallow footings.

4.15. A ground movement assessment has been undertaken within and surrounding the excavation using X-Disp and P-Disp with P-Disp ground movement imported into X-Disp. The assessment has determined that ground movements will not affect the structural integrity of neighbouring buildings with a Burland damage scale category of not more than 1 (very slight) determined. However, it is considered that this is likely to underestimate vertical movements as it does not include settlement resulting from the ground yielding into the excavation, nor construction related settlement such as the shrinking of the drypack. Additionally the stiffness values adopted for the Claygate member are at the upper range of what might be expected and are not moderately conservative as required by the planning guidance.

4.16. Ground movements have been determined during underpinning installation (Stage 1), excavation (Stage 2), basement slab construction (Stage 3), and for the long term (Stage 4) total ground movements. It should be clarified whether these movements are cumulative and what ground movements have been adopted to derive the damage category.

4.17. The site is located on a slope and a comment should be provided on how impacts to slope stability will be mitigated.

4.18. Monitoring of ground movements is suggested by the GMA and is included as part of the Construction Method Statement, which will be agreed under the Party Wall Agreement.

4.19. The area of new basement does not increase the extent of impermeable surfacing and will not impact on current rainwater discharges to the below ground surface water drainage system. The development is not in an area prone to flooding. It is therefore accepted there are no significant impacts to surface water flows.

4.20. The development is remote from the Hampstead Heath Pond chain or other pond catchment areas. The site is close to a tributary of the “lost” River Westbourne and a spring line. The basement will be founding within the Claygate Member, a Secondary A Aquifer. The BIA states that the Claygate Member does not support significant volumes of water. However there are discrepancies in the details of groundwater monitoring installations and a third round of monitoring is absent from the report and should be provided. Further discussion should also be provided for the groundwater observations observed in BH1. Clarification is required to confirm whether the basement will impact on subterranean flows.

4.21. Groundwater, as identified in the GMA, should be anticipated during basement construction. A comment on how groundwater will be managed during basement construction should be provided in the Construction Method Statement.

5.0 CONCLUSIONS

5.1. The Site Investigation and Ground Movement Assessment report (GMA) incorporates the BIA, and the Construction Method Statement (CSM) have been carried out by individuals who possess suitable qualifications.

5.2. A utilities search has not been undertaken and is required.

5.3. A single storey basement is proposed and the CSM discusses underpinning during construction with suitable temporary propping arrangements. The basement will be constructed with a reinforced concrete raft slab.

5.4. The BIA and Construction Method Statement are contradictory in regard to the basement proposals and these should be clarified.

5.5. Justification should be provided for the strength, stiffness and bearing resistance of the Claygate Member assumed in the design.

5.6. The BIA has identified that ground water will likely be encountered during basement excavation. A comment should be provided on suitable mitigation methods in the Construction Method Statement.

5.7. A Ground Movement Assessment is provided. The assessment methodology requires further justification.

5.8. Ground movements have been determined during underpinning installation, excavation, basement slab construction, and for the long term, total ground movements. It should be clarified whether these movements are cumulative and what ground movements have been adopted to derive the damage category.

5.9. The site is located on a slope and a comment should be provided on how impacts to slope stability will be mitigated.

5.10. Structural calculations are not provided and are requested to demonstrate structural stability.

5.11. A movement monitoring strategy during excavation and construction is indicated and will be formalised during the Party Wall Award.

5.12. It is accepted that the development will not impact on the wider hydrology of the area and is not in an area subject to flooding.

5.13. Clarification on the groundwater is required to confirm whether the basement will impact on subterranean flows.

5.14. It cannot be confirmed that the BIA complies with the requirements of CPG: Basements until the queries raised in Section 4 and Appendix 2 are addressed.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Harding	-	01/05/2020	BIA missing.	Included as part of the Site Investigation & Ground Movement Assessment reference J19232 issue 3 as final, dated March 2020.

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	A utilities search has not been undertaken and is required.	Open	
2	BIA	The BIA and Construction Method Statement are contradictory in regard to the basement proposals. This should be clarified and the documents updated to accurately reflect the proposed scheme.	Open	
3	Stability	The strength, stiffness and bearing capacity of the bearing stratum requires confirmation.	Open	
4	Stability	Queries are raised with respect to the methodologies adopted. GMA should be updated once these have been clarified.	Open	
5	Stability	Structural calculations are not provided and are required.	Open	
6	Stability	The site is located on a slope and comment should be provided on how slope stability concerns will be mitigated.	Open	
7	Subterranean flows	Groundwater queries should be clarified before the impact on subterranean flows can be confirmed. Mitigation measures to be described where necessary.	Open	

Appendix 3: Supplementary Supporting Documents

None

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