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52-54 Avenue Road
London, NW8 6HS

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13693-70
Revision: D1

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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 52-54 Avenue Road (planning reference 2022/1863/P). The basement is considered to fall within Category C as defined by the Terms of Reference.

1.2. The Audit reviewed the Basement Impact Assessment (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. It is proposed to demolish the existing building on site and to construct three separate three-storey structures and a two-level basement with a maximum depth of 9.5m bgl. The two-level basement will extend beneath and between all three residential blocks, and the basement perimeter is proposed to be retained by a contiguous reinforced concrete piled wall.

1.5. The BIA has been prepared by A-squared Studio Ltd. The qualifications of the individuals involved in the production of the BIA are not fully in accordance with LBC guidance.

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

1.7. A site investigation was undertaken indicating that the basement will be constructed within the London Clay Formation. The London Clay does not support significant groundwater flows and it is accepted there will be no adverse impacts to the local or wider hydrogeology.

1.8. A Flood Risk Assessment and SuDs Strategy report demonstrates that there will be no adverse impacts to the hydrological environment.

1.9. As trees are proposed to be removed, a qualitative assessment should be presented in the BIA to confirm that neighbouring foundations will not be impacted by tree removal.

1.10. The Ground Movement Assessment (GMA) should be reviewed, and further information provided as described in Section 4.

1.11. The BIA notes that the design of the basement and substructure are currently ongoing. As the design of the temporary and permanent works will have a significant influence on impacts to stability, it is recommended that a Basement Construction Plan is provided confirming the detailed design and impacts to surrounding structures and infrastructure.

1.12. Queries and requests for information are discussed in Section 4 and summarised in Appendix 2. Until the clarifications requested are presented, the BIA does not meet the requirements of Camden Planning Guidance: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 12th of July to carry out a Category C audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 52-54 Avenue Road, London, NW8 6HS, planning reference 2022/1863/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 *"Demolition of existing dwelling and erection of three, 3 storey buildings over part lower ground/basement, comprising total of 12 townhouses (12 x 4 bed), together with associated landscaping (including disabled parking) and installation of new access gate onto Avenue Road."*

2.6. The audit instruction confirms that the development neither involves, nor is neighbour to, any listed buildings.

2.7. CampbellReith accessed LBC's Planning Portal on the 20th of July 2022 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment by A-squared Studio, ref: 1942-A2S-XX-XX-RP-Y-0002-04 Revision 04, dated May 2022.
- Geotechnical Design Report (GDR) by A-squared Studio, ref: 1942-A2SI-XX-XX-RP-Y-0002-04 Revision 04, dated May 2022.
- Factual Report by A-squared Studio, ref: 15721-A2SI-XX-XX-RP-Y-0001-00 Revision 01, dated December 2021.
- Phase I Desk Study Report by A-squared Studio, ref: 1942-A2S-XX-XX-RP-Y-0001-03 Revision 03, dated May 2022.
- Ground Movement Assessment (GMA) by A-squared Studio, ref: 1942-A2S-XX-XX-RP-Y-0003-04 Revision 04, dated May 2022.
- Flood Risk Assessment & SuDS Strategy Report by Heyne Tillett Steel, ref: 2673 Revision P01, dated May 2022.
- Structural Method Statement by Heyne Tillett Steel, ref: 2673 Revision P01, dated 10th of May 2022.
- Construction Management Plan by Aval Consulting Group, ref: 91544 Revision C1, dated 26 April 2022.
- Arboricultural Impact Assessment Report by Landmark trees, ref: DML/52AVR/AIA/01d Revision 01d, dated 6th May 2022.
- Proposed Architectural Drawings by DOMVS London, dated April 2022.
- Existing Architectural Drawings by terrain Land and Architectural Surveyors, dated September 2021.
    - Elevations, dated August 2006
    - Floor plans, dated May 2012
    - Elevation/Section dated August 2006.
- Planning Consultation Responses as detailed in Appendix 1.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	It should be demonstrated that authors have the required qualifications as CPG Basements.
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	Section 2 of the BIA.
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 5.1 of the GDR.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Sections 4.3 & 4.4 of the BIA.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Sections 4.1 & 4.2 of the BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.2 of the BIA.
Is factual ground investigation data provided?	Yes	Section 5 of the BIA and Appendix B of the BIA.
Is monitoring data presented?	Yes	Section 10 of the BIA and Appendix C of the BIA
Is the ground investigation informed by a desk study?	Yes	Phase 1 Desk Study – Appendix A1 of SMS
Has a site walkover been undertaken?	Yes	Section 7.1 of the BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	No	Sections 2.5 & 3.2 of the BIA. Neighbouring buildings are assumed to be founded near surface.
Is a geotechnical interpretation presented?	Yes	Section 5.2 of the GDR.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Sections 5.2 and 6.6.4.4 of the GDR.
Are reports on other investigations required by screening and scoping presented?	Yes	Ground Investigation Report, Geotechnical Design Report, GMA, Arboricultural Impact Assessment and Flood Risk Assessment and SuDS Strategy Report, Structural Method Statement and Construction Management Plan are provided.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Neighbouring buildings are assumed to be founded near surface.
Is an Impact Assessment provided?	Yes	Section 7 of the BIA.

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	Ground Movement Assessment Report. GMA provided; clarifications requested.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	Sections 7 of the BIA and Ground Movement Assessment Report. GMA provided; clarifications requested.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Section 9 of the GDR. However, further mitigation measures and/or revision of the presented mitigation measures may be required.
Has the need for monitoring during construction been considered?	Yes	Section 9 of the GDR. An Action Plan document and procedure should be developed in order to present the excavation and construction performance criteria, alongside agreed trigger levels for the primary phases of construction.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Negligible. However, subject to further revision.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Ground Movement Assessment Report. GMA provided; clarifications requested.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Flood Risk Assessment and SuDS Strategy Report
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	As above.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Ground Movement Assessment Report. However, clarification on the GMA is required.
Are non-technical summaries provided	Yes	Non-Technical Summary of the BIA.

4.0 DISCUSSION

4.1. The BIA has been carried out by A-Squared Studio Ltd. The qualifications of the individuals involved in the production of the BIA have been demonstrated to be in accordance with LBC guidance in regard to land stability and hydrological Assessments, however the hydrogeological assessment has not been undertaken by a chartered geologist.

4.2. The site is located at 52 Avenue Road, it is currently occupied by a two-storey residential building with no existing below ground space or basement other than a swimming pool to the front of the property.

4.3. The proposed development comprises demolition of the existing building on site and construction of three separate three-storey structures, housing a total of 12 residential units. A two-level basement is proposed as part of the development, with a maximum depth of 9.5m below ground level (bgl). The two-level basement will cover the entire proposed basement footprint, and the basement perimeter is proposed to be retained by a contiguous reinforced concrete piled 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. The site is located in a critical drainage area. However, the Flood Risk Assessments and SUDs Strategy Report states that the site is at low probability of flooding from all sources. The Flood Risk Assessment indicates that the development can be constructed and operated safely without increasing the flood risk elsewhere. A number of SuDS have been incorporated into the proposed development. Surface water at the site will be attenuated using a combination of blue and blue green roofs and porous paving. Section 5 of the FRA and SUDs Strategy report indicates that the runoff rates will be decreased compared to the existing rates and confirms that the proposed development will not impact the hydrological environment.

4.6. A Ground Investigation (GI) was undertaken by A-squared Ltd. The investigation comprised 2no. cable percussion boreholes to 40m bgl, 6no. window sampler boreholes to 5m bgl and 4no. hand excavated trial pits. Made Ground was encountered to a depth of 0.7m bgl, underneath the Made Ground London Clay was found down to 40m bgl. The new basement will extend to a depth of approximately 9.5m bgl and will be founded within the London Clay.

4.7. Groundwater was not encountered during the GI, however it was reported that finite bodies of perched groundwater may be present within the Made Ground above the London Clay Formation. The GDR states that due to the low permeability of the London Clay, it is unlikely that significant dewatering operations will be required to facilitate basement construction.

However, it is recommended that a provision for local sump pumping is provided any finite volumes of groundwater within the Made Ground.

4.8. The London Clay does not support significant groundwater flows and it accepted there will be no impact to the hydrogeology. The proposal is expected to increase the proportion of hard standing across the site. However, the site-specific ground investigation has confirmed that the London Clay is the shallowest stratum on site. Due to its very low permeability, the London Clay is unable to provide significant attenuation and the development is unlikely to alter the site from its current run-off condition. The proposed scheme will include a robust drainage strategy / system to accommodate any excess surface water runoff.

4.9. It is accepted that there are no slope stability impacts, however, there are potential impacts to the stability of surrounding structures and infrastructure. The basement retaining scheme is described and geotechnical parameters to inform those assessments and piled wall calculations are presented in the Geotechnical Design Report and are accepted.

4.10. The BIA states that foundation system design is currently ongoing. It assumes the bulk excavation and construction of permanent works elements will take place following installation of all retention systems and by adopting a bottom-up sequence and that suitable construction controls and temporary works, including rigorous monitoring, are adopted to control ground movements. A proposed construction sequence for the basement is presented in the Structural Method Statement.

4.11. A 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. The analyses were carried out using the Oasys programmes PDisp and XDisp.

4.12. The GDR states that for the contiguous pile wall, typical embedded wall lengths would be in the order of 1.5 to 2 times the retained height. No outline retaining calculations were provided to support the assumptions regarding the embedded retaining wall pile length. However, a wall length of 14.3m is adopted in the GMA corresponding to 1.5 times the retained height. If deeper piles are to be adopted, the ground movement assessment will need to be updated to reflect those changes.

4.13. The GMA has been undertaken for the proposed development and considers ground movements resulting from the installation of a contiguous retaining wall and basement excavation. It assumes that the basement retaining wall will be propped at high level. The following points require further clarification or revision:

- The BIA states that the CIRIA curve for the installation of contiguous bored pile wall in stiff Clay have been reduced by 70%. This reduction seems generous. Clarification is requested to confirm whether the installation movements were reduced by 70% (70%

reduction applied) or to 70% (30% reduction applied). And if the former, justification is requested for the adoption of reduced ground movement curves.

- Ground movements resulting from wall installation have been reduced compared to what is suggested by CIRIA C760. However, those are highly dependent on the construction methods adopted. A detailed temporary works design, construction methodology and controls should be presented within a Basement Construction Plan (BCP) and the GMA should be updated to reflect any amendments of the current proposal.
- Input and Output data from PDisp and XDisp models are not provided and summary data are requested.
- Assessment of the impact the predicted movements will have on the highways and the utilities nearby.

4.14. The results of the Building Impact Assessment currently indicate damage to neighbouring buildings will not exceed Category 1 (Very Slight); however, the GMA requires further consideration in line with the points raised above.

4.15. The BIA states that a supervision and monitoring plan will be required to support the management of geotechnical risks during construction. The GMA will be supplemented by a project-specific monitoring regime and Action Plan, which will delineate lines of responsibility, trigger levels in accordance with those presented in this GMA, and appropriate mitigation measures.

4.16. The Arboricultural Report indicates that trees are going to be removed. If there is the potential for soils with shrink-swell potential to be present close to the surface, the BIA should confirm whether the neighbouring properties will be impacted by the tree removal (i.e. due to potential for change in moisture content of the soil to cause shrink / swell movements) and, if so, an assessment should be provided along with recommendations for mitigation measures, if required.

5.0 CONCLUSIONS

5.1. The qualifications of the individuals involved in the production of the BIA are not fully in accordance with LBC guidance.

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

5.3. A site investigation was undertaken indicating that the basement will be constructed within the London Clay Formation.

5.4. A Flood Risk Assessment and SuDs Strategy report demonstrates that there will be no adverse impacts to the hydrological environment.

5.5. As trees are proposed to be removed, a qualitative assessment should be presented in the BIA to confirm that neighbouring foundations will not be impacted by tree removal.

5.6. The Ground Movement Assessment (GMA) should be reviewed, and further information provided as described in Section 4.

5.7. The BIA notes that the design of the basement and substructure are currently ongoing. As the design of the temporary and permanent works will have a significant influence on impacts to stability, it is recommended that a BCP is provided confirming the detailed design and impacts to surrounding structures and infrastructure.

5.8. Queries and requests for information are summarised in Appendix 2. Until the clarifications requested are presented, the BIA does not meet the requirements of Camden Planning Guidance: Basements.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Alex Thompson	Redacted	12/07/2022	• Increased Risk of Flooding • Effects to groundwater flow • Slope stability issues	• See Section 4.5 • See Sections 4.7 – 4.8 • See Section 4.4 – 4.11 to 4.14

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	The qualifications of the individuals involved in the production of the BIA have not been demonstrated to be in accordance with LBC guidance.	Open – See Section 4.1	
3	Land Stability	Assessment of the impact that the predicted movements will have on the highways and the utilities nearby.	Open – See Section 4.13	
4	Land Stability	Summary GMA Inputs and Outputs of Pdisp & XDisp analyses are requested.	Open – See Section 4.13	
5	Land Stability	Assessments of impact of tree removal on neighbouring properties is requested.	Open – See Section 4.16	
6	Land Stability	Clarification regarding reduced ground movement curves.	Open – See Section 4.13	

Appendix 3: Supplementary Supporting Documents

None

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