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34 Glenilla Road, London NW3 4AN

Basement Impact Assessment Audit

For

London Borough of Camden

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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 34 Glenilla Road, London NW3 4AN (planning reference 2020/2412/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 BIA has been prepared by individuals who possess suitable qualifications.

1.5. The anticipated geology comprises Made Ground over London Clay Formation.

1.6. The proposed development comprises lowering and extending the footprint of the existing basement at the site. The basement will be formed using underpinning in a 'hit-and-miss' sequence.

1.7. It is accepted that the development will not have a significant impact on the hydrogeology or slope stability of the area.

1.8. In light of the proposed attenuation measures, it is accepted that the development will not have a significant impact on the hydrology of the area.

1.9. The ground movement assessment has been revised to use the correct excavation depth and an appropriate model geometry. The assessment indicates that damage to adjacent structures will not exceed Burland Category 1 (Very Slight).

1.10. The BIA indicates that the predicted ground movements affecting the adjacent public highway of Glenilla Road are considered to be negligible.

1.11. The BIA recommends that a monitoring strategy be implemented and trigger values and associated mitigation should be agreed as part of the Party Wall Award.

1.12. Based on the revised submission it can be confirmed that the BIA complies with the requirements of CPG: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 5 August 2020 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 34 Glenilla Road, London NW3 4AN.

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 *"Erection of a ground floor rear conservatory; enlargement of the existing rear dormer; enlargement of the existing basement; alterations to side and rear fenestration; installation of metal gate to front boundary treatment; replacement side access gate; alterations to the front garden paving and landscaping.".*

2.6. The Audit Instruction confirmed the development at 34 Glenilla Road neither involved, nor was a neighbour to, any listed buildings.

2.7. CampbellReith accessed LBC's Planning Portal on 6 August 2020 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (BIA) by Card Geotechnics Ltd, ref. CG/38419, rev 0, dated May 2020.
- Construction Method Statement by Price & Myers, ref. 28873, rev. 1, dated May 2020.
- Planning Application Drawings consisting of existing and proposed plans, section and elevations.
- Design & Access Statement by Adam Kahn Architects, rev 00, dated May 2020.
- Flood Risk Assessment and Drainage Report by Price & Myers, ref. 28873, rev 1, dated May 2020.
- Arboricultural Report and Impact Assessment by Crown Tree Consultancy, ref. 10510, dated 28 May 2020.
- Planning Consultation Responses

2.8. The following additional documents were provided to CampbellReith between September 2020 and February 2021:

- Basement Impact Assessment (BIA) by Card Geotechnics Ltd, ref. CG/38419, rev 2, dated February 2021.
- Construction Method Statement by Price & Myers, ref. 28873, rev. 2, dated September 2020.
- Planning Application Drawings by Richard Morton Architects, consisting of existing and proposed plans, section and elevations, all revision 5, all dated 27 November 2020.

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	
Are suitable plan/maps included?	Yes	Plans referenced where appropriate.
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	The revised development proposal has reduced the distance that the basement extends into the rear garden.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
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	
Is factual ground investigation data provided?	Yes	Investigation for neighbouring property at No. 32 used.
Is monitoring data presented?	Yes	At least one groundwater monitoring visit was carried out.
Is the ground investigation informed by a desk study?	No	Carried out for neighbouring site.
Has a site walkover been undertaken?	Unknown	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	
Is a geotechnical interpretation presented?	Yes	Section 6.7 of the BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	A Flood Risk Assessment (FRA) and Arboricultural Report are provided.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	

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	Presented in BIA and FRA.
Has the need for monitoring during construction been considered?	Yes	
Have the residual (after mitigation) impacts been clearly identified?	Yes	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Based on the revised submission.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Mitigation measures for perched groundwater are provided.
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	
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Card Geotechnics Ltd (CGL) by individuals who have suitable qualifications.

4.2. The Design & Access Statement (DAS) identified that 34 Glenilla Road is located in the Belsize Conservation Area and that no listed buildings likely to be affected by the development are present on site or in the immediate vicinity.

4.3. The proposed development comprises lowering the existing basement and extending it to underlie the full footprint of the building, and extend beyond the building to the side and rear. The revised submission drawings show the basement extent into the garden area is reduced. The Proposed Section planning drawings indicate an additional 2.0m excavation will be undertaken in the centre of the basement, towards the rear of the property, to form a sump pump pit. It is noted that the revised Construction Method Statement (CMS) was produced prior to the basement footprint being reduced, therefore some of the drawings and references therein are now superseded. This is not considered to have a significant impact on the BIA.

4.4. The formation level for the proposed basement is given in the initial BIA as 57.62m OD with an existing ground level given as 61.80m OD. Subsequent correspondence confirmed a formation level of 58.18m OD for the proposed basement. The revised BIA has been amended to reflect this. The revised Construction Method Statement (CMS) presents retaining wall calculations that indicate an excavation depth of 3.60m. This corresponds with the confirmed formation level of 58.18m OD, as well as the levels indicated on the planning drawing.

4.5. It is proposed to construct the basement using traditional underpinning techniques in bays not exceeding 1m, using a 'hit and miss' construction sequence. The party wall with No. 36 will be formed using mass concrete underpins with a reinforced retaining wall cast adjacent, within the property. The remainder of the basement development will use reinforced concrete retaining wall underpins. The BIA indicates a ground bearing basement raft foundation will be used.

4.6. The proposed basement will extend the full width of the site. The northwest side will be formed directly against a pile wall at the boundary of No. 32, which is yet to be constructed. The BIA assumes that this wall will be in place prior to the construction of the basement at No. 34. Noting that the current basement proposals for No. 32 are still to be determined by LBC, this assumption is not considered to be suitably conservative, however it is noted that, due to the existing basement at No. 34 and distance of No. 32 from No. 34, the adjoining property of No. 36 is considered to represent the most sensitive neighbouring structure.

4.7. The BIA uses ground investigation data from the neighbouring site at No. 32 to compile a ground model and inform the subsequent assessments. It identifies the ground conditions to

comprise Made Ground to a depth of 2.30m, below which lies the London Clay Formation. Given the proximity to the site, the ground conditions at No. 34 are likely to be comparable to those at the adjacent property.

4.8. Groundwater was encountered during drilling at a depth of 5.8m below ground level (bgl). This corresponded with the presence of a claystone band within the London Clay. Subsequent groundwater monitoring recorded levels at 1.88m bgl within the Made Ground, and at 4.15m bgl within the London Clay. This groundwater was considered to be perched and not representative of the wider groundwater table. A design groundwater level has been taken as 1.5m below ground level. The revised CMS now describes mitigation measures should perched groundwater be encountered during excavations.

4.9. The site is underlain by London Clay, which is designated unproductive strata. As such, it is accepted that the development will have no significant impact on the hydrogeology of the area.

4.10. The BIA identifies two tributaries of the historical River Tyburn approximately 20m west of the site. The BIA indicates that no evidence for the presence of this stream was noted during the site investigation at No. 32, which is located on the west side of No. 34.

4.11. The site is identified to be within a Critical Drainage Area and a Flood Risk Assessment (FRA) has been compiled for the development. The FRA indicates the site has a low risk of flooding from watercourses. Parts of Glenilla Road adjacent to the site are shown to be prone to surface water flooding, however the site itself has been determined to have a low risk of surface water flooding due to the site's topography preventing overland flow from flooding the building. The FRA recommends the use of permeable paving and attenuation tanks to reduce the peak flow rates to sewers. Based on the above, it is accepted that the development will not significantly impact the hydrology of the area.

4.12. The site is generally flat and level, therefore it is accepted that the proposed development will not have a significant impact on the slope stability of the area.

4.13. The BIA identifies the presence of a basement in the neighbouring property at No. 36, however this basement is present on the far side of the property. A foundation formation level of 60.80m OD has been adopted for the party wall foundation (foundation depth of 1.00m below ground level).

4.14. The BIA indicates an allowable bearing capacity of 100kN/m^2 for the basement at the shallower excavation depth of 58.18m OD.

4.15. The soil parameters used in the retaining wall calculations in Appendix B of the revised CMS now reflect those given in the BIA, and those presented in Section 3 of the CMS.

4.16. Section 6 of the revised CMS has been updated to clarify the underpin construction sequence.

4.17. A Ground Movement Assessment (GMA) is presented in Section 8.2 of the BIA. Vertical ground movements associated with the development have been assessed using PDisp software. The assessment has been carried out in three stages; construction of the underpins, excavation of the basement and long term movements following construction of the basement slab. These stages are based on a construction method sequence presented in Appendix F of the BIA, which is indicated to be from the Price and Myers CMS. The sequence presented in Appendix F does not fully match that presented in the CMS, however for the purpose of the GMA the sequences are considered comparable.

4.18. The PDisp assessment in the revised BIA submission now considers the additional excavation required for the sump pump pit. The PDisp assessment has been updated to use the confirmed formation level of 58.18m OD, and the loading and unloading values have been updated accordingly. The input geometry has been amended to remove any overlap of loading data.

4.19. In addition to the movements predicted by PDisp, the GMA includes a component of settlement arising from construction of the underpins. This value has been taken as 5mm, assuming good workmanship.

4.20. The building damage assessment is presented in Section 8.3 of the BIA. The assessment methodology adopts the Rankin criteria of angular distortions, which considers the long and short term vertical ground movements predicted by the PDisp assessments, and the component of ground movement arising from construction of the underpin. The predicted maximum angular distortion is given as 1/810 in the revised BIA, which is indicated to be within the risk category for ‘negligible’ damage.

4.21. The BIA also provides a damage category assessment using the Burland approach, which indicates the anticipated damage category for the adjoining property at No. 36 to be a maximum of Burland Category 1 (Very Slight). Horizontal movement of the underpins has been assumed to be 4.5mm.

4.22. The BIA indicates that the predicted ground movements affecting the adjacent public highway of Glenilla Road are considered to be negligible.

4.23. The BIA recommends that a monitoring strategy be implemented to observe ground movements during construction. Trigger values and associated mitigation should be agreed as part of the Party Wall Award.

5.0 CONCLUSIONS

5.1. The BIA has been carried out by individuals who possess suitable qualifications.

5.2. Site investigation from the adjacent site at No. 32 has been used in the BIA. It is considered likely that ground conditions on site will be comparable to those at No. 32. The anticipated geology comprises Made Ground over London Clay Formation.

5.3. The proposed development comprises lowering and extending the footprint of the existing basement at the site. The basement will be formed using underpinning in a 'hit-and-miss' sequence.

5.4. It is accepted that the development will not have a significant impact on the hydrogeology or slope stability of the area.

5.5. The proposed development will include attenuation measures to reduce the peak flow rate to sewers, therefore it is accepted that the development will not have a significant impact on the hydrology of the area.

5.6. The revised BIA submission now uses the correct ground level for the basement excavation, which is presented consistently throughout the BIA. The PDisp assessment has been updated to use appropriate loads and geometry to reflect the development.

5.7. The ground movement assessment has been revised to reflect the GMA results. Where the Burland approach is used, a horizontal ground movement component of 4.5mm has been used. The damage category assessment indicates that damage to adjacent structures will not exceed Burland Category 1 (Very Slight).

5.8. The BIA indicates that the predicted ground movements affecting the adjacent public highway of Glenilla Road are considered to be negligible.

5.9. The BIA recommends that a monitoring strategy be implemented to observe ground movements during construction. Trigger values and associated mitigation should be agreed as part of the Party Wall Award.

5.10. Based on the revised submission it is confirmed that the BIA complies with the requirements of CPG: Basements.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Hudson	36 Glenilla Road	5 August 2020	Change of groundwater flow in the area due to basement development	The London Clay, which underlies the site, has a very low permeability and is designated an unproductive stratum with respect to groundwater. It is therefore unlikely that significant groundwater flow exists through this stratum.
			Impact to the stability of the foundations of the conservatory located 1.3m from the boundary	The ground movement assessment considers the impact to walls perpendicular to and adjoining the party wall, which is considered to be more critical than the conservatory foundations due to the proximity to the proposed basement. Damage to the conservatory is therefore not likely to exceed that predicted for the walls assessed. The revised ground movement assessment indicates that damage to the neighbouring property will not exceed Burland Category 1 (Very Slight), which is in line with LBC policy.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	Clarification of the maximum basement excavation depth should be provided. The correct maximum excavation depth should be used consistently in all assessments.	Closed Open	30/09/20
2	Hydrogeology	Consideration of mitigation measures if perched groundwater is encountered during excavations should be included in the BIA.	Closed	30/09/20
3	Stability	Further clarification regarding backfilling the underpins is required.	Closed	30/09/20
4	Stability	Soil parameters should be presented and used consistently in all documents.	Closed	30/09/20
5	Stability	Consideration of the additional excavation required for the sump pump pit should be included in the BIA.	Closed	11/02/21
6	Stability	The ground movement assessment (GMA) should be updated using the amended PDisp results. The building damage category assessment following the Burland approach should include horizontal ground movement in addition to vertical movement.	Closed Closed	11/02/21 11/02/21
7	Stability	The PDisp assessment should be updated using load that are representative of the correct basement excavation depth and an appropriate input geometry.	Closed	18/02/21

Appendix 3: Supplementary Supporting Documents

None

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