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14 Greenaway Gardens
London, NW3 7DH

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 13693-63
Revision: F1

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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 14 Greenaway Gardens (planning reference 2021/6257/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. The proposal includes demolition of the existing house whilst retaining the existing façade. Subsequently constructing a three-storey house with roof accommodation and a single level basement below the entire building footprint and partially below the rear garden.

1.5. The qualifications of the individuals involved in the production of the BIA are in accordance with LBC guidance.

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

1.7. A site investigation has been undertaken indicating the basement will be founded in the Claygate Member.

1.8. Geotechnical parameters to inform design have been provided.

1.9. It is accepted that here will be no impact to the hydrogeological and hydrological environments.

1.10. The Ground Movement Assessment (GMA) using reduced CIRIA curves has been presented which predicts damage impacts of Category 0 to 1 (Negligible to Very Slight) to surrounding structures.

1.11. It is recommended that a Basement Construction Plan is provided confirming the detailed temporary and permanent works design, construction methodology for the substructure and impacts to surrounding structure and infrastructure.

1.12. Considering the additional information presented, it can be confirmed that the BIA meets the requirements of Camden Planning Guidance: Basements, subject to a BCP being presented as described above that demonstrates a maximum Category 1 damage to neighbouring structures.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on the 27th of May 2022 to carry out a Category C audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 14 Greenaway Gardens, London, NW3 7DH, planning reference 2021/6257/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 *"Partial demolition of walls to the North (rear) and West (side) elevation, the Front and East external walls are to be retained. Rear single story infill extension, front garage extension, new internal floor structures and internal lift. A new basement construction is proposed under the full footprint of the house, a small extension under the rear garden and a new external lightwell to the front".*

2.6. CampbellReith accessed LBC's Planning Portal on the 15th of June 2022 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment by Geotechnical & Environmental Associates Limited, ref: J21089 Rev 2, dated 08 April 2022.
- Structural Engineer's Construction Method Statement by Engineers HRW, ref:2117 Rev D, dated 10 May 2022.
- Flood Risk Assessment Report by Infrastruct Ltd, ref: 4498-GREE-ICS-XX-RP-C-07.001B, dated 07 April 2022.
- Arboricultural Impact Assessment Report by Landmark Trees, ref: SHH/14GRW/AIA/01b Rev 0b, dated 04 May 2022.
- Construction/Demolition Management Plan pro by Size Group Ltd, Version 1, dated 04 April 2022.
- Design and Access Statement by Spence Harris Hogan, Rev PL02, dated May 2022.
- Revised Architectural Drawings by Spence Harris Hogan, Rev PL02, dated 05 May 2022.

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

- Basement Impact Assessment by Geotechnical & Environmental Associates Limited, ref: J21089 Rev 3, dated 25 July 2022.
- Structural Engineer's Construction Method Statement by Engineers HRW, ref:2117 Rev E, dated 27 July 2022.

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	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 3.1.2 of the BIA. Q13 – relative depth of foundations, with reference to 2.1.1 of BIA and section drawings. However, assessment of potential stability impacts due to construction are considered within the Ground Movement Assessment (GMA).
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.1.1 of the BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.1.3 of the BIA.
Is a conceptual model presented?	Yes	Sections 7.0 and 10.2.1 of the BIA.

Item	Yes/No/NA	Comment
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.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	N/A	No items carried to scoping.
Is factual ground investigation data provided?	Yes	Section 4.2 and Appendix of the BIA.
Is monitoring data presented?	Yes	Section 5.4 of the BIA.
Is the ground investigation informed by a desk study?	Yes	Section 2.0 of the BIA.
Has a site walkover been undertaken?	Yes	Section 1.3 of the BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Section 9.1.1 of the BIA. None adjacent, as 2.1.1.
Is a geotechnical interpretation presented?	Yes	Sections 8 & 10.2.1 of the BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 8.1.2 of the BIA.
Are reports on other investigations required by screening and scoping presented?	Yes	Ground Movement Assessment; Desk Study and Ground Investigation Report; Arboricultural Impact Assessment; Structural Engineer's Construction Method Statement; Construction and Demolition Management Plan; and Flood Risk Assessment (FRA) and Drainage Statement.
Are the baseline conditions described, based on the GSD?	Yes	

Item	Yes/No/NA	Comment
Do the base line conditions consider adjacent or nearby basements?	Yes	Section 2.1.1 of the BIA.
Is an Impact Assessment provided?	Yes	Section 13 of the BIA.
Are estimates of ground movement and structural impact presented?	Yes	Section 10 of the BIA. GMA provided; results accepted.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	Sections 10 & 13.14 of the BIA. GMA provided; results accepted.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Sections 11.2 & 13.1 of the BIA.
Has the need for monitoring during construction been considered?	Yes	Section 11.2 of the BIA and Section 7.2 of the SMS.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Negligible.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Section 9 of the BIA. GMA provided; results accepted.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Section 13 of the BIA.
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 11 of the BIA. GMA provided; results accepted.
Are non-technical summaries provided	Yes	Executive Summary of the BIA.

4.0 DISCUSSION

4.1. The BIA has been carried out by Geotechnical and Environmental Associates Limited (GEA) and the individuals concerned in its production have suitable qualifications.

4.2. The site is located on a T-shaped plot measuring approximately 75m northeast-southwest by 90m northwest-southeast. It fronts onto Greenaway Gardens to the southwest and is bordered by No 12a Greenaway Gardens to the northwest, Nos 15a and 15b Greenaway Gardens to the southeast, and by private gardens of properties fronting Chesterford Gardens to the northeast.

4.3. The site is occupied by No 14 Greenaway Gardens, a three-storey detached property, with a single storey extension to the rear, a single storey garage along the south-eastern elevation and roof accommodation. A partial basement/cellar is present below the north-western part of the building footprint, approximately 1.80m below ground floor level (at c. 91.50 mOD). The house is positioned in the southwestern half of the site and is separated from the footway and carriageway of Greenaway Gardens by a paved driveway area that includes a semi-circular area of lawn along the southwestern boundary and planted borders along the north-western and south-eastern boundaries. The driveway slopes up from street level to ground floor level of the house, which is c. 0.90m above the level of the footway. The north-eastern half of the site forms the private rear garden, which comprises a large central lawn area, the far north-eastern part of the site includes an outdoor swimming pool surrounded by paving, a hard paved tennis court in the north-western corner and an outbuilding in the south-eastern corner of the site.

4.4. The proposal includes demolition of the existing house whilst retaining the existing façade, subsequently constructing a three-storey house with roof accommodation and a single level basement below the entire building footprint and partially below the rear garden. The basement will extend to a level of 88.97 mOD, requiring an approximately 4m deep excavation. A lift pit will require localised deeper excavation to 88.07 mOD.

4.5. 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. It is noted that Q13 of the Land Stability screening assessment indicates that the proposed scheme will not significantly increase the differential depth of foundations relative to neighbouring structures, this contrary to the BIA text and construction drawings. Notwithstanding this, assessment of potential stability impacts due to construction are considered within the Ground Movement Assessment (GMA).

4.6. The BIA 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.

4.7. The BIA states that the proposed development will decrease the overall proportion of hardstanding areas. In addition, a SuDS strategy is proposed which makes allowance for climate change in accordance with good practice.

4.8. A site investigation was undertaken by Geotechnical & Environmental Associates (GEA). Site works comprised: a single borehole advanced to a depth of 20.00m bgl (73.00 mOD) using a cable percussion rig; two open drive sampler boreholes advanced to a depth of c. 6.45m bgl (86.85 mOD and 86.55 mOD); five boreholes advanced to a depth of 4m bgl (between 93.60 mOD and 89.60 mOD) using window sampling equipment; and, six trial pits were manually excavated to establish the configuration of existing foundations. Made Ground was encountered to depths of 0.20 and 0.60 m bgl (93.10 mOD and 94.10 mOD). The Claygate Member was encountered over the London Clay Formation and extended to a depth of 11.00m bgl (84.47 mOD). The London Clay was encountered to the maximum investigated depth of 20.00m bgl (73.00 mOD).

4.9. The new basement will extend to a depth of approximately 4.00m bgl and will be founded at a level of 88.97 mOD, within the Claygate Member. A localised deeper excavation will extend to a level of 88.07 mOD in order to form a lift pit below basement level.

4.10. Seepages of groundwater were encountered at various depths of between 1.00m and 9.80m bgl within the Claygate Member, corresponding to levels of between 94.00 mOD and 83.20 mOD, with groundwater monitoring not indicating a continuous groundwater table below the site. Perched groundwater may be present within the sand beds, partings and lenses within the Claygate Member. As such, it is accepted that groundwater flows will not be materially altered by the basement structure, noting also the potential for groundwater to flow below and around the structure, as required.

4.11. Groundwater control measures will be required during the proposed basement construction due to the potential for isolated inflows from the Made Ground and the granular the Claygate Member soils, which is likely to be provided by sump pumping.

4.12. The geotechnical parameters to be adopted in retaining wall calculations, foundation design and ground movement calculations are presented in Sections 10.2.1 and 8 of the BIA. The information required by the GSD Appendix G3 has been presented.

4.13. Structural information including a proposed construction sequence for the basement is presented in the Structural Engineers Construction Method Statement. The CMS confirms that temporary propping is proposed in the short term and that the new retaining walls will not be cantilevered at any stage. The permanent works provide for the basement being formed as a reinforced concrete box.

4.14. 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.

4.15. The sensitive structures relevant to this assessment are considered to be the neighbouring properties of Nos 12a and 15b Greenaway Gardens to the northwest and the southeast respectively, in addition to the footway and the carriageway to the north/southwest.

4.16. The GMA has been undertaken for the proposed development and considers ground movements resulting from the installation of a contiguous bored pile wall and basement excavation.

4.17. Outline structural calculations to support assumptions regarding retaining wall pile lengths are provided and accepted.

4.18. Ground movements resulting from wall installation have been reduced compared to what is presented by CIRIA C760. However, those are highly dependent on the construction methods adopted. The ground conditions, construction methods, site controls and monitoring regimes adopted on this site should be comparable to the ones adopted in the case study mentioned in Ball, Langdon & Creighton used to modify the CIRIA curves. 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.

4.19. The excavation modelled in XDisp does not consider the deepest basement excavation, where the lift pit will be located (88.07 mOD). The lift pit is located in the centre of the building and is far away from the neighbouring buildings. It is accepted that this deeper section will not cause additional impact or damage to the neighbouring buildings.

4.20. The results of the Building Impact Assessment, using the reduced ground movement CIRIA curves, indicate damage to neighbouring buildings will not exceed Category 1 (Very Slight) and that the highway and underlying utilities will not be impacted.

4.21. 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. It is recommended that a monitoring strategy and mitigation scheme are submitted as part of a Basement Construction Plan (BCP), to ensure that a suitably robust scheme is adopted, in line with the assumptions made in the GMA.

4.22. An Arboricultural survey of all trees within an impact distance of the site work has been undertaken. No trees are to be removed or pruned.

5.0 CONCLUSIONS

5.1. The qualifications of the individuals involved in the production of the BIA are in accordance with LBC guidance.

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

5.3. A site investigation has been undertaken indicating the basement will be founded in the Claygate Member.

5.4. Geotechnical parameters to inform design have been provided.

5.5. There will be no impact to the hydrogeological and hydrological environments.

5.6. The Ground Movement Assessment (GMA) using reduced CIRIA curves has been presented which predicts damage impacts of Category 0 to 1 (Negligible to Very Slight) to surrounding structures.

5.7. It is recommended that a Basement Construction Plan is provided confirming the detailed temporary and permanent works design, construction methodology for the substructure and impacts to surrounding structure and infrastructure.

5.8. Considering the additional information presented, it can be confirmed that the BIA meets the requirements of Camden Planning Guidance: Basements, subject to a BCP being presented as described above that demonstrates a maximum Category 1 damage to neighbouring structures.

Appendix 1: Residents' Consultation Comment

Residents' Consultation Comments

Residents' consultation comments presented are related to issues outside the scope of this BIA.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Land Stability	GMA to be reviewed and sensitivity analysis provided.	Closed – See Sections 4.16 to 4.20	19/08/22
2	Land Stability	Outline structural calculations to support the assumed pile lengths are required.	Closed – See Section 4.17	19/08/22

Appendix 3: Supplementary Supporting Documents

None

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