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82 Fitzjohn's Avenue
London NW3 6NP

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13398-96
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 82 Fitzjohn's Avenue NW3 6NP (planning reference 2021/1787/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 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 and Structural Strategy Report (SSR) have been prepared by individuals with the qualifications required by Camden's planning guidance.

1.5. The BIA has confirmed that the proposed basement will be founded within the Claygate Member and further information in relation groundwater was previously requested. The updated submissions include further ground investigation data indicating groundwater should not be encountered, or where present, can be managed during construction to mitigate potential impacts. There will be no impacts to groundwater flow.

1.6. The BIA and the Structural Report describe the basement construction process with new walls formed by a combination of underpinning and reinforced concrete piles.

1.7. The revised submissions include the additional information requested in regards to the choice of construction methodology and updated structural information.

1.8. The Ground Movement Assessment (GMA) indicates that predicted damage to neighbouring properties should be no worse than Category 1 (Very Slight) in accordance with the Burland Scale. The revised submissions provide the additional information requested to clarify the GMA and also confirms there will be no impact to neighbouring foundations from the removal of trees.

1.9. Outline proposals are provided for a movement monitoring strategy during excavation and construction.

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

1.11. Queries and requests for further information are discussed in Section 4 and summarised in Appendix 2. Considering the revised submissions, the BIA complies with the requirements of CPG: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 06/05/2021 to carry out a Category C audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 82 Fitzjohn's Avenue NW3 6PN, Planning Reference 2021/1787/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 *"Alterations and extensions including erection of 2 storey extensions, increased ridge height, alterations to fenestration, erection of dormer windows to roof and creation of sunken terrace, removal of existing pool house and erection of new orangery involving basement excavation for new pool, and other associated works; hard and soft landscaping including replacement sheds and garage and removal of 6 x trees."*

2.6. CampbellReith accessed LBC's Planning Portal on 21/05/2021 and gained access to the following relevant documents for audit purposes:

- Ground Investigation & Basement Impact Assessment Report (BIA) – GEA Ltd, Ref J20158, Rev 2, dated April 2021
- Structural Report (SR) – Harrison Shortt, Ref 2092-BIA-C, dated April 2021
- Planning Application Drawings by Charlton Brown Architects, consisting of:

  Existing Architect's Plans

  Existing Architect's Sections

  Existing Architect's Elevations

  Proposed Architect's Plans

  Proposed Architect's Sections

  Proposed Architect's Elevations

- Tree Survey & Arboricultural Method Statement – Tree Tec, Ref 20003, dated March 2021

2.7. No planning consultation responses were listed on the LBC Planning Portal.

2.8. CampbellReith received the following following relevant documents for audit purposes between July and November 2021:

- Ground Investigation & Basement Impact Assessment Report (BIA) – GEA Ltd, Ref J20158, Rev 4, dated 13 July 2021.
- Ground Investigation & Basement Impact Assessment Report (BIA) – GEA Ltd, Ref J20158, Rev 5, dated 1 November 2021.
- Structural Report (SR) – Harrison Shortt, Ref 2092-BIA-Revisions D and E, dated April 2021 (submitted July and August 2021 respectively).

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Details confirmed of author's and reviewer' qualifications in BIA
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?	No	Documents referenced in section 13 of BIA but Arup GSD map extracts not presented
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	No	See note above
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	The BIA suggests that neighbouring properties contain basements or lower ground floors. That is not supported by other information provided.
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	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Addressed in updated submissions.

Item	Yes/No/NA	Comment
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?	Yes	Section 4.1 of the BIA. Despite the footprint of the building increasing, there is no increase in impermeable area associated with the basement
Is factual ground investigation data provided?	Yes	GI presented in Appendices of BIA
Is monitoring data presented?	Yes	
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	No nearby basements identified
Is a geotechnical interpretation presented?	Yes	Section 5 of the BIA
Does the geotechnical interpretation include information on retaining wall design?	Yes	Calculations in structural report not consistent with BIA recommendations
Are reports on other investigations required by screening and scoping presented?	Yes	Arboricultural Method Statement
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	No nearby basements identified
Is an Impact Assessment provided?	Yes	

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented	Yes	Updated in revised submissions
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	Updated in revised submissions
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Updated in revised submissions
Has the need for monitoring during construction been considered?	Yes	Section 11 of BIA
Have the residual (after mitigation) impacts been clearly identified?	Yes	Updated in revised submissions
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Updated in revised submissions
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?	Yes	Updated in revised submissions
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Section 12 of the BIA
Are non-technical summaries provided?	Yes	Section 13 of the BIA

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by engineering consultants Geotechnical & Environmental Associates (GEA) and the individuals concerned in its production have suitable qualifications.

4.2. The Structural Strategy Report (SSR) has similarly been carried out by a firm of engineering consultants, Harrison Shortt Structural Engineers Ltd. The author is confirmed as a chartered structural engineer.

4.3. The LBC Instruction to proceed with the audit indicated that neither the site nor neighbouring properties have listed status.

4.4. The proposed works consists of partial demolition of the existing structure to accommodate a single storey basement beneath the north eastern corner of the property with a lowered swimming pool area. Due to a change in ground levels, the basement slab level (c92.50m) is nearly 7m below ground level at the northern site boundary (c99.50m), but only around 3m below ground level at its southern edge. The basement is to be formed within a contiguous piled wall, with piles installed from around 95.50m. The upper portion of the northern basement retaining wall will be formed by reinforced concrete underpinning.

4.5. The construction sequence is highlighted as

- Demolition of existing above ground structure
- Underpinning of northern boundary wall
- Excavation to first lower level
- Construction of piled raft foundations and contiguous piled walls to lower pool basement level
- Construction of superstructure

4.6. In the revised submissions, the BIA and SSR consistently present the proposed sequence of works and propping of retaining elements, in both the temporary and permanent conditions.

4.7. A site investigation was carried out by GEA in 2020 and the BIA has indicated the ground conditions as Claygate Member beneath a nominal thickness of Made Ground. The Claygate Member was proven to a maximum depth of 15m bgl.

4.8. Groundwater was encountered as a seepage in the borehole at depths of 3m (c 93m) and 10m. A round of monitoring in October 2020 recorded ground water levels at 1.45 and 2.65m bgl (c 95 and 94.55m). The original BIA suggested that the standpipes had collected water following heavy rainfall. Noting the standpipe installation details, this suggests that the rainfall has resulted in groundwater flowing into the standpipes through the Claygate Member.

4.9. The original BIA noted that groundwater should be expected to be encountered during excavation and recommended further monitoring to confirm construction methodology and appropriate dewatering techniques are adopted. In the revised submissions, an additional trial pit to the full depth of the proposed basement has been undertaken to allow groundwater observations over several days. A slow seepage of water was observed at 92.45m OD. On the basis of this, contingency dewatering methods have been proposed.

4.10. Retaining wall calculations in the Structural Report assume a ground water level as 2m below ground. This contradicts section 8 of the BIA which recommends a groundwater level of 1m bgl is adopted. It is also noted that the structural engineering calculations do not adopt the recommended 'Effective Friction Angle' of 25 degrees.

4.11. The Subterranean (groundwater) screening exercise in section 3 the BIA raised three impacts to be taken forward to the screening stage:

- The Claygate Member is considered to be an aquifer.
- It is considered possible the basement excavation will extend beneath the water table.
- The site is within 100m of a water course.

4.12. The BIA concludes that there is no impact to subterranean flows as the basement does not extend below the water table (section 13). However, as 4.11, contingency dewatering may be required to complete construction and ensure stability in the temporary case.

4.13. The surface flow and flood screening indicated no potential impacts to be carried forward for assessment. This is accepted.

4.14. The slope stability screening contained in the BIA raised four potential impacts to be carried forward to the scoping stage.

- History of seasonal shrink – swell subsidence in local area.
- Existing trees on the site to be felled as part of the development.
- The site is within 100m of a watercourse or potential spring.
- The site is located within an aquifer.

4.15. Whilst the screening exercise indicates that surrounding buildings have basements and lower ground floors, avoiding increased differential foundation depths, this is not supported by other information in the BIA. Section 13.1 of the BIA correctly identifies this impact exists and requires assessment. The assessment of foundations and other slope stability impacts are further considered in section 13.

4.16. Trees will be removed during the redevelopment. In the revised submissions, it has been assessed that there will be no impacts to neighbouring foundations as result of the removal of trees.

4.17. As noted above, the new basement foundations will increase the difference in level of the neighbouring foundations. Neighbouring buildings within the zone of influence of the basement comprise Fitzjohn's Primary School and a Royal Mail delivery office. The school is located upslope of 82 Fitzjohn's Avenue and, for the purposes of the ground movement assessment, is assumed to have shallow foundations at 0.50m depth (c 99m). The sorting office lies downslope of the subject site and its foundations are also assumed to be at around 0.50m depth (94.25m).

4.18. Movements due to deflections from underpinning and piling are estimated using a variety of sources of information including the structural engineer's calculations, published case study data and specialist modelling software. The assessment predicts that damage to the two nearby structures can be limited to Burland Category 1 Very Slight).

4.19. The original Ground Movement Assessment (GMA) was not considered to be moderately conservative and a number of queries were raised in the previous Audit (D1). The revised submissions provide the additional information requested to clarify the GMA, including updated construction methodology, structural propping information and assessment methodology.

4.20. The BIA recommends a movement monitoring strategy during excavation and construction. Proposals are presented in the structural engineer's report which may be refined during the Party Wall Award negotiations.

4.21. It is accepted that there are no slope stability concerns regarding the proposed development.

5.0 CONCLUSIONS

5.1. The BIA and Structural Report have been carried out by firms of engineering consultants using individuals who possess suitable qualifications.

5.2. The revised submissions confirm there will be no impacts to groundwater flow or stability impacts from the presence of groundwater due to construction within the Claygate Member, a Secondary Aquifer.

5.3. The BIA and the Structural Report describe the basement construction process with new walls formed by a combination of underpinning and reinforced concrete piles. The revised submissions include the additional information requested in regards to the choice of construction methodology and updated structural information.

5.4. Structural calculations for walls should be updated to reflect water table and angle of friction recommendations contained in the BIA.

5.5. The GMA indicates that predicted damage to neighbouring properties should be no worse than Category 1 (Very Slight) in accordance with the Burland Scale. The revised submissions provide the additional information requested to clarify the GMA.

5.6. The revised submissions confirm there will be no impact to neighbouring foundations from the removal of trees.

5.7. A programme and an outline movement monitoring strategy during excavation and construction are provided.

5.8. It is accepted that the surrounding slopes to the development site are stable.

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

5.10. Queries and requests for further information are summarised in Appendix 2. Considering the revised submissions, the BIA complies with the requirements of CPG: Basements.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	Confirmation of temporary propping to walls during construction to be provided.	Closed	November 2021
2	Stability	Need for dewatering to be confirmed and any impacts assessed	Closed	November 2021
3	Stability	Construction sequence and structural engineering calculations do not accord with BIA in respect of: Recommendation for secant wall Assumed groundwater level and soil parameters for design	Closed	November 2021
4	Stability	Justification required for application of reductions to predicted ground movement. Clarification required with respect to impact of predicted heave and settlement around basement.	Closed	November 2021
5	Stability	Impact of tree removal on nearby shallow foundations to be confirmed	Closed	November 2021
6	Subterranean flows	BIA is contradictory with respect to relative levels of basement and groundwater, and nature of groundwater flows into the basement excavation	Closed	November 2021

Appendix 3: Supplementary Supporting Documents

None

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