

Confidential

1 Wadham Gardens,  
London, NW3 3DN

Basement Impact Assessment  
Audit

For

London Borough of Camden

Project Number:

13693-34

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## Document Details

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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 1 Wadham Gardens, London, NW3 3DN (planning reference 2021/6174/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 Quadrant Harmon Consulting Engineers and Geo-Environmental Services Ltd. It should be demonstrated that the authors of the BIA possess qualifications in accordance with CPG Basements 2021.
- 1.5. The proposal involves the creation of a single storey basement under the full footprint of an existing detached multi occupancy residential property.
- 1.6. A Screening Assessment has been undertaken, informed by a Desk Study. An outline construction programme and utilities information should be provided.
- 1.7. A ground investigation confirms that the basement will be founded within the London Clay, and that groundwater is not expected to be encountered. It is accepted that the development will not impact on the wider hydrogeological environment.
- 1.8. The basement will be formed by underpinning and sheet piling techniques. In order to support the internal walls plunge columns will be installed. Outline structural information is provided.
- 1.9. The impermeable site area will not significantly increase as a result of the proposed basement. It is accepted that the development will not impact on the wider hydrological environment and the site is not subject to flooding.
- 1.10. A ground movement assessment (GMA) has been undertaken and a damage assessment is provided indicating damage to be within Category 1. However, a number of queries are raised, as detailed in Section 4.
- 1.11. Proposals are provided for a movement monitoring strategy. The proposal should be reviewed once the GMA is updated.
- 1.12. 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 21/01/2021 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 1 Wadham Gardens, London, NW3 3DN and Planning Reference 2021/6174/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:
- maintain the structural stability of the building and neighbouring properties;
  - avoid adversely affecting drainage and run off or causing other damage to the water environment;
  - 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 *"Excavation of single-storey basement level under footprint of existing building, sunken terrace to north-west of site, 4x front and side light-wells with grilles, internal alterations to flats on ground, first and second floors, new and altered window openings to rear ground floor and first floor level, demolition and rebuild of the north-west end of the building, new boundary treatment and landscaping works, in association with 6 existing dwellings"*.
- 2.6. The Audit Instruction confirmed 1 Wadham Gardens did not involve, or was a neighbour to, listed buildings.
- 2.7. CampbellReith accessed LBC's Planning Portal on 02/02/2022 and gained access to the following relevant documents for audit purposes:
- 2.8. Ground Appraisal Report. Geo-Environmental Services Ltd, Version 2.0 – November 2018.
- 2.9. Structural Calculations and Basement Impact Assessment (BIA) by Quadrant Harmon Consulting Ltd, Ref No. – SOH/1550/23, Rev 5, dated 15 December 2021.
- 2.10. Construction Management Plan. HUB Architects, Issue 1, Ref No. – 1179-App-02, Dated 24<sup>th</sup> November 2021.

- 2.11. Arboricultural Impact Assessment Report by Landmark Trees, dated 30<sup>th</sup> November 2021.
- 2.12. HUB Architects and Designers Ltd and Quadrant Harmon Consulting Ltd Planning Application drawings:
  - Proposed Block Plan (1179-00)
  - Existing Plans (1179-01)
  - Proposed Plans (1179-01)
  - Existing Elevations (1179-02)
  - Proposed Elevations (1179-02)
  - Existing Sections (1179-03)
  - Proposed Sections (1179-03)
  - Proposed Plans Soft and Hard Landscaping (1179-10-B)
  - Proposed Site Plan Diagram (1179-PL-01)
  - Underpinning, Temporary Works & Sequence (1550-01-2)
  - Basement Plan (1550-02-3)
  - Temporary propping (1550-04-1)

### 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	No	CPG Basement 2021, Section 4.7
Is data required by Cl.233 of the GSD presented?	No	Utilities information and outline construction programme required.
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	
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	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	.



Is a conceptual model presented?	No	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 5.1 of the BIA listing potential impacts.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	NA	No potential impacts carried over from screening.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	NA	No potential impacts carried over from screening.
Is factual ground investigation data provided?	Yes	Section 6.0 and Appendix B of the BIA.
Is monitoring data presented?	Yes	Section 7.3 of the BIA.
Is the ground investigation informed by a desk study?	Yes	Section 2.0 of the BIA along with supporting information in Appendix A.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	
Is a geotechnical interpretation presented?	Yes	Section 7.0 and 8.0 of the BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 8.4 of the BIA.
Are reports on other investigations required by screening and scoping presented?	NA	



Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	No	
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	Section 9.0 of the BIA.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	However, queries are raised in regard to the GMA.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	However, queries are raised in regard to the GMA and consequential mitigation requirements.
Has the need for monitoring during construction been considered?	Yes	Section 9.5 of the BIA.
Have the residual (after mitigation) impacts been clearly identified?	No	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	GMA to be reviewed to limit damage to within Category 1.
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	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	No	GMA to be reviewed to limit damage within Category 1. Xdisp output show category 2 damage.
Are non-technical summaries provided?	Yes	Quadrant Harmon Consulting Ltd BIA Report

## 4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) was undertaken by Geo-Environmental Services Limited and Quadrant Harmon Consulting Ltd. It should be demonstrated that the authors of the BIA possess qualifications in accordance with CPG Basements 2021.
- 4.2. The site is located on the south-west side of Wadham Gardens within the Elsworthy Conservation area in the London Borough of Camden. The audit instruction identified that the basement proposal neither involved, nor was neighbouring to, a listed building.
- 4.3. The site comprises an approximately rectangular shaped parcel of land occupied by a one to two storey detached property, with a multi occupancy residential use. The building is of traditional load bearing masonry construction and some alterations and extensions have been carried out historically, noticeably a single storey extension with roof terrace to the north.
- 4.4. The proposal is to demolish the northern extension and to reconstruct it in a different configuration, to create a single storey basement under the full plan of the property, along with a basement level terrace to the north-west, two lightwells to the south and two lightwells to the east. The majority of the basement perimeter walls will be positioned directly beneath the existing masonry walls and the walls will be formed by reinforced concrete in an underpinning sequence. The maximum excavation depth is approximately 3.50m below ground level (bgl).
- 4.5. A Screening Assessment has been undertaken, informed by a Desk Study, broadly in accordance with LBC guidance. An outline construction programme and utilities information should be provided.
- 4.6. A ground investigation undertaken by Geo-Environmental Services Ltd in September 2015 identified Made Ground to a maximum depth of 0.60m bgl underlain by the London Clay Formation which was proven to 4.60m bgl. Although groundwater was not encountered during the ground investigation, two standpipes were installed and groundwater was monitored during four visits, between 2.12m and 3.16m bgl, above the proposed basement level. The BIA concluded those levels represent an accumulation of perched water in the standpipes rather than a continuous groundwater body. However, the BIA considers the potential for groundwater ingress during construction and indicates mitigation measures to be implemented as part of the temporary works. The London Clay is designated unproductive strata. There will be no impact to the wider hydrogeological environment.
- 4.7. The structural drawings indicate four lightwells are to be built utilising sheet piling that will be hydraulically driven in a vibrationless manner. The remaining retaining walls are to be formed by underpinning techniques, with structural drawings indicating construction in 2-stages. The basement slab is to be a ground bearing reinforced concrete slab tied into the toes of the L shaped underpinning, and will provide a permanent base prop to the retaining walls.
- 4.8. The ground floor construction is to be replaced with a suspended reinforced concrete slab that will span between the underpinned walls and internal reinforced concrete columns. In order to support the internal walls, temporary plunge piles will be installed and post construction will be used as tension piles beneath the basement to reduce heave. Preliminary calculations have been produced in order to estimate heave forces per pile and pile capacity.

- 4.9. The impermeable site area will not significantly increase as a result of the proposed basement. It is accepted that the development will not impact on the wider hydrological environment and the site is not subject to flooding.
- 4.10. A Ground Movement Assessment (GMA) is provided in Section 9.0 of the Ground Appraisal Report. Maximum heave movements due to excavation in the short and long term have been calculated using a Pdisp model and are 12 and 18mm respectively.
- 4.11. An Xdisp model has been produced to estimate ground movements due to basement construction by underpinning in accordance with CIRIA C580 (now replaced by CIRIA C760), with the underpinned sections being treated as bored piles. Whilst the CIRIA approach is intended for embedded retaining walls, it is accepted that the predicted ground movements are within the range typically anticipated for underpinning techniques carried out with good control of workmanship. The Xdisp analyses show that vertical and horizontal movements along the perimeter of the excavation are 3 to 4mm and 6 to 7mm, respectively.
- 4.12. Section 9.4 of the report includes a damage assessment in accordance with the Burland scale, with damage to neighbouring structures indicated to be Category 0 to Category 1 (Negligible to Very Slight). However, the following queries are raised which should be clarified:
- In good conditions for underpinning (e.g. dry, firm to stiff cohesive deposits) a range of movements of 5mm to 10mm vertically and horizontally per lift (stage) are generally anticipated. Two stages of underpinning are proposed. Therefore, the currently predicted range of movements does not appear to be reasonably conservative.
  - Allowance for movements generated by the sheet piling has not been included within the assessment.
  - The allowable bearing capacity is stated as being 160 kPa whilst the structural calculations indicate a bearing pressure of approximately 130 kPa. It should be confirmed that the settlements due to foundation loads will not exceed the GMA predictions.
  - The GMA should explicitly predict damage to the other properties (flats above / within the subject property) in addition to the surrounding structures, and consider any infrastructure (e.g. highways, utilities etc) within the zone of influence of the works.
  - A review of the Xdisp outputs indicates Category 2 damage to the neighbouring façade, which is beyond the policy limits for damage of Category 1.
  - A movement monitoring strategy is provided in Section 9.5 and trigger levels are presented in the structural drawing (GN02). The trigger levels should be reviewed following any revisions to the GMA.

## 5.0 CONCLUSIONS

- 5.1. It should be demonstrated that the authors of the BIA possess qualifications in accordance with CPG Basements 2021.
- 5.2. A Screening Assessment has been undertaken, informed by a Desk Study. An outline construction programme and utilities information should be provided.
- 5.3. A ground investigation confirms that the basement will be founded within the London Clay. It is accepted that the development will not impact on the wider hydrogeological environment.
- 5.4. The basement will be formed by 2-stage underpinning and sheet piling techniques. Outline structural information is provided.
- 5.5. It is accepted that the development will not impact on the wider hydrological environment and the site is not subject to flooding.
- 5.6. A ground movement assessment has been undertaken. However, a number of queries are raised, as detailed in Section 4.
- 5.7. Proposals are provided for a movement monitoring strategy. The proposal should be reviewed once the GMA is updated.
- 5.8. 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: Consultation Responses

None

## Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA Format	It should be demonstrated that the authors of the BIA possess qualifications in accordance with CPG Basements 2021.	Open	
2	BIA Format	An outline construction programme and utilities information should be provided.	Open	
3	Land Stability	GMA to be reviewed, as comments in Section 4.	Open	
4	Land Stability	Trigger levels for movement monitoring to be reviewed following any revisions to the GMA.	Open	



## Appendix 3: Supplementary Supporting Documents

None

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