CampbellReith
consulting engineers

1 Dunollie Road, London, NW5 2XN

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13398-05
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Campbell Reith Hill LLP
15 Bermondsey Square
London
SE1 3UN

T:+44 (0)20 7340 1700
E:london@campbellreith.com
W:www.campbellreith.com

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Author	K Barker
Project Partner	E M Brown, BSc MSc CGeol FGS
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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 the land adjacent to 1 Dunollie Road, London, NW5 2XN (planning reference 2019/5649/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 (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 planning statement should be amended to remove the suggestion that the BIA was carried out in association with CampbellReith.

1.5. The BIA has been carried out in two parts; the hydrogeology, land stability and ground movement was undertaken by Maund Geo-Consulting and the hydrology assessment and structural engineering appraisal were undertaken by Croft Structural Engineers. The individuals who completed each part of the BIA are considered to hold suitable qualifications as required by CPG4.

1.6. The BIA has confirmed that the proposed basement will be founded within London Clay, with a maximum excavation depth of 3m.

1.7. The BIA identifies no potential sources of flood risk for the site. It is accepted that the proposed development will not increase the surface water discharge from the site or adversely impact the hydrology at the site.

1.8. It is accepted that the development will not impact the hydrogeology at the site and that the surrounding slopes to the development site are stable.

1.9. Conflicting information is provided regarding the construction method and sequence of works. Similarly a conflicting RC retaining wall design is presented in the structural drawings and the calculations. Drawings, calculations and the construction methodology should all be consistent.

1.10. Further information pertaining to the ground movement assessment should be provided, including the full PDisp output. The GMA and corresponding damage category assessment should be updated in accordance with the comments in Section 4.

1.11. A ground movement monitoring strategy has been provided which should be reviewed when the construction methodology and GMA are confirmed.

1.12. A number of queries have been raised and are summarised in Appendix 2. It cannot currently be confirmed that the proposal adheres to the requirements of the CPG Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 29 January 2020 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for the land adjacent to 1 Dunollie Road, London NW5 2XN.

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

- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Camden Planning Guidance Basements. March 2018.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- Local Plan Policy A5 Basements.

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 two storey (plus basement) 2-bed dwelling house (Class C3) with hard and soft landscaping to front following demolition of existing garages*"

2.6. CampbellReith accessed LBC's Planning Portal on 11 February 2020 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (BIA), Croft Structural Engineers, ref. 190611, rev 1, dated 6th November 2019.
- Design and Access Statement (DAS), Francis Birch Architect, rev 6, dated November 2019.
- Planning Statement, Francis Birch Architect, rev 6, dated November 2019.
- Planning Application Drawings by Francis Birch Architect, consisting of Existing and Proposed Plans and sections.
- Sustainability Statement, Francis Birch Architect, rev 1, dated September 2019.
- Pre-development Arboricultural Survey and Report, Wassells, ref. WAS 131/2019, dated 10 October 2019.
- Planning Consultation responses

2.7. After an initial review a number of data gaps were identified in the BIA and LBC was notified. The following document was submitted on 2 March 2020 to complete the application:

- Basement Impact Assessment: Hydrogeology, Land Stability and Ground Movement Assessment, Maund Geo-Consulting, ref. MGC-BIA-19-21-V1, dated 1 August 2019.

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	
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?	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?	N/A	No items carried forward to scoping.
Is factual ground investigation data provided?	Yes	
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	
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	Arboricultural Report 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	However some aspects of the Ground Movement Assessment (GMA) are queried.

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	This cannot be confirmed until the queries described in Section 4 are addressed.
Has the need for monitoring during construction been considered?	Yes	Monitoring strategy provided.
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?	No	Some queries regarding the GMA have been raised.
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	Further assessment of the GMA and damage category is required.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	However, the GMA requires further assessment.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. Section 2 of the Planning Statement suggests the Basement Impact Assessment (BIA) was carried out *'in association with CampbellReith'*. This is incorrect and any suggestion that CampbellReith was involved in the compilation of the BIA should be removed.

4.2. The BIA has been carried out in two parts; the hydrogeology, land stability and ground movement assessments were undertaken by Maund Geo-Consulting and the hydrology assessment and structural appraisal were undertaken by Croft Structural Engineers. The individuals who completed each part of the BIA are considered to hold suitable qualifications as required by CPG4.

4.3. The BIA identified that the site is located within a Conservation Area, however no listed buildings are present either on site or in the immediate vicinity.

4.4. The proposed development comprises the construction of a new dwelling with two above-ground floors and a single basement level immediately adjacent to 1 Dunollie Road, which belongs to the applicant. The maximum basement excavation depth is given as 3.00m.

4.5. The site currently comprises two single garages and hardstanding. It is accepted that the proposed development will therefore not increase the surface water discharge from the site and, due to the incorporation of SUDS, may reduce it. It is accepted that the proposed development will not adversely impact the hydrology at the site.

4.6. A ground investigation was carried out and confirms the ground conditions to comprise Made Ground to a depth of 0.40m, with London Clay below. Groundwater monitoring identified only limited groundwater present at depth, 2.88m below the excavations depth of the basement.

4.7. In the absence of an aquifer, it is accepted that the development will not impact the hydrogeology at the site.

4.8. It is accepted that there are no slope stability concerns regarding the proposed development and it is not in an area prone to flooding.

4.9. A geotechnical interpretation, including soil parameters derived from the site investigation data, is provided in the Maund BIA and is considered appropriate for the site.

4.10. There is some discrepancy between the Ka and Kp values given in Table 5.3 of the Maund BIA (0.35 and 2.5 respectively), Section 8.1 of the Croft BIA (0.4217 and 2.3711 respectively) and the TEDDs retaining wall design output for the basement wall, presented in Appendix A of the Croft BIA (calculated as 0.384 and 3.237 respectively). Appropriate values should be confirmed and the various assessments updated as necessary.

4.11. Structural drawings and a temporary works sequence, presented in Appendices D and E of the Croft BIA, indicate mass concrete underpinning beneath the party wall with No 1 Dunollie Road. An RC wall is to be constructed inside the underpinning along that side. Elsewhere an RC wall is to be constructed in an underpinning type sequence. Excavation for the construction of the basement walls is to take place on a hit and miss basis with the excavation faces supported by trench sheeting. The central soil dumpling is to be excavated once the retaining wall is complete.

4.12. Section 10.1 of the Maund BIA describes the intention to *'drive trench sheets around the open faces'* and excavate the soil mass before casting a reinforced concrete retaining wall in bays. It notes that the retaining wall is to be cast on a *'sacrificial concrete strip'*. The sequence differs from that described by Croft and, while it does not refer to underpinning, underpinning is discussed later in the Maund BIA. Clarification of the construction methodology for the basement is required.

4.13. Depending on the confirmed construction methodology, further detail regarding the *'sacrificial concrete strip'*, the impact of ground movement and vibration from driving the trench sheets, and what is referred to by the term *'open faces'* may be required.

4.14. Appendix A of the Croft BIA presents structural calculations for the basement wall. Clarification is required regarding the use of a 200mm long heel in the general arrangement of the retaining wall design. The subsequent structural drawings presented in Appendix D do not show a heel to the retaining wall. Drawings, calculations and the construction methodology should all be consistent.

4.15. A ground movement assessment (GMA) and building damage assessment are presented in Sections 10 and 11 of the Maund BIA. Section 10.1 indicates that horizontal and vertical movement resulting from installation of the wall and subsequent excavation have been assessed in accordance with CIRIA C760. Whilst CIRIA C760 is not intended to be directly applicable to underpinning (if it is confirmed that underpinning is to be utilised), it is recognised that the reference is commonly used to provide an estimate of ground movements. In this instance, the method of estimating ground movements is not consistently applied, for example, the presence of firm or stiff clay and the distance beyond the retaining walls over which movement occurs.

4.16. The GMA also includes an estimation of short term and long term vertical movements due to unloading from the excavation of the basement using PDISP software. The results of the PDISP analysis presented in Sections 10.2.1 and 10.2.2 identify undrained (short term) heave of 5mm and a drained (long term) heave of 4mm at the site boundary with 1 Dunollie Road. The graphical representation in Figures 6.3 and 6.4 show these values to be approximately 4.8mm and 6.0mm respectively. It should be clarified whether the 'long term' movement represents the

total settlement or the residual settlement component after immediate settlement has been subtracted. Heave estimates should be confirmed once the construction sequence is clarified as the stage at which mass excavation takes place will have a significant bearing.

4.17. The PDisp output presented in Appendix E of the Maund BIA only presents the analysis input data. Once the construction and assessment methodologies are confirmed, the results of the analysis should be provided to support the conclusions of the GMA.

4.18. Section 11 and Table 11.2 present a damage category assessment for the adjacent wall at 1 Dunollie Road. A diagram should be provided indicating which wall was assessed, to show that the most critical situation has been considered. The damage assessment should be updated based on the revised GMA.

4.19. Consideration of the impact to the highway should also be included in the assessment.

4.20. Section 8.5.3 of the Croft BIA presents a movement monitoring strategy for the existing structures and includes proposed trigger values for vertical and horizontal movement. A drawing showing the proposed monitoring locations is presented in Appendix F of the Croft BIA. A monitoring strategy is also proposed in Section 12 of the Maund BIA, and is generally consistent with the approach given in the Croft BIA. The Maund BIA includes monitoring of the adjacent garden walls, as well as 1 Dunollie Road. Trigger values should be confirmed once the GMA has been updated.

5.0 CONCLUSIONS

5.1. The planning statement should be amended to remove the suggestion that the BIA was carried out in association with CampbellReith.

5.2. The BIA has been carried out in two parts; the hydrogeology, land stability and ground movement was undertaken by Maund Geo-Consulting and the hydrology assessment and structural engineering appraisal were undertaken by Croft Structural Engineers. The individuals who completed each part of the BIA are considered to hold suitable qualifications as required by CPG4.

5.3. The BIA has confirmed that the proposed basement will be founded within London Clay.

5.4. The BIA identifies no risk of flooding for the site. It is accepted that the proposed development will not increase the surface water discharge from the site or adversely impact the hydrology at the site.

5.5. It is accepted that the development will not impact the hydrogeology at the site and that the surrounding slopes to the development site are stable.

5.6. Conflicting information is provided regarding the construction method and sequence of works. This should be clarified such that both BIAs present a consistent approach.

5.7. Structural drawings and calculations provided in the Croft BIA present conflicting information regarding the form of the RC retaining walls and should be revised such that they are consistent.

5.8. Further information pertaining to the ground movement assessment should be provided, including the full PDisp output. The GMA and corresponding damage category assessment should be updated in accordance with the comments in Section 4.

5.9. A ground movement monitoring strategy has been provided which should be reviewed when the construction methodology and GMA are confirmed.

5.10. A number of queries have been raised and are summarised in Appendix 2. It cannot currently be confirmed that the proposal adheres to the requirements of the CPG Basements.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Fletcher	Unknown	11/01/20	Ground subsidence relating to construction	This is addressed in the BIA
Symons	Unknown	11/01/20	Basement excavation causing subsidence of neighbouring properties.	A ground movement assessment has been undertaken to assess the damage and is appraised in the BIA audit.
Taylor	Unknown	06/01/20	Basement impact associated with adjacent tree	Tree protection is not within the remit of the BIA audit, however an arboricultural survey has been provided in the planning submission
Martin	Unknown	10/01/20	Basement excavation compromising adjacent foundations	This is addressed in the BIA
Hall	Unknown	08/01/20	Basement excavation	This is addressed in the BIA

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	Parameters for Ka and Kp should be clarified and used consistently through all analyses.	Open	
2	Stability	Conflicting construction methods and sequences of work are presented and should be clarified such that both BIAs present consistent information.	Open	
3	Stability	Structural drawings and calculations should be revised to reflect the revised construction method and sequence of work.	Open	
4	Stability	Further information is required to support the conclusions of the ground movement assessment presented in the Maund BIA.	Open	
5	Stability	Further details of the PDisp output should be provided and the GMA should be updated in accordance with the comments in Section 4.	Open	
6	Stability	The damage category assessment should be updated based on the revised GMA.	Open	

Appendix 3: Supplementary Supporting Documents

None

London

15 Bermondsey Square
London
SE1 3UN

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Surrey

Raven House
29 Linkfield Lane, Redhill
Surrey RH1 1SS

T: +44 (0)1737 784 500
E: surrey@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

Bristol

Wessex House
Pixash Lane, Keynsham
Bristol BS31 1TP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com