CampbellReith
consulting engineers

14-19 Tottenham Mews
London, W1T 4AA

Basement Impact Assessment Audit

For

London Borough of Camden

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Campbell Reith Hill LLP
15 Bermondsey Square
London
SE1 3UN

T:+44 (0)20 7340 1700
F:+44 (0)20 7340 1777
E:london@campbellreith.com
W:www.campbellreith.com

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Document Details

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Author	C Botsialas, BSc MSc MBA CEng MIMMM CGeol FGS RoGEP Specialist
Project Partner	E M Brown, BSc MSc CGeol FGS
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Appendix

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 14-19 Tottenham Mews, London, W1T 4AA (planning reference 2020/5633/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 Basement Impact Assessment (BIA) has been prepared and reviewed by individuals with suitable qualifications in accordance with CPG Basements.

1.5. The site is currently occupied by a two-storey building with no basement.

1.6. The proposed development will involve the demolition of the existing building and construction of a new seven storey building including a single storey lower ground floor. The maximum anticipated excavation will be c.4.10m.

1.7. The lower ground floor will be formed adopting a contiguous piled wall and underpinning.

1.8. An outline construction sequence for the proposed lower ground floor is provided, however, the construction sequence drawings were missing and are requested.

1.9. An impact assessment on nearby sewers may be required and Thames Water shall be consulted.

1.10. Screening charts and scoping sections are included in the Geotechnical BIA. The full desk study information were not available at the time of this audit and are requested.

1.11. The Geotechnical Interpretative Report was not available at the time of this audit and is requested.

1.12. The on-site geology comprises Made Ground over Lynch Hill Gravel Member over London Clay. Monitoring data suggest that the groundwater level is at c.5m bgl.

1.13. It is accepted that the proposed development is not anticipated to impact the hydrogeology of the area, subject to the review of the groundwater monitoring data pending to be provided with the Geotechnical Interpretative Report, as requested above.

1.14. A ground movement assessment (GMA) and a damage assessment has been presented. Queries have been raised and shall be addressed as discussed in Section 4 of this audit.

1.15. Clarifications with regard to the proposed Observational Method are requested.

1.16. Monitoring is recommended during the demolition stage to confirm the conclusions of the GMA.

1.17. A combination of a blue roof system and drainage into the existing sewer is proposed. The latter will require permission from Thames Water.

1.18. It is accepted that there will be no impact to the surface water from the proposed development.

1.19. 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 24/12/2020 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 14-19 Tottenham Mews, London, W1T 4AA (planning reference 2020/5633/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: 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.

LBC's Audit Instruction described the planning proposal as "*Erection of a six storey building (and basement) to provide office (use Class E) at part ground and basement levels and self-contained flats (use class C3) at ground and floors one to five; with associated landscaping, cycling parking and enabling works. CONSULTATION NOTE: Application is linked to redevelopment of Network building and flats (ref 2020/5624/P)*".

The Audit Instruction clarified that the site does not involve, or is a neighbour to, any listed building.

2.5. CampbellReith accessed LBC's Planning Portal on 14/1/2021 and gained access to the following relevant documents for audit purposes:

- "Structural Engineering Report & Subterranean Construction Method Statement" (SER), 13/11/2020, Rev.P1, Elliott Wood Partnership Ltd;
- "Preliminary Basement Impact Assessment" (Geotechnical BIA), October 2020, Rev.0, Card Geotechnics Ltd. It is included as Appendix C in the SER report;
- "Surface Water Drainage Statement", 13/11/2020, Rev.P1, Elliott Wood Partnership Ltd;
- Design & Access Statement, November 2020, by Piercy & Company;
- Planning Statement, November 2020, DP9 Ltd;
- Planning Application Drawings consisting of existing, demolition & proposed plans, dated 24/11/2020, by Piercy & Company.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Refer to Section 4.1 of this audit for more details.
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	However, the desktop study information has not been provided and is requested.
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	Refer to Section 3.3 of the Geotechnical BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer to Section 3.2 of the Geotechnical BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer to Section 3.4 of the Geotechnical BIA.
Is a conceptual model presented?	Yes	Refer to Figure 4 attached in the Geotechnical BIA.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Refer to Section 4 of the Geotechnical BIA.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Refer to Section 4 of the Geotechnical BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	N/A	No issues were identified during the screening process.
Is factual ground investigation data provided?	No	A Factual and Interpretative Report carried out for the subject site is missing and shall be provided.
Is monitoring data presented?	No	As above.
Is the ground investigation informed by a desk study?	Yes	However, the desk study data are included in a Factual and Interpretative report which is missing and shall be provided.
Has a site walkover been undertaken?	Yes	Refer to the Geotechnical BIA report, Section 2.2.1.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Refer to Section 3.6 of the SER.
Is a geotechnical interpretation presented?	No	A Geotechnical Interpretative Report was not available at the time of this audit and is requested.
Does the geotechnical interpretation include information on retaining wall design?	No	As above.
Are reports on other investigations required by screening and scoping presented?	Yes	A ground movement assessment is presented in the Geotechnical BIA report. A Surface Water Drainage Statement has been provided.
Are the baseline conditions described, based on the GSD?	Yes	However, a Geotechnical Interpretative Report was not available at the time of this audit and is requested to confirm the assumptions of the BIA.
Do the base line conditions consider adjacent or nearby basements?	Yes	

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	
Are estimates of ground movement and structural impact presented?	Yes	Refer to Sections 8 & 9 of the Geotechnical BIA.
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	
Has the need for monitoring during construction been considered?	Yes	However, queries have been raised in Section 4 of this audit.
Have the residual (after mitigation) impacts been clearly identified?	No	Queries have been raised in Section 4 of this audit. Responses to these queries should assist in defining any residual impacts.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Queries have been raised about the ground movement assessment in Section 4 of this audit.
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?	Yes	However, queries have been raised about the ground movement assessment in Section 4 of this audit.
Are non-technical summaries provided?	Yes	Refer to Section 1 of the SER Report and Section 11 of the Geotechnical BIA.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) consists of a Structural Engineering Report (SER) prepared by Elliott Wood Partnership Ltd and a Preliminary Basement Impact Assessment (Geotechnical BIA) issued by Card Geotechnics Ltd (CGL). All reports have been prepared and reviewed by individuals with suitable qualifications in accordance with CPG Basements.

4.2. The site is located within the Charlotte Street Conservation Area, on the west side of Tottenham Mews; it is rectangular in plan and it is relatively flat. It is currently occupied by a two-storey prefabricated timber structure on mass concrete strip/pad footings believed to have been built in 1970s. There is no basement in the existing building. Three neighbouring structures namely Middlesex House to the west, Arthur Stanley House to the south and Bedford Passage Development to the north all have existing basements according to the SER. 13 Tottenham Mews is located to the immediate northeast and according to the Geotechnical BIA report has no basement.

4.3. The proposed development will involve the demolition of the existing building and construction of a new seven storey mixed use building, including a single storey lower ground floor extending to the full footprint of the property, comprising a reinforced concrete box. The proposed lower ground floor structural slab level will be at 23.336mOD and the formation level at c.22.39mOD. The ground level at Tottenham Mews to the east is at an elevation of c.26.50mOD, therefore the maximum anticipated excavation to accommodate the lower ground floor will be c.4.10m below the existing ground level. A deeper formation level at 20.99mOD will be required locally to accommodate the proposed lift pit.

4.4. Minor differences (100mm) noticed in the floor slab levels for the proposed lower ground floor and the ground floor shown in the drawings attached to the SER report and the latest architectural drawings do not influence the outcome of the BIA.

4.5. According to the SER, the lower ground floor will be formed with a contiguous piled wall consisting of 450mm diameter piles at 550mm centres adjacent to Tottenham Mews to the east. Underpinning installed in a 'hit and miss' sequence with underpins maximum 1m wide is proposed for the party wall with Middlesex House to the west. There will be a localised area of deeper underpinning adjacent to Middlesex House to form the proposed lift pit. High level horizontal props supported by plunge columns will be installed to resist the lateral pressures in the short term. A reinforced concrete liner wall will be constructed on all sides of the lower ground floor and the foundation is proposed to comprise a raft foundation 800mm thick. The floor slabs will permanently support the lower ground floor structure in the long term.

4.6. An outline construction sequence for the proposed lower ground floor, including the temporary works required, is discussed in Section 13 of the SER with further reference to drawings in

Appendix B of the same. However, the construction sequence drawings were missing from the submitted SER and are requested.

4.7. According to the Geotechnical BIA report, a couple of Thames Water sewers run almost parallel to the east boundary of the site, below Tottenham Mews, at distances between 3.5m and 5m of the proposed pile wall line. An impact assessment of the proposed excavation on these assets may be required in accordance with the respective asset owner's policies. The applicant should contact and consult separately with Thames Water to find out the requirements, as this is outside the audit remit.

4.8. Screening charts for the hydrogeology, land stability and hydrology of the site are included in Sections 3.2 to 3.4 of the Geotechnical BIA report. Scoping sections are included in Section 4. The information provided seems to be supported by desk study information and site walkovers, as required by CPG Basements, however, the full desk study information was not available at the time of this audit and are requested to confirm assumptions.

4.9. According to the Geotechnical BIA, restricted access inside the existing building due to the presence of asbestos, allowed only external trial pits to be undertaken on-site, in order to identify the depth and geometry of the existing and the neighbouring buildings foundations. For the needs of the proposed development, ground data and geotechnical design parameters have been informed by adjacent site investigations undertaken by CGL at Arthur Stanley House to the south and Bedford Passage to the north. According to the Geotechnical BIA, all the site specific and nearby geotechnical information has been presented and assessed in a Geotechnical Interpretative Report which was not available at the time of this audit and is requested in order to confirm assumptions made. A conceptual ground model has been presented in Figure 4 of the Geotechnical BIA.

4.10. According to the Geotechnical BIA report, the available information indicates that the on-site geology comprises Made Ground to 4m depth over Lynch Hill Gravel Member to 8.50m depth over London Clay. Groundwater monitoring data suggest that groundwater level is at approximately 5m bgl within the Lynch Hill Gravel Member.

4.11. Additional site investigation in the form of a 30m borehole is proposed by the Geotechnical BIA post-demolition and prior to construction, in order to confirm the assumptions of the Geotechnical Interpretation and the BIA.

4.12. The GI suggests that the existing groundwater level is approximately 5m below ground level which is below the proposed lower ground floor formation level. The SER confirmed that for the design of the substructure an assumed water level of 1m below ground level was conservatively considered.

4.13. A groundwater assessment is presented in Section 7 of the Geotechnical BIA. The proposed single storey lower ground floor is anticipated to be above the groundwater level, with localised dewatering possibly required only for the construction of the lift pit excavation. It is accepted that the proposed development is not anticipated to impact the hydrogeology of the local area, subject to the review of the groundwater monitoring data to be provided with the geotechnical interpretative report, as requested above.

4.14. A ground movement assessment (GMA) has been presented in the Geotechnical BIA report. The ground movements due to demolition works, installation of the proposed secant piled wall, installation of the underpins, excavation of the basement, application of the proposed structural loads, short and long term conditions have been considered in the GMA. Proprietary software (PDisp, Wallap) was used together with a modified CIRIA C760 methodology for the assessment of ground movements due to wall installation. Relevant ground movement contour plans and graphs have been produced and are attached in the Geotechnical BIA report.

4.15. In the GMA, horizontal and vertical ground movements due to the installation of the proposed contiguous piled wall have been assumed to be equal to 0.02% of wall length, based on a case study paper presented by Ball et al. (2014), which are lower than those suggested by CIRIA C760 curves (0.04% of wall length). The case study by Ball et al., refers to a contiguous piled wall consisting of 300mm diameter piles in similar ground conditions with the subject site, with good control of workmanship including a 'hit one miss three' installation methodology, full casing of the CFA pile shafts in the River Terrace Gravels and to the top of London Clay, and a rigorous monitoring programme in place. The above assumed reduction of ground movements compared to CIRIA C760 curves is accepted given the similarity of the ground conditions and the proposed type and size of the wall (contiguous wall with 450mm diameter piles) for the subject site. However, it is requested that a statement is included in the Geotechnical BIA that a construction methodology similar to that applied in the case study ('hit one miss three' pile installation and full casing of piles) will be applied in the subject site too, in order to control ground movements, in accordance with the GMA.

4.16. Further, the GMA shall be reviewed and clarifications be provided in accordance with the following comments:

For No. 13 Tottenham Mews contradictory references are noted with regard to the maximum anticipated settlement below footing foundation; Section 9.2 states 6mm, Plate 5 indicates 7mm, Section 8.8.2.2 reports 9.8mm.

Calculation of the critical deflection values shown on Plates 5, 8, 10, 12 does not consider the full length (L) of the wall elements evaluated. However, the damage calculation considers the full length of those walls and this inconsistency shall be justified.

The Wallap analysis assumes a piled wall installed at 26.5mOD with a temporary prop installed at a higher elevation (26.65mOD). A clarification is required whether it is intended to install a temporary support at a higher level than the level of installation.

Convergence errors are noted in the output of Wallap analysis and these should be reviewed.

4.17. The GMA confirms that the anticipated structural damage to the adjacent property at 13 Tottenham Mews will be Category 1 of Burland scale while for Arthur Stanley House, Middlesex House and Bedford Passage will be Category 0. Maximum vertical and horizontal ground movements of 10.5mm and 7.5mm are suggested by the GMA for the Tottenham Mews highway to the east. A statement whether these movements are anticipated to result in any damage on the highway and footpath is requested, with mitigation measures if required.

4.18. Section 10 of the GMA proposes a monitoring strategy to be applied during construction with predefined ground movement trigger levels in accordance with the Observational Method of CIRIA Report 185. However, CIRIA's Observational Method is relevant mainly to the design method, not the monitoring strategy. It is understood that the design at the site will be undertaken by use of calculation, not by use of the Observational Method. Also, the trigger levels adopted during construction should be associated with the ground movements predicted by the GMA and this should be stated. Clarifications and amendments are requested.

4.19. Monitoring of all structures and infrastructure adjacent to the proposed lower ground floor is also recommended by the SER (Section 10) during excavation and construction. Although not related to basement construction, it would be prudent for monitoring to be undertaken during demolition to confirm the conclusions of the GMA.

4.20. The site is located within Flood Zone 1 in accordance with the Environment Agency mapping. It is also considered to be at a low probability of flooding with reference to the Camden Strategic Flood Risk Assessment. The proposed development will not affect the proportion of hard surfaced areas compared to the existing ones.

4.21. A Surface Water Drainage Statement has been provided which includes a SuDS strategy for the proposed development. A blue roof system is proposed over the main roof area and terraces at Level 05, in order to provide attenuation above ground level. A small area of the site at ground floor which cannot be attenuated above ground it is proposed to drain freely to the sewer. Drainage into the existing sewer will require permission from Thames Water.

4.22. The SuDS strategy indicates that overall the proposed surface water management will be significantly better than the existing case and will satisfy LBC's policies. It is accepted that there will be no impact to the surface water from the proposed development.

5.0 CONCLUSIONS

5.1. The Basement Impact Assessment (BIA) has been prepared and reviewed by individuals with suitable qualifications in accordance with CPG Basements.

5.2. The proposed development will involve the demolition of the existing building and construction of a new seven storey building including a single storey lower ground floor. The maximum anticipated excavation will be c.4.10m. A deeper formation level will be required locally to accommodate a proposed lift pit.

5.3. An outline construction sequence for the proposed lower ground floor is provided, however, the construction sequence drawings were missing and are requested.

5.4. An impact assessment on nearby sewers may be required and Thames Water shall be consulted.

5.5. Screening charts and scoping sections are included in the Geotechnical BIA. The full desk study and Geotechnical Interpretative Report were not available at the time of this audit and are requested.

5.6. It is accepted that the proposed development is not anticipated to impact the hydrogeology of the area, subject to the review of the groundwater monitoring data to be provided with the geotechnical interpretative report, as requested above.

5.7. It is requested that a statement be included in the Geotechnical BIA that a construction methodology similar to that applied in the referenced case study will be applied, in order to accept reduced ground movements assumed in the GMA.

5.8. The GMA and damage assessment shall be reviewed and clarifications be provided in accordance with comments in Section 4 of this audit.

5.9. Clarifications with regard to the proposed Observational Method of CIRIA Report 185 are requested.

5.10. The ground movement trigger levels should be relevant to those predicted by the GMA.

5.11. Monitoring is recommended to be undertaken during the demolition stage to confirm the conclusions of the GMA.

5.12. A combination of a blue roof system and drainage into the existing sewer is proposed. The latter will require permission from Thames Water.

5.13. It is accepted that there will be no impact to the surface water from the proposed development.

5.14. 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: Residents' Consultation Comments

None pertinent to the BIA

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	The desktop study information and the Geotechnical Investigation Report are missing and are requested – audit Sections 4.8, 4.9.	Open	
2	Stability	The construction sequence drawings referenced in the SER are missing and shall be submitted - audit Section 4.6.	Open	
3	Stability	A statement shall be provided about the adopted construction methodology similar to that applied in the case study referenced, in order to control ground movements, in accordance with the GMA – audit Section 4.15.	Open	
4	Stability	The GMA and building damage assessment shall be reviewed in accordance with the comments provided in Section 4 of this audit – audit Section 4.16.	Open	
5	Stability	A statement whether the predicted ground movements are anticipated to result in any damage on the highway and footpath is requested with mitigation measures, if required – audit Section 4.17.	Open	
6	Stability	Reference to the Observational Method shall be clarified – audit Section 4.18.	Open	
7	Stability	Monitoring trigger levels shall be associated with the outcome of the GMA – audit Sections 4.18, 4.19.	Open	
-	Stability	An impact assessment on nearby sewers may be required and Thames Water shall be consulted - audit Section 4.7.	Note only	N/A
-	Hydrology	Drainage into the existing sewer will require permission from Thames Water.	Note only	N/A

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

Campbell Reith Hill LLP. Registered in England & Wales. Limited Liability Partnership No OC300082
A list of Members is available at our Registered Office at: 15 Bermondsey Square, London, SE1 3UN
VAT No 974 8892 43