CampbellReith
consulting engineers

Winter House 81 Swain's Lane
London N6 6PJ

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12985-35
Revision: D1

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Campbell Reith Hill LLP
Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

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

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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 81 Swain's Lane (planning reference 2018/5730/P, 5731/L). 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 has been prepared by Alan Baxter Associates in conjunction with Ground Engineering using individuals who possess suitable qualifications, as required by CPG Basements.

1.5. The redevelopment proposals comprise the construction of a tunnel using contiguous piles, linking the new 1-storey extension building with the existing cutting. The cutting is proposed to be excavated and two storey of underground space created. As part of the 1-storey extension building, a retaining wall is proposed to be constructed into the hillside.

1.6. A site specific soil investigation has been conducted. Factual data and geotechnical interpretation is presented in the BIA.

1.7. It has been confirmed that the below ground structures will be founded within London Clay. Perched water may be encountered during excavation and measures to control these need to be allowed for.

1.8. Estimates of ground movement and associated structural damage have been presented. All, apart from one, neighbouring buildings have been demonstrated to suffer damage no worse than Burland Category 1.

1.9. An outline movement monitoring strategy relating to all affected structures will need to be implemented during construction. Movements and associated damage will need to be limited to Category 1 for all structures.

1.10. Confirmation will be required on the increase in impermeable areas and how the off-site discharge flows will be controlled to meet LBC policy criteria.

1.11. The BIA is to determine the impact, if any, of the removal of the two trees on the main existing building foundations.

1.12. Evidence of consultation with Thames Water regarding their sewer, which runs through site, will be required.

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

1.14. Queries and requests for further information are summaries in Appendix 2. Based on the above comments, it cannot be confirmed that the proposal adheres to the requirements of CPG Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 18th January 2019 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Winter House, 81 Swain's Lane 2018/5730/P, 5731/L.

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;

d) 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 "basement excavation for new tunnel, excavation of infill rubble inside historic cutting". The Audit Instruction also confirmed Winter House was a Grade II* listed building.

2.6. CampbellReith accessed LBC's Planning Portal on 29th January 2019 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) by Alan Baxter dated August 2018.
- Planning Application Drawings consisting of:

  Existing Plans (SHH Architects, dated 12.06.2018).

  Proposed Plans (SHH Architects, dated 12.06.18 and 29.01.2019; Alan Baxter drwgs. 201-202, 211 dated 29.03.18 and 30.01.2019)

  Elevations and Sections (SHH Architects, dated 12.06.2018; Alan Baxter drwgs. 212, 215 dated 29.03.18).

- Design & Access Statement (by SHH dated September 2018).
- Construction Management Plan dated June 2018.
- Flood Risk Assessment by RPS dated February 2018.
- Planning Comments and Response.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	BIA 1
Is data required by Cl.233 of the GSD presented?	Yes	BIA – Multiple sections.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	BIA – Appendices A to I & chapters 3&4.
Are suitable plan/maps included?	Yes	Whilst the site location is not clearly marked on several maps, these have been consulted and referred to 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	BIA Appendices
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA 3.2 and Appendix C
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Appendix C
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Appendix C
Is a conceptual model presented?	Yes	BIA 5.1 and Appendix J
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA 3.2. Insufficient consideration of slope stability issues.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	NA	Not required
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA 3.1. Insufficient assessment provided.
Is factual ground investigation data provided?	Yes	BIA 5.1. and Appendix J.
Is monitoring data presented?	Yes	BIA 5.1.
Is the ground investigation informed by a desk study?	Yes	BIA Appendix J.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	No neighbouring basements identified.
Is a geotechnical interpretation presented?	Yes	BIA Appendix J.
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	N/A	
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Neighbouring basements not identified. Foundation depths to adjacent 79 Swain's Lane provided.
Is an Impact Assessment provided?	Yes	

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	Movement due to wall installation and tunnel excavation considered; it has been confirmed that movement due to heave pressure is anticipated to be negligible in case of the tunnel.
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	Potential for Category 2 damage to Toilet Block; slope stability impacts; shrink / swell impacts to existing foundations.
Has the need for monitoring during construction been considered?	No	Movement monitoring has not been discussed.
Have the residual (after mitigation) impacts been clearly identified?	No	Potential for Category 2 damage to Toilet Block
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Estimated ground movement and associated damage category presented in BIA Appendix I. Potential for Category 2 damage to Toilet Block.
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	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	No	Generally, the anticipated damage has been confirmed to be no worse than Cat. 1. The "Toilet block" has been confirmed to possibly suffer Category Damage 2.
Are non-technical summaries provided?	No	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Alan Baxter Associates in conjunction with Ground Engineering. The individuals involved in its preparation are chartered engineers and geologists, as required by CPG Basements.

4.2. It is noted that the BIA refers to historic LBC guidance (CPG4). Current guidance (CPG Basements and the Local Plan (Policy A5 Basements) should be referenced.

4.3. The LBC Instruction to proceed with the audit identified that the basement proposal involves a Grade II* listed building as well as the Grade II listed Mortuary Chapel.

4.4. The proposed below ground works involve constructing a new tunnel, to an approximate depth of 4m, linking the new single storey extension building with a historically infilled subway cutting. This is to be excavated and two levels of habitable space constructed. The extension to the house is to continue at exiting ground level, which cuts into an existing slope.

4.5. The construction of the single storey extension to the Winter House is proposed to be at existing ground level, with a contiguous piled wall proposed at the rear, where the extension is proposed to cut into the existing hillside. The structural sketches show the piles installed in front of an existing garden wall, which is suggested to be demolished and rebuilt subject to agreement with the boundary wall owners.

4.6. The construction of the tunnel will also comprise a contiguous piled wall with a reinforced concrete liner wall, and top and bottom slab. This is proposed to link the planned extension building with the two levels of below ground space created within the subway cutting.

4.7. The BIA confirmed that the tunnel walls will require high stiffness propping system during construction and has assumed stiff propping for the assessment of ground movement and likely structural damage to neighbouring buildings.

4.8. The BIA included limited information on how the two levels of habitable space will be constructed within the subway cutting. The structural proposals do not seem to refer to this area of the site. The assumption that there are existing permanent props at the top of the cutting needs to be confirmed. Otherwise, the sequence and propping arrangements to ensure movements (and any resultant damage impacts) from excavation of the backfilled cutting should be presented.

4.9. The proposed contiguous piled wall for the rear of the house extension into the hillside is stated to be cantilevered. It should be demonstrated that stability can be maintained and what, if any, impacts will result upslope from the proposed retaining wall.

4.10. The site investigation included 9 hand excavated trial pits and 2 percussive boreholes to a depth of 25m. In-situ testing included Standard Penetration Testing (SPT) and hand shear vane tests to estimate the shear strength of the soil encountered.

4.11. The interpretive geotechnical report identified that the ground conditions encountered comprised Made Ground to varying depths, typically between 0.49m and 5.40m, underlain by the London Clay formation. The same report noted that the 5.4m Made Ground was associated with the infilled historic subway cutting.

4.12. Groundwater monitoring has been undertaken as part of the soil investigation and water was recorded at various levels between 1.34m and 5.2m below ground level (bgl). The BIA comments on the water seepage and confirmed that this appears to be due to water perched within the Made Ground over impermeable London Clay. It is confirmed in the BIA that dewatering is likely to be required during tunnel construction and this should be allowed for.

4.13. The BIA makes reference to an existing Thames Water (TW) sewer running through the site. Further investigation will be required to identify type of construction and size, and whether or not the tunnel construction will affect its integrity. Consultation with TW will be required to demonstrate that there are no asset protection requirements, given the redevelopment proposals.

4.14. The BIA states that two trees will be removed to facilitate redevelopment. Confirmation will be required that the removal of the trees will not impact on the main existing building, given their proximity to its foundations and the high volume change potential of the clay.

4.15. An assessment of likely ground movement and associated structural damage has been undertaken using the methodology documented in CIRIA C760. The structures assessed included the main building, no. 79 Swain's Lane, Highgate Cemetery and the cemetery Toilet Block. The BIA confirmed that any structural damage due to redevelopment plans will typically be limited to Burland Category 1 (Very Slight) damage.

4.16. It is noted that the calculations relating to the damage assessment of the Toilet Block indicate potential theoretical damage corresponding to Burland Category 2 (Slight), which is beyond that permissible with reference to LBC guidance. The assessment was carried out in accordance with the methodology described in CIRIA C760. However, the BIA acknowledges a degree of conservatism associated with the methodology and states that in practice the damage is likely to fall within Category 1. To demonstrate that no more than Category 1 damage will occur, it should be confirmed to what extent movements will be limited and how this will be ensured, including proposed structural monitoring and contingency actions.

4.17. With reference to ABA drg. 215, Confirmation will be required that the excavation for and construction of the capping beam to the contiguous piled wall will not undermine the existing pad foundation locally.

4.18. The BIA discusses the hydrogeological setting and confirmed that the direction of the groundwater flow follows the site slope and occurs within the Made Ground overlying the impermeable London Clay. The BIA also confirmed that the top of tunnel would be located within London Clay and that the overall site hydrogeology will be unaffected by its construction. Given the existing retaining structures across the site and adjacent to the highway, it is accepted that there will be no significant impact to the wider hydrogeological environment.

4.19. The BIA indicates that the proposed development will result in an increase in impermeable site area. Whilst the redevelopment of the existing cutting is discussed in the BIA, no discussion on the proposed tunnel and house extension are included in the assessment. It is proposed to implement a green roof to provide some form of attenuation SUDS, although it has not been demonstrated that this will be in accordance with LBC policy criteria.

4.20. The change in impermeable site area should be clearly stated and outline drainage assessment and proposals should be provided, sufficient to demonstrate that off-site discharge flows will be attenuated and controlled in accordance with LBC policy criteria.

4.21. A flood risk assessment (FRA) is presented which states that the proposed development is at low risk from all sources. However, the FRA recommends standard flood risk mitigation measures, such as raised thresholds and adoption of 'flood resilience techniques' in regards to groundwater, should be implemented.

5.0 CONCLUSIONS

5.1. The BIA has been prepared by firms of engineering consultants using individuals who possess suitable qualifications.

5.2. The development plans comprise the construction of a single storey extension with a retaining wall at the rear and new tunnel linking this to the existing subway cutting. Two levels of below ground space are proposed within the cutting.

5.3. The BIA has confirmed that the proposed below ground construction, including the new tunnel, will be founded within London Clay.

5.4. The engineering proposals indicate contiguous piled wall construction for both the tunnel and new retaining structure at the back of the extension building. Outline calculations relating to wall stability and loadings will be required.

5.5. A site investigation has been conducted which documented the soil conditions and recommended foundation solutions and design soil parameters. Groundwater, that is perched within Made Ground, may be encountered during excavation works and allowances for dewatering should be made.

5.6. An assessment of likely horizontal and vertical ground movements indicate that any associated damage will be no worse than Burland Category 1, except from that to the Toilet Block building. Confirmation will be required on maximum allowable movements and the movement monitoring strategy that will prevent any Category 2 damage to the Toilet Block.

5.7. Confirmation will be required that the construction of the capping beam to the tunnel wall will not undermine the existing pad foundation adjacent to the proposed stairs.

5.8. The BIA suggests that part of the existing boundary wall is demolished and rebuilt. Confirmation will be required that the construction of the new retaining wall will not affect the integrity of the existing boundary wall, should this be retained.

5.9. The BIA is to advise on the impact, if any, of the proposed removal of 2 no. trees on the existing foundations.

5.10. Confirmation will also be required that the proposed below ground works will not impact on the existing Thames Water (TW) sewer running underneath the site. Evidence of consultation with TW regarding any asset protection requirements will be required.

5.11. Confirmation will be required that the construction of the cantilevered retaining wall, as part of the single storey building extension, will not impact on the slope stability.

5.12. The increase in impermeable areas should be indicated and confirmation will be required that the off-site discharge flows are appropriately controlled in accordance with the LBC requirements.

5.13. It is accepted that the development will not impact on the wider hydrogeology of the area and is at low risk of flooding. The recommended measures outlined in the FRA should be implemented.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Parker	-	-	The residents raised concerns with regards to the construction of the 2-storey basement in the immediate proximity of their property and the possible damage due to this.	The BIA author clarified that a 2-storey basement will not be constructed and instead a single storey extension building will be erected.
Woods	-	-	The resident raised concerns about any effects of the basement.	Estimates of ground movement and associated damage, due to construction of the tunnel, have been included in the BIA.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA Format	Reference CPG Basements / Policy A5	Note	
2	BIA Format	Provide non-technical summaries.	Open	
3	Land Stability	Demonstrate slope stability not impacted by proposed cantilever piled wall for house extension into hillside.	Open	
4	Land stability	The sequence and propping arrangements to ensure movements (and any resultant damage impacts) from excavation of the backfilled cutting should be confirmed.	Open	
5	Land stability	Confirm asset protection consultation with TWUL regarding sewer crossing the site is being undertaken.	Open	
6	Land Stability	Confirm shrink / swell impacts to existing foundations and mitigation, if required, re removal of trees.	Open	
7	Lan Stability	With regard to the Toilet Block, to demonstrate that no more than Category 1 damage will occur, it should be confirmed to what extent movements will be limited and how this will be ensured, including proposed structural monitoring and contingency actions.	Open	
8	Hydrology	Confirm change in impermeable site area. Provide sufficient outline assessment and drainage proposals to demonstrate LBC policy criteria will be met.	Open	

Appendix 3: Supplementary Supporting Documents

None

London

Friars Bridge Court
41- 45 Blackfriars Road
London, SE1 8NZ

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

UAE

Office 705, Warsan Building
Hessa Street (East)
PO Box 28064, Dubai, UAE

T: +971 4 453 4735
E: uae@campbellreith.com