

176 Prince of Wales Road,
London NW5 3PT

Basement Impact Assessment
Audit

For
London Borough of Camden

Project Number: 13693-09

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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 176 Prince of Wales Road, London, NW5 3PT (planning reference 2021/2441/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. CampbellReith previously audited a basement scheme at the site (ref 12466-52, September 2017). This current application (2021/2441/P) seeks to renew the August 2018 planning permission and listed building consent that will expire in August 2021. It is understood that there are no changes to the proposed scheme and the application proposals are identical to those approved in 2018.
- 1.4. The site is occupied by a two-storey Grade II listed former Methodist chapel which is currently in use as an art gallery. The proposed development comprises extending the rear part of the existing art gallery through the construction of an additional storey and the excavation of a single level basement which will extend to a depth of 4.70m below ground level (bgl), with localised deepening to 5.70m bgl for the provision of a lift pit.
- 1.5. The BIA has been presented as two documents, prepared by Geotechnical & Environmental Associates (GEA) and Parmarbrook. The qualifications of the authors from GEA are in accordance with CPG Basements guidelines.
- 1.6. The BIA includes the majority of the information required from a desk study in line with LBC guidance. The conceptual site model should be reviewed and updated, if required, within a Basement Construction Plan (BCP) following the additional investigation and monitoring proposed to determine groundwater level.
- 1.7. A site investigation has confirmed the underlying ground conditions to comprise Made Ground over Head Deposits overlying London Clay. Groundwater was monitored between 0.75m bgl and 3.55m bgl, and further groundwater monitoring is proposed on a monthly basis leading up to the time of construction.
- 1.8. Inflows of perched water may be encountered during construction. The BIA recommends that further trial excavations are undertaken to confirm the likely groundwater conditions.

- 1.9. It is accepted that the site is not in a Flood Risk Zone and is at low risk of flooding. The site is within a Critical Drainage Area (Group 3-0103).
- 1.10. The development will not increase the impermeable area across the site because the basement will be entirely beneath the footprint of the existing building. The use of attenuation SUDS has been considered but is not practicable to implement. Given that impermeable site area does not increase, this is accepted.
- 1.11. Outline permanent and temporary works drawings have been provided. A robust temporary works scheme is provided, including outline sequencing and propping. Temporary dewatering requirements should be presented in a BCP.
- 1.12. A Ground Movement Assessment (GMA) has been presented which predicts damage impacts of Category 0 to 2 (Negligible to Slight) to the building on site and surrounding structures, in accordance with the Burland Scale. It is proposed to limit all damage impacts to a maximum of Category 1 by utilising structural monitoring, phased excavations and additional propping where required. This is accepted and, due to the Listed nature of the development, should be secured by a means of a BCP.
- 1.13. Notwithstanding the comments of 1.12, the new development is likely to increase the differential depth of foundations with surrounding structures. The GMA has assumed foundation depths of surrounding structures. These assumptions should be confirmed within the BCP. Where actual foundation levels are shallower, the GMA and damage impact assessment should be revised, and the monitoring strategy for these buildings updated to ensure a maximum of Category 1 damage.
- 1.14. An outline construction programme has been presented.
- 1.15. Queries and matters requiring further information or clarification are discussed in Section 4 and summarised in Appendix 2. The criteria of CPG Basements have been met, subject to confirmation of conditions, assessments and strategies within a BCP, to ensure maximum damage of Category 1 to the structures on and surrounding the site.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 23 June 2021 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 176 Prince of Wales Road, London NW5 3PT, Camden Reference 2021/2441/P. CampbellReith previously audited a basement scheme at the site (ref 12466-52, September 2017).

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 (CPG): Basements. January 2021
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- The Local Plan (2017): 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; and,
- 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 three storey plus basement level rear extension and associated alterations following partial demolition of existing two storey rear building (Use Class D1)."*

- 2.6. The planning portal also confirmed the site does not lie within a Conservation Area but the building is a Grade II listed building.
- 2.7. CampbellReith accessed LBC's Planning Portal on 17 July 2021 and gained access to the following relevant documents for audit purposes:
- Ground Investigation and Basement Impact Assessment Report (Ref J16226A) dated 28 April 2021 by Geotechnical & Environmental Associates Limited (GEA) including:
 - Basement Impact Assessment (ref 1691) dated May 2021 by Parmarbrook.
 - Thames Water Asset Location Search (ALS/ALS/24/2016_3465484) dated December 2016.
 - Application Drawings - Proposed plans of elevations, floor plans and sections dated April and May 2021 by Farshid Moussavi Architects.
 - Design and Access Statement dated 12 May 2021 by Farshid Moussavi Architects.
 - Construction Management Plan by IDL.
 - Letter confirming no design or technical changes from the 2017 Planning Application dated 6th May 2021 by Parmabrook.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The qualifications of the authors of the BIA prepared by GEA are in accordance with CPG guidelines.
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 plans/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	BIA Report prepared by GEA, Section 3.1.2. Assumptions regarding neighbouring foundations to be confirmed within a BCP.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA Report prepared by GEA, Section 3.1.1.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	BIA Report prepared by GEA, Section 3.1.3. Screening refers to CPG Basements 2018 which has been superseded by CPG Basements 2021. Screening does not identify that the site is located with a Critical Drainage Area (Group 3-0103) and the Prince of Wales Road flooded in 2002.
Is a conceptual model presented?	Yes	Assumptions regarding ground conditions and neighbouring foundations to be confirmed within a BCP.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA Report prepared by GEA, Section 4. Scoping states that 'trees were observed during the site walkover' which contradicts Screening which states that 'there are no trees to be felled and no tree protection zones in place on the site'.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	No issues relating to subterranean flow were identified within the screening process.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Historic flooding absent in GEA report but discussed in Parmarbrook report. Conclusions accepted.
Is factual ground investigation data provided?	Yes	BIA Report prepared by GEA, Sections 4 and 5.
Is monitoring data presented?	Yes	BIA Report prepared by GEA, Section 5.4.
Is the ground investigation informed by a desk study?	Yes	BIA Report prepared by GEA, Section 2 and BIA Report prepared by Parmarbrook, Section 3.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	BIA Report prepared by GEA, Section 10.1.1 – assumes surrounding structures do not have basements and are founded between 1.00m and 1.50m bgl. Assumptions to be confirmed within a BCP.
Is a geotechnical interpretation presented?	Yes	BIA Report prepared by GEA, Sections 5 and 8.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Geotechnical parameters for design presented. BIA Report prepared by GEA, Section 8.1.2.
Are reports on other investigations required by screening and scoping presented?	Yes	Thames Water Asset Search (Appendix B of Parmarbrook BIA report).

Item	Yes/No/NA	Comment
Are baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Basements are assumed not to be present. Assumptions to be confirmed within a BCP.
Is an Impact Assessment provided?	Yes	BIA Report prepared by GEA, Section 13.
Are estimates of ground movement and structural impact presented?	Yes	BIA Report prepared by GEA, Section 9, 10 and 11 and Sections 9 and 10 of the Parmarbrook BIA.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	Assumptions regarding ground conditions and neighbouring foundations to be confirmed within a BCP.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Temporary propping, monitoring and trigger levels are discussed (BIA Report prepared by Parmarbrook, Sections 8 and 11 and 12).
Has the need for monitoring during construction been considered?	Yes	BIA Report prepared by Parmarbrook, Sections 11 and 12.
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?	Yes	Based on the assumptions presented, stability has been demonstrated. Assumptions to be confirmed within a BCP.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	The development will not increase the impermeable area. Site drainage will be designed to maintain the existing situation.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Based on the assumptions presented, stability has been demonstrated. Assumptions be confirmed within a BCP.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	BIA Report prepared by GEA, Section 11. Parmarbrook BIA report, Section 10. Assumptions regarding ground conditions and neighbouring foundations to be confirmed within a BCP.

Item	Yes/No/NA	Comment
Are non-technical summaries provided?	Yes	BIA Report prepared by GEA, Section 13.

4.0 DISCUSSION

- 4.1. Two documents have been provided for review: a BIA prepared by Geotechnical & Environmental Associates (GEA) which includes the screening and scoping, site investigation, impact assessment and ground movement assessment. In addition, a further BIA has been prepared by Parmarbrook which includes the desk study, assessment of underground infrastructure, proposed basement construction sequence, ground movement, monitoring strategy and flood risk assessment. The GEA BIA has generally been taken as the lead document for the purposes of this audit unless otherwise stated. The qualifications of the authors of the BIA prepared by GEA are in accordance with CPG Basements guidelines.
- 4.2. CampbellReith previously audited a basement scheme at the site (ref 12466-52, September 2017) in relation to planning application reference 2017/0001/P. This current application (2021/2441/P) seeks to renew the August 2018 planning permission and listed building consent that will expire in August 2021, through the submission of new applications for planning permission and listed building consent. It is understood that there are no changes to the proposed scheme and therefore the application proposals are identical to those approved in 2018. It is also understood that the application documents have been updated, where necessary, to reflect any changes in policies since 2018.
- 4.3. The site is occupied by a two-storey Grade II listed former Methodist chapel which is currently in use as an art gallery. The proposed development comprises extending the rear part of the existing art gallery through the construction of an additional storey and the excavation of a single level basement which will extend to a depth of 4.70m below ground level (bgl), with localised deepening to 5.70m bgl for the provision of a lift pit.
- 4.4. The BIA includes the majority of the information required from a desk study in line with the GSD Appendix G1. However, it is noted that some existing conditions (e.g. groundwater, neighbouring foundation depths) have not yet been established and therefore assumptions have been made, upon which the assessments are based. For instance, neighbouring foundation depth assumptions are not consistently presented within the original ground movement assessment (GMA) and the response letter, which may influence damage predictions, and these should either be established by investigation or consistently presented at a reasonably conservative assumed depth. It is also stated that some form of dewatering will be required to facilitate construction, which may impact upon stability unless closely controlled, but a methodology has yet to be proposed or assessed.
- 4.5. It is recommended that existing conditions are established (as detailed in the following discussion points) and the site model is confirmed as part of a basement Construction Plan (BCP).
- 4.6. An outline construction programme has been presented.

- 4.7. A site investigation was undertaken by GEA in October 2016 comprising one 20m borehole, three window sampler boreholes, eight shallow trial pits and the installation of three groundwater monitoring standpipes. The ground conditions comprise Made Ground over Head Deposits overlying the London Clay. Groundwater was not encountered during drilling but on three subsequent monitoring visits was recorded between 0.75m bgl and 3.55m bgl. The data is presented in an interpretative report broadly in accordance with the GSD Appendix G3.
- 4.8. The site investigation has indicated that groundwater is likely to be encountered within the basement excavation. Inflows of perched water may be encountered from within the Made Ground and the London Clay. The BIA recommended that further trial excavations are undertaken to confirm the likely groundwater conditions. The response letter from GEA (received in June 2017) states that further groundwater monitoring will be undertaken on a monthly basis leading up to the time of construction. The results of this additional investigation and monitoring should be presented within a BCP.
- 4.9. The Screening and Scoping assessments are generally accepted. The London Clay is identified as having a high shrink / swell potential but this has been assessed as having a negligible impact on the proposed development considering the proposed depth of foundations and proximity of trees.
- 4.10. The Screening and Scoping assessments have not identified that the proposed development is likely to have deeper foundations than adjacent structures and will therefore increase the differential depth of foundations. Whilst the BIA authors, GEA, indicate that the assessment is made in the context that there are no shared party walls with neighbouring structures, there are neighbouring structures' foundations within the proposed development's zone of influence.
- 4.11. The BIA states that surrounding foundations have been assumed at between 1.00m and 2.00m bgl. Foundation depths should be established or assumptions should be confirmed to be consistently reasonably conservative. The conceptual site model and assessments (e.g. GMA, damage impact, monitoring strategy) should be updated, as required, and presented within a BCP.
- 4.12. The site is within a Critical Drainage Area (Group 3-0103) and the Parmabrook document identifies that Prince of Wales Road flooded in 2002. However, current Environment Agency and Camden SFRA data indicate that the site is generally at very low risk of flooding, with the exception of the western boundary which is adjacent to an alleyway identified as being at low risk of surface water flooding. The flood risk assessment indicates that the difference in site levels to that of the alleyway mitigates any flood risk, and this is accepted. However, it is recommended that the final site levels are confirmed as being suitably raised compared to the alleyway, and that raised thresholds to lightwells are considered in line with best practice.

- 4.13. The development will not increase the impermeable area across the site because the basement will be entirely beneath the footprint of the existing building. Drainage is proposed to continue broadly as the current situation, discharging to combined sewers. Parmabrook states that the use of attenuation SUDS has been considered but is not practicable to implement. Given that impermeable site area does not increase, this is accepted. The final drainage design will require approval from Thames Water and LBC.
- 4.14. It is proposed to form the basement retaining walls with reinforced concrete underpinning, completed by liner walls. Grade 3 waterproofing measures are proposed (Parmabrook BIA, Section 7.3.3.1). Structural sketches and drawings are provided and the geotechnical parameters for retaining wall design are provided. Given the accompanying May 2021 letter from Parmabrook stating that no design or technical changes have been made to the basement, the previous set of retaining wall calculations provided (in 2017) are considered to still be applicable.
- 4.15. The geotechnical parameters for retaining wall design and the GMA are considered to be at the upper end of the acceptable range, and the stiffness of the Made Ground (EU) is not considered to be reasonably conservative. However, given the shallow depth of the Made Ground, it is accepted these will have very little impact on the overall design / assessments.
- 4.16. Temporary works sequencing and propping drawings are provided, which includes the use of plunge columns. The current propping and sequencing drawings do vary slightly from the 2017 submissions but are still considered to provide the required support. The underpinning is typically formed to 4.8m bgl. However, it is proposed to construct the underpins in stages, with each stage being a maximum of 2.35m in depth. The temporary works are to be stiffly propped at all times.
- 4.17. The BIA states that the underpinning will be formed in stiff London Clay. Whilst it is accepted that the underpins will be founded within stiff London Clay, they will be excavated and constructed through Made Ground, firm Head Deposits and firm to stiff London Clay. They are also likely to encounter groundwater. The temporary works strategy should outline proposed dewatering methods to ensure underpinning works remain stable. Given that further works are proposed to establish the groundwater level and assess the form of dewatering to be implemented, the temporary works strategy should be updated and presented within a BCP.
- 4.18. The GMA predicts damage impacts of between Category 0 to 2 (Negligible to Slight) to the existing building on site and surrounding structures, in accordance with the Burland Scale. The assessment is broadly accepted as predicting movements within the expected range for the scale of the development. The BIA acknowledges that control of construction and workmanship will influence ground movements. In that regard it proposes a structural monitoring regime with appropriate trigger values and contingency actions. It is considered that the monitoring strategy, linked to the phased excavation approach, will provide suitable control of construction to mitigate ground movements and potential damage impacts.

- 4.19. Using the approach described in 4.16, the BIA proposes that damage can be limited to a maximum of Category 1 (Very Slight). This is accepted and, due to the Listed nature of the development, should be secured by a BCP. The BCP should consider the actual depth to potentially affected foundations, the final construction methodology and temporary works detail and should describe all assumptions made with respect to ground, groundwater and structural loads.
- 4.20. In addition to the comments of 4.17, and as discussed in 4.4, 4.7, 4.9 and 4.15, assumptions regarding existing conditions should be confirmed and assessments updated, as required. Where actual foundation levels are shallower than currently assumed, the GMA and damage impact assessment should be revised, and the monitoring strategy for these buildings updated to ensure a maximum of Category 1 damage.
- 4.21. Queries and matters requiring further information or clarification are summarised in Appendix 2.

5.0 CONCLUSIONS

- 5.1. The qualifications of the authors are in accordance with CPG guidelines.
- 5.2. The BIA includes the majority of the information required from a desk study in line with LBC guidance. An outline construction programme has been provided.
- 5.3. The conceptual site model should be updated, as required, based on the additional investigation and monitoring recommended to confirm existing conditions, and presented within a BCP.
- 5.4. Basement / foundation depths of structures within the zone of influence should be confirmed and assessments revised, as required, presented within a BCP.
- 5.5. A site investigation has indicated the underlying ground and groundwater conditions. Further investigation and groundwater monitoring is recommended, to be presented within a BCP.
- 5.6. Inflows of perched water may be encountered from within the Made Ground and the London Clay. Temporary dewatering proposals should be presented to confirm the stability of temporary works within a BCP.
- 5.7. It is accepted that the site is at low risk of flooding. It is accepted that the impermeable site area will not increase.
- 5.8. Outline retaining wall design calculations were presented in the 2017 Planning Application and are accepted not to have changed, based on the current information submitted. These should be confirmed with a BCP.
- 5.9. The phased temporary works proposals in conjunction with structural monitoring are accepted as suitable for controlling construction and limiting ground movements and damage impacts, subject to confirmation of conditions and assessments as described. A maximum of Category 1 damage is predicted, and this should be confirmed in a BCP.
- 5.10. Queries and matters requiring further information or clarification are summarised in Appendix 2. The criteria of CPG have been met, subject to confirmation of conditions, assessments and strategies within a BCP, to ensure maximum damage of Category 1 to the structures on and surrounding the site.

Appendix 1: Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	BIA	Conceptual Site Model to be confirmed.	Open – to be provided as 4.4	To be confirmed within a Basement Construction Plan.
2	Land Stability	Confirm depth of foundations with surrounding structures.	Open – to be provided as 4.4	To be provided within a Basement Construction Plan.
3	Land Stability	Outline retaining wall calculations.	Note Only – Provided in 2017 Application	To be provided within a Basement Construction Plan.
4	Land Stability	Provide outline temporary dewatering proposals.	Open – to be provided as 4.18	To be provided within a Basement Construction Plan.
5	Land Stability	GMA and damage impact assessment.	Open – assessments to be confirmed pending foundation depth assessment as 4.4, 4.19	To be confirmed within a Basement Construction Plan.
6	Land Stability	Damage impacts to surrounding structures.	Structural monitoring and mitigation proposals accepted	A maximum damage impact of Category 1 to be secured by Basement Construction Plan.
7	Groundwater	In accordance with the BIA's own recommendations, further groundwater monitoring should be undertaken.	Open – to be provided as 4.9	N/A – ongoing

Appendix 3: Supplementary Supporting Documents

None

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