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6 Kidderpore Avenue
NW3 7SP

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12985- 47
Revision: F1

July 2019

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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 6 Kidderpore Avenue, NW3 7SP (planning reference 2019/0663/P). The basement is considered to fall within Category B as defined by the Terms of Reference.

1.2. The previous Audit reviewed the Basement Impact Assessment for potential impact on land stability and local groundwater and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures. The current audit is based on the subsequent additional information submitted by the applicant.

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. It is proposed to construct a single storey basement beneath the existing building with associated development of two lightwells towards the front area of the building and a courtyard in the rear garden.

1.5. The BIA has been prepared by Michael Alexander Consulting Engineers by appropriately qualified authors.

1.6. The site Investigation Report and Ground Movement Assessment has been prepared by Jomas Associates Ltd.

1.7. The BIA, site investigation and ground movement assessment (GMA) initially submitted state different ground conditions. This has been revised based on the request in the first audit.

1.8. Factual site investigation data is presented along with in-situ testing logs are and interpretative geotechnical information, based on request in the initial audit. It was previously noted that the site is close to the boundary with the Claygate Member. The logs provided, indicate that the proposed basement will bear on the London Clay below. Proposed foundations have now been consistently presented in the reports.

1.9. Groundwater has been monitored to be below the proposed basement formation level. There will be no impact to the wider hydrogeological environment. It is understood that underpinning is the proposed method of basement construction. Outline structural and temporary works information is provided. Retaining wall design parameters have been revised to be consistent with geotechnical interpretative information. It is likely that perched water will be encountered during constructions, and proposals on the control of such ingress has been included in the revised BIA.

1.10. The initial BIA made assumptions in regards to slope stability and the adjacent development. The slope stability assessment has been updated and confirmed in the current BIA.

1.11. The GMA indicates a maximum of Category 1 (Very Slight) damage will be sustained by neighbouring structures, assuming horizontal movements are limited to 5mm. The methodology of feasibly controlling movements to 5mm has been presented as requested. The inputs and outputs from the GMA calculations has now been provided for review. Impacts to utility infrastructure has been assessed and fund to be satisfactory.

1.12. It was previously noted that residents of the neighbouring property have raised concern over the development of cracks in their property. The response to the previous audit addresses this concern and is discussed under Section 4 of this report.

1.13. It is accepted that the development will not lead to an overall increase in the impermeable surface area. There will be no impact to the wider hydrological environment.

1.14. An outline construction programme has been provided on request.

1.15. Requests for additional assessment has now been addressed. The BIA meets the criteria of CPG Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 25 March 2019 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 6 Kidderpore Avenue, NW3 7SP (planning reference: 2019/0663/P).

2.2. The initial 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. This audit reviews the additional supporting and updated information submitted by the applicant.

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 single storey rear extension at lower ground floor level, including excavation of the building footprint to lower the floor level, and formation of two front light wells."*

The Audit Instruction also confirmed that 6 Kidderpore Avenue was located 32m East of 'The Skeel Library', King's College which is a Grade II listed building.

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

- Basement Impact Assessment (Reference P3439), dated 18th January 2019 prepared by Michael Alexander Associates Ltd.
- Ground Movement Assessment (Reference P9945J1083/rs/rev1) dated 14th December 2018, prepared by Jomas Associates Ltd.
- Basic Geotechnical Ground Investigation Report (Reference P9945J1083) dated 13th June 2017 prepared by Jomas Associates Ltd.
- Planning Application Drawings consisting of:

  Existing Plans and Sections - Dwg No. 10-100 (Rev B), 10-101 (Rev A), 10-103 (Rev A)

  Proposed Plans and Sections – Dwg No. 20-101 (Rev H), 20-102 (Rev M), 20-104 (Rev L), 20-105 (Rev I), 20-107 (Rev M), 20-108 (Rev M) prepared by PURA Ltd
- Construction Management Plan, dated January 2019
- Planning Statement dated 20th December 2019, prepared by DRK Planning.
- Planning Comments and Response
- Design and Access statement, dated 11th January 2019, prepared by PURA Ltd.

2.7. Additional information were forwarded to the planning officer and subsequently to CampbellReith by email on 14th June 2019. They are as below;

- Basement Impact Assessment (Reference P3439), dated 14th June 2019 prepared by Michael Alexander Associates Ltd.
- Ground Movement Assessment (Reference P9945J1083/rs/rev1) dated 5th June 2019, prepared by Jomas Associates Ltd.
- Basic Geotechnical Ground Investigation Report (Reference P9945J1083) dated 5th June 2019 prepared by Jomas Associates Ltd.
- BIA Audit queries response tracker dated 14th June 2019 prepared by Michael Alexander Associates Ltd.

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	Outline construction programme has now been provided.
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	Refer Basement Impact Assessment (Reference P3439, dated 18th January 2019).
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	As above.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer pages 7 - 9 of Basement Impact Assessment (Reference P3439, dated 18th January 2019).
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer pages 4 - 5 of Basement Impact Assessment (Reference P3439, dated 18th January 2019).
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Refer pages 11 - 12 of Basement Impact Assessment (Reference P3439, dated 18th January 2019).
Is a conceptual model presented?	Yes	

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Refer Section 4.02.1 of Basement Impact Assessment (Reference P3439, dated 14th June 2019).
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Refer page 5 of Basement Impact Assessment (Reference P3439, dated 18th January 2019). Inconsistent between documents on whether unproductive strata or secondary aquifer underlies the site. However, groundwater below proposed basement level.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Refer page 12 of Basement Impact Assessment (Reference P3439, dated 18th January 2019).
Is factual ground investigation data provided?	Yes	Refer Geotechnical Ground Investigation Report (Reference P9945J1083, dated 5th June 2019) prepared by Jomas Associates Ltd.
Is monitoring data presented?	Yes	Refer Geotechnical Ground Investigation Report (Reference P9945J1083, dated 13th June 2017) prepared by Jomas Associates Ltd.
Is the ground investigation informed by a desk study?	No	Site investigation report states that no desk study was undertaken.
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	Refer Ground Movement Assessment (Reference: P9945J1083/rs/rev1, dated 14th December 2018) by Jomas Associates Ltd.
Is a geotechnical interpretation presented?	Yes	Refer page 7 of Ground Movement Assessment (Reference: P9945J1083/rs/rev1, dated 14th December 2018).
Does the geotechnical interpretation include information on retaining wall design?	Yes	

Item	Yes/No/NA	Comment
Are reports on other investigations required by screening and scoping presented?	Yes	Tree survey, Arboricultural Impact Assessment and Tree Protection Plan presented.
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	Refer Ground Movement Assessment (Reference: P9945J1083/rs/rev1, dated 14th December 2018).
Are estimates of ground movement and structural impact presented?	Yes	Refer Ground Movement Assessment (Reference: P9945J1083/rs/rev1, dated 14th December 2018). Inputs and outputs to be provided for review
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?	Yes	
Has the need for monitoring during construction been considered?	Yes	Although a need for monitoring has been considered under Section 4.04 of the BIA, an outline monitoring plan is required clearly stating the trigger levels.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Land stability assessments were reviewed based on request and the response is satisfactory. Refer 4.04.7 of the BIA
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Land stability assessments were reviewed based on request and the response is satisfactory. Refer 4.04.7 of the BIA

Item	Yes/No/NA	Comment
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	Land stability assessments were reviewed based on request and the response is satisfactory. Refer 4.04.7 of the BIA
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Refer Basement Impact Assessment (Reference P3439, dated 18th January 2019) and Ground Movement Assessment (Reference: P9945J1083/rs/rev1, dated 14th December 2018). Land stability assessments were reviewed based on request and the response is satisfactory. Refer 4.04.7 of the BIA
Are non-technical summaries provided?	Yes	Refer Page 2 of the Basement Impact Assessment (Reference P3439, dated 18th January 2019).

4.0 DISCUSSION

4.1. The BIA has been prepared by Michael Alexander Consulting Engineers by appropriately qualified authors. The site Investigation Report and Ground Movement Assessment has been prepared by Jomas Associates Ltd. The LBC Instruction to proceed with the audit identified that the basement proposal is 32m east of 'The Skeel Library', King's College which is a Grade II listed building.

4.2. The proposed basement consists of a single storey construction (c.3.50m deep) under an existing L-shaped building. The basement will occupy an area of c.80m^2 under the footprint of the building. In addition to the basement, it is proposed to include two new lightwells (c.2.40m^2; c.3.70m^2) extending into the existing paved car parking area towards the south western area of the building. The proposal also includes the addition of a courtyard (c.4m^2) towards the far eastern corner of the building, extending partly beneath the existing conservatory and partly occupying the rear garden.

4.3. Underpinning is the proposed method of construction for the basement underneath the footprint of the building. Where the basement extends outside the footprint of the existing building (lightwell and courtyard), RC cantilevered retaining walls will be cast in sections.

4.4. The BIA and site investigation indicate that ground conditions comprise Made Ground over the London Clay Formation. The initial ground movement assessment (GMA) states the ground conditions comprise Made Ground over the Claygate Member of the London Clay formation. The revised GMA has adopted the ground model presented in the BIA.

4.5. Factual site investigation data is presented in the GIR and interpretative geotechnical information has been presented in the revised GMA under Table 3.1. It is noted that the site is close to the boundary with the Claygate Member, which is indicated in the presented local historical borehole logs.

4.6. The depth at which Claygate Member / London Clay is assumed to be present within the GMA (0.70m below ground level, bgl) was not consistent with the site-specific ground investigation report (which indicates 2m bgl). This has now been revised and is consistently presented.

4.7. The proposed basement will bear on the Claygate Member / London Clay. The geotechnical interpretation considered the use of piles as the foundation solution, which was not consistent with the methodology presented in the BIA. Full interpretative geotechnical information has now been provided and it is confirmed that the proposal is to use underpinning.

4.8. Groundwater was not encountered during the investigation works, but was recorded at between 4.47m to 5.44m bgl during subsequent monitoring. It is accepted that there will be no

impact to the wider hydrogeological environment. Measures to mitigate any unexpected perched water during construction have now been included in the revised BIA.

4.9. Outline structural and temporary works information is provided. Revised retaining wall design parameters are consistent with geotechnical interpretative information.

4.10. It was noted that the original BIA made assumptions in regard to slope stability and the adjacent development. The slope stability assessment has been revised and is accepted.

4.11. A GMA was carried out to assess the impacts from the proposed development on the neighbouring properties. The assessment considers the temporary and permanent conditions. The full inputs and outputs of the calculations were requested and have been provided in the revised submission. Further review has been carried out as requested in order to ensure the GMA is consistent with the geotechnical interpretation, proposed construction methodology, formation levels and structural loads. The GMA indicates a maximum of Category 1 (Very Slight) damage will be sustained by neighbouring structures, assuming horizontal movements are limited to 5mm. Monitoring and active propping are proposed in order to control movements within maximum limits.

4.12. The previous audit noted that suitable measures should be taken to address the concern that the residents of the neighbouring property raised regarding development of cracks in the property as a result of development in the surrounding area. The applicant has agreed to review the neighbours structural information and consider whether further mitigation is required. It is accepted that the current proposals to limit movements and damage impacts are policy compliant, subject to any structural information provided by the neighbour that may require further assessment.

4.13. It is noted that Thames Water assets have been identified within the zone of influence of the works. Impacts to utility infrastructure has been assessed (Appendix B of the revised BIA) and it has been concluded that the assets will not be impacted.

4.14. The proposed development will lead to an increase in building footprint area due to the inclusion of two new lightwells. It is accepted that the rear garden and the front area of the property is currently hard standing and that the proposed development will not lead to an increase in the impermeable surface area. There will be no impact to the wider hydrological environment.

4.15. An outline construction programme has now been provided and found to be satisfactory (Refer Appendix G of the revised BIA).

5.0 CONCLUSIONS

5.1. The BIA has been prepared by appropriately qualified authors.

5.2. The ground conditions are now consistently presented and interpretative geotechnical information has been included.

5.3. There will be no impact to the wider hydrogeological environment.

5.4. There will be no impact to the wider hydrological environment. The slope stability assessment has been presented satisfactorily.

5.5. The GMA has been updated and is accepted. Impacts to utility infrastructure has been assessed.

5.6. An outline construction programme has been presented.

5.7. Requests for additional assessment as stated in the previous audit has been addressed and found to be satisfactory. The BIA meets the criteria of CPG Basements.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
6 and 6a Kidderpore Avenue	-	23.04.2019	Concern over the presence of cracks within the property as a result of former excavation in the vicinity.	The applicant's engineer will consider any structural information by the neighbour and assess if further mitigation is required.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA / Land Stability	Ground conditions to be consistently reported throughout documents. In-situ testing results to be provided.	Closed	July 2019
2	BIA / Land Stability	Construction methodology, foundation proposals, interpretative geotechnical information etc to be presented consistently throughout documents.	Closed	
3	Land Stability	GMA to be reviewed and updated as described in Section 4. Existing structural damage to neighbouring properties should be assessed, and mitigation proposed, if required. Utility infrastructure to be assessed.	Closed	
4	Land Stability	Assumption on slope stability issues in regards to neighbouring site to be clarified.	Closed	
5	BIA	An outline construction programme should be presented.	Closed	

Appendix 3: Supplementary Supporting Documents

Audit query tracker dated 14th June 2019

P3439	**6 Kidderpore Avenue**			
BIA AUDIT QUERIES - RESPONSE TRACKER			GS & IH for MA 14/06/19	
Query No	**Subject**	**Query**	**Details**	**Response**
1	BIA / Land Stability	Ground conditions to be consistently reported throughout documents. In-situ testing results to be provided.	The BIA and site investigation indicate that ground conditions comprise Made Ground over the London Clay Formation. The ground movement assessment (GMA) states the ground conditions comprise Made Ground over the Claygate Member of the London Clay formation. The depth at which Claygate Member / London Clay is assumed to be present within the GMA (0.70m below ground level, bgl) is not consistent with the site-specific ground investigation report (which indicates 2.00m bgl). Factual site investigation data is presented, although in-situ testing logs are absent and interpretative geotechnical information should be provided for review. It's noted that the site is close to the boundary with the Claygate Member, which is indicated in the presented local historical borehole logs.	Jomas have revised the Ground Movement Assessment and Ground Investigation Report to give consistent referencing. In-situ testing logs and interpretative geotechnical information are provided in Chapter 6 and Appendix 3 of the Ground Investigation Report.
2	BIA / Land Stability	Construction methodology, foundation proposals, interpretative geotechnical information etc to be presented consistently throughout documents.	The proposed basement will bear on the Claygate Member / London Clay. The geotechnical interpretation considers the use of piles as the foundation solution, which is not consistent with the methodology presented in the BIA. Outline structural and temporary works information is provided. Retaining wall design parameters should be consistent with geotechnical interpretative information.	Jomas Ground Investigation Report has been revised to be consistant with Michael Alexander BIA. MA has updated the retaining wall design in BIA according to the Geotechnical recommendations.
3	Land Stability	GMA to be reviewed and updated as described in Section 4. Existing structural damage to neighbouring properties should be assessed, and mitigation proposed, if required. Utility infrastructure to be assessed.	Further review is required in order to ensure the GMA is consistent with the geotechnical interpretation, proposed construction methodology, formation levels and structural loads. The GMA indicates a maximum of Category 1 (Very Slight) damage will be sustained by neighbouring structures, assuming horizontal movements are limited to 5mm. The methodology of feasibly controlling movements to 5mm should be presented. It is noted that residents of the neighbouring property have raised concern over the development of cracks in their property. The GMA should consider the extent of the current damage and what mitigation, if any, is required.	Jomas have updated their GMA providing the full inputs and outputs of the calculations. Michael Alexander has updated Appendix E of the BIA to incorporate appropriate construction techniques to limit movements to 5mm. Michael Alexander and Jomas Associates have not been passed any structural report in respect of the condition or defects to the adjoining buildings. If such information is provided going forward it will be reviewed and any local adjustments to methodology made to suit. As set out in the updated Outline Construction Method Statement (Appendix E), when setting up the Movemement Monitoring, reflective targets will be placed close to any location showing existing signs of distress. Precise monitoring will be carried out during the construction process to ensure any change is understood so that appropriate mitigation can be carried out.
4	Land Stability	Assumption on slope stability issues in regards to neighbouring site to be clarified.	It is noted that the BIA makes assumptions in regard to slope stability and the adjacent development (section 4.04.7). The slope stability assessment should be confirmed. It is noted that Thames Water assets have been identified within the zone of influence of the works. Impacts to utility infrastructure should be assessed and asset owners contacted, as required, to agree asset protection criteria.	For further clarification please refer to Michael Alexander BIA updated clauses 4.01.3, 4.04.7 and to Figure (h). This shows that any signficant slopes are remote from the proposed Works. Michael Alexander has contacted Thames Water in regards to water main; appropriate safeguarding strategy will be developed in due course liasing with the Thames Water and the appointed contractor.
5	BIA	An outline construction programme should be presented.		Michael Alexander has included on outline Construction Programme in appendix G of the BIA.

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