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Belgrove House
London WC1H 8AA

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13398-48
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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 Belgrove House, London WC1H 8AA (planning reference 2020/3881/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.

1.4. The BIA has been carried out by AKT II and has been prepared or reviewed by individuals with appropriate qualifications.

1.5. The BIA indicates that the proposed double basement will be formed by a secant pile retaining wall. Confirmation is required of the basement excavation depth, the piling level for the basement retaining wall and proposed tunnel construction beneath the footpath of Euston Road.

1.6. Soil parameters and groundwater assumptions should be based on the site investigation presented and used consistently in the BIA and in all appended assessments therein.

1.7. It is accepted that the proposed development will not have a significant impact on the hydrogeology or slope stability of the area. With the proposed SUDS and attenuation measures, it is accepted that the proposed development will not impact the hydrology of the area.

1.8. An outline design of the proposed retaining wall for the new basement is presented. However, clarification of the construction sequence and piling level is required.

1.9. The BIA notes that damage to surrounding properties will not exceed Burland Category 1, however, further clarification is required. Full input and output data should be provided to support the conclusions of all assessments presented in the BIA. Assessments of critical structures and the highway are required together with an assessment of the impacts of any tunnels emerging from the basement.

1.10. The BIA indicates monitoring of surrounding buildings and assets will be required, and acknowledges the requirement for third party asset protection agreements to be in place for the development.

1.11. 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 15 September 2020 to carry out a Category C audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Belgrove House, London WC1H 8AA.

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.

2.5. LBC's Audit Instruction described the planning proposal as *"Redevelopment of Belgrove House as a part 5 part 10 storey building plus 2 basement levels for use as office and research and laboratory floorspace; with café, flexible retail and office floorspace at ground floor; an auditorium at basement; incorporating step free entrance to Kings Cross Underground station in place of two entrance boxes along Euston Road; together with terraces at fourth and fifth floor levels, servicing, cycle storage and facilities, refuse storage and other ancillary and associated works."*

2.6. The Audit Instruction confirmed Belgrove House neither involved, nor was a direct neighbour to, any listed buildings. The Design and Access Statement indicates a number of Grade II Listed

properties to the east and west of the site, on the opposite sides of Crestfield Street and Belgrove Street respectively.

2.7. CampbellReith accessed LBC's Planning Portal on 22 September 2020 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (BIA) by AKT II Consulting Structural and Civil Engineers, rev 01, dated 19 August 2020.
- Planning Application Drawings by Allford Hall Monaghan Morris, consisting of Location Plan, Existing Plans and Sections, Demolition Plans, Proposed Plans and Sections.
- Construction Management Plan by RPM Ltd, rev 4, dated 07 August 2020.
- Design & Access Statement by by Allford Hall Monaghan Morris, ref 17002-R004, rev P1, dated 19 August 2020.
- Flood Risk Assessment by AKT II Consulting Structural and Civil Engineers, rev 00, dated 11 August 2020.
- Drainage Strategy by AKT II Consulting Structural and Civil Engineers, rev 00, dated 11 August 2020.
- Arboricultural Impact Assessment by PJC Consultancy, ref. 5494/20/02, dated 10 August 2020.
- Planning Consultation Responses

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
Is data required by Cl.233 of the GSD presented?	Yes	
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	
Are suitable plan/maps included?	Yes	
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Is a conceptual model presented?	Yes	However a characteristic groundwater level should be specified.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	N/A	No issues brought forward.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Is factual ground investigation data provided?	Yes	
Is monitoring data presented?	Yes	Two rounds of groundwater monitoring were undertaken.
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	
Is a geotechnical interpretation presented?	Yes	However, the site investigation report indicates further data is to come.
Does the geotechnical interpretation include information on retaining wall design?	Yes	However, different parameters are presented in the BIA to those indicated in the site investigation report and those used in the retaining wall design.
Are reports on other investigations required by screening and scoping presented?	Yes	
Are the baseline conditions described, based on the GSD?	Yes	However, no information is provided relating to the presence of neighbouring basements.
Do the base line conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	Only the output data is provided.
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	
Have the residual (after mitigation) impacts been clearly identified?	Yes	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	Assessment of an appropriate critical section is required.
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	The Ground Movement Assessment requires additional consideration.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	However no supporting data provided for the Ground Movement Assessment and Building Damage Assessment.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by AKT II Ltd. The qualifications of the individuals involved in the preparation, checking and review of the BIA itself are not provided, however the Non-Technical Summary in Section 1 of the BIA identifies three individuals with suitable qualifications, who have reviewed or approved the impact assessment.

4.2. The LBC Instruction to proceed with the audit identified that the development does not involve, and is not a direct neighbour to, a Listed building. Section 2.4 of the Design and Access Statement (DAS) indicates several Grade II Listed properties are present to the east and west of Belgrove House, on the opposite sides of Crestfield Street and Belgrove Street respectively. The site is located in the Kings Cross and St Pancras Conservation Area.

4.3. The proposed development comprises the demolition of the existing building on site and the construction of a new part 5-storey, part 10-storey building, with two basement levels. Section 6 of the BIA indicates the basement will be formed by a secant pile retaining wall which will be constructed within the existing retaining wall. Two tunnels are shown extending from the north side of the proposed basement to form new access points to the entrance to the London Underground, which is located below Euston Road. The basement slab is indicated to comprise a 1.7m thick raft foundation. Section 6.3 of the BIA indicates that all columns will be directly supported on the basement raft to avoid applying vertical load on the retaining walls.

4.4. Section 6.1 of the BIA indicates the basement will be 9m deep from ground floor level, with the depth to the underside of the foundation indicated in Section 7.2 of the BIA to be 10.70m. Conflicting information is presented in Section 7.1 and 10.3 of the BIA, where the bottom of the raft foundation is indicated to be 17.25m below existing ground level. The maximum basement excavation depth should be presented consistently throughout the assessment.

4.5. A site investigation was carried out at the site and the results are presented in Appendix 2 of the BIA. Investigations included 4no. cable percussive boreholes to a maximum depth of 39.3m. No levels are provided on the borehole logs, however Section 6.1.2 of the site investigation report indicates an approximate ground level of 13.5m OD for all boreholes. Ground conditions generally comprised Made Ground up to 1.80m thick, over London Clay to c. -4.0m OD (c.20m thick), with Lambeth Group soils below.

4.6. The soil parameters given in Section 10.1 of the BIA generally do not correlate with those recommended in Section 6.2 of the Site Investigation report presented in Appendix 2 of the BIA. The soil parameters used in the retaining wall design in Appendix 11 of the BIA are also different to those given in Section 10.1 or Appendix 2. Section 6.2 of the Site Investigation report indicates that some of the geotechnical laboratory testing data had yet to be received at the time of reporting. Section 7 of the Site Investigation report states that “a geotechnical

appraisal is in progress and the report will be updated on completion". Soil parameters should be used consistently in all assessments and should be derived from all available site investigation data. The BIA should be updated to reflect the final site investigation report when it becomes available.

4.7. During drilling, groundwater seepage was encountered in the Made Ground, as well as in the London Clay and Lambeth Group. Monitoring standpipes were installed in the 4 boreholes and two subsequent monitoring rounds were carried out. The borehole logs indicate that the standpipes were a maximum of 1.50m deep, targeting the Made Ground only. Groundwater levels were recorded at between 0.20m and 0.48m depth, which is considered to be representative of perched water that is local and discontinuous. No monitoring of groundwater within the London Clay or Lambeth Group was undertaken. A characteristic groundwater level should be specified in the conceptual ground model and used in subsequent assessments.

4.8. The BIA indicates that the shallowest geology at the site is London Clay Formation, which is designated an 'unproductive' aquifer. There is no water course within 100m of the site and the proposed development will not result in any changes in the proportion of hard surfaced/paved areas. Section 4.9.2 of the BIA indicates that the site has a very low risk of groundwater flooding. It is accepted that the development will have no impact the hydrogeological environment.

4.9. The proposed development will not change the proportion of hard surfacing at the site, however, as surface water flows will change due to a reconfiguration of the site, the BIA indicates that SUDS will be required at the site. The Flood Risk Assessment and Drainage Strategy reports provide details of the proposed SUDS strategy, which includes the use of blue roofs and an attenuation tank within the basement. As such, it is accepted that the development will not significantly impact the hydrology of the area.

4.10. The topographic survey in Appendix 7 of the BIA shows the site to slope from approximately 17.0m OD in the north to approximately 18.5m OD in the south. It is accepted that the proposed development will not impact the slope stability of the area.

4.11. Section 10.2.3 of the BIA presents a Construction and Temporary Works sequence for the development. The sequence indicates that firstly, the existing building will be demolished to ground level. The secant pile wall and capping beam will then be installed from ground level. The Construction Management Plan (CMP) also indicates piling will take place from the ground floor slab. The calculations for the Basement Retaining Wall Design presented in Appendix 11 of the BIA adopt a ground level of 12m OD. Further clarification is required regarding the level from which piles will be installed.

4.12. The BIA has not confirmed the presence of basements in the neighbouring buildings, however it is indicated in Section 7.2 that it has been conservative assumed that neighbouring foundations are at ground level.

4.13. Section 10.3 of the BIA presents a Ground Movement and Damage Impact Assessment. It is stated that the Ground Movement Assessment (GMA) has been carried out in accordance with CIRIA C760 and considers the site specific ground and groundwater conditions. It is indicated that the full calculations and assessment, for both the GMA and an assessment of adjacent Thames Water assets, are presented in the appendix, however the only data presented are the output data for the Thames Water asset assessment. It is accepted that discussions with Thames Water are ongoing, however, the impact of the basement on the surrounding highways should be assessed. .

4.14. Appendix 5 of the BIA presents the results of a Building Damage Assessment (BDA). The data are presented as coloured contour plots. No calculations, input parameters or output data are provided for the GMA and BDA. The critical sections assessed appear to be the frontages of the properties along Crestfield Street to the northeast and Belgrove Street to the southwest. These sections are parallel with their nearest secant pile walls, and are therefore not considered to be the most sensitive walls. The walls that are oriented perpendicular from these frontages should also be assessed, as they are likely to experience a greater degree of differential movement over their length.

4.15. Section 8.2 of the BIA indicates that there are ongoing discussions between the design team and LUL about forming an entrance from the basement to access the underground pedestrian tunnel underneath Euston Road. The BIA states that the design of this connection is not part of the BIA report and will be considered in the architect's design. Two tunnels are shown emerging from the northern edge of the building and the impacts of these excavations should be considered in the GMA.

4.16. Section 10.3.1 of the BIA states that a stress assessment using PDisp will be carried out for the LUL tunnel that underlies the northwest side of the site "in the next stage". The BIA confirms that discussions with LUL are ongoing.

4.17. Section 10.4 of the BIA indicates that surveys and monitoring of the surrounding buildings will be undertaken during construction. The BIA indicates that further assessment will be carried out as details of third party assets become available, and acknowledges the requirement for agreements with third parties to be in place for the development.

5.0 CONCLUSIONS

5.1. The BIA has been carried out by AKT II. The Non Technical Summary of the BIA indicates that individuals with appropriate qualifications have been involved in its review or approval.

5.2. The BIA indicates that the proposed double basement will be formed by a secant pile retaining wall. The maximum excavation is indicated to be 10.7m (comprising a 9m deep basement and a 1.7m thick basement raft) however this depth has also been presented as 17.25m. Confirmation of the basement excavation depth is required. It should also be confirmed whether tunnels are to be constructed beneath the footpath on the northern edge of the basement.

5.3. A site investigation has been undertaken and indicates the site to be underlain by London Clay over Lambeth Group. The BIA should be updated to reflect the findings of the site investigation. Soil parameters should be presented and used consistently in the BIA and in all appended assessments therein. A characteristic groundwater level should be identified for the site.

5.4. It is accepted that the proposed development will not have a significant impact on the hydrogeology or slope stability of the area. With the proposed SUDS and attenuation measures, it is accepted that the proposed development will not impact the hydrology of the area.

5.5. Clarification of the construction sequence and the level from which the secant pile wall will be installed is required.

5.6. Full input and output data should be provided to support the conclusions of the Ground Movement Assessment (GMA) and the Building Damage Assessment (BDA). The BDA should include assessment of the most sensitive adjacent structures that are perpendicular to the basement retaining wall and the highways.

5.7. The proposed tunnel(s) below Euston Road should be considered in the GMA.

5.8. The BIA indicates monitoring of surrounding buildings and assets will be required, and acknowledges the requirement for third party asset protection agreements to be in place for the development. Discussions with London Underground and Thames Water are confirmed to be ongoing

5.9. 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

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
London Underground	N/A	-	Proximity of the site to underground tunnels and infrastructure	The BIA indicates that a more detailed impact assessment will be undertaken in line with TfL requirements and communication with TfL is underway. Further review is beyond the scope of this audit.
Thames Water	N/A	21/09/20	Impact of piling near sewerage utility infrastructure	A Utility Damage Assessment has been carried out and indicates ground movements are within acceptable limits. Further discussion is to be undertaken with TWUL and is beyond scope of this audit.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	The basement excavation depth should be confirmed and presented consistently throughout the BIA.	Open	
2	Stability	The proposed basement construction (depth, level from which the piled wall being installed, and excavation of tunnels) should be confirmed.		
3	Stability	Soil parameters should be presented based on the site investigation report and adopted consistently in the BIA and appended assessments.	Open	
4	Stability	A characteristic groundwater level should be identified in the ground model.	Open	
5	Stability	Full input and output data should be provided to support the conclusions of the Ground Movement Assessment, and the Building Damage Assessment	Open	
6	Stability	Full input and output data should be provided to support the conclusions of the Ground Movement Assessment, and the Building Damage Assessment. The impacts from the tunnel(s) emerging from the basement should be included in the assessments.	Open	
7	Stability	The Building Damage Assessment should include the most sensitive structures, which are oriented perpendicular to the basement retaining wall	Open	

Appendix 3: Supplementary Supporting Documents

None

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