CampbellReith
consulting engineers

# Belgrove House
# London WC1H 8AA

## Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13398-48
Revision: F1

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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.

1.6. Soil parameters and groundwater assumptions are based on the site investigation data 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.

1.9. The revised BIA submission indicates that damage to surrounding properties will not exceed Burland Category 1. No significant impact to surrounding infrastructure is expected.

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. Based on the revised submission, it can be confirmed that the BIA complies with the requirements of CPG: Basements.

## 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

2.8. Additional supplementary information was provided to CampbellReith in response to the queries raised in Appendix 2 of the initial audit, as follows:

- Basement Impact Assessment (BIA) by AKT II Consulting Structural and Civil Engineers, rev 04, dated 07 December 2020.

## 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:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | Yes | |
| Hydrogeology Screening:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | Yes | |
| Hydrology Screening:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | Yes | |
| Is a conceptual model presented? | Yes | |
| Land Stability Scoping Provided?<br>Is scoping consistent with screening outcome? | Yes | |

| Item | Yes/No/NA | Comment |
|---|---|---|
| Hydrogeology Scoping Provided?<br>Is scoping consistent with screening outcome? | N/A | No issues brought forward. |
| Hydrology Scoping Provided?<br>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 | |
| Does the geotechnical interpretation include information on retaining wall design? | Yes | |
| 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 | |
| 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? | Yes | Based on the revised BIA submission. |
| 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 | The revised submission provides an appropriate Ground Movement Assessment. |
| Does report state that damage to surrounding buildings will be no worse than Burland Category 1? | Yes | |
| 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. The revised BIA submission indicates the underside of the basement slab will be formed at two levels; 6.30m OD in the north and 4.80m OD in the south. The basement excavation depth is presented consistently throughout the revised BIA submission.

4.5. A site investigation was carried out at the site by Soiltechnics 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. 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. The revised BIA includes subsequent correspondence from Soiltechnics, which gives revised soil parameters based on the results of the lab testing that was outstanding. The soil parameters presented in the revised BIA submission are used consistently in all assessments and retaining wall design. The revised BIA has adopted a different design line to derive undrained shear strength within the London Clay, to that which is presented in the correspondence from Soiltechnics. However, based on the site

investigation data provided, the design line used in the BIA is considered representative of ground conditions at the site.

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. The BIA identifies that the ground model adopts a water level representative of the perched water encountered. The retaining wall assessment in Appendix 11 adopts a characteristic groundwater level of 14m OD.

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. The calculations for the Basement Retaining Wall Design presented in Appendix 11 of the revised BIA submission now uses a configuration that is consistent with the revised maximum basement excavation depth. The Ground Movement Assessment (GMA) also uses a geometry consistent with the revised scheme. .

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 conservatively assumed that neighbouring foundations are at ground level.

4.13. Section 10.3 of the BIA presents a Ground Movement and Damage Assessment. It is stated that the GMA has been carried out in accordance with CIRIA C760 and considers the site specific ground and groundwater conditions. The revised BIA submission provides the full calculations and assessment, for both the GMA and an assessment of adjacent Thames Water assets. It is accepted that discussions with Thames Water are ongoing. Section 11.1 of the revised BIA submission indicates that no significant impacts are expected to the surrounding infrastructure. Section 10.3 of the revised BIA submission indicates that an Approval in Principle document will be required regarding the roads surrounding the site, in accordance with the provisions of the Highway Agency and LBC.

4.14. Appendix 5 of the BIA presents the results of the Building Damage Assessment (BDA). The revised BIA submission presents full input and output data, as well as coloured contour plots. Additional critical sections have been analysed to ensure the worst case movements are assessed. The BDA indicates that the development will not result in movements in excess of Burland Category 1 (Very Slight).

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. This should be included as part of the ongoing discussions with TfL/LUL.

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 level is indicated to be 6.30m OD in the north and 4.80m OD in the south, and is presented consistently throughout the BIA.

5.3. A site investigation has been undertaken and indicates the site to be underlain by London Clay over Lambeth Group. The revised BIA reflects the findings of the site investigation, including all outstanding laboratory testing. Soil parameters are presented and used consistently and a characteristic groundwater level has been 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. Full input and output data has been provided to support the conclusions of the Ground Movement Assessment (GMA) and the Building Damage Assessment (BDA). The BDA indicates damage to neighbouring structures will not exceed Burland Category 1 (Very Slight). No significant impact to the infrastructure surrounding the site is anticipated and an Approval in Principal will be required in accordance with the provisions of the Highways Agency and LBC.

5.6. 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.

5.7. Based on the revised submission, it can be confirmed that the BIA complies with the requirements of CPG: Basements.

# 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. | Closed | 30/11/20 |
| 2 | Stability | The proposed basement construction (depth, level from which the piled wall being installed, and excavation of tunnels) should be confirmed. | Closed | 08/12/20 |
| 3 | Stability | Soil parameters should be presented based on the site investigation report and adopted consistently in the BIA and appended assessments. | Closed | 08/12/20 |
| 4 | Stability | A characteristic groundwater level should be identified in the ground model. | Closed | 08/12/20 |
| 5 | Stability | Full input and output data should be provided to support the conclusions of the Ground Movement Assessment, and the Building Damage Assessment | Closed | 08/12/20 |
| 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. | Closed | 08/12/20 |
| 7 | Stability | The Building Damage Assessment should include the most sensitive structures, which are oriented perpendicular to the basement retaining wall | Closed | 08/12/20 |

# Appendix 3: Supplementary Supporting Documents

None

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