CampbellReith
consulting engineers

# 13 Prince Albert Road
# London, NW1 7SR

## Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-61

Revision: D1

April 2017

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## Document History and Status

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## Document Details

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## Contents



## Appendix

## 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 13 Prince Albert Road, London NW1 7SR (planning reference 2016/7048/P and 2016/5051/L). The basement is considered to fall within Category C as defined by the Terms of Reference.

1.2. The Audit reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures.

1.3. CampbellReith was able to access LBC's Planning Portal and gain access to the latest revision of submitted documentation and reviewed it against an agreed audit check list.

1.4. The proposed development includes construction of an additional basement level and alteration to a current lightwell. There is minor alteration to the lower ground floor and ground floor.

1.5. The application refers to a previously accepted application from 2011. The application requests an increase in basement depth from the 2011 submission to accommodate services. Approval from the utilities provided is not included.

1.6. The house and surrounding structures, including those sharing a Party Wall, are indicated as being grade I listed.

1.7. A BIA and a Structural Methodology have been provided for review. The BIA prepared by Geotechnical and Environmental Associates (GEA) includes the desk study, screening and scoping, a record of a ground investigation and an impact assessment. The Structural Methodology prepared by Richard Tant Associates (RTA) includes a proposed basement construction sequence, temporary work systems and some structural calculations. The authors' qualifications are in accordance with CPG4 guidelines for all sections. Information on the ground movement associated with basement construction and a monitoring strategy are not provided.

1.8. The BIA includes the majority of the information required from a desk study in line with the GSD Appendix G1. However, with the exception of Thames Water, it is unknown whether utility companies have been approached with regards to the presence of underground infrastructure within the development's zone of influence. No works programme is presented. An up-to-date site walkover is not included.

1.9. The ground conditions comprise Made Ground underlain by London Clay. A location plan for the ground investigation and an interpretative geotechnical report are not provided within the available documents.

1.10. The London Clay is classified as an Unproductive Strata and the site is not located within a Groundwater Source Protection Zone. Groundwater was encountered at approximately 4.0m bgl during progression of one of the window sampler holes. A standpipe was installed but not successfully monitored. Groundwater monitoring is recommended for design and construction purposes.

1.11. The current basement is founded in the London Clay and the proposed development would be founded deeper within the London Clay and at some distance from surrounding basements. As such the proposed development is not considered to adversely affect the hydrogeology.

1.12. It is accepted that the proposed development is at a low risk of flooding.

1.13. It is stated that there will be no change in permeable site area due to the proposed development. However, this is unclear within the drawings and further review is recommended. Soakaway or attenuation SUDS options may need to be considered.

1.14. Structural calculations have only been presented for the Party Wall, the assumptions are not justified with a geotechnical interpretative report. A Ground Movement Assessment (GMA) and calculations for other nearby features such as the adjoining property and Prince Albert Road are not provided. An indication of Damage Impact in accordance with the Burland Scale has not been provided.

1.15. The temporary works provided require assessment for stability of excavating adjacent to the underpinned building.

1.16. No structural monitoring is mentioned. This should be reviewed following submission of the GMA and other reference documents.

1.17. It is accepted that there are no land stability impacts caused by slopes.

1.18. Queries and matters requiring further information or clarification are discussed in Section 4 and summarised in Appendix 2. Until the additional information requested has been provided it is not possible to assess whether the requirements of CPG4 have been met.

## 2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 21st March 2016 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 13 Prince Albert Road, London, NW1 7SR, Camden Reference 2016/7048/P.

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) 4: Basements and Lightwells.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.

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: "*Construction of basement extension with plant room and outlet, enclosed lightwell, relocated new tree all within front garden (Retrospective amendment to ref: 2011/6227/P dated 26/04/2012).*"

2.6. CampbellReith accessed LBC's Planning Portal on 4 April 2016 and gained access to the following relevant documents for audit purposes:

- Desk Study and Basement Impact Assessment Report – Revision 4 (ref J11186) dated 15th December 2016 by Geotechnical and Environmental Associates Limited.
- Structural Methodology Report – Revision E (ref RT/3561/RevE) dated 19th December 2016 by Richard Tant Associates.
- Design and Access Statement New (ref 13 Prince Albert Road) dated December 2016 by Hugh Cullum Architects Limited.

## 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

| Item | Yes/No/NA | Comment |
|---|---|---|
| Are BIA Author(s) credentials satisfactory? | Yes | The author's qualifications are in accordance with CPG4 guidelines for all sections. |
| Is data required by Cl.233 of the GSD presented? | No | Information is broadly in line with the GSD Appendix G1. Assumptions have been made with regard to underground infrastructure – utility records should be confirmed. No programme has been provided. An up-to-date site walkover is not provided. |
| Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology? | No | The application has included indicative temporary works that are to be designed by the contractor. The suggested method provided has a potential stability issue in Stage 3. |
| Are suitable plans/maps included? | No | Arup GSD and Camden SFRA map extracts could be included. |
| Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail? | No | As above. |
| Land Stability Screening:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | No | "No" answers are not justified, however most potential impacts have been correctly identified. |
| Hydrogeology Screening:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | No | Some "No" answers are not justified, however the potential impacts have been identified. |
| Hydrology Screening:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | No | Clarity is required with regard to Q3. |

| Item | Yes/No/NA | Comment |
|---|---|---|
| Is a conceptual model presented? | Yes | A site plan showing the site investigation locations is not included but may be within the October 2012 site investigation report which has not been provided. No groundwater monitoring has been undertaken at the site. |
| Land Stability Scoping Provided?<br>Is scoping consistent with screening outcome? | Yes | |
| Hydrogeology Scoping Provided?<br>Is scoping consistent with screening outcome? | Yes | |
| Hydrology Scoping Provided?<br>Is scoping consistent with screening outcome? | No | No SUDS proposed. The Screening process states the impermeable area is not changed by the proposed development which is not clear in the provided drawings. |
| Is factual ground investigation data provided? | Yes | A cable percussion log and two window sampler logs but no location plan. |
| Is monitoring data presented? | No | A single round of groundwater monitoring was attempted. The standpipe was blocked at 2m. Monitoring is recommended. |
| Is the ground investigation informed by a desk study? | Yes | Comments relating to this are included in section 1.0 of the BIA. |
| Has a site walkover been undertaken? | Unknown | No comment is made on site walkover. An up-to-date walkover survey should be provided. |
| Is the presence/absence of adjacent or nearby basements confirmed? | Yes | Answer to Q13 of the stability screening assessment indicates that adjacent properties have shallow foundations. |
| Is a geotechnical interpretation presented? | No | Section 3 of BIA prepared by GEA includes geological information. No geotechnical information is presented in the BIA. |

| Item | Yes/No/NA | Comment |
|---|---|---|
| Does the geotechnical interpretation include information on retaining wall design? | No | Refer to Section 4. |
| Are reports on other investigations required by screening and scoping presented? | No | The Structural Methodology report by RTA refers to advanced geotechnical analysis for a deep sewer that crosses the corner of the site but it has not been provided. Ground Movement Assessments for the adjacent building, highway and shallow sewer are not provided. |
| Are baseline conditions described, based on the GSD? | No | Refer to Section 4. |
| Do the base line conditions consider adjacent or nearby basements? | No | Refer to Section 4. |
| Is an Impact Assessment provided? | Yes | Impact assessments are provided in sections 5.0, 6.0 and 7.0 of the BIA but not all potential impacts have been fully assessed. |
| Are estimates of ground movement and structural impact presented? | No | Settlement and ground movement assessment is not provided nor referenced. |
| Is the Impact Assessment appropriate to the matters identified by screen and scoping? | Yes | However, the effect of the proposed development on the amount of impermeable area should be clearly demonstrated or drainage assessment should be provided. Also ground movement assessments and building damage assessments should be provided for the surrounding structures. |
| Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme? | No | Clarification of proposed development area or drainage assessment should be provided in line with CPG4 3.51. Information on the conceptual model (groundwater), geotechnical information and assessment of neighbouring basement stability should be provided. |
| Has the need for monitoring during construction been considered? | No | Monitoring is recommended of the existing blocked standpipe. No other monitoring is discussed. |

| Item | Yes/No/NA | Comment |
|---|---|---|
| Have the residual (after mitigation) impacts been clearly identified? | No | Long term ground movements are not discussed. |
| Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained? | No | No demonstration is provided. |
| Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment? | No | Clarification of proposed development area or drainage assessment should be provided in line with CPG4 3.51. |
| Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area? | No | Refer to Section 4. |
| Does report state that damage to surrounding buildings will be no worse than Burland Category 2? | No | No comment is provided on the Burland Scale |
| Are non-technical summaries provided? | No | However, the BIA is written so as to be understandable. |

## 4.0 DISCUSSION

4.1. A BIA and a Structural Methodology have been provided for review. The BIA prepared by Geotechnical and Environmental Associates (GEA) includes the desk study, screening and scoping, a record of a ground investigation (including three logs), impact assessment and Envirocheck report. The Structural Methodology prepared by Richard Tant Associates (RTA) includes the proposed basement construction sequence, temporary work systems and some structural calculations. The authors' qualifications are in accordance with CPG4 guidelines for all sections.

4.2. The proposed development makes reference to an approved basement level. Based on our understanding and information in the Design and Access Statement the proposed development is an amendment to the 2011/6460/L and 2011/6227/P applications. The previously approved basement is no longer possible due to the requirement for the Thames Water soil main to remain in its current location, and therefore the basement is to be deepened. Due to the date of the previous application the current BIA requirements may not be met by the previous assessment.

4.3. The proposed development includes excavations in the front and rear garden and construction of an additional basement level beneath the existing lower ground floor level by approximately 3.6m. There is an additional 1.9m excavation to 5.5m below lower ground floor level for a swimming pool. Based on the architect drawings provided the total excavation depth is in the order of 8.6m beneath the front driveway (adjacent to Prince Albert Road) and 4.3m beneath the rear garden. The proposed basement extends beyond the current footprint of the building into both the front and rear gardens.

4.4. The site and surrounding structures, including those sharing Party Walls, are indicated as being grade II listed.

4.5. The suggested construction methodology includes stepped underpinning of the Party Wall with 12 Prince Albert Road. The underpins are not specified and only shown indicatively on plans appended to the Structural Methodology report at the Party Wall with number 12 Prince Albert Road. The areas of basement outside the existing building footprint are to be formed within a contiguous piled wall with a reinforced concrete liner. A suggested method of works with sequencing of a contiguous pile wall with temporary props and struts is provided. It should be noted that Stage 3 of the suggested method of works indicates an approximately 4m high unreinforced vertical cutting adjacent to the underpins. This stage should be checked for structural stability.

4.6. The BIA includes the majority of the information required from a desk study in line with the GSD Appendix G1. However, with the exception of Thames Water it is unknown if utility companies have been approached with regards to the presence of underground infrastructure within the development's zone of influence. These records should be obtained and presented, including an impact assessment and mitigation proposals, if required. Also a work programme and quantification of any impacts arising from it have also not been provided.

4.7. Baseline conditions are not fully represented as the depth of current basement is not provided, the groundwater table is unknown due to unsuccessful monitoring and the neighbouring foundations are not accurately known. An up-to-date site walkover survey is required.

4.8. A site investigation has been undertaken comprising a cable percussion borehole at the front of the house to 20m bgl and two window sample boreholes to a maximum depth of 6.0m bgl. The ground conditions comprise Made Ground underlain by London Clay (firm to stiff clay). A location plan for these holes and an interpretative geotechnical report are not provided within the available documents and should be.

4.9. The London Clay is classified as an Unproductive Strata and the site is not located within a Groundwater Source Protection Zone. Groundwater was encountered at approximately 4.0m bgl during progression of one of the window sampler holes. A standpipe was installed in the cable percussion hole to 7.0m bgl however it was never successfully monitored as the first attempt to monitor indicated a block at 2.0m where it was dry. The proposed development will extend below the level of the groundwater strike and therefore groundwater monitoring is recommended to confirm the extent of flow at the groundwater strike and provide information for pile and retaining wall design.

4.10. It is accepted that the proposed development will not adversely affect the hydrogeology. The current basement is already founded within the London Clay and therefore deepening the excavation within the London Clay will not affect groundwater flow. Although the area of basement is increased, the basement extension is remote from other basements. There are no other hydrogeological concerns such as ponds or lost rivers shown in the area.

4.11. It is accepted that the site not in a Flood Risk Zone and is at low risk of flooding. The site is within a Critical Drainage Area (Group 3-010) which requires a drainage assessment to be undertaken if impermeable areas are increased.

4.12. It is stated that there will be no change in impermeable site area due to the proposed development; however, review of the drawings provided does not permit this to be verified. It is requested that this is demonstrated or that a drainage assessment will be completed. Neither soakaway or attenuation SUDS options have been considered (as required in CPG4, Section 3.51) to reduce peak discharge flows. An outline drainage strategy, which considers

implementation of SUDS and with sufficient assessment to demonstrate discharge flows will be in accordance with LBC's and Thames Water's requirements, should be provided. Alternately, if considered impracticable, a statement indicating why SUDS cannot be implemented should be presented within the drainage strategy.

4.13. Structural calculations for the Party Wall have been included based on a $K_a$ value of 0.33. A Ground Interpretation Report has not been provided and the retained material appears to be London Clay so the justification for this value is unclear. An allowable bearing capacity of 160kPa has also been cited but not justified by a geotechnical report. No structural design information is presented for the contiguous pile wall.

4.14. A Ground Movement Assessment (GMA) and calculations for the adjoining property and nearby Prince Albert Road have not been included. The foundations beneath the neighbouring building are stated as shallow foundations and this should be confirmed for the BIA. There has been no assessment of Damage Impact to surrounding structures, in accordance with the Burland Scale.

4.15. It is stated in the Structural Methodology report that two sewers cross the site, one at shallow depth and one at 18m, and that Thames Water have approved the scheme. Confirmation of this approval should be provided.

4.16. No structural monitoring is mentioned. This should be reviewed following submission of the GMA and other reference documents.

4.17. It is accepted that there are no concerns regarding slope stability.

4.18. Non-technical summaries should be provided within any revisions to the BIA submitted.

## 5.0 CONCLUSIONS

5.1. The qualifications of the authors are in accordance with LBC requirements.

5.2. The proposed development includes excavations in the front and rear garden and construction of an additional basement level beneath the existing lower ground floor level. There is an additional excavation for a swimming pool. The total depths are approximately 8.6m in the front garden and 4.3m in the rear garden. The site and surrounding structures, including those sharing Party Walls, are indicated as being grade II listed.

5.3. Information within the BIA is broadly in line with the recommendations in the GSD Appendix G1. The presence of underground utility infrastructures not owned by Thames Water within the zone of influence should be identified. No works programme or up-to-date site walkover survey has been provided and should be.

5.4. Three borehole logs from a previous site investigation confirm the underlying ground conditions to comprise Made Ground over London Clay; however the location of these exploratory holes is unknown. Groundwater was encountered at approximately 4.0m bgl. The data is reported to be included within an interpretative report that has not been provided as part of the submission documents. Groundwater monitoring has not been undertaken at the site and is required to inform design and construction.

5.5. It is accepted that the proposed development will not impact the wider hydrogeological environment.

5.6. It is accepted that the site is at low risk of flooding.

5.7. Confirmation of changes to the impermeable is required or drainage assessment should be presented including the consideration of SUDS, in accordance with CPG4 3.51.

5.8. Structural calculations for the Party Wall have been provided; however, without a geotechnical interpretative report the assumptions cannot be justified. No structural calculations have been provided for the other retaining structures and a Ground Movement Assessment (GMA) has not been presented for the adjoining property or Prince Albert Road. No comment is provided on Damage Impact to surrounding structures, in accordance with the Burland Scale.

5.9. The suggested temporary works plan shows a vertical unsupported face adjacent to the proposed underpins at Stage 3. Assessment for stability should be provided.

5.10. An outline for structural monitoring is not presented, which will need to be agreed under the Party Wall Act. The suitability of the proposed trigger values will be considered after provision and review of the GMA calculations and reference materials requested. The GMA should reflect

the depth of and distance to the existing foundations of affected properties and the findings of an up-to-date walkover survey.

5.11. It is accepted that there are no land stability impacts caused by slopes.

5.12. Non-technical summaries should be provided within any revisions to the BIA submitted.

5.13. Queries and matters requiring further information or clarification are summarised in Appendix 2. Until the additional information requested has been provided it is not possible to assess whether the requirements of CPG4 have been met.

# Appendix 1: Residents' Consultation Comments

None

# Appendix 2: Audit Query Tracker

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Audit Query Tracker

| Query No | Subject | Query | Status/Response | Date closed out |
|---|---|---|---|---|
| 1 | BIA | Underground infrastructure | Open – Underground utility infrastructure information for **all** utilities should be provided. The impact assessment should be updated, if required. Information on underground structures should be provided. | |
| 2 | BIA | Site investigation factual report; location of exploratory holes, GEA Ground Investigation Report ref J11186A dated 26 Oct 2012 is referenced in the Audit Instruction | Open – to be provided | |
| 3 | BIA | Site investigation interpretative report; parameters for retaining wall design | Open – to be provided | |
| 4 | BIA | Non-technical summaries | Open – to be provided | |
| 5 | BIA | Walkover survey | Open – to be provided | |
| 6 | BIA | Works programme | Open – to be provided | |
| 7 | Surface Water Flow | Confirmation of change in impermeable site area required. | Open – to be provided including SUDS proposals if appropriate. | |
| 8 | Subterranean Water Flow | Lack of groundwater monitoring and assessment | Open – to be provided | |
| 9 | Subterranean Water Flow | Site Engineering Surveys Ltd Monitoring Report SES-8835-MR156 dated September 2016 is referenced in the Audit Instruction | Open – to be provided | |
| 10 | Land Stability | GMA calculations and references | Open – to be provided | |
| 11 | Land Stability | Outline structural monitoring proposals | Open – to be reviewed in association with GMA calculations. | |
| 12 | Land Stability | Outline structural calculations | Open – to be provided | |

| | | | | |
|---|---|---|---|---|
| 13 | Land Stability | Temporary stability | Open – to be provided | |
| 14 | Land Stability | Thames Water approvals | Open – to be provided | |

# Appendix 3: Supplementary Supporting Documents

None

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