CampbellReith
consulting engineers

# 36 Avenue Road
# London NW8 6HS

## Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12066-38
Rev: D1

September 2015

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## Document History and Status

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## Document Details

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## Appendices

## 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 36 Avenue Road, London NW8 6HS (planning reference 2015/3328/P). The basement is considered to fall within Category B 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 review it against an agreed audit check list.

1.4. It has been confirmed that the development site does not involve a listed building, however it is located with the Elsworthy Road Conservation area which does contain a number of listed buildings. The site is also located close to the St John's Wood Conservation area which contains a number of listed buildings approximately 200m from the proposed development site.

1.5. There is an existing three storey (including basement) building on site that is to be entirely demolished. The proposed new building is to be five stories (including double level basement) and will be excavated and constructed utilising established techniques.

1.6. The majority of the basement wall is to be piled with an internal reinforced concrete liner wall. This is a suitable method of construction for a two level basement. The walls are to be propped during the temporary and permanent cases.

1.7. The BIA has confirmed that the proposed basement will be founded within the London Clay Formation and that the surrounding slopes are stable.

1.8. Groundwater was not discovered within the 20m depth of the boreholes carried out during the site investigations, nor within the standpipe that was installed and monitored for a six month period.

1.9. It is noted that the construction of the basement has no potential to influence ground water flow.

1.10. It is accepted that the risk of surface water flooding the buildings is low, despite flooding recorded in the street in 2002.

1.11. The BIA indicates that although the area of hard standing will be increased, SUDS will be provided above this part of the basement. It is accepted that will not significantly alter the existing surface water drainage conditions.

1.12. The ground movement assessment provided indicates that damage to the adjacent properties will be category 2 or less on the Burland scale.

## 2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 20th July 2015 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 36 Avenue Road, NW8 6HS Reference 2015/3328/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 the "*Demolition of the existing single family dwelling house and replacement with a three storey detached house in association with the excavation of the basement and hard and soft landscaping*"

The Audit Instruction also confirmed that the basement proposals did not involve a listed building but listed buildings were located further along the road.

2.6. CampbellReith accessed LBC's Planning Portal on 25th July 2015 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment by Site Analytical Services Ltd, incorporating;
  - Surface water and floor risk assessment
  - Ground movement assessment report

- Structural Report by Elliott Wood LLP
- Construction management plan
- Arboricultural impact assessment report by Landmark Trees
- Report on a Ground Investigation by Site Analytical Services Ltd
- Drawings;

  AVA-P-080 Proposed basement level B2

  AVA-P-090 Proposed basement level B1

  AVA-P-100 Proposed ground floor plan

  AVA-P-200 Proposed section AA

  AVA-P-210 Proposed section BB

  AVA-P-300 Front elevation

  AVA-P-310 Side elevation

## 3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

| Item | Yes/No/NA | Comment |
|---|---|---|
| Are BIA Author(s) credentials satisfactory? | Yes | The authors of the BIA and the appended reports have satisfactory credentials. |
| Is data required by Cl.233 of the GSD presented? | Yes | The property is detached and is to be entirely rebuilt. Information provided as relevant. |
| Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology? | Yes | BIA Sections 2, 3, 4, and 5 |
| Are suitable plan/maps included? | Yes | BIA and drawings. |
| Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail? | Yes | BIA |
| Land Stability Screening:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | Yes | BIA Section 2.8 |
| Hydrogeology Screening:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | Yes | BIA Section 2.8 |
| Hydrology Screening:<br>Have appropriate data sources been consulted?<br>Is justification provided for 'No' answers? | Yes | BIA Section 2.8 |
| Is a conceptual model presented? | Yes | Section 4 |
| Land Stability Scoping Provided? | Yes | BIA Section 3.1 |

| Item | Yes/No/NA | Comment |
|---|---|---|
| Is scoping consistent with screening outcome? | | |
| Hydrogeology Scoping Provided?<br>Is scoping consistent with screening outcome? | Yes | BIA Section 3.1 |
| Hydrology Scoping Provided?<br>Is scoping consistent with screening outcome? | Yes | BIA Section 3.1 |
| Is factual ground investigation data provided? | Yes | BIA section 4 |
| Is monitoring data presented? | Yes | BIA section 4 |
| Is the ground investigation informed by a desk study? | Yes | BIA section 2 |
| Has a site walkover been undertaken? | Yes | Yes this was carried out on 3rd November 2014 |
| Is the presence/absence of adjacent or nearby basements confirmed? | Yes | It has been confirmed that number 38 has a basement up to the site boundary. It is not confirmed if number 34 (separated by a narrow road) has an existing basement. |
| Is a geotechnical interpretation presented? | Yes | BIA section 4.2 |
| Does the geotechnical interpretation include information on retaining wall design? | Yes | Report on a Ground Investigation by SAS Ltd |
| Are reports on other investigations required by screening and scoping presented? | Yes | Ground investigations and arboricultural report were carried out following scoping stage. |
| Are baseline conditions described, based on the GSD? | Yes | BIA section 4 |
| Do the base line conditions consider adjacent or nearby basements? | Yes | Ground Movement Assessment |

| Item | Yes/No/NA | Comment |
|---|---|---|
| Is an Impact Assessment provided? | Yes | Ground Movement Assessment |
| Are estimates of ground movement and structural impact presented? | Yes | Ground Movement Assessment |
| Is the Impact Assessment appropriate to the matters identified by screen and scoping? | Yes | Each potential impact identified by scoping was discussed within section 5 of the BIA and the appended reports. |
| Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme? | Yes | Contiguous piled wall to be used along boundary with existing basement. A monitoring strategy is to be developed. SUDs in order to attenuate surface water flow into the sewer system. |
| Has the need for monitoring during construction been considered? | Yes | BIA section 5.2 |
| Have the residual (after mitigation) impacts been clearly identified? | Yes | Surface water flooding has been identified as a low residual risk. |
| Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure been maintained? | Yes | Ground Movement Assessment |
| Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment? | Yes | A small increase in hardstanding is to be mitigated with SUDs. |
| Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area? | - | Not possible to confirm. This has not been discussed. |
| Does report state that damage to surrounding buildings will be no worse than Burland Category 2? | Yes | The worst case damage has been found to be less than Burland Category 2 (slight) |
| Are non-technical summaries provided? | Yes | Each section of the BIA is concluded with a non technical summary |

## 4.0 DISCUSSION

4.1. The BIA has been carried out by an established firm of site investigation consultants, Site Analytical Services Ltd, who have employed the services of Structural Engineering consultants Elliott Wood, Geotechnical consultants Applied Geotechnical Engineering, and hydrological consultants Water Environment Limited to supplement the work needed to form the BIA. The authors and reviewers from all of these organisations have suitable qualifications.

4.2. The BIA confirms the presence of a neighbouring basement to 38 Avenue Road, this basement is confirmed as coming to the boundary between numbers 38 and 36 Avenue Road. The presence of other neighbouring basements is not discussed.

4.3. The property is confirmed to be within the vicinity of the historic River Tyburn. However it is confirmed that the River Tyburn is now fully culverted for its entire length.

4.4. The existing site comprises of an existing three storey property including a single basement level. It is proposed to be demolished and replaced with a new five storey property incorporating two basement levels. The plan size of the proposed basement is much larger than that of the existing basement, extending past the rear wall of the superstructure into the rear garden. The proposed basement also extends past the front wall of the super structure where a car lift / car storage area is located within the basement.

4.5. Site investigations were carried out and identified the geological conditions as 0.5m of made ground, overlaying 2m to 3.3m clay head, overlaying the London Clay formation to the depth of borehole (20m). Ground water was not encountered in any of the boreholes, nor was water recorded in standpipes that were monitored between June and December 2014. The shear strength of the London Clay at varying depth was determined from SPT and triaxial testing of samples.

4.6. The proposal is to demolish the existing super structure while retaining the existing basement and ground floor slab during the first stage of construction. The ground floor slab will be propped and used as a platform from which a new contiguous piled wall can be constructed from.

4.7. Tension piles are to be constructed prior to the ground level being reduced. The top section of the tension piles are to be unreinforced in order to be broken down as the ground level is reduced, leaving only a reinforced sections of pile below the basement level. This method demonstrates good practise as it helps to minimise heave during the construction stage as the weight on the subsoil is gradually being relieved as the ground level is lowered, as opposed to only once the final excavation depth has been reached.

4.8. The basement construction differs around the perimeter due to the existing site conditions and restraints. The majority of the basement wall is to be formed by a contiguous piled wall with an inboard reinforced concrete liner wall. Where the basement is adjacent to the neighbouring basement the wall will be formed by a reinforced concrete wall alone. In three areas the proposed basement wall will be in the same location as the existing basement wall which is to be demolished, in this case the existing wall is to be demolished in 1m strips with the new basement wall formed as reinforced concrete walls in an underpinning type sequence to complete the wall at B1 level. These walls will then themselves be underpinned by L shaped underpinning to form basement level B2 once the ground level has been reduced.

4.9. Waling beams and lateral propping are to be provided to the walls as the dig level is reduced. Once the formation level has been reached a suspected ground slab will be cast providing propping to the base of the walls. The slab at B1 level will then be cast, followed by the ground level slab. At each level the temporary propping will be removed once the respective slabs have been constructed and cured which will provide permanent lateral restraint to the walls.

4.10. The above described method and sequence of construction provides continuous lateral stability to the walls and piled walls during the temporary and permanent case. The use of contiguous piled walls where possible in combination with an inboard liner wall will help to limit surrounding ground movements. This method of construction and sequence of work is agreed to be a practical way to limit deflections during the construction and permanent stages.

4.11. A ground movement assessment has been produced in the geotechnical report by Applied Geotechnical Engineering. The movement assessment has been carried out following the guidance given in CIRIA C580 which gives a means to approximate ground movement caused by piled cantilevered walls. The movement calculated has led to a damage assessment for all three neighbouring properties (No 34 and 38 Avenue Road, and No 1 Radlett Road) of very slight or less (Burland damage category 1 or less).

4.12. The geotechnical report concludes that ground water flow is unlikely to be affected by the basement due to the basement being located wholly within the London Clay formation which generally does not contain groundwater flows, confirmed by the absence of ground water in the boreholes.

4.13. The surface water and floor risk report indicates that the property is located within flood zone 1 (low risk), however the road was flooded in 2002.

4.14. A small increase in impermeable surface area is proposed, however this has been mitigated by the provision of an attenuation tank at the front of the property, in order to slow down the rate of surface water entering the sewer system.

4.15. A movement monitoring regime is to be set up with trigger levels provided. The trigger levels are within the generally accepted industry standard limits.

4.16. The geological report confirms that there are no unstable slopes on the site and that the proposal will not cause the ground to become unstable.

4.17. An arboricultural impact report has been commissioned. This report confirmed the presence of 14 trees on site. None of the surveyed trees are under a tree preservation order, however the property stands within the Elsworthy Conservation area which requires the local authorities permission for all tree works. Due to the presence of the existing basement, adjusted root protections areas have been calculated and plotted taking into account how the existing basement would have directed root growth from a natural circular spread around the tree. The root protection areas for all trees to be retained has then been respected with regards to to positioning of the proposed basement.

## 5.0 CONCLUSIONS

5.1. The BIA has been carried out by established organisations. The authors and reviewers from all of these organisations have suitable qualifications.

5.2. The design of the basement and sequence of construction has ensured that lateral restraint is provided to retaining walls at all times during the permanent and temporary case. Best practise has been adopted in order to minimise the risk of ground movement or instability as confirmed by the method statement and sequence of construction.

5.3. The use of a contiguous piled with an reinforced concrete liner wall forming the internal face for the majority of the basements perimeter is considered good design for stability during both the permanent and construction stages.

5.4. Despite confirmation of surrounding basements or a lack of discussion of cumulative impact not having been provided, it has been confirmed that groundwater flows are unlikely to be disrupted by the construction of the basement due to the basement founding within the impermeable London Clay and the lack of water strike during site investigations.

5.5. Surface water runoff has been adequately considered, and while the amount of impermeable hard standing has been increased a surface water attenuation system has been incorporated into the design. The risk of flooding to the area as it stands is considered low.

5.6. The stability of existing trees that are desired to be retained has been considered by considering an amended root protection area based on the original basements location.

5.7. It has been confirmed that land stability will not be adversely affected by the construction of the proposed basement.

5.8. The damage assessment has concluded that the damage to the neighbouring properties caused by the construction of the basement will be very slight or less. This category is within the limit set by the London Borough of Camden.

5.9. Movement monitoring has been proposed and it is agreed that this should be carried out during the works.

5.10. Heave protection by way of tension piles and a suspended basement slab have been incorporated into the design. This is considered good design practice for a two storey basement in the London Clay.

# Appendix 1: Residents' Consultation Comments

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Residents' Consultation Comments

| Surname | Address | Date | Issue raised | Response |
|---|---|---|---|---|
| Elsworthy Advisory Committee | - | 6 August 2015 | Objection of the basements proximity to the neighbours. | The potential impacts of the basement on the neighbouring properties have been adequately considered and mitigated in the BIA and the supplementary reports. This has included production of a damage assessment report, subterranean construction method statement, and a consideration of ground water flows. |
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# Appendix 2: Audit Query Tracker

None

## Appendix 3: Supplementary Supporting Documents

None

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