CampbellReith
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43A Redington Road & NW3 7RA

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13693-21
Revision: F1

February 2022

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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 43A Redington Road (planning reference 2021/4234/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 reviewed it against an agreed audit check list.

1.4. It is proposed to deepen and extend the existing lower ground floor at the site.

1.5. The qualifications of the individuals involved in the BIA are in accordance with LBC guidance.

1.6. Architectural drawings have been updated and are fully dimensioned.

1.7. Screening and scoping assessments are presented, supported by desk study information. Impact assessments have been updated and are included in the revised BIA.

1.8. The site investigation indicates that the proposed basement will be founded in the Claygate Member which is considered to be a suitable founding stratum.

1.9. The geotechnical parameters to inform settlement, retaining wall calculations, foundation design and Ground Movement Assessment (GMA) are presented in the revised BIA and are accepted.

1.10. The BIA states that groundwater may be encountered during the basement excavation and indicates the potential need for localised dewatering from sumps. As the proposed gym will require a deeper excavation, the use of trench sheeting has been proposed to control the inflow of water into the excavation and maintain stability.

1.11. The Ground Movement Assessment (GMA) confirms that the anticipated damage from basement excavation will be within LBC's policy criteria.

1.12. The revised BIA presented an outline monitoring strategy to ensure movements are limited to those predicted.

1.13. Sustainable Drainage Strategy (SUDs) measures will be adopted to ensure that the surface water run-off will not increase as a part of the development. The drainage design will be subject to Thames Water and LBC approval.

1.14. Considering the additional information presented, it can be confirmed that the BIA complies with the requirements of Camden Planning Guidance: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 28 October 2021 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 43A Redington Road, London NW3 7RA, planning reference 2021/4234/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

- Camden Local Plan 2017 - Policy A5 Basements.
- Camden Planning Guidance (CPG): Basements. January 2021.
- 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 *"Erection of a single storey rear extension with terrace at first floor level, excavation at basement level for a two storey side infill extension with lightwells to the front and rear elevations and the conversion of the garage to a habitable room at lower ground and ground floor level."*

2.6. CampbellReith accessed LBC's Planning Portal on November 3, 2021 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) by SYMMETRYS Limited, ref: Draft Rev. P1 dated 31 August, 2021.

- Design and Access Statement by Salisbury Jones Planning dated 01 September, 2021.
- Geotechnical Interpretative Report by Geofirma Ltd, ref: 2021-028-SYM-RED/Rep.002, dated 27 August, 2021.
- Ground Movement Assessment Report by Geofirma Ltd, ref: 2021-028-SYM-RED/Rep.003, dated 27 August, 2021.
- Sustainable Drainage Assessment SuDS report by GeoSmart Information Ltd, ref: 75105.01R2, dated 27 August, 2021.
- Flood Risk Assessment report by GeoSmart Information Ltd, ref: 75105R1, dated 28 July, 2021.
- Structural Calculations Package by SYMMETRYS Limited, ref: 21141, dated 31 August, 2021.
- Structural drawings by SYMMETRYS Limited, dated August, 2021.
    - Temporary works and underpinning layout
    - Underpinning sequence
    - Ground Floor Plan
    - Sections
- Construction/Demolition Management Plan (CMP) by Paul Mew Associates – Traffic Consultants, ref: Version V1, dated 02 August, 2021.
- Architectural Drawings by Amos Goldreich Architecture, dated April, 2021.
    - Site Plans (draft)
    - Location and Block Plans
    - South-East Elevations
    - North-East Elevations (Front)
    - South-West Elevations
    - Roof Plans
    - Lower Ground Floor Plans
    - Ground Floor Plans
    - Existing and Proposed Section
- Planning Consultation Responses, by The Health & Hampstead Society, dated 20 October 2021.

2.7. Subsequent to the initial audit report, CampbellReith gained access to the following relevant documents

- Basement Impact Assessment Report (BIA) by SYMMETRYS Limited, ref: Revision C dated 27 January, 2022.
- Architectural Drawings by Amos Goldreich Architecture, dated April, 2021.
    - Site Plans (draft)
    - Location and Block Plans
    - South-East Elevations
    - North-East Elevations (Front)
    - South-West Elevations
    - Roof Plans
    - Lower Ground Floor Plans
    - Ground Floor Plans
    - Existing and Proposed Section
- Structural Calculations Package by SYMMETRYS Limited, ref: 21141, dated 14 January, 2022.
- Addendum to the Structural Calculation Package by SYMMETRYS Limited, ref: 21141, dated 14 January, 2022.
- Phase I Desk Study and Preliminary Risk Assessment by Geofirma Ltd, ref: 2021/028/SYM/RED/Rep.001, dated 10 July 2021.
- Geotechnical Interpretative Report by Geofirma Ltd, ref: 2021-028-SYM/RED Revision 2, dated 14 January 2022.
- Ground Movement Assessment Report by Geofirma Ltd, ref: 2021-028-SYM-RED/Rep.003 Revision 1, dated 14 January 2022.
- Audit Tracker Including Answers by SYMMETRYS Limited, dated 17 January 2022.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Updated information confirms suitable qualifications as per CPG Basements.
Is data required by Cl.233 of the GSD presented?	Yes	A search to confirm the absence/presence of any underground infrastructure is presented in Appendix 5 – Phase I Desk Study and Preliminary Risk Assessment.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	Section 3.0 of the BIA.
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	Updated drawings are fully dimensioned.
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 4.2 of the revised BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 4.1 of the revised BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 4.3 of the revised BIA.
Is a conceptual model presented?	Yes	Appendix D – Drawing SK02 Long Section A-A and, Section 3.2 of the BIA.

Item	Yes/No/NA	Comment
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 5.0 of the revised BIA.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 5.0 of the revised BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 5.0 of the BIA.
Is factual ground investigation data provided?	Yes	Section 6.1 and Appendix C of the BIA.
Is monitoring data presented?	Yes	Section 3.3, Appendix C of the revised BIA.
Is the ground investigation informed by a desk study?	Yes	Section 3.0 of the BIA & Appendix c Phase I Desk Study and Preliminary Risk Assessment.
Has a site walkover been undertaken?	Yes	Section 5.8.1 of Appendix C.
Is the presence/absence of adjacent or nearby basements confirmed?	No	It is stated that no information is available in relation to No. 41 Redington Road. However, the assumptions made in the BIA and GMA with regards to neighbouring basements are considered to be conservative. Section 2.5.4 of the BIA.
Is a geotechnical interpretation presented?	Yes	Geotechnical parameters have been updated in the revised BIA, section 7.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 7.0 of the revised BIA and Section 4 of Appendix C.
Are reports on other investigations required by screening and scoping presented?	Yes	Flood Risk Assessment, Appendix E - Part 1. SuDs Report, Appendix E - Part 2.

Item	Yes/No/NA	Comment
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	Section 8 of the revised BIA.
Are estimates of ground movement and structural impact presented?	Yes	Appendix D of the BIA.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	Updated hydrological, hydrogeological and land stability assessments can be found in the revised BIA and Appendices
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Mitigation measures can be found in the revised BIA and appendices.
Has the need for monitoring during construction been considered?	Yes	Movement monitoring of neighbouring properties, pavement and kerb around the perimeter of the proposed excavation is recommended. Sections 7.73 & 7.10 of the revised BIA.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Negligible.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Sections 7.7.3 & 7.9 of the revised BIA.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	Section 3.4 of the BIA.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	As above.

Item	Yes/No/NA	Comment
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Section 7.9 of the revised BIA.
Are non-technical summaries provided?	Yes	Section 1.0 of the BIA.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Symmetrys Limited. The revised Basement Impact Assessment confirms that the individuals concerned in its production have suitable qualifications in line with those requested by LBC guidance.

4.2. The building on the site comprises a 4-storey detached house divided into four flats, with load bearing masonry walls. The application property is a flat that occupies an existing lower ground floor and rear garden as well as a portion of the ground floor, including a garage.

4.3. The proposed development includes the erection of a single storey rear extension with terrace at first floor level and the conversion of the existing garage at ground floor level into a 2 storey habitable space, by lowering the floor level by about 2.2m. Lowering part of the existing lower ground floor by approximately 0.65 to 1.00m is also proposed.

4.4. Plans have been updated to include levels and dimensions; elevations and sections have been updated to include levels.

4.5. A site walkover has been undertaken, and it has been determined that the adjoining property 45 Redington Road has a basement of unknown depth, whereas it is unknown whether neighbouring 41 Redington Road has a basement. However, the assumptions made in the BIA and GMA with regards to neighbouring basements are considered to be conservative.

4.6. Screening and scoping assessments are presented and informed by desk study information. Most relevant figures/maps and other guidance documents are referenced within the BIA to support responses to screening questions. The updated land stability, hydrological and hydrogeological assessments are included in the revised BIA.

4.7. Although the Camden Geological, Hydrogeological and Hydrological Study (GHHS) Slope Angle Map suggests that the site is in an area where slopes steeper than 7° may be present, the topographic survey carried out by “Land & Measured Building Surveys” confirms that the gradient between Redington Road and the garden area, and that of the driveway, is less than 7°. The proposed development does not result in an alteration of the slope angle. As the proposed access to the basement level from Redington Road will be achieved via a stepped area of overall slope higher than 7°, reinforced concrete walls capable of resisting the surcharge, soil and water pressure will be implemented to address any potential land stability issue.

4.8. A site investigation was undertaken in July 2021 by Geofirma Ltd to inform the BIA and the basement design. Two window sample boreholes (BH1 and BH2) were formed to confirm ground and groundwater conditions, and two trial holes (TP1 and TP2) were dug to expose the existing foundations. The ground investigation encountered Made Ground to a maximum depth

of 1.40m bgl, whilst the Claygate Member (typically comprising of clay deposits but with presence of silt between 4.65 and 6.10m bgl in BH2) was encountered to a maximum depth of 6.30m bgl. Soils of the London Clay Formation were noted to underlie the Claygate Member to a maximum depth of 7.45m bgl, where the boreholes terminated.

4.9. Groundwater was encountered during the site investigation between c. 4.00m and 4.40m bgl in BH1 and BH2. Groundwater monitoring was undertaken on two occasions, on August 10 2021 recorded levels at c. 4.00m bgl in BH1 and 1.00m bgl in BH2 (both at an elevation of c. 8.80m to a Relative Site Datum (RSD), which is above proposed formation level). The second ground water monitoring visit was undertaken on the 11th of January 2022; only borehole BH1 could be accessed and the water level was 4.09m bgl. The BIA indicates localised dewatering by sump pumping might be required during construction.

4.10. As the basement may potentially be at/below the groundwater level, the main area of concern is the proposed gym which has an FFL of 9.26m RSD which will require a dig level of approximately 8.90m RSD to allow the slab to be cast. In this localised area the use of trench sheeting has been proposed to control the inflow of water into the excavation and maintain stability.

4.11. Based on the general anticipated dig levels of 9.70m RSD for the basement, the proposed geometry, the measured groundwater level of 8.80m RSD, the underlying geology at the site and the proximity of other basements, it is accepted the impact on the wider hydrogeological environment should be negligible.

4.12. The site is not within a critical drainage area. An increase in hardstanding areas is proposed since some landscaping areas will be converted to impermeable areas. The BIA states that the proposed development will not increase the risk of flooding and a 'Sustainable Drainage Assessment' is presented including SuDS proposals to ensure that the surface water run-off will not increase and be managed in accordance with LBC's guidance. It's noted that the detailed drainage design may be subject to Thames Water and LBC's approval.

4.13. In accordance with London Lost Rivers 2016 (Barton & Meyers, 2016) the BIA states that a lost river (Westbourne) is located approximately 60m away from the property. It is unlikely Alluvial Deposits associated with the lost Rivers will be encountered at the site, however, suitable potential mitigation measures should be considered in the RAMS in case these deposits are encountered. These should include allowing for the use of sheet trenching, or the use of dewatering techniques to maintain the stability of excavations.

4.14. The structural drawings presented indicate that it is proposed to construct the basement using reinforced concrete underpinning following a typical 'hit and miss' sequence. A construction

sequence and construction method statement are presented in the BIA along with a description temporary works.

4.15. The geotechnical parameters to inform the retaining wall calculations, foundation design and settlement calculation are presented in the revised BIA and are accepted. The allowable bearing capacities, Ground Movement Assessment (GMA) and Structural Calculation Package were consequently updated as necessary.

4.16. A Ground Movement Assessment (GMA) has been carried out by GEOFIRMA in accordance with CIRIA publication C760 'Guidance on embedded retaining wall design' and takes into account the construction methodology and site-specific ground and groundwater conditions. The GMA has been undertaken to demonstrate that ground movements and consequential damage to neighbouring properties will be within LBC's policy requirements. Ground movements due to underpinning and consequent excavation have been modelled using FEM program PLAXIS 2D.

4.17. The movements behind the wall have been adjusted to take into account the historical observations from previous similar projects. Experience from a nearby site has also been included in the report and GMA taking into account that the site has the same ground conditions. Ground movements between 6 and 7 mm were calculated due to excavation, retaining wall installation and new loads imposed by the development. The predicted damage is expected to fall within Burland Category 0 for 45 Redington Road, and in Category 1 for 41 Redington Road.

4.18. In the GMA, the deflection ratio estimation (Figure 7 of the GMA) has been updated to consider a vertical distance perpendicular to the x axis as indicated in Figure 6.27a of CIRIA C760.

4.19. The extent of the proposed basement is not within 5m of the highway. The distance of the road/highway from the basement wall is such that the impact of the excavation and installation works for the basement will have minimal impact on the road.

4.20. An outline monitoring proposal has been presented, including suggested monitoring point locations and trigger values considering the nearby properties. The pavement and kerb will be also be monitored.

5.0 CONCLUSIONS

5.1. In the revised BIA, the qualifications of the individuals involved are in accordance with LBC guidance.

5.2. Screening and scoping assessments are presented, supported by desk study information. Impact assessments have been updated and are included in the revised BIA.

5.3. The site investigation indicates that the proposed basement will be founded in the Claygate Member.

5.4. The geotechnical parameters to inform settlement, retaining wall calculations, foundation design and Ground Movement Assessment (GMA) are presented in the revised BIA and are accepted.

5.5. The BIA states that groundwater may be encountered during the basement excavation and indicates the potential need for localised dewatering from sumps. As the proposed gym will require a deeper excavation, the use of trench sheeting has been suggested to control the inflow of water into the excavation and maintain stability.

5.6. The Ground Movement Assessment (GMA) confirms that the anticipated damage from basement excavation will be within LBC's policy criteria.

5.7. The revised BIA presented an outline monitoring strategy to ensure movements are limited to those predicted.

5.8. Sustainable Drainage Strategy (SUDs) measures will be adopted to ensure that the surface water run-off will not increase as a part of the development. The drainage design may be subject to Thames Water and LBC approval.

5.9. Considering the additional information presented, it can be confirmed that the BIA complies with the requirements of Camden Planning Guidance: Basements.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
The Health & Hampstead Society	NA	20/10/2021	Adjacent buildings and levels of front and back gardens are not adequately shown in the drawings.	See Section 4.4

Appendix 2: Audit Query Tracker

Audit Query Tracker

8	Subject	Query	Status	Date closed out
1	BIA	The qualifications of the individuals involved in the BIA have not been demonstrated to be in accordance with LBC guidance.	Closed – See Section 4.1.	February 2022
2	BIA	Architecture drawings should be updated to report levels and dimensions.	Closed – See Section 4.4.	February 2022
3	Land Stability	Clarification of the sloping gradient at the site and surrounding areas should be presented and the impact assessed, as required.	Closed - See Section 4.6.	February 2022
4	Hydrogeology	Impact on the wider hydrogeological environment should be revised considering cumulative effect due to neighbouring basement.	Closed – See Section 4.8 to 4.11.	February 2022
5	Land Stability	Geotechnical parameters, potential presence of alluvial soils, presence of groundwater etc	Closed – See Sections 4.11 & 4.13.	February 2022
6	Land Stability	GMA to be clarified; monitoring strategy to be clarified	Closed – See Section 4.13 to 4.18.	February 2022

Appendix 3: Supplementary Supporting Documents

None

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