CampbellReith
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Parsifal House, 521 Finchley Road
NW3 7BT

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 13398-44
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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 (BIA) submitted as part of the Planning Submission documentation for Parsifal House, 521 Finchley Road (planning reference 2019/5709/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. The BIA has been prepared by firms of engineering consultants using individuals who possess suitable qualifications.

1.5. A desk study, a site walkover, a ground investigation and utilities search have been undertaken to inform the BIA.

1.6. The BIA has confirmed that the proposed basement will be founded within stiff London Clay.

1.7. The BIA advises that groundwater should be anticipated during basement excavation, likely as perched water in the Made Ground, and mitigation is discussed for dealing with it during construction.

1.8. The BIA discusses and allows for the presence of neighbouring basements.

1.9. A Construction Method Statement (CMS) report including structural calculations for the proposed basement walls has been provided. Queries about the structural calculations have been discussed and raised Section 4 and Appendix 2 of this audit.

1.10. A ground movement assessment has been provided. Conflicting information regarding the anticipated damage category should be clarified, as discussed in Section 4 and Appendix 2.

1.11. The need for a ground movement monitoring strategy is discussed in the BIA.

1.12. It is accepted that the surrounding ground to the development site is stable.

1.13. It is accepted that the development will not impact on the wider hydrogeology and hydrology of the area.

1.14. 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 18/08/2020 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Parsifal House, 521 Finchley Road, NW3 7BT (planning reference 2019/5709/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: 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 *'Erection of two storey plus basement building, to provide 2 x 3 bed residential units (Class C3). Excavation for basement extension with front light well and rear sunken garden. Provision of 5 x off-street parking spaces to rear of new dwellings. Demolition of 12 x garages.'*

The Audit Instruction confirmed Parsifal House, 521 Finchley Road did not involve, or was a neighbour to, listed buildings.

2.6. CampbellReith accessed LBC's Planning Portal on 14th September 2020 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment, Chelmer Global Ltd, Ref: BIA/11384, August 2020;
- Method Statement for Construction of Retaining Wall as well as attached calculations, Mitchinson Macken Ltd, Ref: 19313, 16/07/2019 with updated foundation layout drawing dated June 2020;
- Factual Report, Chelmer Global Ltd, Ref: FACT/11384, May 2020;
- Design and Access Statement, Granit Architecture + Interiors, May 2020;
- Construction Management Statement & Construction Logistics Plan, Granit Architecture + Interiors, October 2019;
- Planning Application Drawings by Granit Architecture consisting of

  Location Plan

  Existing Plans

  Proposed Plans

- Planning Consultation Responses.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	Forward to the BIA
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	BIA
Are suitable plan/maps included?	Yes	Granit Architecture + Interiors current and proposed drawings.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Section 2 BIA & Granit Architecture + Interiors Design & Access Statement
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 7.3 BIA
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 7.2 BIA
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 7.4 BIA
Is a conceptual model presented?	Yes	Section 10.1 BIA
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 8.2 BIA.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	N/A	No issues found during the screening stage.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 8.3 BIA.
Is factual ground investigation data provided?	Yes	Chelmer Global LTD Factual Report.
Is monitoring data presented?	Yes	Section 9.6 BIA.
Is the ground investigation informed by a desk study?	Yes	Sections 2 – 6 BIA. Appendices A – E BIA.
Has a site walkover been undertaken?	Yes	Section 9 BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	No	Section 10.2.4, 10.2.6, 10.6.4 & 10.6.5 BIA. Nearby basements have been assumed at this stage and shall be confirmed during detailed design.
Is a geotechnical interpretation presented?	Yes	Section 10.4 BIA.
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 10.4 BIA. Section 10.5.6 BIA.
Are reports on other investigations required by screening and scoping presented?	N/A	
Are the baseline conditions described, based on the GSD?	Yes	Section 10 BIA.
Do the base line conditions consider adjacent or nearby basements?	Yes	Section 10.2.4 BIA.

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	Yes	Section 10.5 BIA.
Are estimates of ground movement and structural impact presented?	Yes	Section 10.5 BIA - GMA provided. However, clarification on the predicted damage Category is requested as per the comments of Section 4 of this audit.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	Section 10.5, 10.6 & 10.8 BIA.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Section 10.9 BIA.
Has the need for monitoring during construction been considered?	Yes	Section 10.7 BIA.
Have the residual (after mitigation) impacts been clearly identified?	Yes	Section 10.9 BIA.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Section 10.5 and 10.6 BIA. However, the structural calculations should be rechecked as per the comments of this audit
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	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Section 10.6 BIA. However, clarification on the predicted damage Category is requested as per the comments of Section 4 of this audit.
Are non-technical summaries provided?	Yes	Section 11 BIA.

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by engineering consultants Chelmer Global Ltd and the individuals concerned in its production have suitable qualifications.

4.2. The Method Statement for Construction of Retaining Wall (CMS) and the structural calculations have been carried out by Mitchinson Macken Ltd. The author is a chartered structural engineer.

4.3. The LBC Instruction to proceed with the audit identified that the basement proposal does not involve a listed building, nor it is adjacent to any listed buildings.

4.4. The site comprises Parsifal House, a detached four storey residential building with no existing below ground structure and a garden to the rear of the property, which will not be subject to development. Beyond the garden lie three rows of single storey garages, two of which are adjoined back-to-back and some hard standing, where the proposed buildings will be constructed. The site slopes gently to the south away from Hampstead Heath.

4.5. The existing garages will be demolished and a new two storey, residential building comprising two semi-detached houses with a single storey basement will be constructed in their place. Both houses will have front gardens at ground floor level with green roofs. An additional single storey building comprising 5 car garages is proposed to the north of the new development adjacent to the southern end of the existing back garden to Parsifal House as shown in the Granit existing and proposed drawings.

4.6. The basement will be formed by lowering the existing ground level by up to 4.0m as part of a 'bottom up' construction sequence. Multilevel propping and traditional underpinning in panels no greater than 1m of cantilevered 'L' shaped reinforced concrete retaining walls are proposed for the perimeter basement walls. The stages of construction are indicated in the Mitchinson Macken CMS and discussed in the BIA, which confirms will be subject to agreement under party wall agreements.

4.7. A desk study, utilities search and site walkover have been undertaken as part of the BIA.

4.8. During the site walkover, a single storey basement was identified beneath No. 523 and No. 1g Parsifal road. The BIA has also identified this basement application via a search of the Camden planning portal. Section 10.2.6 of the BIA describes that No. 1e has a basement as indicated on the planning portal, but it has not been confirmed as present. It has been assumed to be present as part of the BIA and Section 10.6.4 of the BIA notes that the presence of this basement should be confirmed during detailed design and this is accepted.

4.9. The BIA has identified that the basement will be founding in a stiff London Clay which was identified across the site below Made Ground. The BIA generally identified up to 1.2m of Made

Ground across the site and this should be anticipated during basement excavation. Deeper Made Ground was found in TP1 and is thought to be associated with the adjacent basement construction of the neighbouring property as discussed in Section 10.1.1 of the BIA.

4.10. Design undrained shear strength and bearing resistance estimates are provided for the London Clay, soil parameters for the Made Ground and London Clay are provided as part of the Ground Movement Assessment (GMA) and these are accepted.

4.11. Groundwater was not encountered during the ground investigation. Standpipes were installed in two boreholes, one to the north of Parsifal house (BH1), and the other to the south (BH2), located proximally to the proposed basement. Groundwater monitoring was undertaken for two weeks. BH1 did not record any water during monitoring and BH2 recorded water between 6.0-6.5m bgl.

4.12. The BIA identified during screening that the basement will extend below the phreatic level and so potentially could impact groundwater flows. Though groundwater was not encountered or monitored within the proposed basement formation level, the BIA does note that there may be seasonal fluctuations in groundwater and that as a worst case scenario groundwater could be encountered as high as ground level, and this assumption should be adopted for the design. The BIA identifies that there are basements that are, or are likely to be, present in neighbouring properties and notes that this basement could obstruct any potential drainage pathways.

4.13. The BIA also identifies that given the low permeability of the London Clay encountered, which is supported by the ground investigation observations, any seepages are likely to be small. The existing garages and associated hardstanding on site would already impede any ground water flow through the Made Ground and so the basement is unlikely to make this worse. The BIA advises that groundwater should be anticipated during basement construction, likely as perched water in the Made Ground and this should be accommodated during construction. It is accepted that there will be no impact to the hydrogeology of the area.

4.14. The BIA describes that both houses will be constructed with ‘landscape amenity gardens’ and green roofs, which will offset any minor encroachment into the existing soft landscaping by the new car garage. Finchley Road was identified as flooding in 2002 and this is discussed further in Section 10.8 of the BIA.

4.15. The area of new basement will increase the extent of impermeable surfacing, however, this will be mitigated by the inclusion of green roofs and additional gardens in the proposed scheme. Therefore, the development is not anticipated to impact the current rainwater discharges to the below ground surface water drainage system. The development is not in an area prone to flooding and additional mitigation is provided as part of the basement construction in case flooding is encountered. It is accepted there will be no impact to the hydrology of the area.

4.16. The BIA identifies that a recently felled 20m high willow tree is located upslope from the proposed garages and a 'substantial' recently fallen Copper Beech tree is located approximately 6m from the proposed basement, adjacent to the shared driveway. The BIA proposes that the basement retaining walls shall be designed to allow for lateral pressures due to these trees and confirms that there will be no impact in regard to the basement proposal and this is accepted.

4.17. The BIA screening and scoping has identified the basement is located near a public highway, the access way from Parsifal Road. Temporary and permanent support by underpinning is proposed as detailed in the GMA and this is accepted.

4.18. Structural calculations are provided in the CMS, however, these should be updated based on the following comments: (i) The retaining wall analysis has been undertaken based on BS8002:1994 which is now superseded by BS8002:2015. It must be confirmed that the calculations are still valid (or amended as needed) in accordance with the updated standard. (ii) The groundwater considered in the calculations is taken at 0.6m bgl despite the recommendation of the geotechnical assessment presented in the BIA; the latter proposes that groundwater for design purposes be taken at ground level. A clarification/amendment is requested. (iii) The geotechnical parameters assumed in the calculations (angle of friction, unit weight and allowable bearing pressure) are different to those proposed by the geotechnical assessment (refer to Sections 10.4.11 and 10.4.13 of the BIA report). Justification/amendment of the different parameters is requested.

4.19. A ground movement assessment (GMA) has been undertaken and presented in the BIA report using proprietary software (PDisp) and CIRIA C760 methodology. Whilst the CIRIA approach is intended for embedded retaining walls, it is accepted that the predicted ground movements are within the range typically anticipated for underpinning techniques carried out with good control of workmanship.

4.20. Vertical ground movements have been calculated during excavation and construction of perimeter walls (Stage 1), excavation of central area of basement and construction of basement slab (Stage 2), Construction of internal basement walls/columns/piers and all superstructure (Stage 3), and for the long term (Stage 4) total ground movements. Horizontal movements are described during excavation and underpinning, based on best practice as described in Section 10.4 of the BIA, with typical movements provided in Section 10.6.1.

4.21. The assessment has determined that ground movements will not affect the structural integrity of neighbouring buildings with a Burland damage scale category of not more than 1 (very slight) identified in Section 10.6.10. However, Figure no.11 indicates that the anticipated damage category will be 'negligible' (category 0). A clarification is requested.

4.22. The CMS report (refer to attached in the CMS letter dated 16/7/19) indicates that Category 1 damage is expected making reference to BRE Digest 251, without providing any ground movement estimates. A clarification is requested with the note that Burland methodology should be consistently adopted in the BIA documents, as per the requirements of CPG Basements.

4.23. Monitoring of ground movements is suggested by the GMA and is included as part of the Construction Method Statement, which is suggested will be agreed under the Party Wall Agreements.

4.24. The BIA has shown that the development will not impact the wider hydrogeology of the area, or any watercourses, springs or the Hampstead Heath Pond chain catchment area.

4.25. It is accepted that there are no slope stability concerns regarding the proposed development.

5.0 CONCLUSIONS

5.1. The BIA and CMS have been carried out by engineering consultants' firms using individuals who possess suitable qualifications.

5.2. The BIA has confirmed the proposed basement will be founded within the London Clay and up to 1.20m of Made Ground could be encountered during excavation.

5.3. Though it is unlikely that the ground water table will be encountered during basement foundation excavation, the BIA has assumed a ground water level at ground level should be adopted for design. Suitable mitigation methods are proposed and they are accepted.

5.4. The BIA discusses lowering the ground level by up to 4m as part of a 'bottom up' construction sequence. Underpinning with suitable temporary propping arrangements are proposed.

5.5. A single storey basement has been identified in the neighbouring property No. 523 and No. 1g Parsifal road. No. 1e has a basement described on the planning portal and the BIA assumes it is present for this proposal, but its presence has not been confirmed. The BIA advises this should be confirmed prior to detailed design and this is accepted.

5.6. Structural calculations are provided however a number of queries should be addressed.

5.7. A ground movement assessment (GMA) has been undertaken as part of the BIA report using proprietary software (PDisp) and CIRIA C760 methodology. These have been combined to determine a Burland damage scale category of not more than 1 (very slight). However Figure no.11 indicates that the anticipated damage category will be 'negligible' (category 0) and a clarification is requested.

5.8. The CMS report dated 16/07/19 indicates that Category 1 damage is expected, making reference to BRE Digest 251, without providing movement estimates. A clarification is required and the Burland methodology should be consistently adopted in the BIA documents.

5.9. The need for a movement monitoring strategy during construction is discussed in the BIA and will be agreed under the Party Wall Agreements.

5.10. It is accepted that the surrounding ground to the development site is stable.

5.11. It is accepted that the development will not impact on the wider hydrogeology of the area and is not in an area subject to flooding.

5.12. 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
Wong and Lo	1G Parsifal Road	19/12/19 20/12/19	Impacts of Basement and Construction Phase. Impact on water table, structure etc.	Section 7.2, 7.3 & 7.4 of BIA. Section 10 BIA.
			Demand further information via geotechnical report and detailed BIA.	Chelmer Global LTD Factual Report, ref FACT/11384. Basement Impact Assessment, ref BIA/11384.

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	The retaining wall analysis is undertaken in accordance with BS8002:1994 which is superseded by BS8002:2015. Confirmation calculations are still valid, or amended as needed.	Open	
2	Stability	Groundwater considered in the structural calculations is taken at 0.6m bgl, BIA recommends a groundwater level at ground level. Clarification or amendment is required.	Open	
3	Stability	The Geotechnical parameters used (angle of friction, unit weight, allowable bearing pressure etc.) in the structural calculations are different to those proposed by the geotechnical assessment of the BIA. Justification or amendment is required.	Open	
4	Stability	BIA GMA has determined a Burland damage scale category of not more than 1 (very slight) but Figure no.11 indicates a category of 'negligible' (category 0). Clarification is requested.	Open	
5	Stability	The CMS report indicates that Category 1 damage is expected with reference to BRE Digest 251 without providing any ground movement estimates. Clarification is requested and the Burland Methodology should be consistently adopted throughout all the documents.	Open	

Appendix 3: Supplementary Supporting Documents

None pertinent

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