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152-156 Kentish Town Road
London, NW1 9QB

Basement Impact Assessment
Audit

For

London Borough of Camden

Project Number: 12336-46
Revision: F1

June 2016

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	May 2016	Comment	HPjap12336-46-130516-152-156 Kentish Town Road-D1.doc	HP	WS	EMB
F1	June 2016	For Planning	HPjap12336-46-200616-152-156 Kentish Town Road-F1.doc	HP	WS	EMB

Document Details

Last saved	20/06/2016 12:01
Path	HPjap12336-46-130516-152-156 Kentish Town Road-D1.doc
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Project Number	12366-46
Project Name	152-156 Kentish Town Road
Planning Reference	2016/1372/P

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 152-156 Kentish Town Road, London NW1 9QB (planning reference 2016/1372/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 main BIA document has been prepared by Parmarbrook Ltd and includes documents prepared by GEA Ltd. Both are established firms of engineering consultants using individuals who possess suitable qualifications.

1.5. It has been confirmed that the development site does not involve a listed building, or is in close proximity to a listed building.

1.6. The proposal includes the demolition of an existing building and construction of a new 4 storey mixed use building plus a single storey basement. The basement is within the footprint of the proposed building.

1.7. It is noted that the site is within 5m of a highway or pedestrian right of way. The site is also within the exclusion zone of a London Underground tunnel.

1.8. The BIA has proposed to form the basement walls using a bored piled wall. The retaining wall will be a secant piled wall formed by 600mm diameter CFA piles with suitable temporary propping arrangements. The basement slab will be either raft slab or suspended slab on spread footings bearing on the London Clay.

1.9. The ground investigation and subsequent water monitoring however indicate the groundwater level varies between 0.45m and 1.81m below existing ground level and is likely to be encountered within the basement excavation.

1.10. It is noted that the site is entirely covered by the existing building and hardstanding and therefore infiltration of rain water into the ground beneath the site is extremely limited and that the majority of surface runoff is likely to drain to the sewers.

1.11. It is noted that a full ground movement analysis has been carried out to assess the effect on the surrounding properties. It is also noted that the predicted damage category of the adjoining properties is from Negligible (Category 0) to Slight (Category 2). Where risk of category 2 damage level is found to be present, appropriate mitigation measures have been proposed.

1.12. It is accepted that the development will not impact on the wider hydrology of the area and is in an area with low flooding risk.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 14 April 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 152-156 Kentish Town Road, London NW1 9QB, Camden Reference 2016/1372/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 *"Replacement of existing building with a six storey mixed use building comprising retail (A1 Use Class) at ground and basement level and office space (B1 Use Class) and Dental Practice (D1 Use Class at first floor level with 9x residential units (7x2bed and 2x3bed) on upper floors."* The Audit Instruction also confirmed the property is not a listed building.

2.6. CampbellReith accessed LBC's Planning Portal on 15 April 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment dated March 2016 by Parmarbrook which includes the following documents.
    - Structural Drawings by Parmarbrook.
    - Desk Study & Ground Investigation Report dated January 2016 by GEA.
    - Ground Movement Assessment Report dated March 2016 by GEA.
- Design and Access Statement dated March 2016 by Marek Wojciechowski Architects.
- Architectural Drawings by Marek Wojciechowski Architects.
- Construction Management Plan based on the Council's pro forma undated by Motion.
- Planning Statement dated March 2016 by Montagu Evans.

2.7. Subsequent to the issue of the initial audit report, revised information was uploaded to LBC's Planning Portal. CampbellReith accessed the Planning Portal on 10 June 2016 and gained access to the following revised documents:

- Revised Basement Impact Assessment dated June 2016 by Parmarbrook which includes the following documents.
    - Revised Structural Drawings by Parmarbrook.
    - Revised Desk Study & Ground Investigation Report dated June 2016 by GEA.
    - Revised Ground Movement Assessment Report dated June 2016 by GEA.
- Revised Design and Access Statement dated June 2016 by Marek Wojciechowski Architects.
- Revised Architectural Drawings by Marek Wojciechowski Architects.
- Revised Planning Statement dated June 2016 by Montagu Evans.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The BIA has been completed by Chartered Structural Engineers with appropriate inputs from Chartered Geologists.
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	See BIA Section 1 and Desk Study & Ground Investigation Report Section 1.
Are suitable plan/maps included?	Yes	See BIA Section 2 and 3.
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: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 1.3.2 and Desk Study & Ground Investigation Section 3.1.2.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 1.3.1 and Desk Study & Ground Investigation Section 3.1.1.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 1.3.3 and Desk Study & Ground Investigation Section 3.1.3.
Is a conceptual model presented?	Yes	See BIA Appendix E – Desk Study & Ground Investigation.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	See BIA Section 1.4 and Desk Study & Ground Investigation Section 4.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	See BIA Section 1.4 and Desk Study & Ground Investigation Section 4.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No Yes	Not required, consistent with screening outcome.
Is factual ground investigation data provided?	Yes	See Desk Study & Ground Investigation Section 5.0
Is monitoring data presented?	Yes	See Desk Study & Ground Investigation Section 5.3.
Is the ground investigation informed by a desk study?	Yes	See Desk Study & Ground Investigation Sections 1&2.
Has a site walkover been undertaken?	Yes	See Desk Study & Ground Investigation Sections 1&2.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	See BIA Section 3.3
Is a geotechnical interpretation presented?	Yes	See Desk Study & Ground Investigation.
Does the geotechnical interpretation include information on retaining wall design?	Yes	See Desk Study & Ground Investigation Section 8.1.
Are reports on other investigations required by screening and scoping presented?	No	See Desk Study & Ground Investigation Section 9. Monitoring of the standpipe should be continued to determine equilibrium groundwater and to establish any seasonal fluctuations.
Are 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	See BIA Section 1.5 and Desk Study & Ground Investigation Section 10.
Are estimates of ground movement and structural impact presented?	Yes	See Ground Movement Assessment Report.

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	See BIA Section 10.
Has the need for monitoring during construction been considered?	Yes	See BIA Section 10 to 14.
Have the residual (after mitigation) impacts been clearly identified?	Yes	See BIA Section 10 to 14.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	See BIA Section 7 and 10 to 14.
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 2?	Yes	See BIA Section 9 and 10.
Are non-technical summaries provided?	No	Refer to the discussion in section 4.11 of this report

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by an established firm of engineering consultants, Parmarbrook and Geotechnical & Environmental Associates (GEA) and the individuals concerned in its production have suitable qualifications.

4.2. The development site consists of a 2 storey multiple tenure commercial building. The proposal includes the demolition of the existing building and construction of a new 4 storey mixed use building plus a single storey basement. The basement is within the footprint of the proposed building. The foundations of the existing building and the adjacent structures have not been identified and further investigations will be undertaken to confirm their details.

4.3. Two phases of soils investigation have been undertaken to identify that the geology at the site consists of Made Ground, underlain by London Clay. The proposed basement is about 5m deep and will be within the London Clay with safe bearing pressure of 160kN/m^2. The BIA includes an estimation of loading on the ground and discusses the use of raft slab or spread footings for the basement slab. Either solution will need to consider the effects of ground heave and water pressure. The BIA has stated that the exact design will be further developed during the detailed design stage.

4.4. The BIA has proposed to form the basement walls using a bored piled wall. The retaining wall will be a secant piled wall formed by 600mm diameter CFA piles with suitable temporary propping arrangements.

4.5. Groundwater was encountered within the London Clay at depths of 6.10m and 5.50m during drilling for ground investigation. The subsequent water monitoring however found groundwater present between 0.45m and 1.81m below existing ground level. This is likely perched water level and the BIA proposes trial excavations or monitoring standpipe recharge rate to provide an indication of the likely volume of groundwater that may flow into the basement excavation. It is noted that section 4.3 of Parmarbrook's BIA has not been updated to include the second monitoring presented in section 5.3 of GEA's Ground Investigation Report.

4.6. It is accepted that the site is underlain by a non-aquifer and as such there are no significant volumes of groundwater to be impacted by the basement proposals.

4.7. It is accepted that the site is outside Tidal/Fluvial Flood Risk Areas in Flood Risk Zone 1, where land is assessed as having less than a 1 in 1000 annual probability of river or sea flooding. The site however is identified as a street that was affected by the 1975 flood but not the 2002 flood. It may suggest that the local infrastructure in close proximity to the proposed site has been improved. The EA data shows that parts of Kentish Town Road close to the proposed site are at low risk from surface water flooding.

4.8. It is noted that the proposal will not result in a change in the proportion of hard surfaced/paved areas and will generally maintain the existing site drainage situation.

4.9. The BIA has included Ground Movement Assessment and Damage Assessment of the adjacent properties. The damage category is from Negligible (Category 0) to Slight (Category 2) and a suitable movement monitoring strategy has been proposed. The Section 6.1 of the Ground Movement Assessment states that "*It is prudent to acquire confirmation of the building heights and foundation depths of the buildings assessed to have a 'Slight' damage category in order to reassess the likely movements'.* In response to the initial audit, it has been confirmed by Parmarbrook that the assessment was based on conservative assumptions in respect to heights and foundations and it is unlikely that the damage category will exceed Category 2 once further investigations are undertaken.

4.10. The BIA has included a movement assessment of the adjacent London Underground tunnel. The changes in vertical movement and vertical stress and strain of the tunnel are presented. The information regarding acceptable movement and stress limits is not available. It is noted that the assessment results will be discussed with LUL during the Design Development Stage.

4.11. Although a non-technical summary is not included, the information in the main BIA document prepared by Parmarbrook has been laid out in a way that is considered readable by non-technical readers.

5.0 CONCLUSIONS

5.1. The BIA has been prepared by Parmarbrook with supported documents by GEA. Both are established firms of engineering consultants using individuals who possess suitable qualifications.

5.2. The development site does not involve a listed building.

5.3. The proposal includes the demolition of an existing building and construction of a new 4 storey mixed use building plus a single storey basement. The basement is within the footprint of the proposed building.

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

5.5. It is likely that groundwater will be encountered during basement foundation excavation. Groundwater monitoring indicates that groundwater level is in between 0.45m and 1.81m and it is likely perched water.

5.6. It is accepted that there should be no hydrogeological or hydrological concerns with respect to the development proposals.

5.7. The BIA has proposed to form the basement walls using a bored piled wall. The retaining wall will be a secant piled wall formed by 600mm diameter CFA piles with suitable temporary propping arrangements. The basement slab will be either raft slab or suspended slab on spread footings bearing on the London Clay. The final design will be developed during the detailed design stage, which is accepted.

5.8. A Ground Movement and Damage Assessment of the existing building and adjacent properties have been carried out. The results of the assessment show that the damage category is not greater than Slight (Category 2). Mitigations measures including movement monitoring have been proposed.

5.9. It is anticipated that the surrounding slopes to the development site are stable.

5.10. It is anticipated that the development will not impact on the wider hydrogeology of the area and it is in an area with low flooding risk.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Elliot	105 Bartholomew Road NW5 2AR	18/4/2016	Basement below high water table and increased flooding risk	See 4.5 to 4.8
Etchart	50 Patshull Road NW5 2LD	18/04/2016	Basement below high water table and increased flooding risk	See 4.5 to 4.8
Freyberg	21 Patshull Road	18/04/2016	Basement below high water table and increased flooding risk	See 4.5 to 4.8
Jacquinet	17A Bartholomew Road NW5 2AH	17/04/2016	Basement below high water table and increased flooding risk	See 4.5 to 4.8
Johns	Flat A 77 Bartholomew Road NW5 2AH	15/04/2016	Basement below high water table and increased flooding risk.	See 4.5 to 4.8
Odell	12 Bartholomew Road NW5 2LL	15/04/2016	Basement below high water table and increased flooding risk.	See 4.5 to 4.8
Parker	23 Patshull Road NW5 2JX	15/04/2016	Basement below high water table and increased flooding risk.	See 4.5 to 4.8
Sokol	42 Patshull Road NW5 2LD	16/04/2016	Basement could adversely affect the local watertable.	See 4.5 to 4.8
McCarthy		05/05/2016	Effects on LUL tunnels and structures. Risk of flooding Basement wall construction	See 4.4 to 4.8
Lopez		29/04/2016	Basement below high water table and increased flooding risk.	See 4.4 to 4.8

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	BIA	Justification for 'No' answers in Screening Stage	Closed	20/06/2016
2	Hydrogeology	Confirmation of groundwater level and impact on hydrogeology	Closed	20/06/2016

Appendix 3: Supplementary Supporting Documents

None

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