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1 & 2 Falkland Mews, London, NW5 2PP

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12985-15
Revision: F1

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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 1&2 Falkland Mews, NW5 2PP (Camden planning reference 2016/6906/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 qualifications of the individuals involved meet the LBC guidance requirements.

1.5. The updated BIA makes reference current LBC planning guidance and CIRIA guidance.

1.6. The proposals involved excavating single storey basements by underpinning the foundations to the full footprint of the properties. Clarification of the excavation depths is provided in the revised submissions.

1.7. Groundwater was recorded within the basement depth during the investigations and subsequent monitoring and dewatering measures are proposed during construction.

1.8. The BIA confirms that neighbouring properties do not have basements.

1.9. Subject to the clarifications noted in Section 4, the updated geotechnical design parameters are accepted. The contractor should confirm the insitu shear strength of the London Clay prior to casting foundations, and take foundations deeper where necessary, to ensure the design bearing capacity is achievable, and that ground movements will remain within the predicted range (as 1.10).

1.10. A Ground Movement Assessment (GMA) has been undertaken. The GMA indicated the potential damage to neighbouring properties as no higher than Category 1 (Very Slight).

1.11. An outline structural monitoring strategy has been provided.

1.12. It is stated that there will be no change in the hardstanding area. The flood risk assessment indicates the site to be at a very low risk of flooding.

1.13. It is accepted that there are no slope stability concerns regarding the proposed development and there will be no impacts to the wider hydrological environment.

1.14. An outline construction programme has been provided. A detailed programme should be provided by the appointed contractor at a later date.

1.15. Queries and requests for information are summarised in Appendix 2. Considering the additional information presented, the BIA meets the requirements of Camden Planning Guidance: Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 01 October 2018 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 1 & 2 Falkland Mews, NW5 2PP.

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 Basements. March 2018.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- Local Plan Policy A5 Basements.

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;

d) 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 *"Excavation of basement floor beneath both properties with lightwell to the front."*

2.6. The Audit Instruction also confirmed that 1 & 2 Falkland Mews, does not involve, or neighbour, listed buildings.

2.7. CampbellReith accessed LBC's Planning Portal on 05 October 2018 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (BIA) by Ashton Bennett dated May 2018 included appendices A-F.
- Flood Risk Assessment (FRA) including appendices A&B by UK Flood Risk Consultants dated 29 March 2018.
- Planning drawings including plans, elevations and section by Bashkal & Associates

  Existing drawings dated November 2016

  Proposed drawings dated May 2018
- Site Location Plan
- Planning Comments and Response from Thames Water and London Underground

2.8. CampbellReith were provided with the following relevant documents for audit purposes in November and December 2018, and corresponded with the Applicant's engineer in January 2019:

- Basement Impact Assessment (BIA) Revision 1 by Ashton Bennett dated November 2018 including appendices A-F.
- Letter dated 28th November 2018 by Ashton Bennett.
- Planning Comments and Responses from TFL and Thames Water

2.9. CampbellReith were provided with a further amended submission on 31st January 2019:

- Basement Impact Assessment (BIA) Revision 2 by Ashton Bennett dated January 2019.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	See Audit paragraph 4.1
Is data required by Cl.233 of the GSD presented?	Yes	BIA and supporting documents.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	Excavation and underpinning depth now confirmed (see Audit paragraph 4.5 and 4.6).
Are suitable plan/maps included?	Yes	Some of the relevant maps with site location indicated provided.
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	Location plan with the subject sites and neighbouring properties clearly identified now provided (See Audit paragraph 4.8).
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 12 of the BIA.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 12 of the BIA.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 12 of the BIA.
Is a conceptual model presented?	Yes	Section 13 of the BIA.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 12 of the BIA.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 12 of the BIA.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 12 of the BIA.
Is factual ground investigation data provided?	Yes	BIA report and appendices.
Is monitoring data presented?	Yes	Section 14 of the BIA
Is the ground investigation informed by a desk study?	Yes	BIA.
Has a site walkover been undertaken?	Yes	Section 2 of the BIA.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	BIA confirms neighbouring properties do not have basements.
Is a geotechnical interpretation presented?	Yes	There are queries on this however (see Audit Section 4.0)
Does the geotechnical interpretation include information on retaining wall design?	Yes	Information on foundation design provided, however, there are queries on this (see Audit Section 4.0)
Are reports on other investigations required by screening and scoping presented?	Yes	Flood Risk Assessment has been provided
Are the baseline conditions described, based on the GSD?	Yes	BIA
Do the base line conditions consider adjacent or nearby basements?	Yes	Section 12 of the BIA.
Is an Impact Assessment provided?	Yes	Section 14.7 of the BIA.
Are estimates of ground movement and structural impact presented?	Yes	Section 14.7 of the BIA.

Item	Yes/No/NA	Comment
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	As above.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	
Has the need for monitoring during construction been considered?	Yes	Outline scheme presented however this may require updating following reassessment of the GMA.
Have the residual (after mitigation) impacts been clearly identified?	N/A	None identified.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Geotechnical parameters amended in revised submission.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	BIA and FRA.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	Geotechnical parameters amended in revised submission.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	Geotechnical parameters amended in revised submission.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Ashton Bennett Engineering Geologists and Environmental Scientists, with the Structural Method Statement, Construction Programme and Monitoring Plan carried out by Croft Structural Engineers. The Flood Risk Assessment has been carried out by UK Flood Risk Consultants. The qualifications of the authors of the BIA and the associated reports are in compliance with the requirements of CPG Basements.

4.2. The original BIA included screening, scoping, site investigation and impact assessment stages as defined and required in the LBC Planning Guidance document 'CPG Basements (2018)'. However the Croft BIA makes reference to 'CPG 4' which is now superseded by 'CPG Basements (2018)'. CIRIA C580 is also referenced in relation to the ground movement assessment. This document is superseded by CIRIA C760. These references have been updated in the revised documents.

4.3. The application proposes to construct basements with new lightwells below the existing buildings, 1 & 2 Falkland Mews. The existing buildings are of traditional masonry and timber construction. The property is location off Falkland Road and is surrounded by the rear gardens to the buildings that front on to Fortress Road and Fortress Grove.

4.4. The BIA Audit Instruction confirmed that the site is not situated within a Conservation Area. The site is not a listed building and there are no listed buildings neighbouring the site.

4.5. The proposed works include excavation of new single storey basements beneath the full footprint of the existing properties and constructing new lightwells to the front. The depth of the proposed basements were unclear in the original BIA submission: Croft's report indicates approximately 3.0m below existing ground floor level, however, 2.30m is stated in the ground movement assessment for 'No. 5' whilst 2.50m is indicated in Section 1 of the BIA.

4.6. The depth of the excavation/underpinning has now been clarified and it is stated that the basement is to extend to 3m.

4.7. It is proposed to construct the basements by forming reinforced concrete underpins in a hit and miss sequence beneath the existing properties. A new retaining wall is proposed to be constructed to form the new lightwell structure. Indicative calculations for the retaining wall have been provided. The retaining walls are designed as cantilevers in the permanent condition.

4.8. A limited site investigation has been undertaken, which included two window sample holes in the rear garden and one foundation inspection pit to investigate the foundations of the existing building. The window sample holes, encountered Made Ground to a maximum depth of 1.55m bgl underlain by London Clay, designated unproductive strata. The base of the Made Ground was not identified in the foundation inspection pits which only extended to 0.60m bgl.

Groundwater was not encounter during site works, however groundwater was recorded at c.0.80 and 1.80m bgl during monitoring. The BIA recommends that further readings are taken prior to construction and recommends that the contractor make allowance for temporary dewatering of any perched water encountered. It is accepted that impacts to the wider hydrogeological environment are likely to be minimal.

4.9. The BIA indicates the existing footings as shallow concrete strip footings bearing on the Made Ground. The trial pit identifies a 'large concrete mass' at 150mm bgl and 170mm from the face of the property. Further investigation should be carried prior to commencing construction to identify the purpose of this concrete mass and the impact on the proposed scheme.

4.10. The original drawings (site location plan etc.) provided did not clearly indicate the neighbouring properties or proximity to the subject sites. It was requested that this be clarified to allow the assessment of impacts on the properties within the zone of influence to the undertaken and any Party Walls identified.

4.11. A plan which clearly identifies the neighbouring properties and the distance to the subject sites in now provided with the additional information.

4.12. In previous submissions, the geotechnical assessment included 'interpreted' geotechnical parameters for the design of the retaining wall, foundations and basement slab, comprising a published generic ranges of parameters rather than site specific parameters suitable for the design of retaining walls and foundations. The most recent submission indicates a design bearing capacity of 120 kPa based on an insitu shear strength (note the BIA incorrectly refers to 'effective cohesion') of 63 kPa, and conservative angles of shearing resistance for basement retaining wall design.

4.13. It's noted that in WS2 the SPT results at 2m and 3m depth are not consistent with an insitu shear strength of 63 kPa. The Contractor should undertake insitu strength testing of the clay at formation level to ensure the design shear strength is reached and take foundations deeper, if required. The Engineer should confirm the Contractor's testing technique and results prior to foundations being cast and confirm there will be no impacts to ground movements beyond what has been predicted (see 4.17).

4.14. The BIA notes the high to very high volume change potential of the London Clay. The report recommends that compressible material is laid beneath the basement slab to mitigate against clay heave.

4.15. A Ground Movement Assessment (GMA) and resulting damage assessment for neighbouring properties was undertaken. It was originally stated that CIRIA C580 was used to estimate horizontal and vertical movements due to excavation works and underpinning, revised to reference the current guidance CIRIA C760. A hand calculation was presented and although it is not indicated which curves have been used, based on the calculations, these appeared to be

'installation of planar diaphragm wall in stiff clay' to model the underpinning. The current CIRIA guidance is intended for embedded retaining walls, but it is accepted that this may provide a basis for which to undertake an assessment of an underpinned construction, provided ground movements are within the range typically anticipated for underpinning techniques carried out with good control of workmanship.

4.16. The GMA indicated the potential damage to 'Falkland Mews' as no higher than Category 1 (Very Slight) on the Burland Scale. The original assessment was unclear and a number of queries were raised relating to which properties were being assessed, depth of excavations, magnitude of movements from excavation and construction, settlement / heave considerations and cumulative impacts.

4.17. The ground movement assessment been revised to reflect the above comments. As per the previous assessment, this is based on calculations using the CIRIA C760 curves which is now referenced. Maximum Category 1 (Very Slight) damage is predicted. This is considered to be reasonable assuming good workmanship.

4.18. Proposals were provided for a structural movement monitoring strategy during excavation and construction with trigger values are presented in Croft's report. These should be agreed with the relevant parties prior to construction.

4.19. The BIA notes that the site lies in a 'Critical Drainage Area, 3-003' but not in a Local Flood Risk Zone. It is noted that the basement is situated within Flood Zone 1 (negligible risk of flooding). The Flood Risk Assessment (FRA) report indicates the site to be at a very low risk of flooding.

4.20. An outline construction programme has been provided in accordance with the GSD paragraph 233. A detailed programme is to be provided by the appointed contactor at a later date.

4.21. Consultation has taken place with LUL and it is accepted that the proposals do not impact London Underground Infrastructure.

4.22. Consultation with Thames Water has confirmed that public sewers may run through or close to this development. A full survey to identify buried services should be carried prior to commencing works. The BIA notes mitigation measures such as providing non return valves to the drainage system and sealing all service entries, this is in line with the recommendations made by Thames Water.

4.23. It is accepted that the increase to the hardstanding is negligible. It is accepted that there are no slope stability concerns or wider hydrogeological impacts regarding the proposed development and the site is not in an area prone to flooding.

5.0 CONCLUSIONS

5.1. The qualification of the individuals involved meet the LBC guidance requirements.

5.2. The BIA now makes reference to current documents.

5.3. The proposed development consists of a new single storey basement beneath the full footprints of the two existing properties.

5.4. It is proposed to excavate the basement using underpinning techniques. Clarification has now been received on the excavation and underpinning depths a requested.

5.5. Outline retaining wall calculations demonstrating structural stability have been provided.

5.6. A limited ground investigation was undertaken. Groundwater was not recorded during initial investigation works. Subsequent monitoring recorded the groundwater level at 0.80m bgl. Further monitoring and dewatering methods during construction are proposed.

5.7. Subject to the clarifications noted in Section 4, the updated geotechnical design parameters are accepted. The contractor should confirm the insitu shear strength of the London Clay prior to casting foundations, and take foundations deeper where necessary, to ensure the design bearing capacity is achievable, and that ground movements will remain within the predicted range (as 5.10).

5.8. It is noted that there will not be an increase to the hardstanding area. It is accepted that there will be no impacts to the wider hydrogeological environment.

5.9. The BIA notes the high to very high volume change potential of the London Clay and heave mitigation measures are proposed.

5.10. There queries on the ground movement assessment are now addressed. It is accepted that damage to the neighbouring properties may be limited to Category 1 assuming good workmanship.

5.11. An outline structural monitoring strategy with trigger values is presented. The detailed strategy should be agreed with the relevant parties prior to construction.

5.12. An outline construction programme has been provided. A detailed programme should be provided by the appointed contractor at a later date.

5.13. It is accepted that there are no slope stability concerns and wider hydrogeological impacts regarding the proposed development and it is not in an area prone to flooding.

5.14. Considering the updated information presented, the BIA meets the requirements of Camden Planning Guidance: Basements.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments - None

Surname	Address	Date	Issue raised	Response
TFL		June 2018	Confirmation that no TFL infrastructure will be impacted by the works.	N/A
Thames Water		June 2018	Advice on flood risk mitigation and drainage.	To be noted and adopted.

Appendix 2: Audit Query Tracker

Audit Query Tracker*

Query No	Subject	Query	Status	Date closed out
1	BIA format	Superseded planning guidance and technical documents referenced.	Closed	14/01/2019
2	BIA	Clarification on proximity of neighbouring structures	Closed – plan provided	14/01/2019
3	BIA format/ stability	Contradictory and confusing recommendations on foundation design.	Closed - the contractor should confirm the insitu shear strength of the London Clay prior to casting foundations, and take foundations deeper where necessary, to ensure the design bearing capacity is achievable, and that ground movements will remain within the predicted range.	March 2019
4	Stability	Contradictory information on the depth of excavation/underpinning.	Closed – clarification provided	14/01/2019
5	Stability	Ground movement assessment confusing and unclear. Assessment not undertaken for all potentially affected properties and cumulative impacts of the two excavations not assessed.	Closed – See Section 4.	14/01/2019.
6	Stability	Movement monitoring	Closed – see Section 4.	14/01/2019

*Please provide complete and clear responses to the above queries which are discussed in detail in Section 4. Where any of the documents are updated, please indicate the updated sections in a covering email/letter.

Appendix 3: Supplementary Supporting Documents

None

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