

7 ABC Bayham Street, London
NW1 0EY

Basement Impact Assessment
Audit

For
London Borough of Camden

Project Number: 12985-08

Revision: F1

February 2019

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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 7 ABC Bayham Street, London NW1 0EY (planning reference 2018/3647/P). The basement is considered to fall within Category C 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 proposed development comprises the redevelopment of the site to include a five-storey building with a two-storey basement.
- 1.5. The BIA has been prepared by LBH Wembley and TZG Partnership Engineering Consultants, with supporting documents by Risk Management Ltd. The revised submissions include stability assessments by Southern Testing. The qualifications of the authors have been provided in the revised submissions and are in accordance with LBC guidance.
- 1.6. A desk study broadly in accordance with LBC guidance is presented. Utilities information within the zone of influence of the proposed development is presented in the revised submissions. Asset protection agreements should be entered into, as applicable.
- 1.7. The Geo-Environmental report identifies varying thickness of Made Ground overlying the London Clay Formation. In the revised submissions, factual site investigation information including exploratory hole records are presented.
- 1.8. It is accepted there will be no impact to the local or wider hydrogeological environment. However, perched water is identified within Made Ground that may impact stability during construction of underpinning, and appropriate mitigation should be allowed for.
- 1.9. Options for construction sequencing and methodology are presented, including the use of Sheet Piling. A Basement Construction Plan (BCP) is recommended to ensure that movements and vibrations from sheet piling are accounted for, if adopted, and impacts remain within LBC policy criteria.
- 1.10. A revised Ground Movement Assessment is presented that considers the movements relating to the proposed basement construction and the effects on the adjacent properties. Category 1 (Very

Slight) damage, in accordance with the Burland Scale, is predicted, based on movements being restricted by sequencing and propping in the temporary case. A BCP is recommended to confirm an appropriate temporary works strategy will be implemented. Asset protection agreements should be agreed, as required, in regards to impacts to the highway, including underlying utilities.

- 1.11. In the revised submissions, an outline construction programme is presented.
- 1.12. It is accepted there will be no impact to the hydrological environment.
- 1.13. Queries and matters requiring further information or clarification are discussed in Section 4 and summarised in Appendix 2. Considering the revised submissions presented, with final design and mitigation measures being confirmed within a BCP, the BIA meets the criteria of CPG Basements.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 7 September 2018 to carry out a Category C Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 7 ABC Bayham Street, London NW1 0EY, Camden Reference 2018/3647/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: Basements
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.
- The Local Plan (2017): 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; 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 Planning Portal described the planning proposal as: "*Demolition of existing office buildings (B1) and erection of 5 storey (plus two storey basement) building comprising mixed office (B1) and hotel (C1) use.*"

LBC's Planning Portal confirmed that the site lies within the Camden Town Conservation Area but is not a listed building.

2.6. CampbellReith accessed LBC's Planning Portal on 5 October 2018 and gained access to the following relevant documents for audit purposes:

- Hydrogeological and Hydrological Assessment dated July 2018 (ref LBH4532 Ver 1) by LBH Wembley.
- Land Stability Basement Impact Assessment dated July 2018 by TZG Partnership Engineering Consultants.
- Geo-environmental report and Site Investigation (ref RML6698) dated June 2018 by Risk Management Ltd (incomplete report, pages missing).
- Proposed sections, elevations and floor plans with report (ref aa-a-1704) dated June and July 2018 by Ambigram Architects.
- Ecology Report (ref I&BPB7760R001D0.1, Rev 0.1/Final) dated 23 July 2018 by Royal Haskoning DHV.

2.7. CampbellReith was not advised of any comments and objections pertaining to the BIA.

2.8. CampbellReith were provided with revised submissions in December 2018 and January 2019 for audit purposes:

- Architectural Section BB (D-PL-P-0302, PL-01) dated July 2018 by Ambigram Architectcs.
- Basement Impact Assessment Stage 4 (Ground Movement Assessment) Report (J13886) dated 20th December 2018 by Southern Testing.
- Geo-environmental report and Site Investigation (ref RML6698) dated June 2018 by Risk Management Ltd (complete report).
- Construction Method Statement and Land Stability Assessment (Rev E) dated 20th December 2018 by TZG Partnership Engineering Consultants.
- Utilities Search Information.
- Email of 8th January 2019 responding to CampbellReith comments (presented in Appendix 3) by GL Hearn.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

| Item | Yes/No/NA | Comment |
|--|-----------|--|
| Are BIA Author(s) credentials satisfactory? | Yes | Updated in revised submissions |
| Is data required by Cl.233 of the GSD presented? | Yes | Utility / underground infrastructure; an outline construction programme; updated in revised submissions. |
| Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology? | Yes | |
| Are suitable plans/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 | |
| Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers? | Yes | Land Stability Assessment BIA report, Section 4. |
| Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers? | Yes | Hydrogeological and Hydrological BIA report, Section 5.1.1. |
| Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers? | Yes | Hydrogeological and Hydrological BIA report, Section 5.1.2. |
| Is a conceptual model presented? | Yes | Described within the text and indicated within construction figures. |

| Item | Yes/No/NA | Comment |
|--|-----------|--|
| Land Stability Scoping Provided? Is scoping consistent with screening outcome? | Yes | Land Stability Assessment BIA report, Section 5. |
| Hydrogeology Scoping Provided? Is scoping consistent with screening outcome? | Yes | Hydrogeological and Hydrological BIA report, Section 5.2. |
| Hydrology Scoping Provided? Is scoping consistent with screening outcome? | Yes | |
| Is factual ground investigation data provided? | Yes | Geoenvironmental report and Site Investigation by Risk Management Ltd; Updated in revised submissions. |
| Is monitoring data presented? | Yes | Groundwater and gas monitoring results provided in appendices of Risk Management Ltd report. |
| Is the ground investigation informed by a desk study? | Yes | Phase I Environmental Risk Assessment provided in Risk Management Ltd report. |
| Has a site walkover been undertaken? | Yes | Risk Management Ltd report. |
| Is the presence/absence of adjacent or nearby basements confirmed? | Yes | Reasonable assumptions adopted where information unknown; updated in revised submissions. |
| Is a geotechnical interpretation presented? | Yes | Risk Management Ltd report, Section 7; CNS; GMA; updated in revised submissions. |
| Does the geotechnical interpretation include information on retaining wall design? | Yes | Land Stability Assessment BIA report, Section 7 and Appendix E. CMS / GMSA updated in revised submissions. |
| Are reports on other investigations required by screening and scoping presented? | Yes | Ecological Impact Assessment (confirming no trees to be felled during development). |
| Are baseline conditions described, based on the GSD? | Yes | Depth of proposed retaining wall piles confirmed; Updated in revised submissions. |

| Item | Yes/No/NA | Comment |
|--|-----------|--|
| Do the base line conditions consider adjacent or nearby basements? | Yes | |
| Is an Impact Assessment provided? | Yes | Updated in revised submissions. |
| Are estimates of ground movement and structural impact presented? | Yes | Updated in revised submissions; Southern Testing GMA supersedes other assessments. |
| Is the Impact Assessment appropriate to the matters identified by screening and scoping? | Yes | Updated in revised submissions; Southern Testing GMA supersedes other assessments. |
| Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme? | Yes | Updated in revised submissions; Southern Testing GMA supersedes other assessments. |
| Has the need for monitoring during construction been considered? | Yes | Updated in revised submissions; Southern Testing GMA supersedes other assessments. |
| Have the residual (after mitigation) impacts been clearly identified? | Yes | Updated in revised submissions; Southern Testing GMA supersedes other assessments. BCP re propping / sheet piling recommended. |
| Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained? | Yes | Updated in revised submissions; Southern Testing GMA supersedes other assessments. BCP re propping / sheet piling recommended. |
| 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 | Updated in revised submissions; Southern Testing GMA supersedes other assessments. BCP re propping / sheet piling recommended. |
| Does report state that damage to surrounding buildings will be no worse than Burland Category 1? | Yes | Updated in revised submissions; Southern Testing GMA supersedes other assessments. BCP re propping / sheet piling recommended. |
| Are non-technical summaries provided? | Yes | |

4.0 DISCUSSION

- 4.1. The original BIA has been prepared by LBH Wembley (Hydrology and Hydrogeology) and TZG Partnership Engineering Consultants (Land Stability), with supporting documents (desk study and site investigation) by Risk Management Ltd. The revised submissions include stability assessments by Southern Testing (Ground Movement Assessment).
- 4.2. The qualifications of the authors have been provided in the revised submissions and are in accordance with LBC guidance.
- 4.3. The proposed development comprises the demolition of the existing buildings on site (a mixture of single storey and two storey buildings built in the 19th and 20th Centuries) and the construction of a five-storey building with a two-storey basement for office and hotel use with associated facilities. The basement level will be excavated to a depth of approximately 8m. The site lies within the Camden Town Conservation Area.
- 4.4. The site investigation and BIA have been informed by a desk study broadly in accordance with the GSD Appendix G1. Consultation with TFL confirms the proposed development will not impact upon their Northern Line assets. Utilities information within the zone of influence of the proposed development is presented in the revised submissions. Asset protection agreements should be entered into, as applicable.
- 4.5. The site investigation undertaken identifies the London Clay as the bearing formation for the proposed foundations, underlying Made Ground. The Made Ground was encountered to depths of 2.10m below ground level (bgl). In the revised submissions, factual site investigation information including exploratory hole records are presented.
- 4.6. Interpretative geotechnical information is presented. In the revised submissions, the proposed foundation depths and the retaining wall toe levels, have been confirmed, which are required to inform the Ground Movement Assessment (GMA).
- 4.7. Groundwater is stated to be perched in the Made Ground and was noted during monitoring visits (May and June 2018) to the installations fitted within boreholes BH1, DIS1 and DIS3 between 1.60 m and 3.80m bgl. The monitoring data suggest that groundwater may also be encountered within London Clay. However, it is accepted that this is unproductive strata and there will be no impact on the wider hydrogeological environment.
- 4.8. The proposed basement development will be at a depth of 8m bgl and therefore will encounter groundwater. This may impact upon stability during construction, depending upon the methodology adopted. The Land Stability Assessment considers two forms of construction – a piled ‘top-down’ scheme and a bottom up scheme utilising piled retaining walls and two stage underpinning. If

underpinning is to be adopted, appropriate mitigation for maintaining stability if groundwater is encountered should be allowed for.

- 4.9. The revised submissions provide further construction methodology and temporary works information. Although construction methodology options are proposed, sufficient outline information and assessment has been considered for each option. A Basement Construction Plan (BCP) is recommended to ensure that movements and vibrations from sheet piling are accounted for, if adopted, and impacts remain within LBC policy criteria.
- 4.10. In the revised submissions, an outline construction programme is presented.
- 4.11. The original Ground Movement Assessment (GMA) was not accepted, and a number of queries were raised in the previous Audit. A revised GMA has been presented that considers the movements relating to the proposed basement construction and the effects on the adjacent properties. The revised GMA addresses the queries raised by the previous Audit.
- 4.12. Category 1 (Very Slight) damage, in accordance with the Burland Scale, is predicted, based on movements being restricted by sequencing and propping in the temporary case with reference to published works on control of construction and ground movements by Ball, Langdon and Creighton. A BCP is recommended to confirm an appropriate temporary works strategy will be implemented that is consistent with the construction controls necessary to maintain movements and impacts within LBC policy criteria.
- 4.13. Asset protection agreements should be agreed, as required, in regards to impacts to the highway, including underlying utilities.
- 4.14. A structural monitoring scheme with appropriate trigger values and contingency actions is recommended by the GMA, to ensure movements are limited and construction is controlled, as per the design and construction strategy. Details of the proposed monitoring should be included within the BCP.
- 4.15. Bayham Street lies within Critical Drainage Area (Group 3-003) but is not located within a Local Flood Risk Zone. The Environment Agency indicates that the risk of flooding from surface water at 7 ABC Bayham Street is 'Very Low' however the streets adjacent to the north and south are both at high risk (1 in 30 year) from surface water flooding. Bayham Street was not subject to surface water flooding during 1975 or 2002 events.
- 4.16. The development will not increase the area of hardstanding across the site. There will be no impact to the wider hydrological environment. Section 8 of the Land Stability Assessment BIA report states that given the underlying London Clay it is not feasible to install a soakaway system on site but that there 'may be requirement to attenuate surface water flows prior to discharge to the sewer. The requirement for this will be determined by Thames Water and will be designed by the appointed

underground drainage engineer as necessary'. Detailed drainage design (including attenuation proposals) will require approval from LBC and Thames Water.

- 4.17. The proposed basement will require waterproofing and should adopt standard flood protection measures, including mitigation measures to protect against sewer surcharging.

5.0 CONCLUSIONS

- 5.1. The qualifications of the authors have been provided in the revised submissions and are in accordance with LBC guidance.
- 5.2. The development will comprise the demolition of the existing buildings on site and the construction of a five-storey building with a two-storey basement.
- 5.3. Utilities information within the zone of influence of the proposed development is presented in the revised submissions
- 5.4. Factual site investigation information including exploratory hole records are presented in the revised submissions.
- 5.5. It is accepted there will be no impact to the local and wider hydrogeological environment. However, perched water is identified that may impact stability during construction, depending on the methodology adopted.
- 5.6. Options for construction sequencing and methodology are presented. A Basement Construction Plan (BCP) is recommended to ensure that movements and vibrations from sheet piling are accounted for, if adopted, and impacts remain within LBC policy criteria.
- 5.7. In the revised submissions, an outline construction programme is presented.
- 5.8. A revised Ground Movement Assessment is presented. Category 1 (Very Slight) damage, in accordance with the Burland Scale, is predicted. A BCP is recommended to confirm an appropriate temporary works strategy will be implemented to limit movements to within the stated predictions.
- 5.9. Asset protection agreements should be agreed, as required, in regards to impacts to the highway, including underlying utilities.
- 5.10. It is accepted that the site is at very low risk of flooding. Standard flood mitigation measures should be adopted.
- 5.11. The development will not increase the impermeable site area. It is accepted there will be no impact to the hydrological environment.
- 5.12. Queries and matters requiring further information or clarification are summarised in Appendix 2. Considering the revised submissions presented, with final design and mitigation measures being confirmed within a BCP, the BIA meets the criteria of CPG Basements.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

| Query No | Subject | Query | Status/Response | Date closed out |
|----------|----------------|---|--------------------------|-----------------|
| 1 | BIA | Author qualifications to be demonstrated. | Closed | January 2019 |
| 2 | BIA | Utilities information within the zone of influence of the proposed development should be presented. | Closed | January 2019 |
| 3 | BIA | All appendices of the Site Investigation (including borehole logs) to be provided. | Closed | January 2019 |
| 4 | BIA | An outline construction programme should be presented. | Closed | January 2019 |
| 5 | Land Stability | Geotechnical information and construction methodology information should be clarified | Closed – BCP recommended | January 2019 |
| 6 | Land Stability | GMA and associated calculations / assessments / specifications to be reviewed and re-submitted | Closed | January 2019 |

Appendix 3: Supplementary Supporting Documents

Email of 8th January 2019 by GL Hearn

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----- Message from Jonathan Ordidge <Jonathan.Ordidge@glhearn.com> on Tue, 8 Jan 2019 12:34:14 +0000 -----

To: "Marfleet, Patrick" <Patrick.Marfleet@camden.gov.uk>

cc: Chris Benham <Chris.Benham@glhearn.com>, Kelly McCann <Kelly.McCann@glhearn.com>, "George" <george@tzgpartnership.com>

Subject: 7abc Bayham Street - BIA Audit Responses

Hi Patrick,

Please see our responses below in red and attachments that relate to Campbell Reith's latest comments.

Q1 - author details provided.

Q2 - utilities information: utilities plans not provided but the GMA refers to Thames Water, Gas and Telecoms assets, and proximity of the Highway. The Audit will note that asset protection agreements and Highways AIP to be agreed with each asset owner in advance of construction.

Please see attached utilities information.

Q3 - site investigation appendices / logs: to be provided.

We believe these have already been provided. Please could Campbell Reith give specific reference to which ones are missing and we can point them to the right section?

Q4 - outline construction programme: to be provided.

Approximately 30 months – 6 month pre-construction period (demolition), 24 month construction period

Q5 and Q6 - methodologies and GMA:

-a. In order to limit ground movements, the GMA has assumed contiguous piles (for the basement retaining walls) will be no longer than 13m. In the GMA Section 11, Conclusion, it states that the GMA will need to be revised if pile lengths differ. The CMS states that vertical loads will be taken entirely by the raft; we have therefore assumed that retaining wall piles will be no greater than 13m.

Correct

-b. The GMA has adapted the standard C760 approach, with reference to Ball, Langdon and Creighton and the proposed adoption of 'construction controls'. Whilst its noted that the CMS Section 8, Movement Mitigation Measures, provides an outline of control measures to be adopted, a BCP will be recommended to ensure the final design and construction adopts suitable control measures.

Agreed

-c. The GMA states that excavation depths have been assumed? These depths should be confirmed.

Please see attached updated Section Plan P-0302.

-d. The CMS Appendix D indicates the use of sheet piles. An impact assessment in terms of ground movement / vibration and consequent damage impacts should be presented.

Sheet piles should result in negligible installation movements. Wall deflection movements associated with excavation in front of the wall will be the same as for a stiffened/propped bored pile wall. This assumes that the same level of stiffening/propping is utilised. Ground conditions are cohesive so there should be negligible vibration associated with the installation and the sheet piling will only occur along Bayham Street and will be just a single storey below ground.

-e. Further to point d, Appendix D indicates the use of 2 stage underpinning - again, impacts arising from this should be presented, noting that 5mm to 10mm of vertical and horizontal movement per stage of underpinning may be anticipated with this form of construction.

The underpinned walls would be modelled as an equivalent bored pile wall which is installed in hit-and-miss sequencing, following guidance in CIRIA C760. The movements resulting from the installation of the underpins would, therefore, be less than for a 13m piled wall as the underpin height is less than the pile length. Wall deflection movements caused by excavation in front of the stiffened/propped underpinned wall would be the same as those for a stiffened/propped bored pile wall.

Therefore by inspection the current model is more onerous than the underpinning scenario.

-f. We assume that Appendix F of the CMS is now superseded by the GMA by Southern Testing and no longer forms part of the submission.

Agreed

Kind regards

Jonny

----- Message from Jonathan Ordidge <Jonathan.Ordidge@glhearn.com> on Tue, 22 Jan 2019 14:22:03 +0000 -----

To: "grahamkite@campbellreith.com" <grahamkite@campbellreith.com>

cc: "camdenaudit@campbellreith.com" <camdenaudit@campbellreith.com>, "Marfleet, Patrick" <Patrick.Marfleet@camden.gov.uk>, <Chris.Benham@glhearn.com>

Subject: RE: 12985-08: 7abc Bayham Street - BIA additional details 2018/3647/P

Hi Graham,

Following my email below, please could you advise when the final audit is likely to be ready and if further information is required?

Thanks

Jonny

From: Jonathan Ordidge
Sent: 18 January 2019 14:48
To: 'grahamkite@campbellreith.com'
Cc: 'camdenaudit@campbellreith.com'; 'Marfleet, Patrick'; Chris Benham
Subject: FW: 12985-08: 7abc Bayham Street - BIA additional details 2018/3647/P

Hi Graham,

I note from the email below that on 4th January you were in the process of reviewing calculations in detail.

Please could you let me know what the latest is on this?

Do you have any comments on the information we provided on the attached email?

We are keen to progress with this application so your earliest attention to this would be most appreciated.

Kind regards

Jonny

From: Marfleet, Patrick [mailto:Patrick.Marfleet@camden.gov.uk]
Sent: 04 January 2019 15:51
To: Jonathan Ordidge
Subject: FW: 12985-08: 7abc Bayham Street - BIA additional details 2018/3647/P

Hi Jonny,

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