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Guinness Court, St. Edmund's Terrace
London, NW8 7QE

Basement Impact Assessment Audit

For

London Borough of Camden

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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 Guinness Court, St. Edmund's Terrace, London NW8 7QE (planning reference 2017/1465/P). Preliminary comments on the initial documents provided were made by CampbellReith in May 2017 and subsequently the BIA was revised and published in August 2017 following these comments. The basement is considered to fall within Category B as defined by the Terms of Reference.

1.2. Subsequent to the issue of the above initial audit, the BIA was revised by Barrett Mahony Consulting Engineers dated October 2017 in order to accommodate the queries highlighted in the previous audit (dated September 2017).

1.3. 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.

1.4. 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.

1.5. The proposed work involves the conversion of an existing ground floor bin store to provide a two bedroom porters lodge. The existing ground floor level will be excavated by approximately 1.5m bgl to enable an additional floor to be installed over half the extent of the building.

1.6. The BIA has been prepared by Barrett Mahony Consulting Engineers. The author's qualifications for the subterranean flow section are not fully in accordance with LBC guidelines, and should be co-authored by a Chartered Geologist. Given the underlying non-aquifer and limited extent of the development, the assessment has been accepted.

1.7. The BIA has been informed by a desk study broadly in accordance with the LBC guidance. An outline construction programme has been provided in the revised submissions .

1.8. A site investigation was undertaken in 2007 during the development of the existing Guinness Court building. One borehole was drilled adjacent to the proposed basement to a depth of 15mbgl and this identified London Clay, underlying 1m of Made Ground. Interpretative geotechnical information is presented.

1.9. Groundwater level readings from 2007 are presented, and the basement excavation may encounter groundwater. It is recommended that trial excavations are undertaken in advance of the main excavation / construction works to further inform temporary works contingency

planning and control of construction. However, it is accepted that any perched volumes of water are likely to be limited and should be adequately dealt with by sump pumping. The proposed development will not impact the wider hydrogeological environment.

1.10. The permanent structural scheme will be tied into, and found upon, existing piled foundations. Given the limited extent of the new excavation, and distance from neighbouring structures, the outline detail of the temporary works scheme is considered adequate in confirming that retaining walls will be propped at all times. The depth of embedment of temporary walls has been provided in the revised submissions.

1.11. A Ground Movement Assessment (GMA) and damage impact assessment is presented that indicates Category 0 to 1 damage (Negligible to Very Slight) in regard to No. 25a-c St Edmund's Terrace and Guinness Court Block B.

1.12. The revised BIA presents an outline structural monitoring methodology which is considered appropriate to control damage impacts within the limits predicted.

1.13. The BIA has identified that the site is at low risk of surface water flooding. It is also at risk from flooding from the nearby Barrow Hill reservoir. Flood risk mitigation measures are proposed to be incorporated into the final design, which should be implemented.

1.14. The proposed scheme will increase the impermeable area on site by $6m^2$ and assessment is presented indicating that increase in off-site discharge flow rates will be negligible. It is accepted that attenuation SUDS may be impractical to implement.

1.15. Non-technical summaries have been provided.

1.18 Queries and matters requiring further information or clarification are discussed in Section 4 and summarised in Appendix 2. Considering the updated information with the revised submissions, the BIA meets the criteria of CPG4.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 27 April 2017 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for Guinness Court, St. Edmund's Terrace, London NW8 7QE, Camden Reference 2017/1465/P. Preliminary comments on the initial documents provided were made by CampbellReith in May 2017 and subsequently the BIA was revised and published in August 2017 following these comments.

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. Subsequent to the issue of the above initial audit, the BIA was revised by Barrett Mahony Consulting Engineers dated October 2017 in order to accommodate the queries highlighted in the previous audit (dated September 2017).

2.4. 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.

2.5. 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: "Conversion of existing waste/recycling refuse store to include excavation to create 1x 2bedroom self-contained flat and creation of associated lightwell within residential building".

The Planning Portal confirmed that the site does not lie within a Conservation Area, the site and is not a listed building and there are no listed buildings within the vicinity of the site.

2.6 CampbellReith accessed LBC's Planning Portal on 12 September 2017 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (ref 17708-RP-01) dated 7 August 2017 by Barrett Mahony Consulting Engineers.
- Existing and Proposed elevations, ground floor plans, roof plans and sections dated March 2017 by JAA.
- Sections and details dated 7 August 2017 by Barrett Mahony Consulting Engineers.
- Comments and objections to the proposed development from local residents.

2.7 The audit was subsequently updated based on a review of the following documents in November 2017:

a) Basement Impact Assessment (ref 17708-RP-01) dated 19 October 2017 by Barrett Mahony Consulting Engineers.

b) Construction timeline dated 20 October 2017 (author unknown).

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	The authors have CEng MIEI, which is recognised as equivalent to CEng MICE. The hydrogeology assessment should include evidence of input by a Chartered Geologist; however, the assessment is accepted based on limited extent of development and underlying non-aquifer.
Is data required by Cl.233 of the GSD presented?	Yes	Outline Construction programme should be provided.
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	BIA report, Section 2.3.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	BIA report, Section 2.2. Considered appropriate for the limited excavation depth and underlying non-aquifer.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	BIA report, Section 2.1. Guinness Court has a low risk of flooding from surface water but is at risk from flooding from the nearby Barrow Hill reservoir, located 80m northeast of the site. St Edmund's Terrace is within a Critical Drainage Area (Group 3-005), although this was not identified within screening process.

Item	Yes/No/NA	Comment
Is a conceptual model presented?	Yes	Description of proposed works and potential impacts accepted.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA report, Section 3.3.
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA report, Section 3.2. Groundwater readings taken in October and September 2007 from a borehole adjacent to the proposed basement recorded groundwater levels at 3.2m to 3.7mbgl which are likely to represent perched water levels within the London Clay.
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	BIA report, Section 3.1. There is a small increase in hard surfaced area assessed to have negligible impact on discharge flow rates. SUDS assessed as impracticable. Flood risk mitigation measures proposed.
Is factual ground investigation data provided?	Yes	BIA report, Appendix 4 provides a record of the borehole drilled adjacent to the proposed basement area in 2007. Geotechnical parameters provided.
Is monitoring data presented?	Yes	Trial excavations in advance of the main works also recommended.
Is the ground investigation informed by a desk study?	No	Not demonstrated.
Has a site walkover been undertaken?	Yes	A site walkover inspection was undertaken on 17th July 2017.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	There is an existing basement level car park on the site, 7m from the proposed basement. There is a single level masonry structure at the rear of the garden of No. 25a-c St Edmund's Terrace which the report assumes to have no basement. Nearby foundation depth have been assumed to be conservatively shallow for GMA purposes.

Item	Yes/No/NA	Comment
Is a geotechnical interpretation presented?	Yes	Section 5.4.2
Does the geotechnical interpretation include information on retaining wall design?	Yes	Appendix 6
Are reports on other investigations required by screening and scoping presented?	N/A	
Are baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Assumptions made are considered conservative.
Is an Impact Assessment provided?	Yes	BIA report, Section 5.
Are estimates of ground movement and structural impact presented?	Yes	Movements and damage category predicted in line with expectations for scale of development.
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Suitable temporary works propping, structural monitoring, flood protection measures.
Has the need for monitoring during construction been considered?	Yes	Proposed Monitoring Strategy provided (BIA report, Section 5.6) which outlines the monitoring works to be undertaken at the site.
Have the residual (after mitigation) impacts been clearly identified?	N/A	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	Movements and damage category predicted in line with expectations for scale of development.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	

Item	Yes/No/NA	Comment
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	BIA report, Section 5.4.3. Category 0 to 1.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The BIA has been prepared by Barrett Mahony Consulting Engineers. The authors' qualifications for the surface flow and land stability sections are in accordance with CPG4 guidelines. The author's qualifications for the subterranean flow section are not fully in accordance with CPG4 guidelines, which should be co-authored by a Chartered Geologist. Given the underlying non-aquifer and limited extent of the development, the assessment has been accepted.

4.2. The proposed work involves the conversion of an existing ground floor bin store to provide a two bedroom porters lodge. The existing ground floor level will be excavated by approximately 1.5m bgl to enable an additional floor to be installed over half the extent of the building. There is an existing basement level car park on the site which is understood to be more than 2m below existing ground level, but over 7m from the proposed basement. A small lightwell / terrace will also be provided.

4.3. The BIA has been informed by a desk study broadly in accordance with the GSD Appendix G1. Prior to construction, an identified foul sewer adjacent to the proposed basement will be diverted and protected. The details are to be agreed with asset owners.

4.4. In the revised submissions, an outline construction programme has been provided.

4.5. The construction methodology indicates that the existing piled foundations and existing shared ground beam foundation to the current bin store and the adjacent residential building will be retained, reused and protected. The existing ground beams and piles within the bin store will be broken down to enable the lowered ground floor slab to be constructed. The existing bin store ground beams will then be reinstated at a lower level. It is proposed to construct reinforced concrete L-shaped walls supported on the reinstated ground beams to retain the external soil and support the new suspended floors to the building. Retaining wall design information is provided.

4.6. An indicative temporary works scheme confirms that all excavations will be propped. Embedded retaining walls, such as sheet piling, will retain the excavations until the permanent RC walls are complete. The revised submissions indicate the temporary sheet pile walls will be embedded approximately 1.2m below formation level.

4.7. A site investigation was undertaken in 2007 during the development of the adjacent Guinness Court. One borehole was drilled adjacent to the proposed basement to a depth of 15m bgl and this identified London Clay, underlying 1m of Made Ground. The existing borehole information is considered appropriate to the scale of the development. Interpretative geotechnical information, broadly in accordance with the GSD Appendix G3 and sufficient for the scheme, is presented.

4.8. Groundwater level readings of 3.2m to 3.7m bgl were recorded in October and September 2007. On the basis of this information, the proposed basement may encounter groundwater. Given the time elapsed since monitoring, it is recommended that trial excavations are undertaken in advance of the main excavation / construction works to further inform temporary works contingency planning and control of construction. However, it is accepted that any perched volumes of water are likely to be limited and should be adequately dealt with by sump pumping. The proposed development will not impact the wider hydrogeological environment.

4.9. The BIA recommends that a 'worst credible' design groundwater level acting just below ground level be considered. The BIA states that this head of water should also be considered in the design of any retaining walls, such as those for the lightwell / terrace area. This is generally accepted as a reasonably conservative approach.

4.10. A Ground Movement Assessment (GMA) and damage impact assessment is presented. The effects of heave are considered and heave protection will be incorporated into the design. The BIA states that as Guinness Court is founded on piles with suspended ground floor slabs, any ground movement due to the excavation will not negatively affect the foundations or be transmitted to the structure.

4.11. The BIA text and drawings indicate that an embedded retaining wall will be used to temporarily support excavations, prior to the construction of permanent RC walls. The revised submissions confirm that sheet piles will be pushed in place, rather than vibrated, to 1.2m below formation level.

4.12. The damage impact assessment indicates Category 0 to 1 damage (Negligible to Very Slight) in regard to No. 25a-c St Edmund's Terrace and Block B Guinness Court. It is noted that in the calculations presented, the retaining wall is stated to be 'low stiffness', which is considered a conservative approach.

4.13. The BIA presents an outline structural monitoring methodology. Frequency of survey, trigger levels and contingency actions are considered appropriate to control construction and maintain impacts within the limits predicted.

4.14. St Edmund's Terrace is within a Critical Drainage Area (Group 3-005), although this was not identified within the BIA screening or scoping process. The BIA has identified that the site is at low risk of surface water flooding but is at risk from flooding from the nearby Barrow Hill reservoir. The BIA states that the nearby Barrow Hill reservoir is a fully contained sub-surface tank which was recently re-constructed and therefore the risk of a breach from this reservoir is seen as negligible. Notwithstanding this assessment, flood risk mitigation measures are proposed to be incorporated into the final design, such as drained cavity waterproofing, dual

pumps to basement pumping system, 24 hour emergency storage volume, non-return valves and raised thresholds to external doors and lightwells, which should be implemented.

4.15. The proposed scheme will increase the impermeable area on site by $6m^2$. The BIA states that the opportunities for SUDS measures are restricted due to the underlying impermeable London Clay and current site layout. Assessment is presented indicating that the increase in off-site discharge flow rates will be negligible. It is accepted that attenuation SUDS may be impractical to implement.

4.16. Non-technical summaries have been provided.

4.17. Queries and matters requiring further information or clarification are summarised in Appendix 2.

5.0 CONCLUSIONS

5.1. The author's qualifications are not in full accordance with LBC guidance and should demonstrate input from a Chartered Geologist. Given the underlying non-aquifer and limited extent of the development, the hydrogeological assessment has been accepted

5.2. The BIA has been informed by a desk study broadly in accordance with the guidance. An outline construction plan has been provided.

5.3. It is proposed to divert a foul sewer to protect it from the proposed construction works.

5.4. Site investigation and geotechnical parameters are presented, in accordance with the guidance.

5.5. Groundwater may be encountered within the basement excavation. It is proposed to confirm groundwater conditions in advance of the construction works. It is accepted that the wider hydrogeological environment will not be impacted.

5.6. The construction methodology, structural scheme and temporary works proposed are generally accepted. In the revised submissions, the depth and type of temporary embedded wall are confirmed.

5.7. The ground movement and damage impact assessment predict Category 0 to 1 damage to neighbouring structures. This is in line with expectations for a development of this scale and depth.

5.8. The BIA presents an outline structural monitoring methodology which is considered appropriate.

5.9. Flood risk mitigation measures are proposed to be incorporated into the final design, which should be implemented.

5.10. The change in off-site drainage discharge flow rates will be negligible due to the proposed development, which will not impact the wider hydrological environment.

5.11. Non-technical summaries have been provided.

5.12. Queries and matters requiring further information or clarification are summarised in Appendix 2. Considering the revised submissions, the BIA meets the criteria of CPG4.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Colin	26 St Edmund's Terrace	24th April 2017	After the previous construction work at Guinness Court 26, 28a and 28b St Edmund's Terrace have suffered flooding and rising damp which the resident claims to be created by the extensive underground car park that was built, that affected the water table.	The basement is being excavated into a non-aquifer and as such there should not be hydrogeological impacts.

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status/Response	Date closed out
1	BIA	Outline Construction Plan	Closed	November 2017
2	Stability	Type and depth of embedded retaining wall to be stated. GMA, damage impacts and monitoring scheme to be updated, as required. If sheet piling is proposed, with vibrated installation, assessment of vibration should be provided.	Closed	November 2017

Appendix 3: Supplementary Supporting Documents

None

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