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Camden Goods Yard

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 13398-46
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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 a variation to previously approved development at Camden Goods Yard (planning reference 2020/3116/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 groundwater conditions arising from the variation to the 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 individuals who hold suitable qualifications.

1.5. It is accepted that the proposed basement will not impact the hydrogeology of the area.

1.6. It is indicated that a site specific ground investigation will be undertaken at the site. A re-evaluation of the ground model should be undertaken once this investigation is complete, and the findings form part of a Basement Construction Plan (BCP).

1.7. Further information is required to support the conclusions of the Ground Movement Assessment and Building Damage Assessment in the BIA to demonstrate that damage can be limited to Burland Category 1. It should be noted that the Ground Movement Assessment and Building Damage Assessment will also require to be reviewed and confirmed as part of the BCP on completion of the site specific investigation and design development.

1.8. An outline monitoring strategy should be included as part of the BCP, with trigger levels to ensure damage does not exceed that predicted.

1.9. 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 19 August 2020 to carry out a Category C audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for a variation to a previously approved development at Camden Good Yard – Morrisons Supermarket at Chalk Farm Road.

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 groundwater conditions arising from basement development. The impact to surface water was not assessed, as the proposed variation will not affect this aspect at the site.

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 *"Variation of Conditions 3 (approved drawings) and 73 (number and mix of residential units) of planning permission 2017/3847/P dated 15/06/2018 (as amended by 2020/2786/P dated 09/07/2020, 2020/0034/P dated 05/05/20, 2019/6301/P dated 24/12/2019, 2019/0153/P dated 06/02/2019 and 2019/2962/P dated 04/07/2019) for redevelopment of the petrol filling station site and main supermarket site; namely for: additional storeys across buildings A, B, C and F creating 71 additional residential units (52 market, 19 affordable) (Class C3) and associated elevational changes;*

relocation of concierge to Block A; and alterations to basement and landscaping. This application is accompanied by an addendum to the original Environmental Statement."

2.6. The Audit Instruction confirmed that the basement proposals neither involve, nor are a neighbour to, listed buildings.

2.7. CampbellReith accessed LBC's Planning Portal on 2 September 2020 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment (BIA) by AECOM, ref. 60620758, revision 08, dated 13 July 2020.
- Planning Application Drawings consisting of Location Plan, Proposed Plans and Sections dated July 2020
- Camden Goods Yard - Outline Phasing of Works letter to Network Rail by Aecom dated 13 November 2019.
- Draft meeting minutes from Aecom, dated 11 June 2020.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
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	
Are suitable plan/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	
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	N/A	Not assessed in this audit.
Is a conceptual model presented?	Yes	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	N/A	Not assessed in this audit.
Is factual ground investigation data provided?	Yes	However further site specific investigation is to be undertaken.
Is monitoring data presented?	Yes	
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	Table 5.3 of the BIA
Are reports on other investigations required by screening and scoping presented?	Yes	
Are the 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	
Are estimates of ground movement and structural impact presented?	Yes	However, further information is required to support the ground movement assessment.

Item	Yes/No/NA	Comment
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	
Has the need for monitoring during construction been considered?	Yes	
Have the residual (after mitigation) impacts been clearly identified?	Yes	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	However, the ground movement assessment predicts an unacceptable damage category based on the proposed construction methodology.
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	However, the ground movement assessment predicts an unacceptable damage category
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	No	Some of the walls assessed are predicted to experience Burland Category 2 and 3 damage.
Are non-technical summaries provided?	No	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by Aecom and the individuals concerned in its production hold suitable qualifications.

4.2. The LBC Instruction to proceed with the audit identified that the basement proposal neither involves a listed building, nor is adjacent to listed buildings.

4.3. Planning permission for the development was originally granted in 2017. A BIA for the scheme was audited by CampbellReith. Changes to the original basement scheme have subsequently been made, requiring the submission and audit of a new BIA. The proposed changes to the basement include:

- Increasing the footprint of the existing double basement (B2) level under Blocks E and F.
- Changing the levels for the B1 and B2 level basements,
- Changing the basement retaining wall from contiguous to secant pile wall and changing the diameter of the piles to 750mm.
- Increasing the pile diameter to 1050mm diameter where the double basement is present along the southern site boundary.
- Constructing a new B2 level basement below Block A, covering an area of 300m^2, to accommodate a swimming pool and associated plant.

4.4. The BIA indicates the B1 basement excavation will extend to a level of 28.40m OD and the B2 basement excavation will extend to a level of 24.60m OD. Ground level is indicated to be at 33.50m OD.

4.5. The BIA describes a number of site investigations that have been carried out in the vicinity of the site, and one investigation that was undertaken on the site itself. The data from these investigations have been used to compile a ground model for the site, which indicates Made Ground over London Clay Formation. The BIA indicates that a site specific ground investigation will be undertaken at the site in autumn of 2020.

4.6. The site investigation carried out at the site encountered water at 4.4m to 5.0m depth within the Made Ground, and at 22.5 to 23.6m depth within the London Clay Formation. For the purposes of the BIA, and due to the limited data available, a groundwater level of 1.15m below ground level (32.35m OD) was adopted.

4.7. The shallowest geology at the site is London Clay, which is designated an Unproductive Stratum with respect to groundwater. As such, it is accepted that the basement will not significantly impact the hydrogeology of the area.

4.8. A number of trees are to be removed from the southern boundary of the site, and the impact of removing these trees is discussed in Section 5.1 of the BIA. A zone of influence has been calculated for the trees based on guidance in Chapter 4.2 of NHBC guidance. The BIA states that, based on the thickness of Made Ground on site, the foundations for the properties along Gilbeys Yard are likely to be at least 2m deep, beyond the zone of influence of the 'worst case' tree removal, and therefore not impacted by the removal of trees. Based on the assessment provided in the BIA it is accepted that the removal of these trees will not significantly affect the surrounding properties.

4.9. A main trunk and a secondary branch of a Victorian brick sewer were identified on the site. It is proposed to retain both of these sewers and the BIA indicates that discussion with Thames Water are ongoing regarding the consents required to build over these sewers.

4.10. Table 5.3 of the BIA presents characteristic soil parameters for use in ground movement analyses undertaken using WALLAP and PLAXIS 2D software. The parameters in the table differ from those used in the BIA for the original scheme, however it is noted that since the original BIA, additional site investigation data has been undertaken and used to inform the soil parameters. The soil parameters appear suitable for the soils described, but should be confirmed as part of Basement Construction Plan (BCP) following completion of the site specific ground investigation.

4.11. The notes at the end of Table 5.3 indicate a different correlation between Young's modulus and undrained shear strength has been used in a PDisp assessment. The correlation used in the PDisp assessment is considered to be more conservative, however no input or output data for this assessment has been provided to confirm the actual parameters used.

4.12. Section 5.2 of the BIA presents a ground movements assessment (GMA) undertaken for the proposed basement development. The GMA calculates vertical and horizontal ground movements that result from installation of the secant pile retaining wall in accordance with CIRIA C760. Horizontal and vertical deflection of the retaining walls due to basement excavation is assessed using WALLAP and PLAXIS 2D software and empirical relationships described in CIRIA C760. Vertical ground movement due to unloading the ground during basement excavation is assessed using PDisp software.

4.13. Section 5.2.2 of the BIA describes the proposed construction sequence for the basement. Three typical sections for the basement retaining wall have been assessed in the GMA; double basement excavation using 1050mm diameter piles and two levels of temporary propping, single basement level using 750mm diameter piles with no temporary propping, and double basement level excavation using 750mm piles and one level of temporary propping.

4.14. The stages used in the WALLAP assessment for each of the three retaining wall sections have been provided in Sections 5.2.5.3 to 5.2.5.5 of the BIA. Output data from the WALLAP analyses have been presented in Appendix G of the BIA. No input or output data have been provided for the assessments carried out using PLAXIS 2D and PDisp, therefore it is unclear how the data from these assessments have been incorporated into the GMA, or used in the subsequent damage category assessment. The input and output data for the PDisp assessment, and contours of ground movement, should be provided.

4.15. Section 5.2.5.8 of the BIA indicates that the maximum ground movement predicted using WALLAP, out of the three wall sections assessed, is 24mm. Numerical values of the predicted horizontal and vertical ground movement, which are subsequently used in the Building Damage Assessment (BDA), should be provided.

4.16. Section 5.3.1 of the BIA presents anticipate ground movements affecting the adjacent Network Rail assets adjacent to the east and west boundaries of the site. The predicted short and long term ground movements affecting these assets are presented in Tables 5.4 and 5.5, along with Network Rail criteria. It is understood that liaison with Network Rail is currently underway to ensure appropriate asset protection agreements are in place for the development.

4.17. Section 5.3.3 of the BIA presents a BDA for the properties along Gilbeys Yard on the southern side of the site. The properties to the north of the site are indicated to have pile foundations and are distant enough that the impact is considered negligible. The Winding Engine Vaults, located below the railway tracks on the southwest side of the site, are indicated to be 10m from the double level basement with foundations between 7.6m and 8.6m below the track level. Construction details for these vaults are presented in Appendix M of the BIA. Stable and Horse Tunnel Markets are indicated to be founded at a lower level, which is comparable with the excavation required to form the adjacent single level basement. Construction details for these structures are presented in Appendix K and L of the BIA. It should be confirmed that impacts to these structures are not altered by the revised basement proposals.

4.18. The most sensitive structure neighbouring the site is identified as being Gilbeys Yard to the south, adjacent to the proposed double basement excavation. The BDA was carried out for the walls of this building, and of the walls analysed, five walls returned a damage category of Category 2 (Slight) or more. The BIA notes that the affected walls are ‘garden walls’ and are expected to be ‘timber fences’ and therefore not of structural importance. The construction of these fences should be confirmed. In accordance with LBC planning policy, basements that result in a damage category that exceeds Burland Category 1 (Very Slight) are unacceptable.

4.19. The BIA indicates that the walls where a Damage Category of 2 or 3 is predicted are garden walls, and therefore not structurally significant to the building. Section 5.3.3.2 of the BIA states that the BDA should be considered preliminary at this stage. In Section 6 of the BIA it is

indicated that the BIA will be updated based on the findings of the site specific ground investigation and states that *"any structures classified as damage category 2 or higher following the detailed design assessment would be subject to further mitigation measures"* such as monitoring and refinement of the temporary propping design. This information should be included as part of the BCP.

4.20. Section 6.2 of the BIA identifies the third party approvals required, and evidence that consultation is underway has been provided.

5.0 CONCLUSIONS

5.1. The BIA has been carried out by individuals who hold suitable qualifications.

5.2. It is accepted that the proposed basement will not impact the hydrogeology of the area.

5.3. It is indicated that a site specific ground investigation will be undertaken at the site. A re-evaluation of the ground model should be undertaken once this investigation is complete, and the findings form part of a Basement Construction Plan (BCP).

5.4. Further information is required to support the conclusions of the Ground Movement Assessment (GMA). This should include a breakdown of the anticipated vertical and horizontal ground movements from each component of the GMA. The PLAXIS 2D output contours and PDisp assessment input and output data should be provided. Further clarification should be given regarding how these results have been used in the subsequent Building Damage Assessment (BDA). The GMA and BDA also require review as part of the BCP on completion of the site specific investigation and design development.

5.5. An outline monitoring strategy should be included as part of the BCP, with trigger levels to ensure damage does not exceed that predicted.

5.6. 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

None

Appendix 2: Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	Stability	Input and Output data should be provided for the PDisp assessment. Plaxis 2D contour plots of vertical and horizontal ground movement should be provided. The magnitude of ground movements calculated using the CIRIA C760 should be provided.	Open	
2	Stability	It should be confirmed whether the walls indicated to exceed Damage Category 1 are timber garden fences.	Open	
3	Stability	Confirmation required that impacts to other surrounding structures (such as Engine Winding Vaults and Horse Market) are unaltered due to revised basement proposals.	Open	

Appendix 3: Supplementary Supporting Documents

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