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British Museum, Great Russell Street, WC1E 7JW

Review of Detailed Basement Construction Plan

For
London Borough of Camden

Project No.
12366-26

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1.0 INTRODUCTION

1.1 CampbellReith was instructed by the London Borough of Camden (LBC) to undertake a review of the detailed Basement Construction Plan (DBCP) submitted by MBP for British Museum, Great Russell Street, London WC1E 7JW, in respect to planning reference 2023/1848/P. A DBCP is a stipulated requirement of a Section 106 Agreement between the British Museum and the London Borough of Camden, dated 17 July 2024. The detailed BCP, its contents and obligations are described in the Section 106 Agreement in Clause 2.11.

1.2 The Section 106 Agreement requires the owner should appoint an independent suitably certified engineer (Basement Design Engineer) to formulate the detailed BCP to ensure:

- that the design plans have been undertaken in strict accordance with the terms of the Agreement incorporating proper design and review input into the detailed design phase of the Development and ensuring that modelling in accordance with the approved Basement Impact Assessment relating to the local ground conditions and local water environment and structural condition of Neighbouring Properties have been incorporated into the final design;
- that the Development will be undertaken without any impact on the structural integrity of the Neighbouring Properties beyond 'Very Slight' with reference to the Burland Category of Damage; and
- that the Basement Design Engineer, having confirmed that the design plans have been undertaken in accordance with this Agreement, includes a letter of professional certification confirming this and that the detailed measures set out in sub-clauses (i)-(vii) below have been incorporated correctly and appropriately and are sufficient in order to achieve the objectives of the Detailed Basement Construction Plan;
- (i) Reasonable endeavours to access and prepare a detailed structural appraisal and conditions survey of all the Neighbouring Properties to be undertaken by an independent suitably qualified and experienced chartered surveyor provided always that access for such appraisal and survey is provided by the owner of the relevant Neighbouring Property (and the Owner shall provide details of the dates and means of contact to secure such access where it has not been provided by the owner of the relevant Neighbouring Property).
- (ii) A method statement detailing the proposed method of ensuring the safety and stability of all Neighbouring Properties throughout the Construction Phase including temporary works sequence drawings and assumptions with appropriate monitoring control risk assessment contingency measures and any other methodologies associated with the basement and the basement temporary works in accordance with the Basement Impact Assessment.
- (iii) Detailed design drawings incorporating modelling in accordance with the Basement Impact Assessment relating to the local ground conditions and local water environment and structural condition of Neighbouring Properties prepared by the Basement Design

Engineer for all elements of the groundworks and basement authorised by the Planning Permission together with specifications and supporting calculations for both the temporary and permanent basement construction works.

- (iv) The Basement Design Engineer to be retained throughout the Construction Phase to inspect, approve and undertake regular monitoring of both permanent and temporary basement construction works during the Construction Phase.
- (v) Measures to ensure the on-going maintenance and upkeep of the basement forming part of the relevant phase of the Development and any and all associated drainage and/or ground water diversion measures in order to maintain structural stability of the Development the Neighbouring Properties and the local water environment (surface and groundwater).
- (vi) Measures to ensure ground water monitoring equipment shall be installed prior to Implementation and retained with monitoring continuing during the Construction Phase and not to terminate monitoring until the issue of the Certificate of Practical Completion (or other time agreed by the Council in writing).
- (vii) Amelioration and monitoring measures of construction traffic including procedures for coordinating vehicular movement with other developments taking place in the vicinity and notifying owners and or occupiers of the residences and businesses in the locality in advance of major delivery schedules and amendments to normal traffic arrangements.

1.3 The Section 106 Agreement also requires that:

- the Certifying Engineer reviews the design plans and offers a 2 page review report to the Council confirming the design plans have been formulated in strict accordance with the terms of this Agreement and have appropriately and correctly incorporated the provisions of sub-clauses (i) – (vii) above and are sufficient to achieve the objectives of the Detailed Basement Construction Plan AND should any omissions, errors or discrepancies be raised by the Certifying Engineer then these to be clearly outlined in the report and thereafter be raised directly with the Basement Design Engineer with a view to addressing these matters in the revised design plans;
- Only thereafter shall the Owner submit the agreed finalised version of the Detailed Basement Construction Plan to the Council for its written approval with a letter of professional certification from the Certifying Engineer confirming that the Detailed Basement Construction Plan is in an approved form and has been formulated in strict accordance with the terms and clauses of this Agreement.

1.4 This report covers our review of the detailed BCP information submitted by MBP in response to the Section 106 Agreement, which comprises the following:

- Basement Construction Plan Rev P04 by MBP reference/job number 10269 dated 20 December 2024
- Appendix A MBP Structural Drawings

- Appendix B MBP Structural Calculations
- Appendix C Movement monitoring proposal
- Appendix D Drone survey report
- Appendix E MBP Sequence and TW drawings
- Appendix F MBP Temporary works calculations
- Appendix G GCG Note
- Appendix H GIA Schedules of Condition
- Appendix I Contractors Method Statement
- Appendix J Drainage Maintenance Plan
- Appendix K Groundwater monitoring proposal
- Appendix L Traffic Management Plan
- Appendix M MBP Letter of Professional Certification
- Appendix N MBP appointment
- Review of Basement Construction Plan by Certifying Engineer dated 20 December 2024, Reference 1910/50/PS

Additional information was requested from CampbellReith upon receipt of the detailed BCP information from MBP. The supplementary information from MBP comprised of the following:

- Ground Investigation Report
- CV of Certifying engineer
- Addendum to Appendix F, including site investigations
- Addendum to Appendix H, including ground movement and damage impact assessment
- Revised MBP Structural Drawings (SW001-MBP-1110-A_00-DDG-S-0095-S2_C02 and SW001-MBP-1110-A_01-DDG-S-0100-S2_C02)
- Revised MBP Structural Calculations for Permanent (SW001-MBP-1110-A_XX-LCA-S-0001_P03) and Temporary Works (SW001-MBP-1110-A_XX-LCA-S-0002_P03)
- Addendum to Appendix A, including MBP Specification Notes drawing (SW001-MBP-1110-A-TSP-A-0001-S2_P01)

2.0 BASEMENT CONSTRUCTION PLAN REVIEW

The following information has been reviewed and found to comply with the requirements of the S106 agreement, where indicated below.

Condition Surveys: • Photographic and descriptive record of existing condition of neighbouring properties • Condition survey of neighbouring properties to be carried out by third party independent of the design and contractor team to be carried out prior to commencement of works.	 ✓ ✓
GMA Report: • Ground Movement Assessment using appropriately conservative modelling • Building damage assessment • Damage no worse than "Very Slight" according to Burland Category of Damage	 ✓ ✓ ✓
Movement Monitoring Proposals including drawings & specifications to include: • The trigger and action levels for horizontal, vertical and tilt movements. • Monitoring targets to be indicated on the elevation drawings. • The monitoring frequency. • Groundwater monitoring proposals.	 ✓ ✓ ✓ ✓
Temporary and Permanent works proposals: • Method statement for basement works throughout construction phase including temporary works drawings, monitoring measures and contingency measures. • Detailed design drawings for all elements of groundworks and basement with specifications and supporting calculations for temporary and permanent case. • Measures for ongoing maintenance including drainage, groundwater monitoring and construction traffic. • Measures to monitor groundwater until issue of Practical Completion Certificate. • Amelioration and monitoring measures of construction traffic. • Ground Investigation Report.	 ✓ ✓ ✓ ✓ ✓ ✓

Engineering Review: • Confirmation of suitably qualified Basement Design Engineer. • Confirmation of Temporary Works Engineer professional qualifications. • Basement Design Engineers Certification that the DBCP is formulated in accordance with the Section 106 Agreement. • Provision to retain the Basement Design Engineer throughout the Construction Phase. • Details of review by suitably qualified and experienced certifying engineer who is independent of the design team. • Evidence of comments raised by certifying engineer on design and review of calculations. • Certifying Engineers Report confirming BCP is in accordance with Section 106 Agreement.	✓ ✓ ✓ ✓ ✓ ✓ ✓

3.0 DISCUSSIONS

3.1 The following comments apply to the detailed BCP, reference Job No. 10269 produced by MBP Consulting Engineers, acting as the Basement Design Engineer for British Museum, Great Russell Street, and cover both temporary and permanent works proposals.

3.2 The author of the detailed BCP is noted as Clementine Dal Fitto from MBP, who act as the Basement Design Engineers.

3.3 The author of the temporary works design is noted as Clementine Dal Fitto from MBP. Confirmation of membership of the Institute of Structural Engineers is included for both Clementine Dal Fitto and Malcolm Brady.

3.4 The structural condition of all the Neighbouring Properties listed in the S106 Agreement has been assessed. A drone survey report has been completed by MBP and is included in Appendix D. Additionally, a condition report has been completed from GIA and for all the neighbouring properties and is included in Appendix H.

3.5 A Ground Movement & Building Damage Assessment report has been completed by GCG in March 2023 (Addendum to Appendix H), which indicates that the damage to the Neighbouring Montague Street properties to the east are classified as Category 0 (negligible). However, it notes that the wall shared between the existing ERB and the Grange Hotel extension should be adequately protected and supported during all the construction stages given its vicinity to the ERB. Since this assessment report, MBP has developed a construction sequence in order to minimise damage to the Grange Hotel. A second assessment (Appendix G) was therefore completed by GCG in October 2024 that confirms that the damage to the Grange Hotel will not exceed Category 1 (very slight) with reference to Burland category of damage.

3.6 Section 2 of the detailed BCP confirms that the Basement Design Engineer (MBP) will be retained with a site presence throughout the construction stage to monitor whether the works are in accordance with the agreed drawings.

3.7 Preliminary basement drawings and calculations for the permanent works are included in Appendix A. Two structural drawings were re-issued as part of the supplementary information requested by CampbellReith.

3.8 The structural calculations for the permanent works are included in Appendix B. The calculations for both the bearing and the secant piles are also presented in this Appendix.

3.1 Detailed proposals for monitoring of the adjacent structures on Montague Street are contained in a drawing/sketch within Appendix C. This includes location of targets and sets trigger levels for action should movement occur.

3.2 Ground conditions and groundwater level are confirmed in the Ground Investigation report, completed by Harrison Geotechnical Engineering in November 2023. The Ground Investigation report was not included in the Appendices of the original DBCP issue but was later added as an Addendum.

3.3 Preliminary temporary propping proposals from MBP are included in Appendix E. Temporary works calculations are included in Appendix F. The basement is proposed to be constructed with two levels of temporary propping. This process is described in the Contractor's method statement (Appendix I) and the temporary works drawings (Appendix E of the DBCP).

3.4 Measures to ensure the on-going maintenance and upkeep of the basement and associated drainage are detailed within Appendix J of the detailed BCP. The report contains the drainage maintenance report which describes the components of the drainage system that require maintenance. Additionally, the BCP states that the structure is designed for the groundwater and is therefore designed to be stable without permanent diversion measures. The basement is designed and detailed to be waterproofed using Type A and C barriers and the secant piled wall.

3.5 Appendix K of the detailed BCP contains a drawing for groundwater monitoring proposal. A borehole is proposed to be drilled at 10m bgl during the construction stage, with the exact position to be confirmed on site. The BCP states that a 10m groundwater monitoring well will be installed and continuous monitoring will be carried out.

3.6 A logistics traffic plan is provided in Appendix L outlining site mapping and the management of vehicle movement within logistics operations. This includes delivery vehicles, traffic route optimisation and the coordination of traffic flow to reduce congestion and maximise safety on site. Additionally, a construction phase plan is included that outlines health, safety, and logistical measures for the construction site. It covers site rules, requirements, potential risks, mitigation measures, and traffic management.

3.7 The basement construction and dewatering strategy are outlined in the Contractors method statement contained in Appendix I.

3.8 The Basement Design Engineer (MBP) that was appointed (Appendix N) have confirmed that the design plans have been undertaken in accordance with Section 106 Agreement, including a letter of professional certification confirming this (Appendix M).

3.9 The Certifying Engineer is confirmed as Paul Snape MEng MIStructE from Alan Baxter Ltd. The 2-page review report to Camden Council identified several technical comments, all of which have been addressed and incorporated into the updated BCP confirming that there are not any additional comments and the review is in accordance with the requirements of the Section 106 Agreement.

4.0 CONCLUSIONS

4.1 We are generally satisfied that the detailed structural engineering proposals provided within the Detailed Basement Construction Plan by MBP, reference 10269 revision P04, listed Appendices A-N and supplementary information requested by CampbellReith, comply with the requirements of the relevant clauses of the S106 Agreement.

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