CampbellReith
consulting engineers

Middlesex Hospital Annex,

Cleaveland Street London W1T 4JT

Detailed Basement Construction Plan Review

For

London Borough of Camden

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Campbell Reith Hill LLP
15 Bermondsey Square
London
SE1 3UN

T: +44(0)20 7340 1700
E: london@campbellreith.com
W: www.campbellreith.com

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Author	S.Ash CEng MIStructE MICE
Project Partner	E. Brown MSc GCeol FGS
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1.0 INTRODUCTION

1.1. CampbellReith was instructed by London Borough of Camden (LBC) to undertake a review of the Detailed Basement Construction Plan (DBCP) submitted by Aecom Consulting Engineers for Middlesex Hospital Annex, Cleveland Street, London W1T 4JT, planning references 2017/0414/P, 2021/3087/P and 2021/3089/P. The DBCP is a stipulated requirement of a Section 106 Agreement between University College London Hospitals Charity, Middlesex Annexe LLP and the London Borough of Camden, dated 15 January 2018.

1.2. The Section 106 Agreement requires the owner to appoint an independent suitably certified engineer (Basement Design Engineer) to formulate the Detailed Basement Construction Plan (DBCP) and use reasonable endeavours 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 appropriately conservative modelling relating to the local ground conditions and local water environment and structural condition of the Neighbouring Properties has been incorporated into the final design;

- that the result of these appropriately conservative figures ensure that the Development will be undertaken without any impact on the structural integrity of the Neighbouring Properties beyond Category 1 'very slight' with reference to the Burland Category of Damage;

- that the design plans have been undertaken in strict accordance with the Agreement, including a letter of professional certification confirming this and that the detailed measures set out in sub-clauses (i) to (xii) (presented 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 condition survey of all Neighbouring Properties to be undertaken by an independent suitably qualified and experienced chartered surveyor (and for details to be offered if this is not undertaken in full or part).

  (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.

  (iii) Detailed design drawings incorporating conservative modelling 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 including groundwater control;

(iv) Ground investigation fully characterising the soil sequence, soil strength parameters and groundwater regime at the property.

(v) A full utilities search and consultation with affected owners.

(vi) Detailed ground movement and damage assessments for affected structures and infrastructure

(viii) The Basement Design Engineer to be retained at the Property throughout the Construction Phase to inspect approve and undertake regular monitoring of both permanent and temporary basement construction works throughout their duration and to ensure compliance with the plans and drawings as approved by the building control body.

(ix) 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 Property the Neighbouring Properties and the local water environment (surface and groundwater).

(x) Further investigative work as recommended in the Preliminary Ground Movement Assessment and Preliminary Geotechnicial Interpretative Report dated 21 April 2017 and further assessment as scoped in the Basement Impact Assessment dated 21 April 2017 by Aecom ltd

(xi) 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).

(xii) Amelioration and monitoring measures of construction traffic including procedure for coordinating vehicular movement with other development taking place in the vicinity and notifying owners and or occupiers in 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 Owner appoints a second independent suitably certified engineer (qualified in the fields of geotechnical and/or structural engineering) from a recognised relevant professional body having relevant experience of sub-ground level construction commensurate with the Development (the Certifying Engineer) and for details of the appointment of the Certifying Engineer to be submitted to the Council for written approval in advance;

- 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) 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;

- A letter of professional certification from the Certifying Engineer with the DBCP confirming that it is in an approved from and has been formulated in strict accordance with the S106 agreement shall be submitted.

1.4. The applicant is also required to meet the requirements of clause 2.25 7 of the Section 106 Agreement and to answer any queries raised by LBC.

1.5. This report covers our review of the DBCP information submitted by Aecom, as described in their letter (reference 201215_AEC_L_LD_DW) in response to the Section 106 Agreement. The reviewed information includes the following key documents:

- Ground Movement Assessment Report ref 601516144/GEO/GMA/002 by Aecom, rev 003, dated 11 Nov 2020.
- Movement and Tolerance Specification ref MHA-ACM-XX-SP-SE-0007 by Aecom dated 23 October 2020
- Geotechnical and Geo-Environmental Ground Condition Report ref 601516144/MH-ACM-XX-XX-RP-GE-01 by Aecom, rev P01, dated April 2020.
- Basement Impact Assessment ref MHA_GEO_BIA_0014 by Aecom, rev 06, dated November 2020.
- Delva Patman Redler Condition Survey letter, ref 17596, dated 15 December 2020.
- Aecom Independent Review Sign Off report, ref 2106_BPD_BIA, dated 18 May 2021
- Aecom Certifying Engineer's letter, ref 210602_AEC_L_LD_GGS, dated 02 June 2021.
- Aecom Capping Beam Calculation Report dated 28 October 2021
- Keltbray Secant Wall Design Report 54X003-KLB-XX-XX-RP-X-1003 dated 07 July 2021
- Modbest Bulk Excavation Sequence Report
- Morgan Sindall Basement drawings/sequence details received on 16 December 2021
- CDS Temporary Works Calculations reference MS.20.015.CALC24
- Aecom updated structural basement drawings received on 16 December 2021
- Aecom Independent Basement Design Review Report, ref MHA-ACM-XX-XX-RP-SE-09501 February 2022

2.0 BASEMENT CONSTRUCTION PLAN REVIEW

The following information has been reviewed and found to comply with the requirements of the Section 106 Agreement where indicated below.

Condition Surveys • Plan drawing showing extent of condition surveys • Photographic and descriptive record of existing conditions • Condition Survey to be carried out by third party independent of the design and contractor team to be carried out prior to commencement of works. • Utilities search and consultation	 x x ✓ x
GMA Report • Ground movement assessment using appropriately conservative modelling • Building damage assessment • Damage no worse than “Slight” according to Burland Category of Damage	 ✓ ✓ ✓
Movement Monitoring Proposals including drawings & specification 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	 ✓
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 groundwater monitoring and construction traffic • Measures to monitor groundwater until issue of Practical Completion Certificate	 ✓ ✓ ✓ ✓
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	 ✓ x ✓

• 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 Engineer's Report confirming BCP is in accordance with Section 106 Agreement	✓

3.0 DISCUSSION

3.1. The following comments apply to the DBCP for the Middlesex Hospital Annexe, Cleveland Street W1T development.

3.2. The proposed development contains multi storey mixed use buildings constructed over a single storey basement to the south and central areas of the site, with a double storey basement to the northern area of the site. The single storey basement is reported as up to 3m below the level of the existing basements and the double storey basement level is a further 3.30m below. The basement is to be supported via a secant piled wall to the perimeter propped by the new floors in the permanent case and temporary props installed during the construction phase.

3.3. Ground Conditions are confirmed in Aecom Ltd report as Made Ground to a maximum thickness of 5.50m, overlying lynch Hill Gravel up to 2.50m maximum thickness, over London Clay. Groundwater was encountered between 5.19 and 6.69m below ground level.

3.4. The DBCP is produced by Aecom Ltd Consulting Engineers on behalf of University College London Hospitals Charity and Middlesex Annexe LLP; Aecom are identified as the Basement Design Engineer and a commentary on the Section 106 requirements is contained with Aecom letter report 201215_AEC_L_LD_DW certifying the documents.

3.5. The Certifying Engineer report MH-AACM-XX-XX-RP-SE-09501 has been produced by Aecom via an independent team.

3.6. Temporary works designs, drawings and construction sequence are provided by Morgan Sindall PLC, qualifications from the Temporary Works Design Engineer have not been provided to date.

3.7. Condition surveys of neighbouring properties have not been completed to date. A letter provided by Delva Patman Redlar (ref 17596-2020-12-15-DPR confirms the intent to carry out and agree the surveys without confirming a timescale.

3.8. Aecom letter report 201215_AEC_L_LD_DW (item 2) confirms the team leaders for Structural, Geotechnical and Civil Engineering all hold suitable professional qualifications.

3.9. Aecom letter report 201215_AEC_L_LD_DW (item viii) confirms that Aecom Ltd will be retained throughout the construction stage and their duties include regular monitoring of both permanent and temporary basement construction works.

3.10. A Ground Movement Assessment (November 2020) carried out by Aecom Ltd is presented in which eight adjacent buildings have been considered. All adjacent properties are predicted to fall into the Burland Category 1 limit of damage (very slight) or less.

3.11. Detailed proposals to monitor adjacent structures along with target trigger levels and frequency are detailed in the Movement and Tolerance Specification ref BCP-MHA-ACM-XX-SP-SE-0007 produced by Aecom

3.12. An achaeological site investigation has been carried out by Iceni.

3.13. Aecom Ltd letter report 20215_AEC_L_LD_DW indicates that a full GPR survey has been carried out to inform the existing buried services along with detailed proposals for any diversions etc is in hand, however no details are presented to date.

3.14. Measures to ensure the on-going maintenance and upkeep of the basement and associated drainage are outlined in Aecom's BIA report and within the Geo-Enviormental Ground Condition Report, along with measures to ensure on-going maintenance to the basement.

3.15. Additional investigations were identified in the preliminary GMA and the Preliminary GIR (from 2017), Aecom have confirmed these works have now been carried out and the Basement Impact Assessment report was updated to include the findings from 2 further boreholes and additional groundwater monitoring.

3.16. Management of construction traffic is noted in the Demolition Management Plan and referenced within Morgan Sindall letter 2.25.C.3.xii dated 15 December. Although this addresses the S106 requirements, it is not clear whether the constraints highlighted in the DMP apply to the new construction as well as the demolition phase.

4.0 CONCLUSIONS

4.1. We are generally satisfied that the detailed information provided for our review of the Detailed Construction Plan pack for Middlesex Hospital Annexe complies with the requirements of the relevant clauses of the Section 106 Agreement.

4.2. It is accepted that the professional requirements of the Basement Design Engineer and the Geotechnical Consultants (Aecom) are in accordance with the requirements of the Section 106 Agreement. The qualifications of the Temporary Works Design Engineer (JFH) have not be confirmed but they are recognized as reputable engineers in regard to temporary works design.

4.3. It is noted that the Basement Design Engineers are to be retained through the construction phase and the appointment includes regular site inspections.

4.4. The Ground Movement Assessment contained in the DBCP indicates the anticipated impact on the Neighbouring Properties as no worse than Category 1: very slight, with reference to the Burland Category of damage.

4.5. Condition surveys of neighbouring properties have not been undertaken to date, however the DBCP confirms these will be completed prior to implementation of the works.

4.6. It is accepted the DBCP contains a detailed method statement and phasing of the temporary works proposed to construct the basement, together with a monitoring action plan. Monitoring target locations are shown in the specification.

4.7. It is accepted the DBCP contains detailed basement design drawings and structural calculations prepared by the both the Basement Design Engineer and the Temporary Works Engineer.

4.8. The DBCP contains reference to the hydrology, and the site investigations confirm the local ground conditions as Made Ground over London Clay Formation. It is accepted the basement should not have any impact on the local water environment and stability of the Neighbouring Buildings.

4.9. Certification has been provided by both the Basement Design Engineer (Aecom) Letter report 20215_AEC_L_LD_DW dated 15 December 2020.

4.10. A second independent certifying review has been carried out by Aecom and recorded in MHA-ACM-XX-XX-RP-SE-09501 07 dated February 2022.

London

15 Bermondsey Square
London
SE1 3UN

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Surrey

Raven House
29 Linkfield Lane, Redhill
Surrey RH1 1SS

T: +44 (0)1737 784 500
E: surrey@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

Bristol

Unit 5.03,
HERE,
470 Bath Road,
Bristol BS4 3AP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com