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77 to 79 Charlotte Street

Basement Construction Impact Assessment

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Project Revision Sheet

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Contents

1 Introduction

1.1 This Construction Method Statement (CMS) gives specific details of the excavation, temporary works and construction techniques, including details of the potential impact of the subterranean development on the existing and neighbouring structures, based on the site characteristics, including the type of geology and hydrology found in this area.

1.2 This statement has been prepared by persons holding the required qualifications at each stage under the supervision of Alan Pemberton, a Chartered Civil and Structural Engineer (FICE; FIStructE) and is submitted in support of the planning application made by Charlotte Street Property Limited.

1.3 This Basement Impact Assessment (BIA) has been prepared in accordance with relevant guidance issued by London Borough of Camden covering basement construction method statements in accordance with CPG4 – Camden Planning Guidance on Basements and Lightwells.

1.4 This statement describes the design and proposed method of construction of the basement structure on land at 77 to 79 Charlotte Street within London Borough of Camden, as shown on Coveburgess Architect's Site Plan, drawing no. 2128/0101 in Appendix F.

1.5 This statement should be read in conjunction with support documents enclosed in Appendix A to E and basement design drawings in Appendix G.

2 Scoping Stage of Basement Impact Assessment

2.1 Refer to Appendix A for main flowchart assessments for the Screening Stage.

2.2 In answer to Question A1.10 – is the site within an aquifer and if so will the proposed basement extend beneath the water table such that dewatering may be required during construction? Yes, it will be and the construction method to be adopted in order to safely deal with this by localized de-watering is set out in Sections 8.1 and 8.2 of this assessment report.

2.3 In answer to Question A1.12 – Is the site within 5m of a highway or pedestrian right of way? Yes, it is and the construction method to be adopted in order to safely deal with this by providing a contiguous piled retaining wall to safely support the highway in both the temporary and permanent condition is set out in Sections 8.3 and 8.4 of this assessment report.

2.4 In answer to Question A1.13 – Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties? Yes it will be deeper than the foundations to the Party Wall with No 75 Charlotte Street and deeper than the separated dividing walls between Nos. 79 and 81. The design of the basement and foundations to the proposed building will be designed to ensure that there is no significant net change in soil stresses below the existing structure thus avoiding any risk of significant differential settlement. This is further outlined in Sections 8.5 and 8.6 of this report and in the Ground Investigation Report by Soils Limited, ref. 14653/GIR, enclosed in Appendix B.

3 Existing site and Geotechnical Results

3.1 The site is currently occupied by an "L" shaped building; it is bounded by Charlotte Street to the East, approximately 27.5m AOD, and Tottenham Mews to the West, approximately 26.5m AOD. To the North is a similar sized commercial building and the building immediately South is currently under development.

3.2 The existing building is approximately 25m long by 12m wide along the front entrance at Charlotte Street and 6m wide along the rear entrance at Tottenham Mews. It is a five storey building with a lower ground floor (basement) and was previously occupied by the BBC. It is assumed the main structural frame of building is constructed with braced steel frames.

3.3 The design and method of construction of the basement are based on the findings of the ground investigations carried out in December 2014 and the subsequent report by Soils Limited.

3.4 Groundwater has been and is continuing to be monitored on a regular monthly basis.

4 Proposed Development

4.1 The proposed development comprises the demolition of the existing building and construction of a new six storey building with a double level basement. It is intended to be of mix use; with the upper floors from roof to second for residential and first floor to basement for office use.

4.2 The current proposal is to construct the main structural frame from basement up to the fourth floor in reinforced concrete and the remaining upper storeys in lightweight braced steel frame as it reduces in size when the front and back elevations begin to step away from the main facade.

5 Basement Structural Design Criteria

5.1 The basement structure are designed in reinforced concrete construction forming a very stiff box structure designed to withstand lateral earth and hydrostatic pressures based on the basement overall depth below ground level. The surcharge loading from adjacent buildings and highways has been taken into account in this design in addition to current and possible future groundwater levels.

5.2 The basement wall panels are designed to span between return walls and basement floor slabs. The wall design will ensure that there is no relaxation of the ground around the basement thus eliminating the risk of any movement and avoiding any impact of the subterranean development on the existing neighbouring structures.

5.3 The basement is designed with steel reinforced concrete walls and slabs that will be cast inside traditional underpinning to the flank walls and contiguous piles walls to the front and rear walls.

5.4 The walls and floor slabs of the basement "box" have been designed to form a very strong and rigid structure to eliminate movement or settlement of ground or existing buildings around the basement once the excavation within the walls is complete.

5.5 The risk of subsidence has been considered. The ground down to a depth of approximately 8 metres, i.e. below the proposed basement, comprises Made Ground, Silts and Gravels none of which are not particularly susceptible to volume changes particularly in the absence of trees.

5.6 Drainage from the new building will be totally contained within the basement walls and pumped to a manhole at ground floor level from where the drainage will discharge by gravity to the public sewer.

5.7 The possible effect of groundwater flows around the basement structure has been considered. The Groundwater Basement Impact Assessment, ref. 1132/R1, is enclosed in Appendix C.

6 Design Data

6.1 Loading data

Design Life
50 years and in accordance with relevant design codes.

Commercial Floors	
Screed	1.65 kN/m2
Finishes and Services	0.50 kN/m2
Live Loads	3.5 kN/m2 (+1.0 for partitions)

Residential Floors	
Screed	1.65 kN/m2
Finishes and Services	0.50 kN/m2
Live Loads	1.50 kN/m2 (+1.0 for partitions)

Roof Terrace	
Screed	1.65 kN/m2
Finishes and Services	0.75 kN/m2
Live Loads	3.00 kN/m2

External Walls (typical)	
Brick & Block	4.00 kN/m2
Brick & Metal Stud	3.00 kN/m2
Glazing/Curtain Wall	0.75 kN/m2

Wind Loading	
National Grid Reference	181787N; 529354E
Basic Wind Speed, Vb	21.00 m/s
Site Altitude	27.50 m
Probability Factor, Sp	1
Seasonal Factor, Ss	1
Directional Factor, Sd	1
Nearest Distance to Sea	70.00 km

6.2 The proposed floor plans for the building are fairly open throughout, and the floors are typically supported by load bearing columns or walls within the external walls. The axial loads from these columns and walls at foundation level will be in the range of 1500kN and 120kN/m respectively.

7 Disproportionate Collapse

7.1 The proposed building shall be design to Class 2B in accordance with The Building Regulations 2010, Approved Document A. The proposed building shall be design to meet the requirements of this classification with effective use of horizontal and vertical ties. Checking the integrity of the building following the notional removal of vertical members and the design of key elements required where effective vertical ties are not possible.

8 Basement Construction Considerations

8.1 The basement extends below the water table by about one metre and therefore into an aquifer. This will require localized dewatering during the construction of the traditional underpinning to the flank walls of the basement. The underpinning will be carried out in short lengths in a 5-bay sequence. Therefore at any one time, only a small number of short lengths of excavation will be open and these can be safely de-watered by conventional pumping techniques.

8.2 Prior to the underpinning the front and rear walls of the basement will be formed by a contiguous piles wall as described below. Thus once the underpinning is complete and propped internally, the ground around the perimeter of the basement will be secured. This will allow further de-watering by pumping within the basement "box" to allow the lower basement slab to be constructed thereby sealing the basement against significant water ingress.

8.3 The proposed basement abuts a public highway and footpath to both front and rear. To enable the basement to be safely constructed without impairing the stability of the public highway a contiguous piled wall will be installed to the front and rear of the proposed basement immediately following demolition of the existing superstructure.

8.4 The contiguous piled walls will be designed to safely support the lateral earth pressures and surcharge loading from the public highway. These contiguous piled walls will be left in place when the inner basement walls and floors are constructed thus further stiffening the support for the public highway and at no time leaving the highway in an un-supported condition.

8.5 Prior to carrying out the contiguous piling the existing pavement vault brick arches will be repaired to restore their full structural integrity.

8.6 The proposed basement is one storey height deeper than the existing. Calculations have been prepared to demonstrate that the reduction in soil stresses due to the removal of soil to form the additional basement will be approximately equal to the increase in weight of the new building compared with that of the existing. Therefore, there will be no significant increase or decrease in net soil stresses below the existing foundations to the buildings either side of the proposed basement and therefore no significant risk of differential settlement through the design life of the structure. For further information on settlements, refer to Section 5 - Foundation Design of the ground investigation report by Soils Limited.

8.7 The basement will also be constructed in such a way as to avoid any movement of adjacent ground levels or nearby or adjoining structures during construction. This will be achieved by underpinning the exiting walls to either side of the basement with traditional underpinning. This will be carried out in a 5-bay sequence and in two stages in order to keep the excavations to a safe and manageable size throughout. Each underpinning block will be dry-packed to the underside of the foundation over in order to take up the load and transfer it to the bearing stratum below the underpinning. This will ensure that the load is gradually and evenly transferred to a competent bearing stratum at the maximum depth of the proposed basement before the bulk excavation of the basement is undertaken. This will avoid any significant deflection of the existing foundations to either side of the proposed basement.

8.8 The details of temporary works and permanent basement structure are shown on MLM structural drawing nos. 6665721/S001 to S003 & S020 in Appendix F.

8.9 The Contractor will be required to use machinery that minimises noise, creation of dust and vibration throughout the works.

8.10 The sides of the excavation/temporary works will be monitored by precision levelling throughout the works.

8.11 Following completion of the demolition vertical loadbearing piles will be formed from the existing basement level by contiguous flight auger piling to minimise and noise and vibration.

8.12 After the piling has been completed and the excavation deepened to the new basement level, the lowest level basement slab will be cast in steel reinforced concrete. The slab will incorporate tension piles set into the London Clay below to resist and uplift due to hydrostatic pressure.

8.13 After the basement slab has been cast, in-situ steel reinforced concrete walls will be constructed up to the next level of slabs and the slabs then constructed in reinforced concrete. The slabs will then prop the sides of the concrete box in the permanent condition.

8.14 As construction of the basement walls and upper floor slabs progresses upwards, the internal shoring between the sides of the retaining walls will be de-stressed and removed.

8.15 Vertical loads from the superstructure will be transmitted by the basement walls to the pilecaps cast with the lowest level slab. The resulting stresses on the soil under the basement slab will be less than existing and in addition, as stated above, tension piles will be installed to resist any uplift forces to avoid any settlement or heave of the ground around the basement.

8.16 The construction sequence of forming the excavation will therefore be as follows;

a) Demolish existing building including ground floor whilst providing temporary props P1. Undertake remedial works to pavement vaults.

b) Install contiguous pile walls to front add rear of property to retain public highways and install new piles at existing basement slab level.

c) Install traditional underpin blocks in sequence to Level One; demolish remaining building as required. (Refer to Method Statement for Underpinning Construction and relevant drawings for sequencing.) Install temporary props P2 and P3 to provide lateral restraint to Party wall foundations.

d) Excavate and install traditional underpin blocks to Level two in sequence. Install temporary props P4 and P5. Localized de-watering will be required, refer to the Ground Investigation Report for further details.

e) Construct all basement substructure including drainage and waterproofing within box formed by underpinning and contiguous piled walls. Remove temporary props P5 to P2 in sequence as work progresses.

f) Construct all substructures to Lower Ground Level including walls, slabs and waterproofing; remove temporary props P3 as required.

g) Construct all substructures to Upper Ground Level including walls, slabs and waterproofing; remove temporary props P2 as required.

9 Summary

9.1 This BIA including details of the methods to be adopted for excavation, temporary works and construction techniques demonstrates that the development will have no adverse impact on the existing neighbouring structures, based on a site specific site investigation that has been undertaken to determine the type of geology and hydrology on this site.

9.2 This BIA demonstrates that the geology is capable of supporting the loads and construction techniques to be imposed and that there will be no adverse impact on the structural integrity and natural ability for movement of existing and surrounding structures, utilities and infrastructure surrounding drainage, sewage, surface water and ground water, flows and levels and that all necessary structural concerns have been satisfactorily addressed in the design.

Appendices

Appendix A:

Screening Flowcharts

Appendix A1 - Slope Stability Screening Flowchart

Question 1 – Does the existing site include slopes, natural or manmade greater than 7 degrees?

Answer to Qu. 1 - No, the site is flat and level.

Question 2 – Will the proposed re-profiling of landscaping at site change slopes within the property boundary by more than 7 degrees?

Answer to Qu.2 -No, there are no proposed changes to site slopes.

Question 3 – Does the development neighbour land including railway cuttings and the like with a slope greater than 7 degrees?

Answer to Qu. 3 – No. There are public highways to the front and rear at existing ground levels within the site and the adjoining properties both sides have similar ground floor levels.

Question 4 – Is the site within a wider hillside setting in which the general slope is greater than 7 degrees (approximately 1 in 8)?

Answer to Qu. 4 - No, the maximum ground slope in the area of the development is significantly less than 1 in 8.

Question 5 – Is the London Clay the shallowest strata at the site.

Answer to Qu. 5 - No. the shallowest strata at the site is Made Ground to a depth of 4 metres. His is underlain by approximately 4 metres of Lynch Hill Gravel. The London Clay is below this at a depth of approximately 8 metres and therefore below the underside of the proposed basement. Refer to Ground Investigation Report in Appendix B.

Question 6 – Will any trees be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained?

Answer to Qu. 6 – There are no trees on or adjacent to the proposed development site.

Question 7 – Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site.

Answer to Qu.7 – No. The London Clay is about 8 metres below ground level and therefore not subject to seasonal shrinkage or swelling. Refer to Ground Investigation Report in Appendix B. There is no evidence of such effects at the site.

Question 8 – Is the site within 100m of a watercourse or potential spring line?

Answer to Q.8 – No. Refer to Ground Investigation Report in Appendix B and Groundwater Basement Impact Assessment in Appendix C.

Question 9 – Is the site within an area of previously worked ground?

Answer to Qu. 9 – No. Refer to Ground Investigation Report in Appendix B.

Question 10 – is site within an aquifer? If so will the proposed basement extend beneath the water table such that dewatering may be required during construction.

Answer to Qu. 10 – Yes, carry forward to Section 2 - Scoping Stage.

Question 11 – is the site within 50m of the Hampstead heath Ponds?

Answer to Qu. 11 – No.

Question 12 – Is the site within 5m of a highway or pedestrian right of way?

Answer to Qu. 12 - Yes, carry forward to Scoping Section.

Question 13 – Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?

Answer to Qu. 13 -Yes, carry forward to Section 2 - Scoping Stage.

Question 14 – Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?

Answer to Qu. 14 – No. Refer to Appendix E - Searches of Royal Mail Rail and Underground Tunnels.

Appendix A2 - Surface Flow and Flooding Screening Flowchart

Question 1 – Is the site within the catchment of the pond chain on Hampstead Heath?

Answer to Qu. 1 – No.

Question 2 – As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?

Answer to Qu. 2 – No the building footprint and surface water outfall will be exactly the same as existing.

Question 3 – Will the proposed basement development result in a change in the proportion of hard surfaced/paved external areas?

Answer to Qu. 3 – No, the proportion of hard surfaced/paved external areas will be exactly the same as existing.

Question 4 – Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses?

Answer to Qu. 4 – No, the profile of the inflows (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses will be exactly the same as existing.

Question 5 – Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?

Answer to Qu. 5 – No, the profile of the quality of surface water being received by adjacent properties or downstream watercourses will be the same or better than the existing.

Appendix A3 Subterranean (Groundwater) Flow Screening Flowchart

Refer to Groundwater Basement Impact Assessment Report by Chord Environmental Ltd. ref. No. 1132/R1 January 2015, Appendix C.