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1 St. Marks Crescent, Camden,

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Basement Impact Assessment :

Structural Method Statement

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1.0 INTRODUCTION

- 1.1 This report has been prepared by Helen Hawker MSc BEng (Hons) MIStructE of Conisbee for Mr A R Ashman. It is intended for the use of the client and related parties and submission to the London Borough of Camden as part of supporting documents for a planning application.
- 1.2 It is proposed to undertake a basement extension and minor alterations to the ground floor to 1 St Marks Crescent. This report covers aspects in relation to the proposed new basement which extends to the footprint of the building with light wells front and rear to allow natural light into what would be otherwise an artificially lit area.
- 1.3 This Structural method Statement is to be read in addition to the Basement Impact Assessment (BIA) which has been prepared by Chelmer. ref. BIA/9918 Dated October 2018. The BIA incorporates the following information:
 - A desk study and historical data of the site and surrounds;
 - A site investigation, including 2 boreholes carried out at the site on 13th June (Conisbee were in attendance for a time).
 - Site investigation information obtained during a previous refurbishment of the property, carried out in 2005. Trial pits taken out at this time recorded the existing foundations and local soil conditions (by Conisbee).
 - Assessment of the geological and hydro-geological impacts of the proposals in accordance with the London Borough of Camden PG4 requirements; and
 - geological characteristics for the subsoil for foundation design and preliminary piling design (which addresses the main criteria as set out by CPG4 for the BIA)
 - Interpretive commentary on the proposals.
 - Screening and Scoping flowcharts, as provided in CPG4 and the ARUP Camden geological, hydro-geological and hydrological study.

This report outlines the structural engineering aspects of the works, with explanations to the existing and proposed construction, worked scheme design and temporary works proposals.

It is not proposed to reproduce the geotechnical information provided by the BIA within this report, expect where necessary for structural engineering design criteria.

2.0 EXSITING CONSTRUCTION

- 2.1 1 St. Marks Crescent was built circa. 1860s, as a 4 storey terrace dwelling, the loft was modestly converted (i.e. without dormers) sometime in the 1980s.
- 2.2 The construction is of the typical Victorian terrace, i.e. solid load bearing brickwork party and front and rear walls, and brickwork 'addition' (which may post-date the original construction as a 'water closest'), and timber floors, roof and spine wall.
- 2.3 Work undertaken in 2006 incorporated box frames in ground floor to open up the space and an extension to the rear.
- 2.4 The Regents Canal runs along the rear of the property and will have pre-dated the terrace. The Canal & River Trust are presently responsible for the canal.
- 2.4.1 The ground condition comprises made ground to a depth of up to 2.0m, overlying solid geology London Clay formation. The stiffness of the clay below the existing foundations seems to have changed over time, with it appearing to be relatively soft at the time of the 2005 investigations, albeit with no apparent cracking to the walls. However a site investigation to 31 St. Marks Crescent (adjacent) and the site boreholes carried out prove the clay to now be firm-stiff at even relatively shallow depths.

3.0 PROPOSED

- 3.1 It is proposed to form the basement and light-wells in reinforced concrete, underpinning the existing load-bearing walls as necessary, with a new reinforced concrete ground floor slab propping the top of the retaining walls. A capping beam will transfer propping forces where the floor needs to be open at the top of the retaining wall (i.e. at light-wells and stairwells).
- 3.2 Existing vertical and lateral loads will be transferred again into the surrounding subsoil via the new reinforced concrete structure.
- 3.3 The ground investigation has proved the water table to be below the level of the proposed basement formation, however as best practice, a water head up to 1m below ground level is taken for design. Heave due to removing overburden of the clay will also be expected (although a good proportion of this is relieved in the short period after the dig), and is to be incorporated into detailed design, although this is typically resisted by the combined dead load of the existing and new structure with a reinforced concrete base slab.
- 3.4 Refer to proposed scheme drawings, construction sequence sketches and calculations appended.



Part mark-up to show neighbouring properties (appended).Not to scale.

4.0 **NEIGHBOURING PROPERTIES**

- 4.1 The nearest properties to the proposed basement are adjacent neighbours, 31 and 3 St Marks Crescent.
- 4.2 As previously noted, a canal runs to the rear of the property, some 9m away from the extent of the rear light-well. Mr Osi Ivowi of the Canal & River trust has been contacted with a description and section of the proposed works, and has commented:

"it is unlikely that the works will have any detrimental effect on the canal and therefore will not require our consent."

However he has confirmed that should any works activities encroach within 3m of the canals edges, the Canal & Rivers Trust will need to review and consent. This will be made as it will be proposed within Construction Management Plan the that spoil is removed onto waiting lighters on the canal to relieve road traffic, for environment responsibility and to uphold the historic use of the canal for construction and material traffic (at all times ensuring relevant health and safety measures are under taken).

The email correspondence with the Canal & River Trust is appended to this report.

4.3 The nearest other properties, are 5 St. Marks Crescent adjacent to number 3, No.30 St.Marks Crescent opposite and no. 55 and 57 Gloucester Avenue.

- 4.3.1 No.3 St. Marks Crescent is 6m away from the proposed construction and as base of the dig to the basement is to be max. 4.5m below the existing lower ground floor level (same as number 3), it will not structurally encroach on no.3. This is upheld by the ground movement analysis in the BIA by Chelmer.
- 4.3.2 No. 30 St,Marks Crescent and the Gloucester Road properties are over 9m away. As the dig is some 6m below street level (which is believed to be generally over all lower ground floor levels), even if the properties were at street level, the dig will not encroach to within a 45 degree line of their foundations. Again, this is upheld by the analysis and interpretative information within the BIA.
- 4.4 The ground around the site and neighbouring areas is level therefore no particular surcharge or slope stability needs to be taken into account in the design of retaining walls.
- 4.5 An application has been made and approved for a similar basement construction to the adjacent neighbour, no 31 St. Marks Crescent. The basement has not been constructed to date, and so the following information is based upon the existing condition. The final design, method statement and sequencing methodology will need to take into account a basement to no. 31 St. Marks Crescent.

5.0 STRUCTURAL METHOD STATEMENT

- 5.1 Refer to outline sequence drawings appended, and supporting calculations.
- 5.2 The following is a typical procedure that the contractor could use to form the proposed basement construction. The final sequence will need to be by the contractor and will be agreed in advance with the structural engineer and principal designer.
- Prior to undertaking any works the monitoring stations are to be set up in accordance with the Basement Excavation Monitoring Specification and initial (baseline) readings taken.
 Refer to Section 7.
- b) Site set up.
- c) Level site to rear by approx 0.5m, to remove all existing hard landscaping and ground bearing floors without undermining existing foundations. Existing steels left in-situ.
- Install underpins in sequence to first level of rear elevation and party or garden walls and, including pushing vertical and horizontal reinforcement bars as shear keys into surrounding ground.

- e) Temporary waling beams and horizontal props are to be inserted as the ground is then lowered prior to the next section of pins. Beams and props to be tied into pins. The pins are reinforced to ensure that, along with the temporary steelwork; they do not slide or overturn during construction.
- Pins are to be installed in up to two sections vertically with the lower section offset horizontally from the bay over to form staggered vertical joints.
- g) Next set of pins completed in sequence, temporary steelwork whalers and props inserted and ground dug until base of proposed formation is reached. Beams and props to be tied into pins.
- h) Reinforcement for base slab and sump pump placed and checked.
- i) Cast new base slab and sump pump walls. Water bars inserted to all joints.
- j) Reinforcement for lower ground floor formed and checked.
- k) Cast floor/top slabs.
- I) Once the concrete has been achieved adequate strength temporary props can be removed.
- m) Superstructure works to commence once sub structure works complete.
- 5.3 Works to the light wells will be similar; first forming a capping beam and then top-down formation of a reinforced ring wall tied into the adjacent underpins. All joints to have water stops.

6.0 SERVICEABILITY & DRAINAGE.

- 6.1 In order to achieve a Grade 3 basement, the reinforced concrete retaining walls are anticipated to be formed with a water tight concrete (e.g. Pudlo), water stops at all junctions and be lined with additional measures such as a drained cavity (specified by the architect). Any water will be collected into its own dedicated sump and will be pumped to allow it to be discharged.
- 6.2 It is envisaged that the development will only impact on the below ground services serving 1 St. Marks Crescent. These will have to be diverted accordingly to avoid clashing with the proposed basement development.
- 6.3 Any drainage extending from the basement will require pumping to an appropriate level to allow it to feed into the existing Thames Water Sewer network. The basement will include a pump room and sump-pump as necessary. The final location is to be decided in detailed design.

7.0 MONITORING

- 7.1 The contractor will be required to monitoring the building and party walls during the formation of the basement and ground floor. It is expected that the monitoring will be via a series of points located at mid and storey levels to the party walls and main load bearing walls, recorded at a some intervals prior to construction and then regularly during the works, i.e. twice weekly during the underpinning and once weekly thereafter until the retaining wall an ground slab have been cast and packed in place for 4 weeks.
- **7.2** The monitoring will have a traffic light system, agreed with party wall surveyors / engineers, the structural engineer and the contractor, with an action plan drawn up to be put into place that will be implemented should any trigger levels be exceeded. The trigger levels being appropriate limits of movement envisaged within the BIA.

8.0 IMPACT ON SURROUNDING AND EXISTING STRUCTURES

- 8.1 From the site investigation and BIA reports prepared by Chelmer and above information, the impact on nearby structures are generally confined to the adjacent buildings, due to the proposed differential foundations. Refer to Item 10.6 Damage category Assessment of the BIA.
- 8.2 The form of construction, reinforced underpinning has been chosen to be a relatively quiet and typical form of construction whilst appropriate for the building and soil conditions.
- 8.3 As per the BIA and ground movement analysis, with correctly placed propping elements and formation of the underpinning, any movement to the existing structure and adjacent buildings will be expected to be at most 1, very slight, according to the Burland categorisation table, below.

Damage category	Description of degree of damage	Description of typical damage and likely forms of repair for typical masonry buildings.	Approx. crack width (mm)	Max. tensile strain %
0	Negligible	Hairline cracks.		< 0.05
1	Very slight	Fine cracks easily treated during normal redecoration. Perhaps isolated slight fracture in building. Cracks in exterior visible upon close inspection.	0.1 to 1.0	0.05 to 0.075
2	Slight	Cracks easily filled. Redecoration probably required. Several slight fractures inside building. Exterior cracks visible; some repainting may be required for weather-tightness. Doors and windows may stick slightly.	1 to 5	0.075 to 0.15
3	Moderate	Cracks may require cutting out and patching. Recurrent cracks can be masked by suitable linings. Tuck pointing and possible replacement of a small amount of exterior brickwork may be required. Doors and windows sticking. Utility services may be interrupted. Weather tightness often impaired.	5 to 15 or a number of cracks > 3	0.15 to 0.3

Part table of Damage Classification proposed by **Burland** (note however this is for traditional masonry structures)

9.0 EXCECUTIVE SUMMARY

- 9.1 The design of the proposed basement and light-wells to No. 1 St. Marks Crescent will have negligible or no negative impacts on the existing building and neighbouring properties, structurally or in relation to geotechnical and hydro-geological aspects once mitigation measures as outlines in the BIA by Chelmer are taken into account during detailed design. During construction it will be imperative on the construction company and specialist subconsultants to adhere to method statements and designed elements to ensure this remains so during and after construction.
- 9.2 A Chartered structural engineer with experience of these type of works will be engaged to undertake the final design and oversee the site works.
- 9.3 Refer to the non-technical summary of the BIA by Chelmer.

Signed by author

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Signed by reviewer

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