engineersHRW

17 BRANCH HILL
LONDON NW3 7NA

STRUCTURAL ENGINEER'S
DESIGN STATEMENT FOR PLANNING

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Signed …… Date ……

Job Number: 1281

This planning feasibility report has been prepared for and on behalf of our clients, Adam Kaye and Lucy Ronson, based on the planning proposals by SHH Architects (drawing references listed in section 8.3.2). It is for the use of the client, the client's professional advisers and London Borough of Camden and is for their use only. The report should not be used for any purposes other than for which it was considered. The report should be read in conjunction with Engineers HRW Structural drawings 1281/GA/10, 11, 12, 13, 1281/SE/21, 21, HRW Sketches 1281/SK/08, 09 and SAS Site Investigation Reports and Basement Impact Assessment dated November 2014.

1.0 Introduction

1.0.1 Engineers HRW have been asked to consider the structural issues surrounding the proposed construction works to support the planning application.

1.0.2 The proposals comprise the almost full demolition of the existing residence on the site to allow construction of a new three storey property inclusive of lower ground (rear garden level) and basement levels.

1.0.3 This report has been prepared in compliance with the London Borough of Camden's DP27 and CPG4 Basements and Lightwells requirements for basement extensions. It includes a construction methodology statement prepared and signed off by a Chartered Structural Engineer (MIStruct.E) and includes proposals for temporary supports and sequence of construction. A site specific soils investigation report is also attached.

2.0 Site Information

The site is situated in the Hampstead district of London and access is from Branch Hill along a private drive. It is behind "The Chestnuts" formerly a hotel but now two private houses. The overall site is circa 30.0m long x 19.0m wide excluding drive and car parking. To the north is Savoy Court, a modern five storey apartment block. The ground slopes steeply to the south and west across the property. This site has been stepped by use of retaining walls to the lower ground floor and the external ground level at the rear of the existing property is approximately 3.0 m below the level at the front of the property.

There are boundary retaining walls to most of the site. The Chestnuts has a single storey lean-to structure on the north east boundary.

The adjacent properties have large trees, some subject to TPO, close to the boundary. See Landmark Trees Report SHH/17BRH/AIA/01 dated July 2014 for recommendations for protection of the trees.

2.1 Existing Building

The existing building to be demolished on the site consists a three storey (inclusive of lower ground floor) building set back from Branch Hill. It is of recent construction and the structure appears to be traditionally constructed above ground floor, with load-bearing external solid brickwork walls, assumed timber floors and timber roof. The ground and lower ground floors are assumed to be constructed in reinforced concrete.

2.2 Geotechnical Ground Conditions

2.2.1 Geology

A detailed Geotechnical Site Investigation has been carried out and full report is attached. The British Geological Survey maps indicate the site is located on the alluvial Bagshot Formation consisting clay and fine grained sand underlain by the Claygate member of the London Clay Formation. The suitably qualified site investigation consultant has commented on hydrological issues and groundwater flows in the SAS Basement Impact Assessment. The exploratory holes revealed that ground conditions are generally consistent with the geological records and known history of the area and comprised MADE GROUND approx. 0.8m in thickness over the typical BAGSHOT Formation. These soils extended for the full depth of the investigation of 15.0m and comprised of loose becoming medium dense clayey silty fine sand locally becoming stiff silty sandy clay.

2.2.2 Groundwater

The geological build up noted above could suggest that perched ground water may be present locally within the made ground. Groundwater was encountered at a depth of 7.2m below ground level (112.70mOD). Groundwater was subsequently found to have stabilised at a depth of 7.11m below ground level (112.79mOD) in the monitoring standpipe. The ground water is therefore below existing and proposed floor levels. The SAS Basement Impact Assessment states that it is considered that the proposed development will have minimal impact on any nearby watercourses.

2.2.3 Contamination

The site investigation identifies concentrations of lead in excess of Level 4 and asbestos within the made ground. It is recommended that remediation is carried out, consisting of removing the top 600mm of soil from the site and replaced with clean cohesive fill. It may be possible that the extent of remediation required could be reduced by further investigation.

2.3 Flood Risk

2.3.1 Tidal Flood Risk

The site is not situated within a tidal flood zone as designated by the Environment Agencies Tidal Flood Map.

2.3.2 Surface Water Flood Risk

The site risk category as defined by the Environment Agencies Surface Water Flood Map is very low.

3.0 Proposed Structural Works

3.1 Introduction

The proposed development of the site involves the demolition of the existing building and construction of a new three storey property inclusive of lower ground (rear garden level). Generally, the proposed depth of excavation below the existing ground level to the front of the property (high level) is to be a maximum of 4.0m, however in the area of the proposed study/ games room to the rear of the property this will decrease to around 2.5m (circa 2.8m below existing garden level to the rear of the property). The existing ground level is to be raised in this area resulting in a final retained height of 5.5m against the northern boundary. The existing retained height at the boundary retaining wall is approximately 3.5m.

3.2 Demolition Works

It is proposed that all demolition works will be carried out in accordance with BS 6187 'Code of practice for demolition' and an appropriately skilled and experienced contractor is to be appointed. The works are to be carefully sequenced and undertaken and the contractor is to provide full temporary works and supervision to ensure that the stability of the remaining structure and surrounding structures are maintained at all times.

3.2.1 Outline Method statement / Sequence of Demolition Works of Existing Building

Generally the demolition works are to be carried out from top to bottom and temporary works are to be introduced as required. See engineersHRW sketches 1281/SK/008 and 009 for initial proposals.

1. Prior to demolition works the contractor is to undertake a detailed survey of the existing structure, site and the surrounding areas and provide a full method statement and temporary works proposals to the Structural Engineer for comment.

2. The existing roof and first floor structure is to be demolished down to ground level.

3. Elements not contributing to the lateral restraint of the existing retaining walls to be demolished down to the lower floor level.

4. Permanent contiguous bored piles walls and lateral restraint installed.

5. Elements of the existing lower ground floor slab and walls to be removed as required.

3.3 New Lower Ground Floor Structure

3.3.1 The new lower ground floor structure is to consist a reinforced concrete box constructed partly within the existing walls and within a propped contiguous wall. The propped contiguous bored pile wall approach is to deal with the multiple levels and existing basement walls. Temporary propping is proposed to be installed during the demolition and excavation works and as the internal concrete box is formed. The piles will be propped below floor levels to allow construction of the new horizontal slab elements that prop the walls of the reinforced concrete box in the permanent condition.

3.3.2 As the new lower ground floor to the rear is deeper than the existing floor level heave of the underlying clay soils is to be allowed for. This is achieved by supporting the building on piles and constructing the floor slabs on compressible fill.

3.3.3 The presence of groundwater was observed during the site investigation (refer to section 2.2.2). It is below the deepest excavation however perched water may be present. In the permanent condition the reinforced concrete box within the contiguous piled wall perimeter will be designed to resist vertical and lateral water pressures.

3.3.4 The concrete structure will be designed to BS8110 with full top and bottom reinforcement to all sections. The concrete in itself is not a watertight / waterproof construction and in order to achieve a Grade 3 'habitable' basement in accordance with BS8102 a combination of external tanking system with an internal drained cavity system will be provided. However the final waterproofing system is yet to be agreed with the architect.

3.3.5 The RC basement structure is classified as a "robust" structure and any accidental lateral loading applied to the new basement structure can be resisted / absorbed by the new RC structure.

4.0 Control of Movement

The proposed basement scheme and method of construction are of a typical form for which we are confident that resulting ground movements can be controlled in both the temporary and permanent condition.

4.0.1 Vertical Movement

Vertical movement resulting from heave of the strata below the basement slab following excavation will be allowed for by adopting a compressible filler beneath the lower ground floor.

4.0.2 Horizontal Movement

Horizontal deflection adjacent to existing structures to the perimeter of the basement void will be limited by propping of the contiguous piled walls in both the temporary and permanent conditions. The adjacent structures are limited to retaining walls and the adjacent single storey lean-to garden building. In the temporary condition steel props will be installed between waling beams to mass concrete bases as excavation progresses. In the permanent condition the concrete walls will be propped by the reinforced concrete slabs forming the lower ground and ground floor.

5.0 New Superstructure

5.1 Superstructure - Overall Stability / Load Transfer

5.1.1 The proposed reinforced concrete frame will take stability from the columns and walls, whilst the steel structure constructed off the first floor slab and providing support for the roof will rely on steel braced bays to the perimeter to provide stability.

5.1.2 Reinforced concrete columns will carry vertical loads down the structure and back to the ground through the lower ground floor to the piled foundation. In some locations reinforced concrete transfer beams form part of the load path where column free spaces are required below.

5.1.3 The new reinforced concrete lower ground floor structure will be designed to resist upwards and lateral water pressures resulting from groundwater, as well as vertical loads from above and horizontal ground forces imposed via the propping action of low level slabs to the perimeter concrete wall.

5.2 Superstructure - Disproportion Collapse

5.2.1 The proposed reinforced concrete shear core structure is an inherently robust structural form. Compliance with disproportionate collapse requirements will be ensured by the tying of reinforcement through the structure to include peripheral ties, horizontal ties, vertical ties, internal ties and corner column ties.

6.0 Temporary Works

6.0.1 Temporary Works

The contractor will be responsible for the design, erection and maintenance of all temporary works in accordance with all relevant British Standards. The contractor will be contractually obligated to appoint a qualified temporary works engineer to provide adequate temporary works and supervision to ensure that the stability of the existing structure, excavations and surrounding structures are maintained at all times.

6.0.2 Submissions

The contractor will be required to submit full proposals, method statements and calculations to the engineer and all appropriate parties (party wall surveyors, etc.) for approval prior to the start of any works on site.

The contractor will also be required to appoint a Temporary Works Co-ordinator for the duration of the contract in accordance with the specification and BS 5975.

6.0.3 Monitoring

All items of temporary works and surrounding structures should be monitored in a manner and frequency commensurate with the construction activity taking place. The extent will limited to the existing retaining walls and the adjacent garden lean-to building. As a minimum the monitoring should include a daily full visual survey of all temporary works and surrounding structures and a weekly measured survey using fixed survey points during the main basement works, subject to proposed construction sequence, party wall agreement, etc.

7.0 Method Statement / Sequence of Works

Outline construction sequence and temporary works assumed in the design as described below will be superseded by the contractor's proposals.

1. The existing building is to be demolished top to bottom and temporary works installed as noted in section 3.2.1

2. Existing foundations and any other obstructions that may have a detrimental impact on the foundation works to be undertaken are to be carefully grubbed up and backfilled.

3. The lower ground floor will contiguous piled wall and internal basement slab piles are then to be bored and cast. The contiguous piled wall will be constructed on a hit one miss three basis which will mean fresh piles are cast at a nominal spacing of 1.8 centre to centre. This will ensure bore stability during construction and limit the numbers of piles bored next to adjacent properties in one go.

4. The capping beam is to be cast to the perimeter contiguous piled wall, installing any temporary works as required next to the adjacent properties.

5. Further to the capping beam and pile concrete achieving full strength excavation of the basement can commence, installing temporary propping to capping beams as necessary. A sump / pumping system should be put in place to remove any water seepage into the basement void when excavations descend below the stabilised water level as observed in the SI.

6. Safe slopes may then be formed within the basement void to the underside of the pool / spa / gym and lift pit formations to allow construction of low level reinforced concrete slabs and walls.

7. The basement slab can then be constructed, followed by the contiguous pile lining walls and lower ground floor slab. When the basement box concrete has achieved full design strength remove temporary propping.

8. Construct superstructure.

8.0 Design Criteria

8.1 Code of Practice

Structural use of Concrete BS 8110-1:1997

Structural use of Concrete BS 8110-3:1985

Code of practice for foundations BS 8004

Structural use of Steel BS 5950-1:2000

Structural use of Timber BS 5628-2:2002

Structural Use of Masonry BS 5628-1:2005

Loading for Buildings BS 6399: Part 1:1996, Part 2:1997

8.2 Loading – Imposed loadings to BS 6399

Domestic areas = 1.5 kN/m2

External areas = 3.0 kN/m2

Roof (flat with access) = 0.75 kN/m2

Roof (pitched) = 0.6 kN/m2

8.3 List of relevant drawings

8.3.1 engineersHRW Sketches and Drawings

1281/SK/08 P2
1281/SK/09 P2

1281/GA/10 P2
1281/GA/11 P2
1281/GA/13 P2
1281/SE/20 P2
1281/SE/21 P2

8.3.2 Architects Drawings

(779)020_P02 Lower Ground Floor Plan
(779)021_P01 Ground Floor Plan
(779)023_P01 First Floor Plan
(779)204_P01 North Elevation
(779)205_P01 East Elevation
(779)206_P01 South Elevation
(779)207_P01 West Elevation
(779)300_P01 Proposed Section AA
(779)301_P01 Proposed Section BB
(779)311_P01 Existing Section BB
(779)313_P01 Existing Section DD

9.0 Conclusion

As noted above a preliminary feasibility assessment of the proposed scheme has been undertaken although detailed calculation checks, investigations and full design will need to be completed. At this stage we are satisfied that the proposed scheme is viable and that if carried out in a carefully defined sequence such as noted above, it can be completed without compromising the structural stability of any adjacent properties or structures. Note that site is largely bounded by gardens so the adjacent structures are limited to retaining walls and a lean-to garden building.