Quadrant Harmon Consulting Ltd
Consulting Civil & Structural Engineers

BASEMENT IMPACT ASSESSMENT

GEO-TECHNICAL AND STRUCTURAL ENGINEERING

For

FORMATION OF NEW BASEMENT

1 Wadham Gardens

London

NW3 3DN

Prepared for

Amek Property Investments LLP

Consulting Civil & Structural Engineers
39 Margaret Street
London
W1G 0JQ
Tel: 020 7637 2770
info@quadrantharmon.co.uk

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EXECUTIVE SUMMARY

This report and supporting documentation demonstrates that the proposal to construct a basement below the existing house can be executed safely, using conventional construction techniques.

The basement is to be constructed using underpinning techniques and top down method of construction. This method uses temporary piles to support the new ground floor slab and the basement is then excavated below this using temporary propping to restrain the underpinning until the permanent works are completed. This method is shown diagrammatically on drawing 1550/01.

The following report and supporting documentation meets the requirements of The London Borough of Camden Planning Guidance Basements and Light Wells CPG4:-

1 Detailed desk top study provided with submission

2 Site investigation carried out and water levels recorded.

3 Details of the Adjoining buildings do not shown signs of historic or ongoing movement

4 The details of the structure and foundations have been determined.

5 There will be no impact on water flows or cumulative effects.

6 The surface water drainage system will be re-used along with the connection to the mains sewer.

7 There is no risk of flooding on the site and there is no increase in surface water run-off.

8 The sequences of construction are shown on the structural engineering documents and drawings submitted with the application.

9 There is a very minimal risk of damage being caused to adjoining buildings this is because of the depth of excavation and proximity of the adjoining buildings.

The predicted worst case damage is Category 0 and 1 Negligible and Very Slight BRE Digest 251 Assessment of Damage in Low Rise Buildings. These are the lowest categories possible to quote but it is not envisaged that any damage to buildings will be caused by the formation of the basement during and post construction.

10 There are no basements in close proximity to the site.

11 A utilities search has been carried out and there are no utilities under the side and those in the road/pavement would be unaffected by the works being carried out and any subsequent small ground movements.

1.0 Introduction

1.1 This report has been prepared to support the Planning Application which is to be submitted by Hub Architects on behalf of Amek Property Investment LLP. The report should be read in conjunction with the submitted architects planning drawings, structural scheme drawings, the Site Investigation Report and Site Search Report. (Geo-Environmental Report GE17961).

The purpose of this report is to outline the anticipated method of construction and anticipated sequence for the formation of the new basement and to demonstrate the works can be carried out safely and without causing damage to the t adjacent building, roads and footpath.

Summarised below are the findings of report GE17961 a more detailed description of the proposals are contained within the following Sections 2.0 to 9.0.

1.2 Basement Impact Assessment Screening.

These are set out in report GE10977 and are summarised below:-

1 Subterranean (Groundwater) Screening Assessment

The above assessment did not identify any potential issues with regard to groundwater flows.

2 Stability Screening Assessment.

The above assessment identified three items which needed to be assessed:

Q5 The London Clay Formation is the shallowest stratum at the site.
Q12 The site is within five metres of the highway and pavement.
Q13 The proposed basement foundations will be deeper than the neighbouring properties foundations.

3 Surface Flow and Flooding Screening Assessment

The above assessment did not identify any potential issues with regard to surface flow and flooding.

1.3 Basement Impact Assessment Scoping.

These are set out in report GE10977 and the impacts are summarised below:-

Q5 The London Clay Formation is prone to seasonal shrinkage and swelling.
Q12 The site is within five metres of Wadham Gardens
Q13 Excavation for the basements may result in structural damage to neighbouring properties if there is sufficient differential depth between adjacent foundations.

The above impacts were assessed by carrying out the following:

1.4 Site Investigation Strategy

These are set out in report GE10977 and the impacts are summarised below:-

Environmental Areas of Concern: Investigated using window sampling, testing and analysis.

Geotechnical Areas of Concern:

Shrinkable Soils: Window sample boreholes located across the site coupled with regular sampling and laboratory analysis. Positions WS1 to WS4

Existing Foundations: Hand excavated trial pits located adjacent to the building to reveal and

plot the existing foundations. Positions TP1 to TP4.

Groundwater: Standpipes installed to record water levels. Positions WS2 and WS4

1.5 Impact Assessment and Review (Outline)

These are set out in report GE10977 and the impacts are summarised below:-

Foundations will be underpinning to the existing walls to a depth of 3.5 to 4.0 bgl and the allowable ground pressure is assessed at 160kN/sq,m. For the raft an allowable bearing pressure of 40 kN/sq.m in order to limit differential settlement.

Excavations within the made ground will remain stable in the short term but will require temporary supports in the long term. Conditions encountered in Trial Pit 2 indicates a leak from a sewage pipe that means the ground is saturated and will require temporary support.

Basement Construction will not encounter the water table however perched water tables may be encountered and some limited pumping may be required.

The basement will have negligible effect on the existing groundwater regime in respect of the wider environment.

The basement is to be fully tanked and designed to resist hydrostatic pressures as required by the relevant standard.

Basement Retaining Walls are to be designed using the parameters provided and in this respect the underpinning is to be reinforced and designed as a retaining wall monolithic with the basement raft slab.

Sub Surface Concrete is to be designed in accordance with BRE Special Digest 1 for sulphates to DS-2 classification AC-1s.

Vertical Movements Due to Excavations (Short Term)

The short term analysis estimates a maximum of 9mm heave at the centre of the excavation. Predicted heave movements beneath the party walls range between 2mm and 4mm.

It is noted that it is unlikely that these levels of movements would be realised occur, due the restraining effect of the underpinning etc.

Vertical Movements Due to Excavations (Long Term)

The long term analysis indicates 12mm heave at the centre of the excavation and 7mm on the party wall.

Again it is noted that it is unlikely that these theoretical values would be attained.

Movements due to pile installation, underpin construction and basement excavation.

Horizontal movements were assessed to be of the order of 7mm at the perimeter and becoming negligible 12 metres from the excavation and that the settlement around the perimeter at ground level would be 3-4mm and negligible (<1mm) at 8m from the excavation.

Building Damage Assessment

The damage assessed from the analyses was Category 0 to 1 i.e. Negligible to Very Slight. It is anticipated that the cross propping would be introduced early in the works to provide a very stiff support system to the walls and underpinning would be carried out to avoid instability of excavations and keep ground loss to a minimum

Monitoring

The adjoining building and existing building will be monitored using the Red, Green and Amber system as set out on 1550/GN02.

Utilities

A utilities search has been carried out and there are no utilities beneath the site. Utilities in the road and pavement will not be affected by the works or any very minor ground movements.

2.0 Technical Description

2.1 The proposed basement will be designed and detailed in accordance with the Building Regulations and relevant British Standard or Eurocode as applicable.

2.3 The building is mainly a traditionally constructed two storey house, using loadbearing walls which support suspended timber floors and the pitched roof. Subsequent alterations have created rooms in the loft space and the building has a newer single storey side extension

Existing foundations are corbelled out brickwork for the original building and concrete strip foundations for the newer extensions.

It is proposed to demolish the newest extensions along the north elevation and construct a basement over the area and a single storey above on a lesser scale than the existing footprint. The basement will be formed after demolition by constructing pins to a sequence shown on the drawings.

2.2 The proposed basement will be formed by underpinning the entire perimeter walls with reinforced concrete underpinning which will act to transfer the main loads to the lower level and also to retain the adjacent ground. The base of the underpinning will be monolithic with the basement slab and in the permanent situation will be propped by the new reinforced concrete ground floor slab.

Internal walls will be supported from the suspended ground floor slab with loads transferred to columns basement to ground floor.

2.3 It is proposed that the works are executed using the top down method and the proposed sequences for works are shown on drawings 1550/GN02 and 1550/GN03.

2.4 In order to minimise inward deflections during excavations, the sequences referred to above and shown on the drawings require temporary propping and this will be achieved by the new ground floor slab propping the top of the retaining wall. Temporary propping will also be required to prevent sliding at basement level. This will be removed on completion of the basement slab.

This propping system will be provided with a monitoring system.

2.5 During construction and for six months following completion of the basement the adjoining buildings and the existing building will be monitored for movement. The proposed monitoring regime is outlined on drawing 1550/GN02.

2.6 Once the basement and ground floor are completed the proposed structural alterations for the superstructure will be completed.

3.0 Ground Conditions

3.1 A desk top study and site investigation has been carried out by Geo Environmental referenced in the introduction and is to be read with this documents and to form part of the application.

3.2 The Geological Survey Sheet for the area, Sheet No 256 (North London) identifies that the naturally occurring sub-soil is London Clay. This is confirmed by the window sampling carried out on site which shows varying depths of made ground and weathered London Clay becoming un-weathered with depth.

3.3 No water was encountered at the level of the basement although there was some ingress from a perched water table at a higher level. The perched water table is localised and to enable construction some minor pumping may be required. Standpipes are installed in order to monitor this until construction commences on site.

The basement walls however will be designed for a head of water.

3.4 The findings of the contamination testing show that there was elevated levels of lead and this forms a risk to construction workers who will need to wear suitable protection. For end users in soft landscaping areas it is recommended that 600 of the surface soils are removed and 150mm of stone fill and 450mm of top soil are imported. This is not required in hard landscaped areas.

3.5 There are no basements in close proximity to the site. Also there are no major utilities under the site and those in the road will not be affected by the works due to the predicted small displacements.

4.0 Existing Foundations

4.1 The existing foundations generally comprise corbelled brick/concrete strip footings at depths varying from 1000 to 1600 below external ground.

5.0 Design

5.1 The new basement will transfer the loads from the building to the London Clay and retain the soils and adjacent buildings and walls. Formation level is approx. 3.5 metres below ground level.

5.2 Due the depth of the basement release of the overburden pressure and resulting heave is not considered to be significant however the basement slab will be designed for heave pressure.

5.3 The allowable bearing pressure at basement level for the underpinning is 160 kN/sq.m and the allowable bearing pressures for the raft will be 40 kN/sq.m.

5.4 The methodology and sequencing of the basement will be carried out to minimise inward horizontal deflections and hence minimise the risk of settlement at ground level.

6.0 Design of Temporary Piles

6.1 In order to support the internal walls temporarily plunge piles will be installed. The plunge piles in the final condition will be cut to basement level and used to reduce heave.

6.2 For the final design the amount of settlement of the piles will be determined and if necessary hydraulic jacks will be used to ensure controlled transfer of loads from the building over to the supports.

6.3 To form the light wells hydraulically driven press in vibration less piles will be adopted i.e. Giken or similar. The adoption of impact driven piles will not be permitted.

7.0 Influence of Settlement on Adjacent Properties and Utilities

7.1 The influence of settlement on the adjoining building is not considered to be significant is assessed at Category 0 to i i.e. Negligible and Very Slight . Also as noted above any settlements of ground to due inward defection of the retaining walls will be minimised by the stiffness of the designed sub-structure and method of construction proposed.

7.2 There are no basements in close proximity to the site.

7.3 A utilities search has been carried out and there are no utilities beneath the site. Utilities in the road and pavement will not be affected by the works or any very minor ground movements.

8.0 Construction Method.

8.1 The construction methods to be employed are conventional however prior to construction the Main Contractor will be requested to provide method statements and final construction sequences for review. The anticipated sequences envisaged are provided on the drawings.

9.0 Hydrology

9.1 The site lies approximately mid-way between two tributaries of The Tyburn (Ref Lost Rivers of London) which are now culverted. The site is not overlain with Terrace Gravels and the boreholes encountered no inflows of water which demonstrates that there are no streams running through the site.

9.2 The site is not within an area designated by the Environment Agency to be subject to flooding and there is no history of flooding also there are no aquifers in close proximity to the site.

9.3 The new basement does not impinge on the water table and thus flows through and around they site will not be affected. Also it should be noted that the building that area is not overdeveloped and given the density of buildings, the new basement under the property and if constructed under all the adjoining properties could not form a significant barrier to water flows.

9.4 The existing storm water drains and the connection to the main sewer are to be retained and because of the nature of the development there will be no increased flow to the main sewers.

Prepared By

Stuart Harmon B.Eng(Dist), C.Eng, M.I.Struct.E.

For and on behalf of Quadrant Harmon Consulting Ltd
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