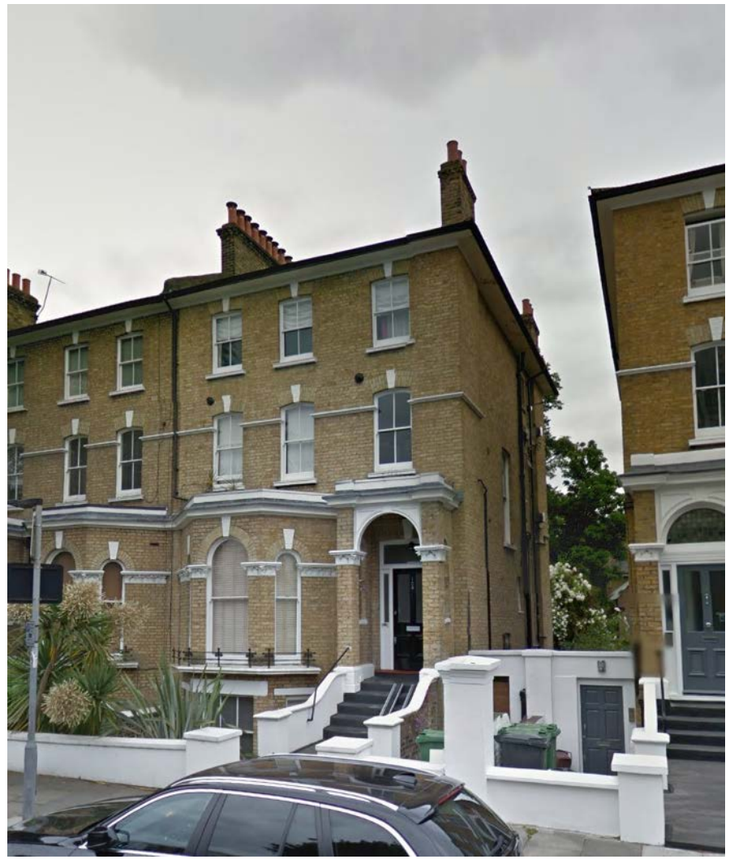
SINCLAIRJOHNSTON

STRUCTURAL DESIGN & CONSTRUCTION STATEMENT

FOR ALTERATION WORKS PROPOSED AT:

109 KING HENRY'S ROAD
LONDON
NW3 3QX



Prepared by:

R. AZAD MEng CEng MICE MIStructE

Sinclair Johnston & Partners Limited
93 Great Suffolk Street
London
SE1 0BX

Tel: **020 7593 1900**
e-mail: **razad@sinclairjohnston.co.uk**

8438/R/RA (PLANNING ISSUE) **AUG 2016**

CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 The following Structural Design & Construction Statement has been prepared as part of the wider Basement Impact Assessment (BIA) undertaken for the planning application, submitted by Forge Architects Ltd, for the proposed residential redevelopment at 109 King Henry's Road, London NW3 3QX.

1.2 The purpose of this report is to describe the existing site and ground conditions, to present the structural scheme to be adopted for the proposed development, and to describe the proposed construction methodology for the execution of the works. The report and information contained within has been prepared for planning purposes only.

1.3 This report should be read with the Basement Impact Assessment (BIA) Report prepared by Soil Technics Ltd and all other Consultant's reports produced for the planning application.

1.4 The report has been prepared by Mr Ravi Azad MEng CEng MICE MIStructE; Technical Director at Sinclair Johnston & Partners.

2.0 EXISTING SITE

2.1 The site address is 109 King Henry's Road London, NW3 3QX and is located at approximate National Grid reference TQ 27336 84156.

2.2 The site is located within the London Borough of Camden within the Camden Town and Primrose Hill ward.

2.3 The property is not listed but lies within the Elsworthy Conservation area.

2.4 The site comprises:

2.4.1 A four storey semi-detached property (109 King Henry's Road), which is arranged over lower ground floor, raised ground floor, first floor and second floor.

2.4.2 The property has been converted into flats, but otherwise appears to be largely undeveloped.

2.4.3 The local area is not on a hillside setting, although the topography of the site slopes gently down by about 2 degrees in a southerly direction with the slope (to the South of King Henry's Road).

2.4.4 The lower ground floor is located marginally above rear garden levels. Main front garden levels are located about 1.6m above the lower ground floor levels, with a change in ground levels provided by a cutting slope within the garden.

2.4.5 The site is bounded to the left by 107 King Henry's Road, to the right by 111 King Henry's Road, and to the rear by the rear garden of properties on Elsworthy Road.

2.5 Access onto site is provided directly off King Henry's Road.

2.6 As identified in the Camden Flood Risk Management Strategy the site is not in an area at risk of flooding from rivers or the sea. Nor is it in an area that has historically been at risk from surface run-off, groundwater and sewer flooding.

2.7 According to historical maps, the existing property appears to have been constructed around 1890.

2.8 The property is of traditional loadbearing masonry construction, comprising solid brick external walls with internal timber and masonry walls. Floors and roofs are of timber construction.

3.0 SITE GROUND CONDITIONS

3.1 The general topography of the surrounding site is as follows (levels shown in metres AOD):

3.2 The following is a brief summary of the site ground conditions, as obtained from the site investigation works undertaken. Reference should be made 'Ground Investigation Report' dated August 2015 and 'Basement Impact Assessment Report' dated September 2015 by Soil Technics Ltd for detailed information.

3.3 In summary, the site ground profile comprises:

Ground	Depth below ground level (m)	Thickness (m)	Notes
Made Ground	0	0.7 – 1.5	Medium strength dark brown and grey silty sandy gravelly clay
London Clay	0.7 – 1.5	To depth	Clay was encountered to full depth of investigation (7m below ground level)

3.4 The site is not within a fluvial or tidal flood plain.

3.5 No groundwater was encountered during investigations.

3.6 The nearest surface watercourse is the Regent's Canal, the channel of which is located approximately 750m to the South of the site.

3.7 The London Clay formation deposits on site are designated as 'unproductive strata' by the Environment Agency.

3.8 The site is recorded as being within a Source Protection Zone 2 (Outer Zone), with the abstraction point in the Chalk Aquifer located at least 100m below the property. As such, the proposed development will have no influence on the Chalk Aquifer.

3.9 The site is underlain with a substantial thickness (85m) of relatively impermeable London Clay Formation. On this basis, groundwater is not likely to be available at the site and thus the proposed works are unlikely to present a risk of causing groundwater flooding.

4.0 PROPOSED DEVELOPMENT

4.1 The description of the proposed development given below is provided to give context to the following sections of the report. For a detailed description of the various disciplines proposals, reference should be made to the various reports submitted with the planning application.

4.2 The proposed development comprises:

- Retention of the existing property.
- Construction of a new single-storey basement under the rear half of the building, also extending into the rear garden to form a lightwell.
- Construction of a single-storey rear extension over part of the new basement structure.

5.0 STRUCTURAL PROPOSALS

5.1 Drawings describing the structural proposals are provided in Appendix B.

5.2 The structural works comprise:

a. Underpinning below all internal and perimeter loadbearing solid brick walls, which will provide both temporary and permanent earth support

b. Construction of reinforced concrete retaining walls in the rear garden to form lightwells, which will provide both temporary and permanent earth support

c. Casting a basement groundbearing raft slab integral with the underpin walls

d. Casting a suspended reinforced concrete ground floor slab providing temporary and permanent earth support.

e. The superstructure scheme is to comprise a loadbearing masonry structure with a timber roof over.

Structural Stability

5.3 Reinforced concrete walls cast in an underpinning sequence will form the basement perimeter walls. The form of retaining wall proposed has been successfully used on many similar basement projects and the performance characteristics of such walls in London Clay are well documented and understood.

5.4 The reinforced concrete walls will act as retaining structures, and are to be designed to support the lateral pressures resulting from earth, surcharge and transient hydrostatic loads. Pressures are to be calculated using the geotechnical parameters set out in the Site Investigation Report by Soil Technics Ltd. A design ground water level of -1.0m below the retained earth level is to be adopted for the design of all retaining structures. A minimum surcharge pressure of 10kN/m2 is to be adopted. There are no surcharge loads from adjacent foundations.

5.5 The reinforced concrete retaining walls are to be propped in the temporary and permanent cases. After each underpin wall has been cast, the ground is to be backfilled, which will provide temporary support to the walls. Once wall underpin wall sections have been formed, temporary propping is to be installed, in the form of steel 254UC73 beam struts, propped between the cast wall faces, installed at high level. Once the propping is in place at high level, excavation to basement level can be undertaken. Permanent propping is provided by the reinforced concrete ground bearing basement slab and reinforced concrete suspended ground floor slab.

5.6 No water was encountered during the investigation works. Given the relatively impermeable Clay subsoil, this will allow the Contractor to construct the basement in a relatively 'dry' environment without the need for significant de-watering.

5.7 The excavation required to form the basement results in the removal of the original over-burden pressure. This results in the bottom of the excavation rising, which is a phenomenon commonly known as 'heave.' The Basement Impact Assessment Report by Soil Technics Ltd has assessed this heave, and it is considered that heave during construction will be of negligible magnitude. The weight of the new basement structure and the existing building over will resist any ongoing heave in the permanent condition.

Predicted Structural Damage to Neighbouring Properties

5.8 An initial prediction of structural damage to neighbouring properties has been undertaken in general accordance with CIRIA publication C580 by Soil Technics Ltd. Calculations and a summary of their findings are provided in the Basement Impact Assessment Report.

5.9 The assessment by Soil Technics Ltd has found that the category of damage to Nos. 107 and 111 King Henry's Road, as classified under Burland et al, anticipated from the proposed construction of the new basement is expected to be no worse than Category 2, Slight.

5.10 The Contractor will be required to monitor ground movements during the works to check the validity of the ground movement analysis and the performance of the temporary works and working methods. A 'traffic light' system of green, amber, red trigger values will be set with specific Contractor actions set against each trigger values. Indicative ground movement trigger levels to be set are as follows:

Traffic Light	Trigger Value (mm)	Contractor Action
Green	<5	No action required.
Amber	5	Notify the CA and Party Wall Surveyor(s). Increase frequency of monitoring. Implement contingency measures if movement continues.
Red	>10	Notify the CA and the Party Wall Surveyor(s). Implement measures to cease movement and stop work.

5.11 The monitoring method is to be developed further during detailed design and will be undertaken prior to construction of the underpin walls and will continue through to completion of the basement structure.

5.12 The risk of on-site sewer flooding will be reduced by the incorporation of a pumping installation which would prevent effluent from the public sewer backing up in to the proposed basement of the dwelling. By using a dual pump with a high level alarm, the risk of on-site drainage system exceedance is vastly reduced.

5.13 An indicative programme for the works is as follows:

- Underpinning to rear lightwells and below perimeter walls – 22 weeks
- Install high level lateral propping – 2 weeks
- Excavate to basement formation level and install low level lateral propping – 5 weeks
- Cast basement raft slab – 2 weeks
- Install steel beams and cast new lower ground floor slab – 5 weeks
- Remove propping and dry-pack existing walls off new slab – 2 weeks
- Construct single storey load bearing masonry rear extension - 4 weeks

6.0 PARTY WALL MATTERS

6.1 The works comprise the excavation for a new basement adjacent to the site boundaries and within close proximity to Nos. 107 and 111 King Henry's Road. Full procedures under The Party Wall etc Act 1996 are therefore required.

6.2 The structural scheme adopted has been designed with due regard to maintaining the structural stability and integrity of neighbouring buildings & structures and surrounding land. The structural form of the basement and the method of construction have been developed to ensure that lateral deflections, and associated ground movements, are kept within acceptable limits.

6.3 An initial assessment of the predicted ground surface movements using the approach set out in CIRIA C850 has indicated that the predicted category of damage to adjacent properties would be no worse than Category 2 – Slight.

7.0 CONSTRUCTION GENERALLY

7.1 The proposed sequence of works outlined below has been assumed for the purposes of undertaking the planning stage structural design of the building and is provided to demonstrate that the works can be executed with due regard to the local amenity. For the purposes of this report, the basement is to be constructed using a bottom-up method of construction, as outlined in the following construction sequence:

Proposed Sequence of Works

i) Install local reinforced concrete (r.c.) underpin wall sections either side of rear bay window and form new rear lightwells in a typical 1-3-5-2-4 hit/miss sequence to basement level. Underpin widths to be limited to 900mm to ensure that the existing wall over can effectively arch over temporary excavations. Given the cohesive nature of the existing clay subsoil, faces of excavations to the depth of underpinning are likely to be stable during excavations for underpins. Reinstate arisings from excavation for underpins in well-compacted layers once each underpin has been cast to provide temporary support.

ii) Install temporary steel cross beams and needle beams through the base of the rear bay window, spanning between recently-cast sections of r.c. wall.

iii) Install reinforced concrete (r.c.) underpinning under perimeter walls of house in a typical 1-3-5-2-4 hit/miss sequence to basement level. Reinstate arisings from excavation for underpins in well-compacted layers once each underpin has been cast to provide temporary support.

iv) Install r.c. underpinning under internal walls of rear of house in a typical 1-3-5-2-4 hit/miss sequence to basement level. Reinstate arisings from excavation for underpins in well-compacted layers once each underpin has been cast to provide temporary support.

v) Excavate down 500mm below top of r.c. underpin wall level under main body of house. Remove spoil through side access to property.

vi) Install temporary steel waling beams and flying shore props across width of property between faces of r.c. underpin walls to provide temporary propping to underpinning.

vii) Excavate down to top of underpin base level and install temporary steel waling beams and flying shore props across width of property between faces of r.c. underpin walls at low level to provide temporary propping to underpinning.

viii) Excavate down to underside of basement raft level and cast new basement raft slab integral with r.c. underpins. Remove low level temporary steel waling beams and flying shore props.

ix) Build up new r.c. walls from basement level to underside of lower ground floor level. Pack up new walls to bay window up to underside of masonry at lower ground floor level. Remove temporary steel support beams and needle beams.

x) Install new reinforced concrete slab on profiled metal decking at ground floor, and in-situ flat r.c. slab.

xi) Remove high level temporary flying shores and waling beams.

xii) Construct single storey loadbearing masonry rear extension off r.c. basement box structure.

7.2 The undertaking of such works to existing buildings is specialist work and Sinclair Johnston & Partners Ltd will be involved in the selection of an appropriate Contractor, who will need relevant expertise and experience in working on these types of projects.

7.3 The works are required to be undertaken in accordance with all statutory legislation relating to construction works.

7.4 The Contractor will be required to demonstrate a positive attitude and commitment toward minimising environmental disturbance to local residents and will be required to be registered with the Considerate Contractors Scheme. Impacts on the local amenity due to construction will be strictly controlled and managed by the Contractor.

7.5 Noise, dust, and vibration will be controlled by employing Best Practical Means (BPM) as prescribed in the following legislative documents and the approved code of practice BS 5228:

- The Control of Pollution Act 1972.
- The Health & Safety at Work Act 1974.
- The Environmental Protection Act 1990.
- Construction (Design and Management) Regulations 1994.
- The Clean Air Act 1993.

7.6 General measures to be adopted by the Contractor to reduce noise, dust and vibration include:

- Erection of site hoarding to act as a minor acoustic screen.
- Drop heights to be minimised during any demolition.
- Use of super-silenced plant where feasible.
- Use of well-maintained modern plant.
- Effective noise and vibration monitoring to be implemented.
- Reducing the need to adopt percussive and vibrating machinery.
- Vehicles not to be left idling.
- All loads entering and leaving site are to be covered.
- Measures to be adopted to prevent site runoff of water or mud.
- Water to be used as a dust suppressant.
- Cutting equipment to use water as suppressant or suitable local exhaust ventilation system.
- Skips to be covered.
- Use of agreed wet cleaning methods or mechanical road sweepers on all roads around the site.
- Set up and monitor effective site monitoring of dust emissions.

7.7 The proposals comprise the demolition of the existing lower ground floor structure and excavation below the footprint of the house and part of the rear garden. The demolition works will be required to be undertaken in accordance with the legislative documents stated above and the practices outlined within the ICE Demolition Protocol in order to mitigate the potential impacts of these works.

7.8 Demolition of existing groundbearing concrete floor slab in the existing building and front vaults will need to be undertaken using a 'clean' deconstruction method to reduce noise, dust, and vibration. Concrete elements are to be cut into manageable sections using a stitch drilling method to reduce noise, dust, and vibration.

7.9 Where practical, demolition material is to be taken to recycling plants.

7.10 Working hours will be restricted as required by the Local Authority.

7.11 The Contractor will be required to provide a Construction Traffic Management Plan prior to undertaking the works. The contents of the plan must be agreed with the Local Authority and complied with unless otherwise agreed with the Local Authority.

7.12 The Contractor will be required to provide a Site Waste Management Plan describing how site waste is to be minimised and dealt with.

7.13 A Chartered Engineer holding MICE or MIStructE accreditation from Sinclair Johnston & Partners Ltd will have an ongoing role on site to monitor that the works are being carried out generally in accordance with the structural design and specification. This role will typically involve weekly / fortnightly site visits throughout the duration of structural works on site.

<u>Demolition</u>

7.14 The demolition works will be required to undertaken in accordance with the legislative documents stated in Camden Planning Guidance CPG4 Section 2.83

7.15 Contractors are to adopt the practices outlined within the ICE Demolition Protocol in order to mitigate the impact of the works.

7.16 Where practical demolition material should be taken to recycling plants.

Construction

7.17 The Contractor will be required to be registered with the Considerate Contractor scheme.

7.18 Impacts on the local amenity will be strictly controlled and managed by the Contractor.

7.19 Working hours will be restricted as required by the Local Authority.

7.20 The Contractor will be required to provide a Construction Management Plan prior to undertaking the works. The contents of this plan must be agreed with the Local Authority and complied with unless otherwise agreed with the Council.

7.21 The Contractor will be required to provide a Site Waste Management Plan describing how site waste is to be minimised and dealt with.

7.22 Ground water is well below the proposed basement formation level. Therefore, ground water will not be significant during execution.

Temporary Works

7.23 The Contractor will be required to appoint a Temporary Works Co-ordinator to advise, design, co-ordinate and oversee all temporary works aspects. All temporary works are to be in accordance with BS 5975 'Code of practice for temporary works procedures and the permissible stress design of falsework'.

7.24 Temporary lateral propping to the underpin walls is required to prevent significant lateral movement of the underpinning during construction. The propping is to be kept in place until the permanent propping (reinforced concrete slabs) are constructed. Due to the estimated prop forces, 254UC73 beam struts are considered to be appropriate for use.

Construction Traffic Management

7.25 The Contractor will be required to develop a Construction Traffic Management Plan for submission and agreement with the Local Authority. This Traffic Management Plan is to be in accordance with Camden Planning Guidance 6 Section 8.

8.0 CONCLUSIONS

8.1 The structural proposals and construction methodology for the subterranean development at 65 Palace Gardens Terrace have been developed with due regard to the existing site constraints, the site specific and local ground conditions, the local amenity and the local highway.

8.2 The ground conditions are well understood and have been investigated by Soil Technics Ltd. Refer to Ground Investigation Report dated August 2015 and Basement Impact Assessment Report dated September 2015 for further information.

8.3 The site has not previously been, or is likely to be, subject to surface water flooding.

8.4 Groundwater was not encountered during the site investigation, and the new basement will be founded above the water table. Groundwater during excavation is therefore not considered to be a problem.

8.5 The proposed works and basement development have been shown to be unlikely to detrimentally affect the surface water regime in the local and wider area. The existing pathway for surface water flows will not be altered by the proposals.

8.6 The structure has been designed to maintain the stability and integrity of the surrounding land and the existing and neighbouring buildings, structures, and below ground services.

8.7 A ground movement analysis undertaken (refer to Basement Impact Assessment Report) has confirmed that anticipated ground movements associated with the works can be limited to acceptable values by a combination of the stiffness of the proposed retaining structure, suitably designed temporary works, and good levels of workmanship.

8.8 The predicted category of damage to the adjacent buildings has been estimated to be no worse than category 2 – Slight as defined by Burland et al.

8.9 The site geology is capable of supporting the loads and construction techniques to be imposed.

8.10 The subterranean development, and associated construction and temporary works, have been developed so as to have no adverse impact on the structural integrity and natural ability for movement of existing and surrounding structures, utilities, infrastructure and man-made cavities, such as tunnels.

8.11 The permanent and temporary works and the method of construction have been developed so that the development will not initiate slope instability.

8.12 The subterranean development has no adverse impact on drainage, sewage, surface water and ground water flows and levels.

8.13 The proposed permanent and temporary works and construction method have been developed with due regard to the geology and hydrology.

8.14 The report describes the engineering details of the scheme, including proposals for the excavation and construction.

8.15 The proposed subterranean development has no adverse impact on the structural stability of the existing and adjoining buildings.

8.16 The proposed subterranean development has no adverse impact on existing trees.

8.17 The proposals described herein are a proven form of construction and are designed to maintain the structural stability and integrity of the existing buildings on and around the site.

8.18 This report demonstrates that by adopting good construction practices the works can be executed in a safe manner while minimising any impact on the local amenity.

8.19 A Chartered Engineer holding MICE or MIStructE accreditation from Sinclair Johnston & Partners Ltd will have an ongoing role on site to monitor that the works are being carried out generally in accordance with the structural design and specification.

Appendix A – Site Investigation Report
by Soil Technics Ltd

SINCLAIRJOHNSTON

Appendix B – Existing & Proposed Structural Drawings