7 Proposed Works

The proposed structural design is detailed on Heyne Tillett Steel drawings contained within the Appendices; these outline the proposed alterations to the existing building. A preliminary design of some of the key elements of the structure has been carried out and the results are in the Appendices.

The project involves the alteration and change of use of 1 Sloane Gardens, including:

- A roof extension and roof-level restaurant;
- A bar at basement level and change of use of the basement at 6 Holbein Place;
- the creation of an additional basement level to locate plant servicing;
- amendments to accommodate improved disabled access.

Key structural alterations proposed to the existing structure are:

- Demolition of the structure within the perimeter façade with retention of all of the perimeter walls and the two retail units below first floor level
- Excavation of a new single level of basement under the majority of the footprint of the building, excluding beneath the two retail units, and lowering of the lower ground level vaults beneath the pavements.
- Erection of a new concrete frame structure up to the existing 6th floor level fully tied to the retained perimeter walls.
- Erection of a new single storey steel frame roof extension supported on the 6th floor slab;
- Installation of a new UKPN sub-station in close proximity to the site within the adjacent communal garden and a new service trench connecting the sub-station to the building under the pavement along Holbein Place.

7.1 Superstructure

The proposed works involve the demolition of the existing internal structure above the existing basement level, whilst retaining the two retail units at ground floor and basement level and retaining all of the existing perimeter walls.

The proposed superstructure is typically an in-situ reinforced concrete frame with perimeter blade columns and internal cores supporting a flat slab at each level.

The floors to the building are to be in-situ reinforced concrete flat slabs, with the depth varying from 250-350mm to suit a column layout. All vertical loads are transferred through the slabs to the columns then down to piled foundations at basement. Transfer beams are proposed at second floor level over the retained units. At roof level, a lightweight steel frame with metal decking infill will enable the proposed sloping roof layout to be achieved.

It is proposed to retain the existing internal concrete filler joist floors above the retained GF retail units and adjacent to the balconies. The balcony retention is intended to retain the existing tie action of the slab in this location during the demolition.

7.2 Substructure

The proposals involve the construction of a single storey basement under most of the footprint of the building and lowering of the lower ground level vaults beneath the pavements. The basement is generally limited to a depth of approximately 4.5m to formation level below the existing lower ground level. Refer to next section for more details on the basement construction.

A piled solution has been developed to support the new reinforced concrete frame, using 450mm diameter piles, which will be founded in the London Clay. It is expected that continuous flight augered piles will be used, these will extend to a depth of approximately 25m. The use of CFA piling system minimises vibration and noise and facilitates the formation of a dry excavation without the need for pumping. The basement slab is designed as a flat piled slab and is assumed to be a maximum of 500mm thick and cast with water resisting additive. It has been designed to resist heave and uplift. Preliminary design calculations for these elements have been carried out and are attached in the Appendices.
7.3 Basement Construction

A new waterproof concrete substructure will be formed to create the new basement. The basement will be formed by concrete underpins, formed in a sequential 'hit and miss' approach. The base of the underpinned foundation is expected to be above the groundwater level. A temporary lateral support frame will be installed progressively as basement excavation progresses. Alternatively, subject to a Party Wall award, the underpins can be designed as reinforced concrete retaining walls and lateral props can be limited or omitted.

Following the completion of the underpins, the foundation slab is cast, as described in the previous section, and a reinforced concrete liner wall with water resisting additive will be constructed to the perimeter of the basement to form the water tight basement box. This liner wall will also be designed as the permanent retaining structure for the basement. Preliminary design calculations for this element have been carried out and are attached in the Appendices.

7.4 Underpinning

An underpinning solution has been developed to complete the excavation of the basement. The underpinning will be constructed to a maximum of 1m wide in a typical 'hit and miss' sequence 1-6 with adjacent pins connected via dowels or shear key. The sequence is to be such that no two adjacent pins are cast within 48 hours of on another. Due to the depth of the excavation the pins will probably be formed in two stages.

The typical underpinning sequence will be as follows:

- Demolish the existing slab and reduce the ground level to top of the corbelled foundation
- Carefully remove the existing corbelled toe internally
- Excavate to form the underpinning – It may be necessary to provide some limited ground water control during the construction works
- Install robust shoring as the excavation progresses
- Cast concrete underpins with dowels or shear keys
- Dry pack tight between the top of pins and the underside of existing foundations at least 24 hours after casting
- Back fill excavations to top of existing lower ground floor slab level and retain soil until all the underpins are completed

Once all the pins are completed, the excavation of the basement can commence. Lateral props may be required to provide temporary resistance on the pins against overturning.

7.5 Stability

Lateral stability of the building is achieved through concrete shear walls around the lift shaft and stair core. Lateral loads are transmitted to these walls through diaphragm action of the concrete floor slabs at each level. The loads in the walls are then transmitted to the underlying ground through the piled foundations.

7.6 Disproportionate Collapse

The existing building is currently class 2B and will not change class with the proposal. The conversion to hotel is considered a ‘material change of use’ and therefore the entire building is to comply with class 2B. Since the existing structure will be replaced by a new framed construction, this will be designed to provide sufficient horizontal and vertical ‘ties’ in accordance with the relevant material codes of practice. The perimeter walls will be fully tied to the concrete frame using resin anchors through shelf angles.

The approach with respect to robustness and disproportionate collapse has been discussed and agreed in principle with the approved inspector.

7.7 Proposed UKPN sub-station

The new sub-station is required to satisfy the uplift in energy requirements due to the change of use from residential to hotel. It will be built in close proximity to the site within the adjacent communal garden along Holbein Place.

It involves the construction of a single storey loadbearing masonry building partially sunken into the garden. The retaining structure consists of reinforced concrete retaining walls. The foundations will be pad footings with suspended reinforced concrete beams and slab. The roof is designed as a concrete slab.

A new subterranean service trench is proposed under the pavement along Holbein Place to connect the service cables from the sub-station to the building.

Two door openings will be created within the existing garden wall to provide level and street access to the substation, as per UKPN requirements. The garden wall will be partially underpinned to allow for the excavation of the new foundations and trench.

Additional investigations will be carried out on site to confirm the depth of the garden wall’s foundations. A sub-scan of the pavement has been completed to confirm the final route of the proposed trench to avoid any potential clash with the existing buried services.
7.8 Proposed Drainage

A surface water management plan has been prepared by Heyne Tillett Steel and can be found in Appendices. The following section summarises the drainage strategy.

The proposed preliminary drainage strategy for 1 Sloane Gardens has been designed to meet the requirements of the London Plan (2015) and the Royal Borough of Kensington and Chelsea’s Local Plan. The aim of the strategy is to make it as sustainable as practicably possible for the lifetime of the development.

7.9 Existing Drainage

Thames Water is the statutory sewerage undertaker for the development site. Thames Water own and maintain the public sewerage network. Asset plans identify the local area to be surrounded by a dense network of combined water sewers.

The development site is within an area of the Royal Borough of Kensington and Chelsea which is identified as the Sloane Square Critical Drainage Area (CDA). This area suffers from sewers which have exceeded capacities.

The existing site is found to have a combined drainage network which manages the foul and surface water on site. A single outfall manhole is seen to exist within the site conveys the combined water towards a public sewer (owned and Maintained by Thames Water) under Sloane Gardens. The existing surface water is discharged by gravity and there is no evidence of the use of any pumped devices on site.

A full CCTV survey was carried out by UKDN Waterflow to confirm the extent and condition of the existing network, results of which are included in the Appendices.

7.10 Proposed Drainage Background

The proposed drainage aims to maintain the existing principles as far as possible however introducing a sustainability element as per the National Planning Policy Framework therefore a 30% climate change has been designed into the proposed drainage strategy.

A number of sustainable surface water discharge options were explored in the order of preference below (most preferable first) and reasons against have been given:

1. Greenfield
   a. Inadequate space within the plant room
   b. Increased excavations to incorporate the volume required by the tank
   c. The basement below the lower ground floor results in the need for pumping of surface water

2. 50% Betterment of the existing 1 year peak run-off rate – Inadequate space to store that volume of water in the footprint of the building.
   a. Inadequate space within the plant room
   b. Increased excavations to incorporate the volume required by the tank
   c. The basement below the lower ground floor results in the need for pumping of surface water

3. Limit to the existing 1 year peak run-off rate – This option is feasible as the volume required for surface water storage can be incorporated into the footprint of the building without excavations and possible to discharge by gravity.

The proposed restricted discharge rate results in the need for surface water to be stored on site. Due to number of constraints encountered, the SuDS hierarchy table promotes the use of tanked systems to achieve the storage.

Surface water modelling calculations suggest that a total of 8m³ is required to be stored in a tanked system and flow from the tanked system is restricted using a hydrobrake device set to 5.5 litres per second.

7.11 Proposed Drainage Design

7.11.1 Surface Water

The proposed strategy has been designed to Building Regulation Part H.

Surface and foul water will be run in independent networks within the site and combined at the outfall manhole by gravity where practicably possible.

It is proposed that surface water collected on the impermeable surfaces such as roofs and footpaths are conveyed into the private drainage network via a series of pipes. Surface water is designed to flow into the aforementioned tank structure and stored until the entire volume can be emptied at the set rate of 5.5 litres per second using a Hydrobrake device. The tank has been designed to store water resulting from a 100 (1% Annual Exceedance Probability) and an allowance for 30% climate change.

The pipe used to convey the water from the tank to the outfall manhole will be a sealed pipe unit which is proposed to run at the ceiling of the basement.

The surface water collected at lower ground which cannot be routed through the tank is proposed to be discharged via a small pump device.

7.11.2 Foul Water

The foul water generated on the site at ground floor and above is proposed to be discharged by gravity directly into the outfall manhole. This concept ensures that any sewers which surcharge do not cause flooding within the site boundary.

Foul flows generated from lower ground and basement will be pumped into the outfall chamber. The pump devices provide a level of protection against a surcharged public sewer and reduces the risk of flooding into the site.
8 Design Criteria and Outline Specification

8.1 Design criteria

A1 Codes of Practice:

A1.1 Eurocodes:
- Basis of Design Loading: BS EN 1990 (EC0)
- 1-1 (Dead & Imposed Loads): BS EN 1991 (EC1)
- Part 1-5 (Snow Loads): BS EN 1992 (EC2)
- Part 1-4 (Wind Loads): BS EN 1993 (EC3)
- Concrete: BS EN 1994 (EC4)
- Steelwork: BS EN 1995 (EC5)
- Masonry: BS EN 1996 (EC6)

A1.2 Building Regulations 2000:

A1.3 Design guidance
- British Council for Offices – Best Practice in the Specification of Offices

A2 Design Loadings (in accordance with BS EN 1991)

A2.1 Imposed Loadings: UDL, qk - kN/m²
- Hotel accommodation: 2.0
- Corridors/stairs/landings reception: 4.0
- Roof terraces: 5.0
- Plant areas: 7.5/5.0
- Roof (maintenance access only): 1.5

A2.2 Wind Loadings
- The basic wind speed for the site is Vb,map = 22.0 m/s in accordance with BS EN 1991-1-4 (EC1 Part 1-4).
- Calt = 1.014
- Cdir = Cseason = Cprob = 1.0 (Cdir = 1.0 worst case, reduce where necessary in accordance with EC1)
- Vb = 22.3 m/s

A3 Design Life
- All new structural elements will have a design life of 50 years. Painted steelwork will have a design life of 25 years to first maintenance.

A4 Deflections
- The deflections of the new steel elements of the structure will be designed to meet the following criteria:
- Vertical deflection of floor slabs and beams will be limited to:
  - Deflections under total loads: continuous = [span / 200], cantilevers = [span / 100]
  - Deflections under live loads: internal = [span / 360], perimeter = [span / 500], cantilevers = [span / 180]

A5 Movement
- The overall size and form of the building is such that it will not be necessary to introduce movement joints within the primary structure.

A6 Durability
- Corrosion protection of internal steelwork will be achieved by a suitable paint system which provides a life to first major maintenance of 10 to 15 years. External steelwork will be protected by galvanizing.

A7 Tolerances
- The frame will be constructed to be within the tolerances outlined in the technical specifications and the recommendations of BS 5666. All finishes, cladding, services, internal partitions are required to be detailed to accommodate the worst combination of these. All tolerances to concrete elements are to comply with the tolerances given in the National Structural Concrete Specification (NSSS) CE Marking Edition.

A8 Structural Robustness
- The building is Class 2B according to the Building Regulations. The proposals will consequently be designed in line with this class.

8.2 Outline Specification

B1 General:
- B1.1 The following design elements should be in accordance with the Architects details:
  - Water and damp proofing
  - Fire protection provided by plasterboard
  - Floor separation and acoustic isolation
  - Internal partitions

B2 Concrete:
- B2.1 The concrete grades to be used are as follows:
  - Blinding, GEN1
  - Mass concrete, GEN3
  - Reinforced concrete floor slabs LC30/33

B3 Steelwork:
- B3.1 Steelwork Grade S355 and Grade S275 are to be used as noted on the drawings, to BS EN 1993 (EC3). All hollow section steelwork to be grade S355.
- B3.2 All new structural elements will have a design life of 50 years. Painted steelwork will have a design life of 25 years. All exposed steelwork to have intumescent paint to be factory applied to new steelwork to be submitted to the Architect for approval prior to construction.

B4 Temporary Works:
- B4.1 The contractor is responsible for the design, installation and maintenance of all necessary temporary works to ensure the strength and stability of the building throughout construction.
9 Temporary Works and Sequence of Construction

This section outlines the indicative sequence of construction and temporary works requirements related to the formation of the basement and erection of the permanent structure. Methodology and sequence have been preliminary discussed and agreed with a Contractor and will be finalised prior to construction.

Phase 0 – Site Preparation and Surveys

- Setup temporary welfare and traffic management
- Statutory applications for partial highway and pedestrian walkway closures to be completed
- Site secured and hoarding constructed
- Party wall and façade surveys to be completed
- Set up monitoring stations along party walls and façade and any other third parties’ infrastructure where appropriate (e.g. Thames Water Sewer, LUL)
- Protect any trees and public amenities

Phase 1 – Construction of crane base and temporary foundations for façade retention structure

- Scan pavement for buried services
- Prepare piling mat platform as required
- Install micro-piles in the lightwell for crane base and façade retention platform
- Form the reinforced concrete pile cap platform in lightwell to support the crane and the façade retention structure
- Form the reinforced concrete kentledge in Holborn Place to support the façade retention structure in this location
Phase 2/3 – Erection of crane and façade retention structure, installation of crash deck above retained shop units

- Once the crane base piling cap is cured, erect crane in the lightwell
- Erect façade retention structure
- Erect scaffolding
- Erect crash deck system above the retained units adequately insulated from the existing structure to mitigate risks of noise and vibration.

Phase 4 – Demolition of existing structure and start first stage of underpinning

- All required remedial works to the perimeter walls to repair historical defects are to be completed prior to any demolition
- Commence top-down safe sequential demolition of the existing internal structure
- Cut the filler joists at first floor level to the outer face of the loadbearing masonry and retain slab over units.
- Retain existing internal slab adjacent to the existing cantilevered balconies to tie back the bay windows walls
- Demolish existing lower ground floor slab
- Control and minimise dust through water spraying and hydraulic crushers
- Lower basement ground level above corbels without undermining the existing foundations
- Install first round of underpinning in a typical ‘hit and miss’ sequence. Refer to section 7.0 for a detailed description of the proposed underpinning sequence
Phase 5/6 - Install piles and complete underpinning, excavate to formation level

- Import piling mat material and where possible use crushed demo material
- Prepare piling mat as required – piling platform at existing lower ground floor level
- Install bearing piles from lower ground floor level to support new superstructure, pile cut off level at proposed basement formation
- Progress second stage of underpinning to formation level
- Once underpinning are complete and cured, install later propping to underpinning as required and excavate to formation level – subject to Party Walls agreement, where possible underpinning will be reinforced concrete and designed as cantilevered walls not requiring later props during the excavations
- Excavate to formation level
- It may be necessary to provide some limited ground water control during the construction works

Phase 7 – Form basement and erect superstructure

- Expose pile heads
- Install below slab drainage runs and attenuation tank in the vaults
- Form lift pits
- Cast water resisting concrete basement slab
- Cast water resisting concrete liner walls
- Cast water resisting concrete slab at lower ground floor level
- Form remaining superstructure in a sequential order cores – columns - slab up to top level
Phase 8/9 – Erect steel frame roof extension and remove temporary works

- Erect steel columns and beams to form new roof extension
- Install metal decking slab to form roof
- Remove façade retention
- The site is ready for the fit-out works
10 Impact Assessment

10.1 Impact of basement on adjacent buildings and infrastructure

The basement is situated close to the neighbouring buildings and an open cut excavation has been proposed. Based on the ground movement analysis completed by GEA, it is expected that the current design limits the movements of the adjoining structures and infrastructures to damage category 0 (negligible) and 1 (very slight) of the Burland damage criteria, as outlined in CIRIA C580 with reference to Burland et al, 1977, Boscardin and Cordingley,1989; and Burland, 2001.

Propping of the underpins is proposed at the top and bottom and at mid height. This is deemed to provide the necessary rigidity in order to keep the horizontal deflections to within the above limits. Monitoring measures are to be put in place, which will be agreed as part of the party wall negotiations.

The structural calculations in the Appendices demonstrate that the building will be designed to resist loads such that there will be negligible movement in the permanent works that would affect the long term stability of the neighbouring buildings.

10.2 Party Wall Matters

The proposed works development falls within the scope of the Party Walls Act 1996. Procedures under the act will be dealt with in full by the Employer’s Party Wall Surveyor. As part of the next stage, the Party Wall Surveyor will prepare and serve necessary notices under the provisions of the Act and Agreed Party Wall awards.

The Contractor will be required to provide the Party Wall Surveyor with appropriate drawings, method statements and other relevant information covering the works that are notable under the Act. The resolution of matters under the Act and provisions of the Party Wall Awards will protect the interests of the owners.

The proposed works will be developed so as not to inhibit any works on the adjoining properties. This will be verified by the Surveyors as part of the process under the Act.

10.3 Infrastructure and Utilities

Statutory searches have been undertaken to locate potential underground obstructions and services that may affect the proposed substructure as described in section 5.0. On the basis of these findings it is expected that the following third party approvals will be required prior to commencing the relevant construction activities.

- Thames Water
- London Underground Limited
- UKPN

10.4 Trees

The Arboricultural Survey and Impact Assessment carried out by Thomson Ecology in February 2016 confirmed that the construction activities associated with the new basement, crane base and façade retention platform will not impact on the trees adjacent to the site due to the fact that the existing lightwell, masonry walls, and unfavourable rooting conditions present a barrier to root growth within the footprint of the building.

The structural calculations in the Appendices demonstrate that the building will be designed to resist loads such that there will be negligible movement in the permanent works that would affect the long term stability of the neighbouring buildings.

The construction and location of the substation within the RPA’s in the rear garden have been tailored to suit the recommendations from the report. To mitigate against potential root severance, localised shallow pad footings or micropile and suspended reinforced beam foundations will be employed as the construction method of the substation in lieu of traditional trench foundations.

10.5 Managing the Impact of Construction

Measures will be implemented to ensure that the potential impact of the works on local residents and neighbours will be kept to a minimum. The Contractor shall undertake the works in such a way as to minimise noise, dust and vibration when working close to adjoining buildings in order to protect the amenities of the nearby occupiers. Refer to separate Noise, Vibration and Dust Report prepared separately for details.
11 Conclusions

This document demonstrates compliance of the proposed development with each aspect of the planning policy CL7 and RBKC subterranean development SPD. It demonstrates that the proposed development can be safely undertaken and will not impact on the structural stability of neighbouring buildings or infrastructure, given the works are completed in accordance with our design and specification.

The new basement will not significantly alter the flow of groundwater and movements on surrounding buildings resulting from the development are expected to fall within the tolerances outlined within the CIRIA C580 guidance and RBKC requirements.
Appendix A
Existing Structural Drawings