Construction Method Statement

Option B

Construction Method Statement

For  Alterations and Basement Extension

To   8 Walton Place
      Knightsbridge
      London

Rigby & Rigby
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London, SW3 1RT

By Curtins Consulting Ltd
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36467

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1.0 Introduction

Curtins Consulting have been appointed to provide a construction method statement for the redevelopment of 8 Walton Place, Knightsbridge, London, which includes the refurbishment and extension of the existing building basement with a new lower basement volume.

The current property is a four storey terraced house on Walton Place, with a semi basement and small paved garden to the front and larger paved garden to the rear.

The development proposed comprises of refurbishment to the house with the main structural works being to provide an extension basement volume to the back below the existing garden at a lower level than the existing basement.
2.0 Existing Structure

The site is situated in a predominantly residential area and is currently occupied by a four storey terraced house with a semi basement and small paved garden to the front and larger paved garden to the rear. The site is generally flat lying and surrounded by residential developments of similar age and style.

The Piccadilly underground tube line runs within 200m of the site.

From the historical Ordnance Survey maps it can be determined that the site and surrounding area was developed generally as it can be found today between 1827 and 1898.

It can be reasonably assumed that the structure is likely to be of traditional construction with load bearing masonry walls and timber upper floors. The foundations are expected to be stepped brick corbels at the base of the load bearing walls, but could possibly be concrete strips, bearing directly into the Kempton Park Gravels. The lower ground floor slab could be a ground bearing concrete slab cast onto concrete blinding, with some areas of suspended timber floor. The upper timber floors are likely to be spanning across the building with solid softwood boards. The roof is probably constructed with timber rafters and purlins. Original internal walls are likely to be masonry; though they are unlikely to be load bearing, however this should be checked on site by a competent person before the removal or alteration to any walls.

It is understood that the existing building is listed.
3.0 Proposed Structure

This report on the proposed development is predominately focused on the redevelopment and extension of the basement to underneath the existing rear garden and the lowering and extending of the front basement. Other works within the property at higher floor level involves mainly non-structural items, with the exception of a few alterations to the existing masonry walls, where a site visit is required to confirm the removal/alterations to these walls will not affect the structural integrity of the building.

3.1 Basement under Rear Garden

It is proposed to provide a new media room at a new lower basement level beneath the existing rear garden. Including the wall construction, the new basement will extend the full width of the current garden and extend almost 70% of the gardens length, at approximately four metres below current ground level, two and a half metres below the existing basement floor level.

The lateral and vertical size of the proposed basement will need to take into account the methods of construction to be employed and the elements designed to suit both temporary and permanent conditions. The parameters considered in selecting the solution include:

- Ability to transfer vertical loads from existing building and new basement structure to the ground.
- Control or accommodation of heave resulting from excavation of the basements and any net reduction in long term vertical loading of the ground.
- Control of horizontal movement of retaining walls and effects on neighbouring properties.
- Prevention of water ingress.
- Not to impose new loadings onto existing structures and foundations.

The favoured method of constructing the basement is to use traditional underpinning techniques above the water table to reduce the formation level of the existing walls to allow for the new construction of the basement. Reinforced concrete underpinning will be used to take the existing perimeter walls down to the new formation level.

A reinforced concrete raft slab will then be cast to support the new vertical loads and provide lateral support against the soil pressure. The walls to the basement will be designed as retaining walls to resist the active soil pressure. These will also be restrained by the basement roof slab supporting the new garden which will be designed to resist the compression generated by the active soil pressure acting on the retaining walls.

The new basement will form a water tight enclosure by using Delta Membrane Systems waterproofing system, or similar approved. This is a sealed system formed by a drained membrane placed inside the concrete structure on the floor and walls and over the roof slab. See drawing 36467/05 in Appendix A.
for typical details. Other methods that could be utilised include the use of water resistant concrete (using Calitite additive) to form the slab, retaining walls and roof slab, or applying a low permeability membrane (for example Voltex) between the underpinning and retaining walls and blinding and floor slab.
3.0 Proposed Structure

3.2 Basement – Central

Modifications are required to the existing basement to allow for the new extension, including a new door opening and filling in the current stair access to the basement at ground floor level. A new lintel will be installed to provide support the existing wall above the new opening, subject to confirmation of existing loadings from a site visit. The floor will be infilled with new timber joists spanning between the existing external wall and new stud partition wall.

3.3 Codes of Practice and Design Loads

Where relevant, the following design codes of practice and design loads will be used in the design and checking of all works as the minimum standards to be adopted:

- BS 648 Schedule of Weights of Building Materials
- BS 5950 Structural Use of Steelwork in Building. Part 1 – 9 as appropriate.
- BS 6399 : Part 1 Loading for Buildings : Dead and Imposed Loads
- BS 6399 : Part 3 Loading for buildings. Code of practice for imposed roof loads
- BS 7543 Durability of buildings and building elements, products and components
- BS 8000 Workmanship on building sites. Parts 1 to 16 as appropriate.
- BS 8002 Earth retaining structures
- BS 8004 Foundations
- BS 8110 : Part 1 Structural Use of Concrete : Design and Construction
- BS 8110 : Part 2 Structural Use of Concrete : Special Circumstances
- BS 8110 : Part 3 Structural Use of Concrete : Design Charts
- BS 8500 Concrete – Complimentary British Standard to BS EN 206-1
- BS EN 752:2008 Drain and Sewer Systems Outside Buildings
- BS 5911:2002 Concrete Pipes and Ancillary Products
- BS EN 295 (all parts) Vitrified Clay Pipes and Fittings
- BS EN 1401 & BS 4660 Plastic Piping Systems for Non-pressure underground drainage and sewage
3.0 Proposed Structure

Imposed floor loads from BS6399 Part 1

- Typical Room Load = 1.50kN/m²
- Corridors/Staircases/Landings = 1.50kN/m²
- Plant Area = 3.00kN/m²
- Lightweight Partitions = 1.00kN/m²
- Roof (No Access) = 0.75kN/m²

All dead loads due to building materials to be taken from BS 648 Schedule of Weights of Building Materials.
4.0 Ground Conditions

Listers Geotechnical Consultants Ltd were appointed by Rigby and Rigby to conduct a site investigation at 8 Walton Place, Knightsbridge, London, to provide an assessment of the geotechnical engineering properties of the ground with consideration to the proposed development. This was carried out in June 2012.

The site lies on a primarily residential area and is currently occupied by a four storey terraced house with a semi basement and small paved garden to the front and larger paved garden to the rear. The site is generally flat lying and surrounded by residential developments of similar age and style.

Reference to published geological information on the area indicates that the site is underlain by Kempton Park Gravels of Quaternary age over the London Clay Formation of Eocene age. The Kempton Gravel is generally represented by sand and gravel locally with lenses of silt, clay or peat occurring up to 10m in thickness. The London Clay Formation is generally represented by a fine sandy silty clay, occurring up to 150m in thickness.

Boreholes (historic record boreholes and those performed by Listers Geotechnical Consultants Ltd) suggest that the general sequence of strata can be characterised by Made Ground overlying Kempton Park Gravels overlying London Clay at a depth of about 9.5m below ground level.

Although ground water was not encountered during the field work down to 3.0m depth, long term monitoring revealed a standing ground water level at 7.3m below the existing ground level.

Conventional hydraulic plant should be adequate for excavating for foundations within the Kempton Park Gravels, however it should be noted that the gravels are very dense. Excavations within the Kempton Park Gravels are likely to remain stable in the short term only and should be sufficiently supported to avoid the risk of collapse if personnel access is required. Groundwater is likely to be encountered at 7m below existing ground level. Dewatering by the installation of a well point may be required should significant inflows be encountered. The effect of dewatering on the surrounding existing structures should be taken into account as dewatering could result in settlement and induce local instability.

At the anticipated basement depth of 6m below ground level, Listers Geotechnical Consultants Ltd advise that a could bearing pressure of 200kPa could be achieved for conventional strip foundations no more that 1m wide, with light reinforcement in the base of foundations.
5.0 Construction Method

The construction of a new basement beneath the existing walled garden and extension and lowering of the existing utilities and boiler room will require a well-planned, coordinated and sequenced operation. A significant factor affecting the choice of solution includes preventing movement, settlement and the risk of collapse when the current permanent horizontal support provided by the ground is removed. The permanent works will need to be constructed in a manner that ensures that the existing masonry structures are continuously supported both vertically and horizontally without undue movement both during the construction works and in the final state.

The immediately adjoining properties will be monitored for movement and damage during the initial installation of the underpinning, excavation, construction and initial transfer of loads to the permanent floors and walls. All measures will be subject to agreement with the owners and occupiers of these premises under the Party Wall Act.

To maintain structural integrity to the building and allow works to be carried out, a tried and tested method of underpinning is proposed. This involves the ground being excavated in alternate sections underneath the existing walls and reinforced concrete shuttered and poured under the exposed and existing foundations. Once this is set the same process is then applied to the adjacent sections ensuring uniform structural support at all times, when this is completed the floor level can be lowered to the base of the basement slab and the basement formed from reinforced waterproof concrete.

This document provides a proposed outline method statement for the works to be completed for the new basement under the rear garden and for the works to the existing basement at the front of the property. The detailed design of the temporary works will be carried out by the Contractor, to our approval, at a later stage.

5.1 Proposed Method of Construction for Basement Under Rear Garden

1. Perform a detailed survey of the existing and adjacent properties to confirm the assumed structure and to determine the level of the existing foundations.

2. Demolish the existing masonry walls and glazed roof to the rear of the property as shown on drawings 36467/01 and 36467/02 in Appendix A.

3. Due to the depth of underpinning required, it is likely to necessitate a three phase underpinning arrangement. Excavate the existing garden and perform the underpinning to the existing garden walls and back of property walls as described on drawings 36467/03 and 36467/05 in Appendix A, installing temporary props at centres to suit design. Underpins will be reinforced and of the same width at the base as the existing foundations.
5.0 Construction Method

4. Excavate the remaining area to the required level for slab formation.

5. Cast the basement reinforced raft slab, including drainage and sump/pump point for the waterproofing.

6. Cast the perimeter reinforced concrete retaining walls up to the level of the second stage underpin, just below the lower line of temporary props.

7. Install temporary props to the top of the newly cast wall. Props to be supported on top of the basement slab.

8. Remove the previously installed temporary props to stage two underpin and cast the concrete retaining wall to the top of the wall.

9. Install temporary props to the top of the newly cast wall. Props to be supported on top of the basement slab.

10. Remove the previously installed temporary props to stage one underpin.

11. Install temporary shuttering and cast new concrete basement ceiling slab and beams as required.

12. Remove all temporary supports and shuttering.

13. Waterproof basement using the Delta Membrane System or similar approved. See typical waterproofing details drawing in Appendix A.


5.2 Underpinning Method Overview

To ensure temporary stability of the structure underpinning will progress in bays of no greater than 1.2m in width. Non adjacent bays will be excavated and cast in a typical underpinning sequence – NOTE A sequence for the order in which the bays will be underpinned will be produced in conjunction with the Method Statements for construction, propping, etc. No more than 25% of any individual wall or the sum to all walls will be left unsupported at any one time. Temporary props will be introduced to ensure stability of the structure until the works are complete.
1. Excavate beneath the existing foundations in bays as previously noted.
2. Pour concrete into the excavation to a level close to the underside of the existing foundation.
3. Once initial cure and shrinkage has occurred, dry pack the gap with a mixture of sharp sand and cement to transfer the load from the existing level of foundation through the new concrete underpinning to the new formation level.
4. The next bays in the sequence are then excavated and constructed in the same way.
5. Repeat under each bay until the complete length of wall is underpinned forming a new foundation.

Using current good practice in executing the works, it is considered that the proposed development can be realised with maintaining adequate temporary vertical and horizontal support to the ground and to all the surrounding masonry structures. The final form of the basement construction will minimise any potential ground movements which might cause cracking or settlement of the existing structures.

Detailed method statements will be produced prior to commencement on site to ensure that good practice is followed and that adequate supervision and monitoring is provided throughout the works.
Appendix A

Structural Engineers Drawings
Demolition plan prior to underpinning

SCALE 1:50

- Approximate extents of new basement shown dashed
- Thickness of underpinning and new basement wall to be confirmed following establishing width and setting out of existing foundations to be underpinned
- See drawing 36467-03 for underpinning sequence
- See drawing 36467-04 for basement waterproofing details

G.1. This drawing is to be read in conjunction with all relevant architects and engineers drawings and specifications.

G.2. Do not scale this drawing. All details and dimensions are to be checked by the onsite prior to commencement of construction/ fabrication. Any discrepancies are to be reported to the engineer.

G.3. Any ambiguities, omissions and errors on the drawings, shall be brought to the engineers attention immediately.

G.4. All dimensions are in millimeters unless noted otherwise.
STAGE 1

A. Excavate the minimum amount necessary below the existing wall footing to install 1 No. sacrificial prop, installing temporary support and propping to existing wall as required.

B. Install sacrificial prop and bearing plate and pack tightly.

C. Once packing and grout has set, repeat Items A and B in sequence until all sacrificial props have been installed.

Denotes approximate location of temporary propping to be designed by Contractor

STAGE 2

A. Excavate behind sacrificial props to enable casting of concrete underpinning.

B. Cast concrete underpinning.

C. Allow minimum 48 hours for initial cure and shrinkage, dry pack the gap with a mixture of sharp sand and cement to transfer the load from the existing level of foundation through the new concrete underpinning.

Denotes approximate location of temporary propping to be designed by Contractor

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G.4. All dimensions are in millimeters unless noted otherwise.
**STAGE 3**

A. Excavate the minimum amount necessary below the existing underpinning to install 1No. sacrificial prop.

B. Install sacrificial prop and bearing plate and pack tightly.

C. Once packing and grout has set repeat items A and B in sequence until all sacrificial props have been installed.

- Denotes approximate location of temporary propping to be designed by Contractor

**STAGE 4**

A. Excavate behind sacrificial props to enable casting of concrete underpinning.

B. Cast concrete underpinning.

C. Allow minimum 48 hours for initial cure and shrinkage, dry pack the gap with a mixture of sharp sand and cement to transfer the load from the existing level of foundation through the new concrete underpinning.

- Denotes approximate location of temporary propping to be designed by Contractor

G.1. This drawing is to be read in conjunction with all relevant architects and engineers drawings and specifications.

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G.4. All dimensions are in millimeters unless noted otherwise.
STAGE 5
A. Excavate between props to formation of new RC raft slab.
B. Install waterproof membrane
C. Fix reinforcement and cast new concrete raft slab.

STAGE 6
A. Fix reinforcement for new RC basement walls whilst maintaining horizontal temporary props.
B. Cast new RC walls
C. Install diagonal vertical props to RC basement walls and remove horizontal props making good pockets in RC walls

Denotes approximate location of temporary propping to be designed by Contractor.

G.1. This drawing is to be read in conjunction with all relevant architects and engineers drawings and specifications.
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G.4. All dimensions are in millimeters unless noted otherwise.
Project: 8 WALTON PLACE, KNIGHTSBRIDGE, LONDON
Drg Title: TYPICAL WATERPROOFING DETAIL
Drawn: LB
Checked: LA
Scale: 1:20

Indicative waterproof details
SCALE 1:20

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Section A

Basement to be designed for minimum imposed load of 10.00kN/m² (SLS)

Minimum 1m fill above basement slab structure

New RC waterlight basement structure

New Basement FFL Floor 3.76m

RC Retaining wall

Section B

Basement to be designed for minimum imposed load of 10.00kN/m² (SLS)

Minimum 1m fill above basement slab structure

New RC waterlight basement structure

New Basement FFL Floor 3.76m

RC Retaining wall

New piled wall designed by specialist for load imposed by footing to rear wall to be installed prior to any excavation taking place.