Engineering construction method statement
For
50B Cornwall Gardens | London | SW7 4BG
Job number: 10-6184

Revision Date Comment
A 10 June 2015 First issue
Table of Contents

1. Introduction .................................................................................................................. 3
2. Project .......................................................................................................................... 4
   2.1. Existing building ..................................................................................................... 4
   2.2. Overview of proposals ........................................................................................... 4
   2.3. Basement construction ......................................................................................... 4
   2.4. Stability ................................................................................................................ 5
   2.5. Robustness ........................................................................................................... 5
3. Site and ground conditions ............................................................................................. 6
   3.1. Ground conditions ................................................................................................ 6
   3.2. Hydrological assessment ....................................................................................... 6
4. Construction phase ........................................................................................................ 7
   4.1. Boundaries and adjoining structures .................................................................... 7
       4.1.1. Stability of adjoining structures ........................................................................ 7
   4.2. Monitoring ............................................................................................................ 7
   4.3. Structural proposals .............................................................................................. 8
       4.3.1. Underpinning .................................................................................................. 8
       4.3.2. Temporary works .......................................................................................... 8
       4.3.3. Ground movement ......................................................................................... 9
       4.3.4. Proposed construction design sequence ......................................................... 9
   4.4. Conclusion ............................................................................................................ 9
5. Certification .................................................................................................................... 11
Appendix A .........................................................................................................................
   A1. Construction sequence ...........................................................................................  
Appendix B .........................................................................................................................
   B1. Structural scheme ................................................................................................... 

\NAS-LONDON\CompanyDocsLondon\10\6\1\8\4\10-6184 - 50B Cornwall Gardens, London - Refurbishment\10. Reports\2015-06-10 - 10-6184-Engineering construction method statement.docx
1. Introduction

The structural solution adopted is based on Peter Dann Limited experience gained on many similar projects which have been constructed without detrimental effects to the superstructure or to adjoining buildings and structures.

The construction process has been developed to follow familiar tried and tested techniques used on many projects. The method of construction is within the scope and capability of a competent contractor with previous basement construction experience.

This engineering construction method statement is supplementary to, and as such is to be read in conjunction with, the Price & Myers (P&M) document titled ‘Structural Engineer’s Basement Impact Assessment Report Including Construction Method Statement’.

This engineering construction method statement will aim to define the method of construction of the proposed substructure works and the temporary works to be carried out by the appointed contractor.

The works will fall within The Party Wall Act 1996 which will require condition surveys to be carried out to the adjoining properties. The proposed structural drawings and calculations will be issued to the adjoining owner’s engineers to ensure that the stability of the adjoining properties is maintained. This document is based on an understanding of the structure and a visual inspection. As such, this document does not constitute a structural survey.
2. Project

2.1. Existing building
50B Cornwall Gardens is a three storey plus mansard end of terrace dwelling with ground, first, second and third mansard floors.

The existing structure is formed in load bearing masonry with timber joisted floors. There are internal load bearing walls which are likely to be masonry or load bearing timber stud with what can be assumed to be the original openings. The existing roof is a traditional mansard roof.

2.2. Overview of proposals
The proposed works is the construction of a single level basement beneath. The basement extension will cover the existing footprint of the building plus half of the front terrace. The purpose of the works is to extend the existing single occupancy dwelling.

It is understood that similar extensions have been granted permission and subsequently built on other houses on the same street recently.

2.3. Basement construction
The proposed basement will be formed using reinforced concrete underpinning to the existing walls around the perimeter of the building. The new ground floor level will consist of a profiled metal deck spanning between steel beams on the load bearing wall lines which will support the load from the walls.

A drained cavity waterproofing system will be installed to provide a type C form of construction thus providing habitable grade 3 basement. The construction will include the following flood proofing measures: installation of a Delta membrane system (or equivalent waterproof membrane system) to the internal face of the basement walls and floors of the basement; installation of a sump and pump system to expel any water ingress; all joints between walls and frames of windows and doors to basement rooms must be sealed; all pipes must be sealed; and there are no air bricks proposed at basement floor level.

A system of regular monitoring will be adopted during the construction of the substructure to assess any possible structural movement in the existing adjacent buildings. Refer to section 4.2 for more information.

The basement level is to be designed to take account of potential uplift due to an increase in existing water levels and heave of any underlying clay strata. This will be achieved by having the basement slab spanning between the underpinned load bearing walls.
2.4. Stability
The inherent stability of the load bearing masonry building above will be capable of transferring the existing lateral loads to the substructure walls and foundations. The substructure will then dissipate this load to the substrata.

2.5. Robustness
The existing building is currently three storeys plus mansard roof. The building is to have an additional single storey basement. In accordance with the Building Regulation Approved Document A 2004 Edition, the building falls with the class 2B. However, if the basement is designed as a class 2B structure the superstructure can be designed to the less onerous class 2A level.

The new reinforced concrete basement can easily be designed to fulfil the robustness requirements of the Approved Document.
3. Site and ground conditions

3.1. Ground conditions
The site investigations were undertaken by Soil Consultants (SC). Please refer to the site investigation report produced by SC.

Please refer to section 4.0 in the P&M report.

3.2. Hydrological assessment
Please refer to section 5.0 in the P&M report.
4. Construction phase

4.1. Boundaries and adjoining structures
The Party Wall Act (1996) calls for a survey of the boundary walls and the condition of the gardens and any other structures that are close to the works. The survey would be conducted by both the Party Wall Surveyors together and would result in a detailed description of the state of repair and highlight obvious flaws or disrepair to the buildings.

The property is end of terrace and therefore the only adjoining property is 50C Cornwall Gardens to the south. The property is bordered by Cornwall Gardens to the north, east and west. The entrance to the cul-de-sac of Cornwall Gardens to the north has a masonry arch over. The arch is supported on masonry piers that are joined into the external masonry walls of this property and 50A Cornwall Gardens. It is our understanding that the masonry arch is jointly owned by both properties.

The existing ground levels in the front terrace of the property and other surround properties are unknown. Basement extensions are in the process of being undertaken by the surrounding properties. Further investigation will determine the ground levels and the depths of any surrounding basements and also the location of load bearing cross walls and depths of all existing footings will be established prior to construction.

4.1.1. Stability of adjoining structures
The new concrete basement structure will be designed to withstand any loads from the adjoining property and the masonry arch. The retaining walls, or underpinning, will be propped at ground floor by the profiled metal deck and steel beams in the permanent situation and propped at all times during construction with temporary works, where necessary. This will be designed to minimise any movements in the adjoining property and the masonry arch.

4.2. Monitoring
The party walls and masonry arch are to be monitored during the works for movement. Specialist surveying companies, if deemed necessary, would set up a regime of monitoring using targets and, if necessary, tilt sensors on the neighbouring properties and garden walls.

Precise levelling would be conducted on a regular basis but data will be automatically collected at pre agreed intervals and will be made available to the interested parties.

Trigger levels and subsequent actions will be agreed and the following actions will be taken should the agreed levels be exceeded.
<table>
<thead>
<tr>
<th>Trigger Level</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Notify all Party Wall Surveyors and Engineers. Review works with contractor and revise sequence (methodology if necessary). Closer monitoring of walls required.</td>
</tr>
<tr>
<td>Red</td>
<td>Contractor to stop work. Notify all parties. Review methodology and ensure further movement is limited. Monitoring to be carried out on a more regular basis.</td>
</tr>
</tbody>
</table>

4.3. Structural proposals

4.3.1. Underpinning
The perimeter walls to the new basement will be formed by constructing reinforced concrete underpins around the perimeter of the property.

The pins are to be formed in a single stage and are to be constructed in a hit and miss sequence to be agreed with the contractor. The pins are to be founded at a depth approximately 3.5m below the depth of the existing ground floor level. Excavation for the pins is to be by hand unless an alternative approach is agreed between the contractor and engineer.

The pins will be individually reinforced and have a maximum width of 1.2m. They will be dowelled together to assist with load spread. The liner wall will be a reinforced concrete retaining wall.

Following the construction of each pin the excavation is to be backfilled until all of the pins are complete. The steel beams underneath load bearing wall lines can then be installed spanning between the pins, temporary steel columns will be installed depending on the sequence chosen. The mass excavation can then be undertaken to enable the new basement floor slab to be cast. Temporary propping to underpinning will be installed across the site as the excavation progresses. The new ground floor profiled metal deck can then be installed and propping removed.

4.3.2. Temporary works
The extent of temporary works depends on the sequence of construction which will be established and finalised with the contractor. The suggested method is given in Section 4.3.4.

Temporary works will be required to the pins during the mass excavation until all of the steel beams are installed and the profiled metal deck has been constructed. There is also a need to prop at the low level until the basement slab is installed. The level will be established during the detailed design and the temporary works will be designed to minimise the movement to the walls.
4.3.3. Ground movement
The construction of the basement could result in a small amount of movement of the adjacent ground which may cause some limited damage to adjacent buildings. This will only happen if the suggested sequencing and temporary propping proposals are not carefully adhered to by the contractor. Every effort will be made to minimise this movement by designing and installing adequate temporary propping. Detailed analysis of the pins will enable the likely movement to be predicted and thus establish the optimum time and level for temporary propping.

Temporary works will be designed to ensure that any damage to adjacent buildings is limited to category O (negligible) or I (very slight) as stated in BRE Digest 251.

4.3.4. Proposed construction design sequence
The following is the suggested sequence of construction which will be reviewed and finalised with the contractor. Refer to sketch drawings in Appendix A.

1. Carry out the underpinning to the perimeter of the basement in an agreed hit and miss sequence. Dry pack to the underside of existing structure and back fill each pin as it is completed. Refer to notes on our structural drawings for details on construction of each pin;
2. Once all of the underpinning is complete install steel beams spanning between the pins on each side, with columns and pads as necessary, in an agreed sequence. Temporary works in the form of needling, propping and temporary pads will be installed in order to enable the steel beams to be installed;
3. Remove remainder of the existing ground floor construction and excavate to new basement floor level to level requiring lateral propping. Exact depth to be determined with the contractor;
4. Install temporary works propping to the underpinning across the site;
5. Continue excavation to formation level and install below ground drainage;
6. Construct new basement slab dowelling into underpinning, leaving out enough space to enable pump chamber to be constructed. The bottom temporary prop could be removed at this stage;
7. Temporary propping to remain until the new profiled metal deck at ground floor is constructed;
8. Excavate and construct pump chamber. Allow for some dewatering for this process;
9. Construct the new profiled metal deck at ground floor level spanning between the steel beams and the underpinning;
10. Remove temporary propping once the ground floor profiled metal deck has cured;
11. Install drained cavity waterproofing system in line with manufacture details.

4.4. Conclusion
The project involves tried and tested methods of construction that have been adopted on many projects in London and local to Cornwall Gardens. The works can be carried out by a competent contractor experienced in this form of construction. It is considered, therefore, that the project can
be implemented without any detrimental effect on the property above or the adjoining properties and structures.

One of the site requirements will be to make sure that the vibration and noise levels will be kept to a minimum. All plant and machinery will be selected based on low vibration and minimal noise.
5. Certification
This report has been produced by:

Richard Broadley BEng MSc
Project Engineer
For Peter Dann Limited

Kevin Short MEng CEng MICE
Technical Director
For Peter Dann Limited
Appendix A

A1. Construction sequence
<table>
<thead>
<tr>
<th>Calculations</th>
<th>Output</th>
</tr>
</thead>
</table>

**EXISTING STRUCTURE**

![Diagram of existing structure with annotations]

- Assume all existing floors are timber
- Assume all existing roofs are timber
- Assume all external walls are masonry
- Assume spine wall is masonry
STAGE 1: INSTALL UNDERPINS AROUND PERIMETER AND THEN BACKFILL

EXCAVATE AND FORM 1.2m UNDERPINS TO PERIMETER IN SEQUENCE, WIDTH TO MATCH WALL AND EXISTING POLDINGS.
**STAGE 2**  
INSTALL STEEL BEAMS UNDER LOAD BEARING WALL LINES AND COLUMNS AND PADS

<table>
<thead>
<tr>
<th>Calculations</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSTALL BEAMS UNDER LOAD BEARING WALL LINES REMOVE EXISTING CORBEL WITH TEMPORARY WORKS</td>
<td></td>
</tr>
</tbody>
</table>

**Job** 508 CORNWALL GARDENS  
**Job no.** 10-6184  
**Revision A**  
**Designed** RJBB  
**Checked**  
**Date** 10/06/15
STAGES 3, 4, 5, 6: REMOVE EXISTING GROUND FLOOR, EXCAVATE TO BASEMENT LEVEL, INSTALL PROPPING AND INSTALL BASEMENT SLAB.
**STAGES 7, 8, 9, 10:** INSTALL PUMP CHAMBER, INSTALL GROUND FLOOR PROFILED METAL DECK AND REMOVE PROPPING ONCE SLAB HAS CURLED.

<table>
<thead>
<tr>
<th>Calculations</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSTALL PROFILED METAL DECK</td>
<td>REMOVE PROPS WHEN GROUND FLOOR SLAB INSTALLED</td>
</tr>
</tbody>
</table>
Appendix B

B1. Structural scheme
calculation sheet no.

job 50b CORNWALL GARDENS

job no 10-6184 revision A

item PROPOSED SCHEME designed RJB

date 10/06/15 checked

<table>
<thead>
<tr>
<th>calculations</th>
<th>output</th>
</tr>
</thead>
</table>

BASEMENT

REINFORCED CONCRETE SLAB

LOCATION OF SUMP AND PUMP CHAMBER TO BE CONFIRMED

REINFORCED CONCRETE UNDERPINS INSTALLED IN AGREED SEQUENCE
Temporary steel beams spanning across building, one to underpans.

Void

B BoDING. MASONRY ABOVE, NEW UNDERPANS BELOW

Profiled metal deck spanning between steel beams

Location of static void to be confirmed.

Temporary steel beams under load bearing wall lines