8 Elsworthy Road, London, NW3

Basement Impact Assessment
Addendum - Revised Methodology since Commencement

Rev B

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Appendices

Revised Methodology since Commencement

1 Introduction

During the course of construction works at 8 Elsworthy Road, moderate movement to the structure occurred. Price & Myers have been requested to provide an update to the Basement Impact Assessment previously submitted in relation to revised proposals following this movement.

The previously approved application for 8 Elsworthy Road (Ref 2001/3214/P from December 2011) was supported by a Planning Report (dated June 2011) and a full Basement Impact Assessment (dated November 2011), both prepared by Price & Myers. This addendum is made in reference to the previous Basement Impact Assessment.

2 Events since Commencement

The works to refurbish the property and form the proposed basement commenced in April 2012. Works began on the floors above ground whilst preparatory works to access the basement were undertaken. The works included removal of significant parts of the building which were replaced with temporary works which did not offer the same level of stiffness as the original structure. This included removal of the ground floor joists and internal walls below ground floor.

Underpinning within the basement started in early June 2012 and progressed along the flank walls. This was completed in late July 2012, whereafter the basement was excavated to a reduced level around 300mm above the final formation level.

Late on 9th August 2012, Price & Myers were informed that movement had occurred at the property resulting in cracking to the property and to the Party Wall with Number 10 Elsworthy Road. The Contractor subsequently confirmed that the movement had occurred on the evening of 7th August.

This movement appeared to have occurred alongside the flank wall, in the area of a manhole and deep cast iron drain running in the passageway alongside the property.

The ground movements appeared to have caused the 9” brickwork garden wall in the passageway between Numbers 8 and 10 Elsworthy Road, which ran parallel to the external flank wall, to settle adjacent to the manhole and crack. The wall was subsequently removed.

The flank wall to the property was also subject to movement and developed cracking. Cracks in the front elevation developed. The rear elevation, which had large openings at ground floor level, had largely fallen away.

The Party Wall with Number 10 Elsworthy Road, an extension of the garden wall extended vertically to form a side extension to both properties, also cracked.

The Party Wall to Number 6 Elsworthy Road had also previously developed cracks, smaller in size than those to Number 10, that have damaged some internal finishes. This cracking was 'slight' in accordance with BRE Digest 251 and of an order that might be anticipated with normal underpinning works.

3 Emergency and Temporary Measures

Immediately after the movement occurred, the Contractor erected temporary scaffolding to prop horizontally across the basement between the underpin bases. Further scaffolding was added over the following weeks to secure the upper levels of the property and the neighbouring properties.

The Contractor then engaged a Temporary Works Engineer (Davies Burton Sweetlove Ltd) to check the temporary works they had installed. The scaffolding was inspected by Mr Naran Pindoria from LB Camden Building Control on 30th August 2012, who was satisfied the building had been safeguarded and posed no danger to the public.

Currently the upper floors of the property, including the Party and flank walls, are still supported and restrained with scaffolding. The horizontal scaffolding installed by the Contractor in the basement has been replaced by a more robust temporary works arrangement, designed by the Temporary Works Engineer and Mabey System waler beams and props have now been installed and give better access to complete the basement construction.

The Temporary Works Engineer is now assisting the Contractor with temporary works and sequencing to complete the refurbishment of the property.

3D Target monitoring has been set up on the front, rear and flank elevations and at the top of underpins within the basement of the property, as well as the flank wall of Number 10. Tell-tale marks have been fixed within Number 6 Elsworthy Road and are recorded monthly. The monitoring in place offers measurement of any continued movement in the walls and basement.

The monitoring to date indicates some movement has occurred to the flank and rear walls of the property. No significant movement has been noted in the underpins.

4 Design changes since original BIA

The original BIA contained two possible underpinning alternatives; reinforced underpinning or mass concrete underpinning with a reinforced lining wall. The final detailed design proved that mass concrete underpinning alone was sufficient, given the relatively small depth of excavation below the existing foundations and the weight of walls above.

5 Investigations

Price & Myers have arranged specialist investigations to help determine the causes of the movements.

A further site investigation was carried out with trial pits dug externally and internally to determine the depths of underpins and inspect the ground conditions within the passageway and at the basement formation level.

The site investigation has resulted in a reduced recommended safe bearing pressure. This is due to either a discrepancy in the first investigation or to the extent of water present. The water is believed to be primarily due to the basement excavation creating a large hole which is collecting storm water running off the surrounding areas and into the excavation whilst the basement structure remains incomplete, although the contractor suggests that some of it may be coming from damaged drainage to Number 10 Elsworthy Road.

The trial pit within the passageway showed that there was a clay gravel backfill down to the level of the old drain and that the garden wall and the manhole were founded on this material. The degree of movement in the garden wall suggests that the brickwork may well have been bridging over the manhole already and the ground movements caused by the defective drain may have led to the wall settling within the backfill material.

The backfill material extends to a depth of around 2m, below which the Clay is present. The underpins appear to have been excavated and founded within the Clay strata.

Before works commenced, a survey of the drain suggested it was corroded and works to reline the drain were on going. After the ground movement, the Contractor engaged a drainage company who completed another survey and reported that a section of the drain had now dropped and opened up at a joint.

Core hole samples for testing were taken through the concrete underpins and through the dry pack between the top of the pins and the original footings. These tests determined that the concrete underpins were generally at or just above the specified 28 day concrete strength and that the quality of the concrete was good. The dry pack was generally found to be of fair strength and quality but with mediocre compaction.

6 Conclusions

Based on the above, the following probable causes are suggested:-

a. The underpins are founded in the apparently competent London Clay. Recent site investigations have suggested a lower safe bearing capacity, either due to storm water from the surrounding area entering the incomplete basement excavation or due to discrepancy in the first investigation.

b. The existing cast iron drain appears to have fractured and leaked into the backfill in the passageway. In turn, the garden wall founded within the made ground has settled.

c. The flank wall to the property appears to have dropped. The nature of the movements are so complex that it is difficult to pinpoint any single cause however this movement does seem to be related to the issue noted in b., above.

d. The structure of the property when excavation commenced was less stiff than the building in its original condition since parts of the structure had been removed and replaced with temporary works that did not have the same degree of stiffness and restraint as the original structure. This may have served in this case to exaggerate the effects of other factors.

7 Amended Proposals

The current engineering solution is no longer appropriate to the changed site conditions and amended proposals have been prepared accordingly.

The amended submission involves taking down and rebuilding the existing front and side elevations to return them to their original state. However, as noted above, the underpinning as currently designed relies on the weight of the walls above to remain stable, once they are removed they would need to be kept propped until the walls were rebuilt. Thus, to enable the substantially excavated basement to be completed as soon as possible, and allowing for the current condition of the building and future rebuilding of the walls, reinforced concrete lining walls are proposed to the inside face of the walls below ground floor. The anticipated sequence of construction is as the attached sketches.