SPECIFIC DEFECT INSPECTION REPORT

for

10 THOMPSON COURT
HIGHSIDE VILLAGE
DH1 6SR

on behalf of

MR P SMITH

CONTENTS

1.0 INTRODUCTION

1.1 Client

Mr P Smith.

1.2 Subject Property

10 Thompson Court, Highside Village, DH1 6SR.

1.3 Property Surveyed by

Mr A Potter MRICS.

1.4 Date of Survey

05th April 2013.

1.5 Weather Conditions

Dry, overcast and cold, with an ambient air temperature of around 3ºC.

1.6 Instructions

In accordance with the instruction received from Mr Smith, I have carried out an inspection of the subject property, in order to advise upon the likely cause and nature of cracking, including recommended remedial measures.

1.7 Location

The property is located within an established residential area comprising similar property types.

Where referred to the terms “left” and “right” are taken from a point externally when facing the rear elevation of the property from outside. The property is located on a relatively level site.

1.8 Brief Description of the Property

The property comprises a four bedroom detached house with traditional cavity constructed brickwork external walls and solid concrete floors. Internal partitions are a combination of plastered masonry and plasterboard and studwork construction, under a pitched concrete tile covered main roof; and which is believed to have been built circa 2000.

A single storey sun room was added to the rear of the property in 2007, of cavity brickwork construction, incorporating a solid floor, dual pitched concrete tile covered roof and a structural steel frame. Stepped lead flashings are provided at the abutment of the pitched roof with the facing brickwork.

1.9 Limitations

This report is for the use of the party to whom it is addressed and should be used within the context of the instruction under which it is prepared and which is set out in item 1.6.

It may be disclosed to other professional advisors in respect of this purpose. No responsibility is accepted to any third party for the whole or part of its contents.

No opening up works have been carried out to expose foundations and it is, therefore, not possible to comment on their form of construction or condition

I have not inspected any part of the structure which is covered, unexposed or inaccessible and I am therefore unable to report that any such part of the property is free from defect.

2.0 INSPECTION REPORT

2.1 EXTERNAL

A visual inspection was undertaken externally, with comments as follows:

Diagonal stepped cracking was noted as affecting the facing brickwork to the left side of the rear sun room; and which is the particular subject of this instruction.

Cracking extends through 20 no. vertical brickwork courses, affecting both mortar joints bricks, and is of varying width along its length; being around ½mm wide at the upper level and increasing to around 6mm wide at low level.

Cracking originates around the junction between the original brickwork main gable wall and the later addition single storey wall.

Affected brickwork was noted as having slipped on the damp proof course, with brickwork to the rear left side corner projecting/oversailing the DPC by around 7mm. Whilst low level brickwork is similarly affected along the overall width of the sun room, oversailing has reduced to around 3mm adjacent to the left hand door jamb and was noted as being 1mm to the front right corner.

Further diagonal stepped cracking was noted to the left side wall of the sun room, albeit to a lesser degree and which extends through 15 no. vertical brickwork courses, originating at a point 500mm to the right of the abutment of the “new” brickwork with the original construction, and around 1½mm in width. This cracking is of relatively consistent width along its length and has affected mortar joints only.

Site inspection along with the architect’s drawing and photographs taken during the sun room construction indicated the cavity wall as being of typical 290mm thick brick/block construction; with the inner leaf bonded to the existing facing brickwork using modern stainless steel wall starters, whilst the outer leaf brickwork has been keyed into the existing construction.

It is assumed that both leaves of the new cavity construction to the right side of the sun room are tied to the original brickwork using wall starters; with the external vertical joint mortar pointed and with vertical hairline cracking noted to this element.

The architect’s drawing indicated the extension as incorporating a reinforced concrete raft slab foundation.

The extension incorporates a steel frame, generally formed in square hollow sections and which comprises vertical stanchions to both front facing corners, to the rear right corner and to the left window jamb to the left side of the sun room; all supporting horizontal steel eaves beams and ridge member. Inspection of the drawings did not indicate the cavity construction as being bonded/tied to the steel work, with stanchions appearing to be positioned within the cavity zone of the wall.

No further cracking or associated defects were noted externally, affecting either the sun room or main building.

2.2 INTERNAL

A visual inspection was undertaken internally, with comments as follows:

Cracking was noted at the junction of the sun room ceramic floor tiling and timber skirting, around 1mm wide.

Cracking was also noted as affecting the silicon sealant applied internally to the cills and vertical jambs of the PVCu windows.

A gap was also noted at the junction between the PVCu door thresh and the adjacent ceramic floor tiling.

3.0 CONCLUSIONS

Generally clay brickwork will tend to expand during the life of a building due to thermal and moisture movement changes.

Whilst a masonry wall can absorb a limited amount of expansion or contraction without defects occurring, if a length of wall is subject to more expansion than it can absorb, then displacement and cracking can occur.

Such movement and cracking can be exacerbated by the characteristics of the building; with increased stresses to be anticipated at abrupt changes in level along the length of a wall. In addition, the amount of restraint that a wall is subjected to will have a bearing upon horizontal movement; with lower walls with less inherent dead weight prone to a greater degree of movement.

In order to accommodate such movement and avoid cracks occurring, industry guidelines recommend that appropriately sized movement joints be provided at a maximum spacing of 12.000m for a half-brick skin to a cavity wall. However, current best practice in modern forms of insulated construction recommends joints at 10.000m maximum centres.

Movement joints are also recommended at points considered to be “planes of weakness”, such as for example, the aforementioned changes in level or large openings thorough a wall.

The overall length of the subject wall, in total, is around 13.000m. In this regard, whilst the original 2 storey brickwork to the gable wall was able to accommodate expansion over its length, being around 9.000m, the addition of the single storey sun room has increased the overall length above the recommended guidelines whereby a movement joint is required. In addition, a plane of weakness occurs at the change in level between the original 2 storey brickwork and the single storey element.

In addition, as the sun room roof structure would appear to be generally supported upon the steel frame, the brickwork wall of around 2.300m in height is considered to be relatively poorly restrained given the reduced level of dead weight applied; and which is considered likely to be exacerbating movement occurring within the external leaf.

The cracking noted to the outer leaf brickwork is therefore concluded as having arisen due to the absence of an appropriate movement joint; failing to allow for thermal and

moisture related clay brick expansion; prone to occur at a change in level, being in this instance, the joint between the single and 2 storey walling.

Movement of brickwork is considered to have been further exacerbated by the slip-plane provided by the modern polythene based damp proof course material; with such an occurrence typical to brickwork movement of this nature.

In addition, junctions formed between original construction and later extensions are inherently prone to differential movement, including a degree of minor settlement of the new construction. In this regard, such movement is considered to be the source of vertical cracking noted to the mortar pointed right side junction.

It is therefore recommended that a remedial movement joint be formed, at the abutment between the original and sun room brickwork, being the apparent natural point where movement stresses have exceeded what the wall can accommodate without failure.

As a general rule of thumb, the width of the joint in millimeters should be about 30% more than the distance between the joints in meters. Consequently, I would recommend that the joint in this instance be around 12mm wide (9 + 30%).

The joint may be formed by the careful “Stihl Saw” vertical cutting of the outer leaf brickwork, and the application of an appropriate compressible material, with those of flexible cellular polyethylene, cellular polyurethane or foam rubber preferable. The joint should be suitably sealed externally with a polysulphide material, with the depth of the joint being at least equal to its width.

Current Building Regulations require that wall ties spaced not more than 300mm apart vertically should be provided within 225mm from the sides of un-bonded vertical jambs and it is therefore recommended that bricks be removed from both sides of the proposed joint and appropriate remedial ties, such as screw fixed frame cramps, provided; prior to bricks being reinstated.

Cracked brickwork should then be re-pointed in cement mortar matching the mix, colour and profile of the existing.

Whilst movement around the PVCu door thresh is considered a consequence of the brickwork movement, gaps evident to the edge of the ceramic floor tiling and to silicon sealant around windows internally is considered to have arisen largely as a consequence of the natural thermal/drying out process and which may be suitably made good during the course of periodic maintenance.