

PHILIP GOACHER ASSOCIATES
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

PARK HOUSE 122A NEWLAND ROAD
WORTHING WEST SUSSEX BN11 1LB

A/43/11

Mr & Mrs Ayling
Cobwebs
Billingshurst Road
Coolham
West Sussex RH13 8QN

Our Ref: JAB/CM/07103/001

11th April 2007

Dear Mr and Mrs Ayling

Re: HERONS FARM, DAPPERS LANE, ANGMERING

I confirm visiting the above property on Friday, 30th March 2007 to inspect and report on cracking to the bungalow and garage walls, together with movement to the floors within the main building.

The inspection and report have been prepared in accordance with the Consulting Engineer's Conditions of Appointment Agreement No 3, which is attached. I comment as follows:-

1. The main building was a detached bungalow with cavity external walls and painted face brickwork beneath a pitched tiled roof. The property was thought to have been constructed approximately 50 years ago. The property had been altered and extended significantly in the past with walls having been removed and extensions added. For the purposes of this report the front of the property was assumed to face north. An annexe had been introduced to the east side elevation of the main building. A detached garage was situated to the north west corner of the property.
2. An external inspection of the property and adjacent areas was undertaken and the following was noted:
 - 2.1. The annexe projected from the front of the building. An addition was noted to the front west side of the building which in turn appeared to have been extended in the past to the west. A conservatory lean-to was noted to the middle of the west elevation of the building. Large openings were present to the rear elevation with other openings having been infilled in the past.
 - 2.2. Hairline cracking was present at the junction between the addition to the west of the front elevation and its extension to the west. A rainwater downpipe was present at this location.



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Certificate No: A0726

- 2.3. Mature trees up to 20m high were located at less than 15m from the main building and 5m from the annexe. The trees were generally located to the front, east side and south east corner of the building.
- 2.4. ~~Gulleys~~ were present against all elevations with a number of inspection chambers being noted around the property. Some of the rainwater downpipes were also noted to discharge into water butts which were thought to overspill when full.
3. An inspection within the main building was undertaken and the following was noted:
 - 3.1. Ceiling cracks up to 1mm wide were present throughout the property, some of which were thought to have been caused by poorly or inadequately taped joints between the plasterboards.
 - 3.2. Within the front bedroom and entrance hall of the main building diagonal cracks up to 1mm wide were present at high level on the walls which ran front to back. Localised diagonal cracks were also present below both sides of the front bedroom window. A number of the cracks had been made good in the past although no structural repairs appeared to have been carried out and had since re-opened. The type and location of the cracking could indicate that the walls had dropped towards the front of the building.
 - 3.3. Within the bathroom to the rear of the property a hairline crack was present at high level at the location of the wall separating the hall and rear sitting room. This crack was horizontal at the hall door and then went diagonal and vertical up to the ceiling.
 - 3.4. A repair appeared to have been carried out to a crack below the north side of the lounge window on the west elevation. This repair did not appear to have re-opened.
 - 3.5. A repair was present below the south side of the window within the link between the kitchen and bedroom addition. This repair, which was present between the window sill and floor did not appear to have re-opened.
 - 3.6. Within the bedroom addition and extension to the front of the building hairline vertical cracks were present below both sides of the window on the north elevation. These cracks appeared to have been made good in the past. The window sill fell to the east by 10mm in 600mm when checked with a spirit level. A hairline vertical crack was present to near full height on the north elevation at the junction between the addition and extension to the west.
 - ~~3.7. Within the south bedroom of the annexe extension, a diagonal crack up to 1mm wide was present above the north side of the window on the east elevation. Cracking was also present at high level within the adjacent cupboard.~~

- 3.8. Within the front bedroom of the annexe a repaired near vertical crack was present to full height of the west elevation at the location of the front wall to the main building. This repair did not appear to have re-opened.
- 3.9. The floors throughout the property, which appeared to be of ground bearing concrete slab construction, were noted to have undulations when walked upon with falls generally of 10-15mm in 600mm.
- 3.10. Within the front bedroom, lounge and sitting room of the main building, gaps up to 30mm were present between the underside of the skirting boards and the floors below. When checked with a spirit level, falls of up to 15mm in 600mm were noted. It was thought possible that some of the floors may previously have been covered with thick tiles.
- 3.11. Within the entrance hall a ridge was noted to the floor at the location of the central spine wall. The floor at this location had falls of up to 25mm in 600mm when checked with a spirit level.
- 3.12. Some of the repairs which had been carried out to cracks in the past were rather crude.
4. A brief inspection within the roof space over the main building was undertaken and the following was noted:
 - 4.1. The roof structure spanned front to back. Four sets of raking struts were present to support the purlins below the roof slopes onto the central spine wall. The purlins were 50mm wide x 140mm deep with spans of up to 3.1m. Vertical struts appeared to have been added in the past below the purlins towards their mid span onto the binders below.
5. No inspection was made within the roof space over the annexe.
6. An inspection of the detached garage was undertaken and the following was noted:
 - 6.1. The garage, which was located to the north west corner of the property, measured 7m x 7m on plan, was of single skin brick construction with intermediate piers to the external walls within the garage beneath a felt covered roof which fell front to back. No gutter was present to the rear elevation.
 - 6.2. The shallow pitched roof timbers, which spanned side to side, were supported onto a timber central beam which spanned front to back and was in turn supported by two intermediate timber posts within the garage. The timber beam was supported by a further timber beam which spanned over the full length of the opening to the front elevation of the garage.

- 6.3. Vertical cracks were present on the west rear and south side elevations at the south west corner of the garage. These cracks were tapered and up to 5mm wide at the roof and closed towards ground level. The cracks continued through the sides of blocked up window openings. Areas of the cracks appeared to have been made good in the past and had since re-opened.
- 6.4. A tapered, stepped crack was present on the north side wall. This crack, which was up to 3mm wide, commenced at roof level on the rear wall and disappeared at approximately 15 brick courses below.
- 6.5. The rear wall of the garage appeared to be leaning outwards at high level by 5-10mm in 600mm when checked with a spirit level.
- 6.6. The rear wall of the garage was retaining approximately 400mm of soil from the garden.
- 6.7. The intermediate brick pier on the north side wall within the garage had been partially removed at low level.
- 6.8. Mature trees were located at about 2m from the garage.

7. CONCLUSIONS

- 7.1. In my opinion, the cracking within the bungalow may have been caused by one, or a combination of the following:
 - 7.1.1. Possible subsidence due to the effect of the nearby trees on the ground below the foundations, particularly to the front of the property.
 - 7.1.2. Inadequate foundations or a weak bearing stratum below the footings.
 - 7.1.3. Differential settlement between the structures which may be supported onto foundations of varying depths.
 - 7.1.4. Inadequate support to the sloping roofs over the main building, some of which appeared to be supported onto the ceiling structure.
 - 7.1.5. Poorly finished surfaces, inadequately taped joints between plasterboards and poor quality repairs having been carried out to the cracks in the past.
 - 7.1.6. The layout of the drainage and their effect on the property if leaking into the ground, was unknown at the time of the inspection.

- 7.2. In my opinion, the movement to the floors within the main building may have been caused by one, or a combination of the following:

7.2.1. Settlement of fill material below the ground bearing floor slabs. The amount of movement is normally determined by the depth, quality and compaction of the fill material below the floor slab. If voids are present then further movement may occur.

Gaps between the skirting board and the floor slab of up 10mm to 12mm are normally considered acceptable. However, once the movement is in excess of this figure, it is recommended that remedial action is undertaken.

It is likely that the fill is possibly deeper or more poorly compacted in areas of major settlement than in locations where the movement is less obvious.

7.2.2 Possible subsidence due to the effect of the nearby trees on the ground below the floor slabs.

- 7.3 In my opinion, I believe the cracking to the garage may have been caused by one, or a combination of the following:

7.3.1 Possible subsidence of the ground below the foundations due to the effect of the nearby trees.

7.3.2 Inadequate foundations or a weak bearing stratum below the footings.

7.3.3 Inadequate, or defective construction.

8 RECOMMENDATIONS

- 8.1 I recommend a site investigation, which should be overseen by a Chartered Structural Engineer, is undertaken to determine whether foundation movement to the main building and the garage has been caused by the effect of nearby trees, or inadequate foundations or poor ground conditions. Specialist advice from an Arboriculturalist may be required. Monitoring the cracks to determine whether the movement is ongoing will also be necessary.

If, following the investigations noted above, it is concluded that subsidence caused by an insured peril may exist then I suggest the owners of the property submit a claim to the insurers of the property.

It may be possible, if the claim for subsidence is accepted by the insurance company that the owners of the property could arrange for the claim to be transferred into your name to ensure that you have continuing cover in the future.

Philip Goacher Associates has many years experience with domestic subsidence claims monitoring movement to properties, co-ordinating detailed investigations, preparing Schedule of Works and dealing with Contract Administration up to a satisfactory completion of repairs. Currently insurers are often appointing Loss Adjusters who have subsidence claim handling units and are dealing with many hundreds or thousands of claims. The claim may be dealt with a call centre rather than personally. The Loss Adjusters are often not Structural Engineers and a diagnosis and treatment of the problem can be associated with set procedures instigated by insurers who are very cost conscious rather than undertaking repairs appropriate to the property. An independent Structural Engineer will be able to advise you, or the Vendor, on these matters and can be a point of contact for queries.

Please note, although the garage is likely to remain in a usable condition for a number of years, I recommend an allowance is made to demolish and rebuild the structure in the medium to long term. The replacement garage should comply with current Building Regulation requirements.

- 8.2 I recommend the roof structure over the main building should be strengthened, the design and details of which should be prepared by a Chartered Structural Engineer. It is thought likely that the strengthening works will include introducing raking struts, etc., to provide additional support together with collar ties, bolting fixings, etc., to tie the rafters into the building.

Please note that no inspection of the roof structure over the annexe was undertaken.

As a guide figure only, I envisage the builder's costs associated with the roof strengthening works over the main building to be in the region of £3,000 plus VAT. This includes introducing the additional support and restraint as noted above.

- 8.3 It is recommended that the furniture is removed and the carpets lifted throughout the property in order to check the floors in more detail. This will give a better indication of the movement, which has occurred. Trial holes should ~~then~~ be excavated to determine the most likely cause of the movement and the remedial works necessary. I recommend four trial holes, which should be excavated within the front bedroom, lounge, sitting room and entrance hall of the main building.

If fill material below the floor slab is found to be poor, or excessive movement is noted to other floor areas when the floor coverings are lifted, then additional trial holes may be required.

The remedial works may include breaking out the concrete floors and removing poor fill material, providing a new fully compacted sub-base and a new concrete floor slab, damp proof membrane and screed.

Where minor movement has occurred, re-levelling of the floors by latexing or re-screeding for aesthetic purposes could be considered.

The full extent of the works can only be determined on site once trial hole investigations have been carried out.

As a guide figure only, if it is necessary to replace the concrete floors within the front bedroom, lounge, sitting room and entrance hall, then I envisage the builder's costs associated with replacement of the floors will be in the order of £10,000 - £15,000 plus VAT. This includes to fully replace all of the floors within the front bedroom, lounge, sitting room and entrance hall to a depth of 600mm.

If the movement to the floor is found to have been caused by subsidence then it may be possible to refer back to the insurers of the building.

As you can appreciate it is difficult, from a single visual inspection alone, to determine the cause of the cracking and movement at the property and therefore I have recommended further investigations to help determine the cause, together with remedial works to help stabilise the structure.

Please note the guide figures are for budget purposes only and it will be necessary for further investigations to be carried out in order to determine the extent of remedial works in order for you to obtain competitive quotations from contractors.

I take this opportunity of enclosing a receipted invoice for the preliminary structural inspection, which you were kind enough to settle in advance.

I hope this report is satisfactory for your purposes but should you, or the owners of the property require assistance in dealing with the further investigations or detailing of the remedial works then I will be pleased to assist you.

Yours sincerely



J A BURSTOW
B.Eng.(Hons), C.Eng., M.I.Struct.E.
on behalf of PHILIP GOACHER ASSOCIATES

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