

VISUAL STRUCTURAL DEFECT APPRAISAL

Appraisal Address

1 Beach Road
South Shields
NE33 2QA

Appraisal Date:

15 March 2021

Weather Conditions:

Dry with light cloud

Client:

Mandeville Properties Ltd
107 Darlington Lane
Stockton
TS20 1BW

Description of Property:

The property is an end-terraced three storey residence with rooms in the roof and is of traditional solid brickwork construction estimated as built circa early 1800. The property is noted to be built on slightly sloping ground and consists 4 floor levels:

- part buried basement floor
- ground floor above external ground level
- 1st floor
- 2nd floor in roof space.

The property has most recently been in use as commercial office space. Differing brickwork colours and beams supporting removed loadbearing walls are indicative that a later extension has been added between the rear gable and rear staircase.

Instructions:

As per instructions received from the Client, we have undertaken a specific visual structural defect appraisal with the intent to independently advise on cracking to the building.

1.0 Inspection.

1.1 Front elevation and roof.

The front, rear and hip roof slopes appear acceptably plane with level ridge line. The mortar jointing to external masonry walls is in poor condition with extensive areas of failed, loose and open brickwork joints. The ground accessible external walls and corners of brickwork were checked and found to be satisfactorily plumb at ground level.

The masonry to the rear of the gable elevation appears a differing brick colour and the brickwork to the chimney gable elevation also appears a differing colour to the rear section. Previously remediated vertical cracking is noted at the juncture of the brick colours. The vertical cracking is a maximum at high level with the current crack width estimated at 8-10mm and tapering to 1mm near to ground level. The original crack width is difficult to assess due to remediation with excess mortar and an overall maximum crack width of 20-30mm is estimated as indicative of the overall lateral movement. There is a similar vertical brick colour differential and associated cracking and remedial work to the rear elevation and the new crack width is estimated at 5-7mm with overall movement estimated at 30-40mm.

A small height of vertical cracking of maximum width estimated at 3-4mm is noted to the gable elevation under the ground floor level right side window cill.

There is evidence of vertical movement of masonry to the right side of the left ground floor window lintel, allowing the right side of the stone lintel to drop an estimated 15-20mm.





arc ASSOCIATES (NE) Ltd

Director: A. Singh BEng, CEng, MStructE



NE Business and Innovation Centre || Wearfield || Enterprise Park East || Sunderland || SR5 2TA || T: 0191 516 6710 || E: info@arcassociatesne.biz

Consultants: Dr. K.S. Elliott BTech, PhD, CEng, MICE ; Mr. E.B. Bird CEng, MStructE

www.arcassociatesne.biz



arc ASSOCIATES (NE) Ltd

Director: A. Singh BEng, CEng, MStructE



NE Business and Innovation Centre || Wearfield || Enterprise Park East || Sunderland || SR5 2TA || T: 0191 516 6710 || E: info@arcassociatesne.biz

Consultants: Dr. K.S. Elliott BTech, PhD, CEng, MICE ; Mr. E.B. Bird CEng, MStructE

www.arcassociatesne.biz

1.2 Internal finishes and floors

The majority of floors are found to be acceptably level, however, there is significant sloping of floors noted adjacent the gable and rear walls. The slope is estimated at 25-35mm over a 1.8m length at ground floors and 10-15mm at 1st floors. There is minor cracking of plaster finishes throughout the property of maximum width estimated at 2-3mm and the majority of the cracking is noted throughout the rear half of the property and most frequent at the rear extension adjacent removed walls. Internal beams are noted to rooms to the rear of the property adjacent the gable wall, which line through with external vertical cracking and brickwork colour differential, and this is indicative of original rear walls being removed to allow a rear extension to the property.





arc ASSOCIATES (NE) Ltd

Director: A. Singh BEng, CEng, MStructE

NE Business and Innovation Centre || Wearfield || Enterprise Park East || Sunderland || SR5 2TA || T: 0191 516 6710 || E: info@arcassociatesne.biz

Consultants: Dr. K.S. Elliott BTech, PhD, CEng, MICE ; Mr. E.B. Bird CEng, MStructE



www.arcassociatesne.biz



arc ASSOCIATES (NE) Ltd

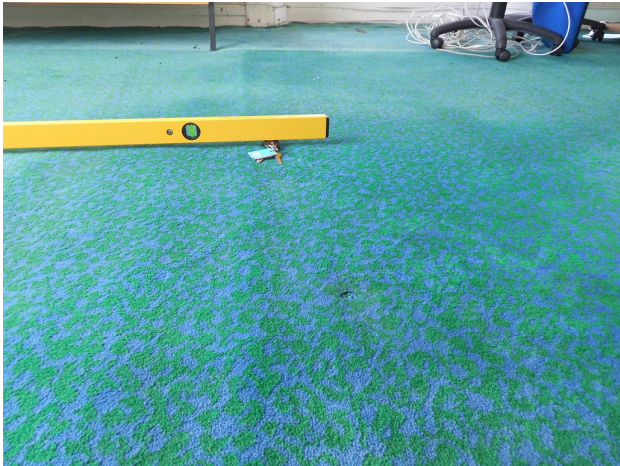
Director: A. Singh BEng, CEng, MStructE

NE Business and Innovation Centre || Wearfield || Enterprise Park East || Sunderland || SR5 2TA || T: 0191 516 6710 || E: info@arcassociatesne.biz

Consultants: Dr. K.S. Elliott BEng, PhD, CEng, MICE ; Mr. E.B. Bird CEng, MStructE



www.arcassociatesne.biz



arc ASSOCIATES (NE) Ltd

Director: A. Singh BEng, CEng, MInstE

NE Business and Innovation Centre || Wearfield || Enterprise Park East || Sunderland || SR5 2TA || T: 0191 516 6710 || E: info@arcassociatesne.biz

Consultants: Dr. K.S. Elliott BTech, PhD, CEng, MICE ; Mr. E.B. Bird CEng, MInstE



www.arcassociatesne.biz

2.0 Conclusions, Recommendations & Remedial Works

2.1 Structural Movement

- The original timber roof structure appears retained and unmodified, no defect of roof structure was apparent.
- The external masonry walls show extensive loss of mortar to brickwork joints. All loose, cracked, failed and open mortar joints should be raked clean and made good with a graded mortar to match original. Due to the age of the building, this is likely to require a specialist lime mortar.
- The property has been subject to significant historic structural movement (BRE 251 Category 4) which is exhibited in settlement of external walls and external cracking as the later rear extension has rotated away from the original building an estimated 35-40mm in each orthogonal direction (ie both sideways and rearwards).
- The movement has not affected the structural integrity of the building.
- New rotational cracking of width estimated upto 10mm as occurred in the interval since the cracking was last remediated. This is estimated as 10-15 years ago.
- The movement appears concentrated to gable and rear offshoot elevation as far as the staircase, this is the region of the later extension.
- The movement above the ground floor gable window appears isolated and has allowed the right side of the stone lintel to drop an estimated 15-20mm.
- Some movement is expected in properties of the period, and the ongoing lateral/rotational movement is likely due to the time differential between the original building and the addition of the rear extension.
- The rear extension has rotated away from the original building, and this movement is typically expected to slow over time as the extension foundations consolidate.
- The risk that the movement is subsidence rather than foundation consolidation is deemed low, and subsidence can only be confirmed by intrusive soil investigation techniques (cost estimate circa £4k - £6k).
- The internal ground floors adjacent the movement show significant slope, and flooring should be removed to check joist bearings remain adequately seated, and the floors relevelled as far as practicable. The 1st floors adjacent the movement slope less severely and these floors may have been recently relevelled for commercial use.
- Settlement can also occur with cracked drainage, and whilst no trees were noted in the vicinity, we recommend drains be inspected by means of camera survey and all cracked drainage found be repaired and made good.

- There is little evidence of movement has ceased, however, the likelihood of severe ongoing movement is deemed low.
- Further rotational movement of the rear extension away from the original building may be mitigated by structural stitching of affected masonry walls using a proprietary system such as Helifix. Such systems adopt stainless steel ties across cracks and through the masonry to control further movement.
- Structural stitching can also be used to remediate the cracked masonry in the vicinity of the dropped lintel at the ground floor gable window.
- See www.Helifix.com or equivalent www.twistfix.co.uk for further proprietary information. (Helifix BowTie and Helifix Helibar or equivalent).
- Quotations for the stitching repair work should be obtained and are currently expected to be in the range £12k - £18k depending on the remedial system adopted.
- All estimated costs are given as budget guidance only, the actual costs may well be a lesser or greater value.
- All work is to be undertaken by suitably experienced, qualified and reputable Companies.

2.2 CDM 2015

- All work is to be undertaken by suitably experienced, qualified and reputable Contractors with reference to CDM Regulations 2015.
- Appropriate risk assessments and should be undertaken by the employed Contractors prior to the start of all work. Safe systems of working should be adopted with risk addressed on an ERIC basis (Eliminate, Reduce, Isolate and Control).

3.0 Warranty

We have not inspected foundations, rain water goods, gullies, drains, lintels, timber-work unless specified, or any part or parts of the structure which are covered, unexpected or inaccessible and we are therefore unable to report that any such part of the structure is free from distress or defect of any kind what so ever.

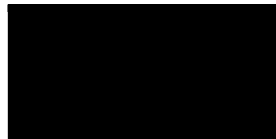
This report does not indemnify against future movement, cracking, subsidence, collapse, settlement, heave, corrosion or latent defect of structure, and is limited to the areas under investigation.

Non-structural items such as weather tightness of roof coverings, areas suspect to rising dampness / timber attack, etc are outside the scope of the works and specialist advice should be sought with regard to these items.

4.0 Limitation Clause

This report in its entirety shall be for private and confidential use of the Client for whom the report is undertaken, and should not be reproduced in whole or any part or relied upon by mortgage lenders or third parties for any use without the express written authority of Arc Associates.

Signed on behalf of Arc Associates,



Raj Singh B.Eng (Hons), C.Eng, M.I.Struct.E.
Chartered Structural Engineer