Project Reference: 202137

Report on the structural integrity of
6 Cross Morlais Street, Merthyr Tydfil, CF48 3AS

Report prepared by **I Lumby**
BSc, CEng (Build), IEng, MCABE, MIMechE, MCMI

Tel: 07795424801
Email: ian@barratt-associates.co.uk

Checked by: **BARRATT ASSOCIATES LTD.**
Studio 1, 27 Rhosybonwen,
Cefneithin,
Llanelli,
SA14 7DJ

Tel: 07946 065051
Web site: www.barratt-associates.co.uk

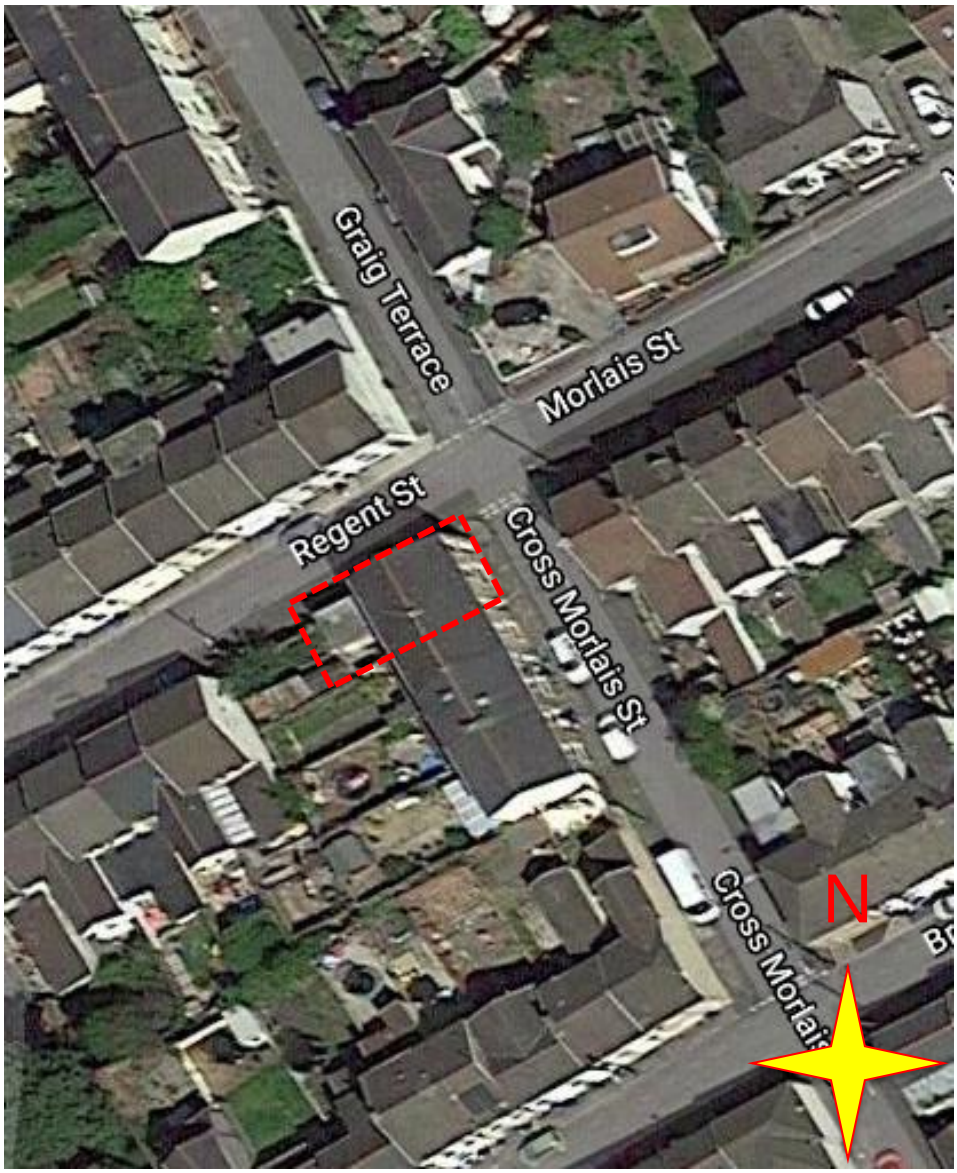
CONTENTS

Introduction

This report has been prepared by Barratt Associates Ltd., Studio 1, 27 Rhosybonwen, Cefneithin, Llanelli, SA14 7DJ, acting on instructions from Ms Evelyn Atat.

The report will seek to determine the structural integrity of 6 Cross Morlais Street, Merthyr Tydfil, CF48 3AS.

In this report these details will be considered, and no other structural area will be assessed. A visual inspection was made on the parts of the building which were safely accessible. Barratt Associates Ltd. has a considerable amount of experience in the forensic examination, structural appraisal and restoration of buildings and is currently involved with similar projects throughout UK. To prepare this report, the property was visited on 16/07/2020. The weather was dry and cloudy.



2.0 Scope of work

This appraisal is based on an inspection of the property and contains the author's considered opinion as to the way the property, or parts of it, have responded to the conditions in which it has been subjected up to the date of inspection.

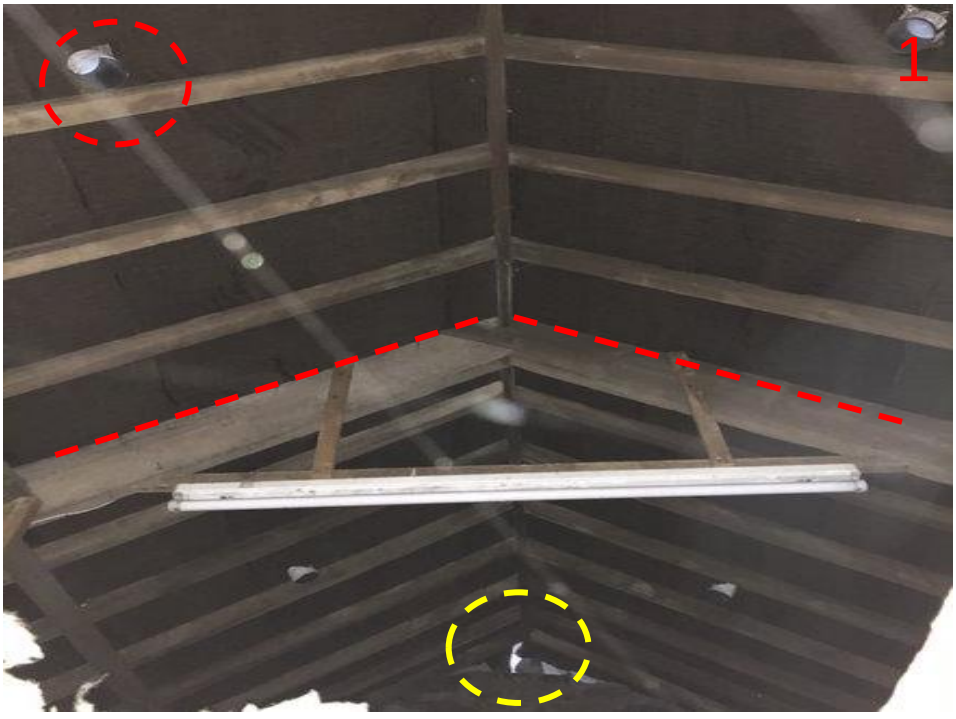
All reference to location is based on left-hand (LH) and right-hand (RH) descriptions as viewed front-to-rear through the building. Ground floor is abbreviated to GF, first floor area is abbreviated to FF.

3.0 Observations and assessments

The building inspected is a 3-storey stone-built semi-detached property with a gable wall to the LH side. From inspecting both the inside and the outside of the property, the building showed no evidence of major structural movement or subsidence in the masonry, however minor bulging and cracking was present throughout the building. The main property has a slate roof cover and the rear flat roof extension was fiberglass. Overall, the property is in a poor state of repair.

<u>Uppermost Structure</u>

- The roof is constructed with 1No primary 'A' frame rafter measuring 215x75 running front-to-back midspan the building, with a lowered collar running at ceiling level. There is 1 set of purlins running left-to-right on both the front and rear roof elevations. These purlins measure 120x75. See picture 1 below.
- There are roof vents on both roof sides circled in picture 1.

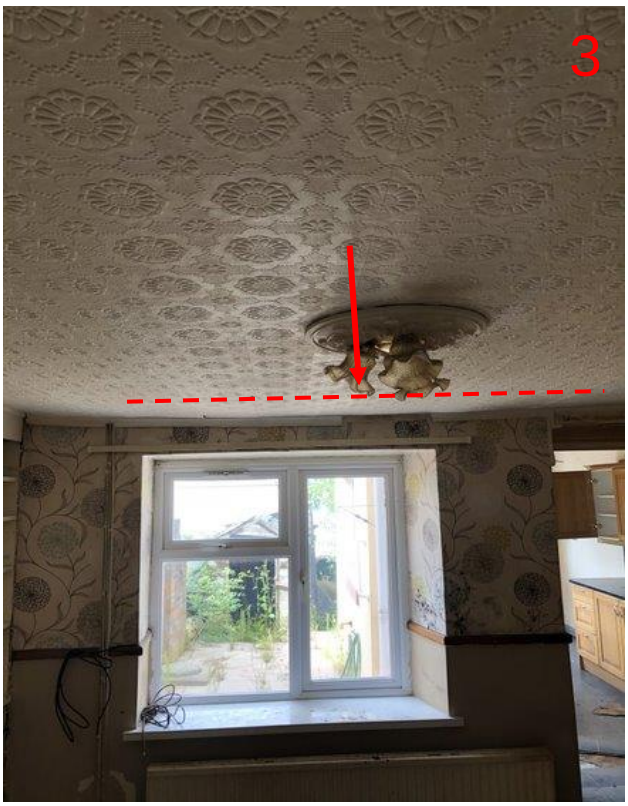


- The ridge board measures 150mm x 18mm.
- Roofing felt is present beneath the timber roof batten, the lining is in good order with no visible rips or tares, however daylight can be seen at the join with the neighbouring property as indicated by the yellow circle in picture 1. In this area the chimney stack has been removed and the roof lining replaced with similar tiles and 2No chimney flues.
- There is a minimum of 100mm insulation present in the attic.
- Plastic goods i.e. downpipes and guttering are in good condition throughout.
- The roof lining is finished at the gable end with a dry verge with no overhang present and the facia board is flush with the gable wall.
- The rest of the original roof, and the overall roof shape was inspected from the outside and there were no major undulations in the timbers that would normally indicate 'roof spread'.
- The fiberglass flat roof has water pooling on it suggesting an incorrect pitch.

Superstructure

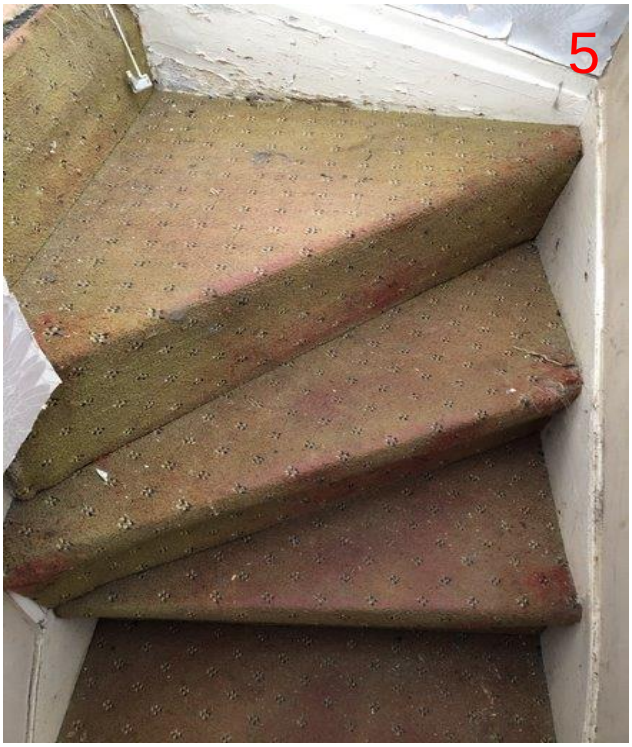
- External walls to the original building are 500mm thick random stone walls with brick inlay on the outer skin around masonry openings. The rear flat roof extension is constructed with a block cavity wall. It is unclear if there is cavity wall insulation.
- The outside and inside have been finished in cement render.
- The internal walls are mostly constructed from modern timber-frame with 12.5mm plasterboard finish which indicates there has been some form of alterations/replacement of the layout of the original internal structure.
- There is a 3-5mm vertical crack at the junction of the original building and the flat roof rear extension, see picture 2 below.

- There are various undulations in the floor throughout the building, including the stairs and landings.
- The floor joist run front-to-back and the ceiling in the rear room of the basement appears to show deflection of the floor joists. However, when the carpet was removed, it was found that the floor joists and floorboards had been replaced in the area over the rear window indicated in picture 3&4.



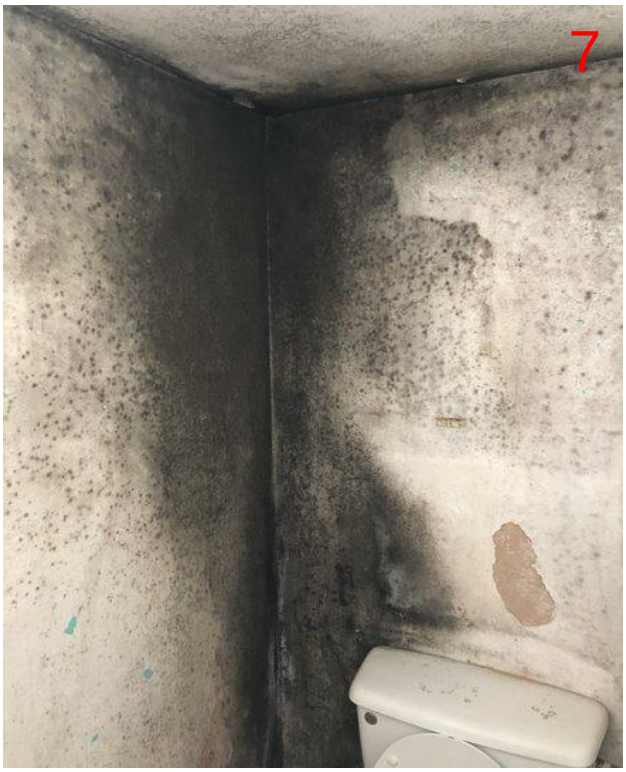
- The window, door and fireplace openings show minor signs of deflection and cracking; however, these are not of any structural concern at this stage.
- There is significant damp on the gable wall and even on a dry day a calibrated moisture detector gave a damp reading of 50-60% in some areas. This is likely due to a combination of little or no overhang of the roof over the gable wall and the rendered stone wall having no cavity and likely filled with rubble causing ‘cold-bridging’ between the outer and inner skin.

- Both sets of stairs do not conform to modern day building regulations (picture 5), however because the stairs are in situ, they therefore do not need to conform to building regulations. Nevertheless, this is detailed as a Health and Safety issue.



- Picture 6 shows the separation between the ceilings and the gable end on the FF. This is and indicator that the gable end wall has suffered from lateral movement or minor bulging in this area.
- The wiring throughout the building is outdated and has been clearly modified by an unqualified electrician. Caution must be used when turning on any electrical loop or circuit.
- Gully pots are partially full of debris. It is recommended to clean out all the drainage areas.

- The basement is suffering from damp issues and there is a pronounced smell of damp throughout the building. Picture 7 below shows the corner of the basement under street level. A moisture detector was used in this area and the readings were over 100% showing significant damp/moisture ingress in this area.



- Picture 8 shows a manhole cover to a drain system and the downpipe that spills onto the street is directly above the damp area in picture 7.

Substructure

- The footings or foundations were not inspected as part of this report therefore the size or type of foundation could not be determined. However, there are no signs of major subsidence in the walls or major structural movement that would indicate failing foundations at this stage.
- A Mackintosh ground probe was not conducted as part of the report.

Unexposed Parts

Internal inspection is made within the limits of ready accessibility, it is not normal practice to lift floor coverings or floorboards, remove panels or plaster, or move heavier items of furniture. Consequently, we have not been able to inspect woodwork or any other parts of the structure which are covered, unexposed or inaccessible.

4.0 Discussion and recommendations

- The uppermost structure on the original building is structurally sound, however it is advisable that an inspection of the roof is undertaken to check the daylight that is noticeable in picture 1.

- The flat roof shows no signs of water ingress although the roof is pooling water, it is advised to increase the pitch of the roof by packing up the wall-plate.

- The damp on the gable wall will be reduced if the roof overhang was increased. During this repair it is advised to inspect and repair the roof lining if found to be failing in anyway.

- The vertical crack in picture 2 is highly likely due to differential settlement. Differential settlement is due to movement of the substructure caused by different foundation depths and loadings. This creates a difference in the rate of structural movement or settlement, producing stresses that lead to cracks. Differential movement is commonly found where new extensions with deeper foundations abut an old house, or when bay windows and porches were built with shallower footings than the main property. It must also be noted that due to the topography of the site, the extension has probably been built on some form of made ground.

  Repair- the crack is to be cleaned out and fill the crack with a non-shrink thixotropic epoxy resin based external filler to stop and further water ingress. Then observe if the crack reappears over time (3 years).

  Cost estimate- the estimated cost for this repair is approximately.

Equipment and materials	£50
Labor	£200

  If it reappears then the crack is progressive and masonry stitching is recommended. A method of stitching would be to use helical stainless-steel reinforcement tie (i.e. Helifix™) resin bonded into the cracks of the inner and outer skin and repointed then the render made good, and/or, a reinforcing mesh system secured to the wall and rendered over to make good. The helical system is inserted horizontally every 400mm due to the nature of the cracking and have 600mm bonded length either side of the crack bending it around any corners where necessary. This is to cease any further movement of the superstructure and stich the masonry.

- The floor joist repair in picture 3&4 appears to have been carried out correctly, however the reason why the ceiling is still bowing is due to either the repair not continuing in the old floor joist pocket, or the ceilings have dropped. It is recommended that the floorboards be removed to fully inspect the repair.

- The damp spores in picture 7 are in the same area as the issues raised in picture 8, therefore it can be assumed that they are linked. A drain inspection is recommended at the LH front corner of the property and the downpipe that is spilling onto the street is probably aspirating the damp issue. The down pipe requires a means of drainage that stops the water possibly entering the property at street level.
- The cracking in picture 6 is common in a property of this type and age and is of no structural concern at this stage.
- The deflection in the FF joists causing the diagonal cracking seen on the internal walls is highly likely to be caused by the masonry wall above on the FF, not being supported correctly. This has been aspirated by the direction of the floor joists running in the same path and the wall(s) showing the cracking, therefore causing the floor joist(s) to bend beyond their limits of deflection.

    Repair method:

    - Option 1 – remove the FF masonry wall and rebuild with a lightweight timber frame wall. The wall(s) are to be constructed using standard CLS studwork and lined with OSB 9mm on one side. The OSB is to prevent and further cracking and brace the wall in situ. The timber frame wall will drastically decrease the excessive loading in this area.
    - Option 2 – support the wall from the underside using a steel beam, or, strengthened with doubled/tripled up floor joists with noggins to adjacent joists. The steel beam must be supported via suitable masonry endbearings, and timber packers used on top of the beam to support any undulations of the floor. These packers will also reduce any excessive floor bounce. In both option 1 and 2 the undulation in the floor is likely to remain however the cracking will reduce.

Observations from the outside of the building were positive, there is evidence of minor structural leaning and movement but no evidence of major bulging or subsidence of any supportive external walls. The outside render, stonework and general appearance of the building is viewed to be in good order.

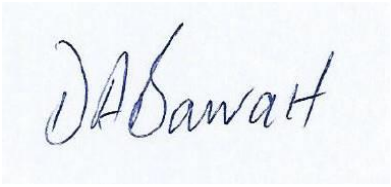
In conclusion the property as it stands is structurally sound although being in a poor state of repair and the issues mentioned are rather minor structural issues or cosmetic rather than major structural issues. Most of the problems are typical of a property of its age and type therefore the property should be considered for mortgage purposes.

5.0 Compliance with Regulations

Throughout any remodelling stages of the proposals it will be necessary to comply with the Planning and Building Regulations.

I Lumby
Chartered Engineering Consultant
BSc, CEng (Build), IEng, MCABE, MIMechE, MCMI

D A Barratt
Chartered Engineer and Checking Engineer
MSc, CEng, FICE, FGS



Checked by Barratt Associates Ltd.
A Chartered Engineering Practice

Barratt Associates Ltd.
Civil, Structural & Geotechnical Engineering Consultants