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Bontnewydd Terrace

Structural Inspection Report

On

Bontnewydd Terrace

For

Merthyr Valley Homes Ltd

Date 5th December 2023

Project no. 23459-R-600-A



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1.0 INTRODUCTION

- 1.1 QuadConsult Ltd was commissioned to undertake an inspection of the former OAP Hall, Bontnewydd Terrace in Trewelis, Merthyr by instruction of Merthyr Valley Homes Ltd
- 1.2 The scope of the investigation was to visually inspect all exposed and accessible aspects of the building and infer the causes of any damage or deterioration based upon the visual survey.
- 1.3 This report summarises the observations made during the inspection and includes a commentary on the development proposals with respect to the existing structural layout.
- 1.4 A asbestos report has been undertaken by Environtec.Ltd in October 2023, report ref. no: J9022008.
- 1.5 A visual inspection was undertaken on the 10th and 15th of November 2023 by Eleni Konstantinou-Arthur, a Structural Engineer and Ganga KC, a Graduate Structural Engineer at QuadConsult. Both engineers report to Will Harrow who is an Associate at QuadConsult and a Chartered Engineer. The weather on the day of the survey was wet and cloudy.
- 1.6 The inspection was based on a visual examination only. No testing of materials, monitoring, or invasive investigation has been undertaken. The Southwest rear elevation was not inspected due to overgrown vegetation. Parts of the roof were not visible, and the thick insulation hindered the investigation in this area. Therefore, we are unable to report conclusively on the status of hidden or inaccessible structure, including structural timber. However, where the symptoms of defects are evident, they have been recorded in this report.
- 1.7 Section 2 of this report describes the property, section 3 provides a description of the defects under consideration, section 4 provides a discussion of the issues from the proposed layout and section 5 provides conclusions and recommendations. Photographs taken during the survey are attached at Appendix 1 and existing and proposed layout of the building are attached in Appendix 2.

2.0 PROPERTY DESCRIPTION

- 2.1 The building is a 1900 single storey building with duo-pitched slate tiled roof and brickwork walls. It consists of a main hall area, kitchen, storeroom, corridor and two wet rooms. The floor plan has an L shape.
- 2.2 Based on the different types of bricks used for the construction of the external walls and the different construction methods that were used (Photograph 5), it appears that the building might have been built in two or three stages as shown on the sketch in Figure 1 Appendix 2. The oldest part of the building is indicated as Part 1 and the more recent additions to the building are indicated as Part 2 and 3.
- 2.3 The external walls of Part 1 are approximately 230mm thick solid leaf masonry and Parts 2 & 3 appear to be cavity walls with an overall thickness of approximately 300mm. Furthermore, sections of the external masonry indicate that the building has undergone many adaptations over its life span to date, and it is unclear if the adapted and modified masonry has been provided with suitable wall ties in those areas. A section of external wall (see photograph 9) is built off an existing stone wall and foundation, the extents of which could not be confirmed but as noted later in the report their signs of distress so further investigation is required to confirm the build-up in this location.
- 2.4 Internally there are masonry walls and stud partitions. In Figure 2 Appendix 2, the masonry walls have been indicated with green and orange colour. The green masonry walls are approximately 300mm thick and appear to be a load bearing as it supports some of the roof rafters and ceiling joists (Photograph 24). The orange colour masonry walls are 100mm thick and appears to be non-load bearing, but further investigation is needed to confirm this in case they are supporting ceiling joists. The rest of the walls shown on the floor plan are stud partitions.
- 2.5 The ground floor typically appears to be a ground bearing concrete slab.
- 2.6 The roof has been formed with cut rafters spanning from the timber ridge board to the external walls with one purlin close to ceiling level (Photographs 25 & 26). The rafters appear to be in good condition with insulation at ceiling level. It appears that the rafters are not supported on the internal 100mm masonry walls, but the thick insulation hindered the inspection so further investigation is needed, it is expected that the ceiling joists will be supported off the 100mm thick brick wall. Externally the roof does not have any signs of sagging or damage and it appears to be in a good condition.
- 2.7 The type of foundations is unknown, but it wouldn't be unreasonable to assume that the building has mass concrete strip footings.

3.0 CONDITION/DEFECTS

3.1 External to the property, condition/defects noted during site visit are as follows:

Photo Ref.	Condition	Stability Issue	Remedials	Comments
6	Crack between Part 1 and Part 2 external wall next to the main entrance	N	Crack stitch repair and re-decoration and check for wall ties.	Potentially due to lack of movement joints or differential thermal and moisture movement between the two brick types.
7,8	Crack between the Part 1 and Part 2 external wall at the Northwest right hand side elevation ranging from 10mm at the bottom to 15mm at the top of the wall	Y	Underpinning foundation and providing a new vertical movement joint.	New external wall is tilting away from the older external wall possible settlement. A contributing factor may be thermal and moisture movement.
10, 11	Mortar joints of the external wall are washed away at the top left-hand side of the Southeast elevation of Part 3	N	Joints to be raked out and repointed with cementitious mortar	
12	Southwest rear elevation is covered with vegetation	N	General Maintenance	Elevation could not be fully inspected
13	Stress relief crack at the top left corner over the end bearing of the concrete lintel above the entrance door at the front Northeast elevation	N	General maintenance and re-decoration	Potentially due to lack of movement joints. Lintel is poorly installed.
3	Access to Southeast left hand side elevation is blocked with overgrown vegetation	N	General Maintenance	Elevation could not be fully inspected

3.2 Internal of the property, condition/defects noted during site visit are as follows:

Photo Ref.	Condition	Stability Issue	Remedials	Comments
14	Gaps below skirting boards of the internal masonry wall on the side facing the corridor ranging from 15mm to 25mm max	Y	Relaying the slab or refilling/grouting the fill	Possibly due to settlement of the slab
14	Crack in wall where an opening looks to have been blocked up on internal masonry wall on the side facing the corridor	Y		Differential thermal movement which may also have been exacerbated by settlement. Wall is proposed to be removed
15	Diagonal cracks in the bottom corner of the internal masonry wall on the side facing the storeroom	Y		Possibly due to settlement. Wall is proposed to be removed
16,17, 18	Diagonal cracks in the window at the storeroom at the top left corner and bottom right corner.	Y	Crack stitch repair and re-decoration.	Possibly differential thermal and moisture movement. Northwest elevation needs to be cleared of vegetation.
19, 20	Crack at the ceiling of the male wet room	N	General maintenance and re-decoration	
21	Crack at the ceiling of the female wet room	N	General maintenance and re-decoration	
22, 23	Cracks at the ceiling of the storeroom and crack at the joint between the ceiling at the store room and the adjacent masonry internal and external masonry walls	Y	Further investigation required	Possibly due to differential thermal movement or settlement

4.0 PROPOSED LAYOUT

4.1 Proposed Ground Floor Layout

- 4.1.1 With regards the proposed internal alterations provided by Le Truccodesign, dwg no LTS379.00.0 in Appendix 2, Figure 3, it is proposed that the 100mm thick internal walls will be removed and the new internal walls will be formed using stud partitions.
- 4.1.2 A section of the 300mm internal masonry wall separating the main hall from the corridor and the storeroom will be removed to accommodate wheelchair access. Removing this section of internal masonry will affect the roof trusses above. Any roof trusses or rafters supported directly off the internal masonry proposed to be removed will require further assessment and additional steel supports will be required. The load redistribution to the foundation will also need to be carefully considered.
- 4.1.3 The stability of the external walls may be affected by removal of the internal masonry wall and small piers may be required but this is subject to detailed assessment.
- 4.1.4 The proposed window openings can be formed by propping the walls and introducing lintels to support the masonry above the opening before removing the bricks. New openings in the external wall will require concrete lintels, sills and cavity wall ties to be installed around the opening.
- 4.1.5 Internal doorways can be blocked up with typical blockwork tied to the surrounding masonry.

5.0 CONCLUSIONS AND RECOMMENDATIONS

- 5.1 The vegetation on the Southwest elevation needs to be removed and the wall needs to be inspected.
- 5.2 Crack stitching using small diameter stainless bars would need to be undertaken to the areas highlighted in section 3.0.
- 5.3 Further investigation is needed to confirm if the differential settlement on the Northwest elevation is historic or ongoing before works commence. Similarly further investigation is needed to determine whether the cracks internally on the Southwest wall are due to foundation movement.
- 5.4 The external walls on the Northwest elevation appear to be suffering from subsidence which affects both Northwest and Southwest elevations. If so this would need to be remediated by stabilisation of the wall foundations by underpinning or the removal and re-building of the walls and foundations may be required or alternatively monitoring of the walls and foundations for ongoing movement to confirm if it is historic or ongoing.
- 5.5 The cause of the gap below the skirting board on the internal masonry wall is likely attributed to settlement on the ground bearing slab. The internal floor level will need to be checked and as a consequence of the suspected slab settlement, potentially the floor slabs may need to be removed and re-laid with suitably compacted engineered fill below to prevent any ongoing settlement taking place.
- 5.6 A camera drainage survey is recommended to confirm the location of the drains and check for any defects that the foundation movement could be attributed too.
- 5.7 Further assessment / safe access of the roof structure in Part 3 the building is required to confirm if the roof or ceiling structure is supported off the internal masonry walls proposed to be removed. If the ceiling joists are supported off the internal walls this is not so significant to remove and replace with suitably sized joists however if the roof structure is supported, then steelwork will be required. Access is limited to the roof void in part 3 of the building and various animal droppings cover the insulation over the ceiling joists making it unsafe to crawl from one roof area to another.

APPENDIX 1 - PHOTOGRAPHS



Photo 1 - North East front elevation of the building



Photo 2 - North West right hand side elevation



Photo 3 - Part of the South East left hand side elevation

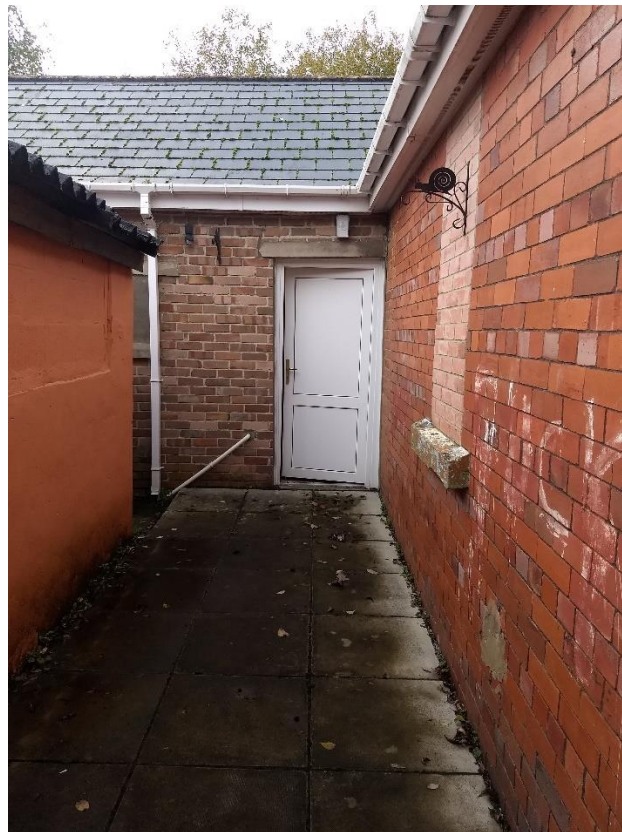


Photo 4 - Part of the North East and South East elevation



Photo 5 - Three different type of bricks



Photo 6 - Oldest Part 1 (right hand side) and later built Part 2 (left hand side) external masonry wall joined together with a key brick every three courses at the South East elevation



Photo 7 - Older Part 1 (left hand side) and later built Part 2 (right hand side) external masonry wall joined together with a key brick every three courses at the North West elevation



Photo 8 - Older Part 1 (left hand side) and later built Part 2 (right hand side) North West elevation- cracks marked with red line indicating settlement



Photo 9 - Later built Part 2 North West elevation- cracks marked with red line indicating settlement, air brick showing.



Photo 10 - External wall at top left part of South East front elevation where partially filled joints are shown (Part 3)



Photo 11 - External wall at left part of South East front elevation where partially filled joints are shown (Part 3)



Photo 12 - South West rear elevation covered with over grown vegetation



Photo 13 - Stress relief crack at the corner of the concrete lintel above the front entrance door



Photo 14 - Internal masonry wall, side facing the corridor. Gap below the skirtings and the floor ranging from 15-25mm max. Crack on the wall at the location of the blocked opening



Photo 15 - Internal masonry wall, side facing the storeroom, with crack at the bottom corner



Photo 16 - Diagonal cracks at the top left and bottom right corner of the window in the storeroom (photos 17 & 18 show a closer view)



Photo 17 - Stress relief diagonal crack at the top left of the window in the storeroom



Photo 18 - Stress relief diagonal crack at the bottom right corner of the window in the storeroom

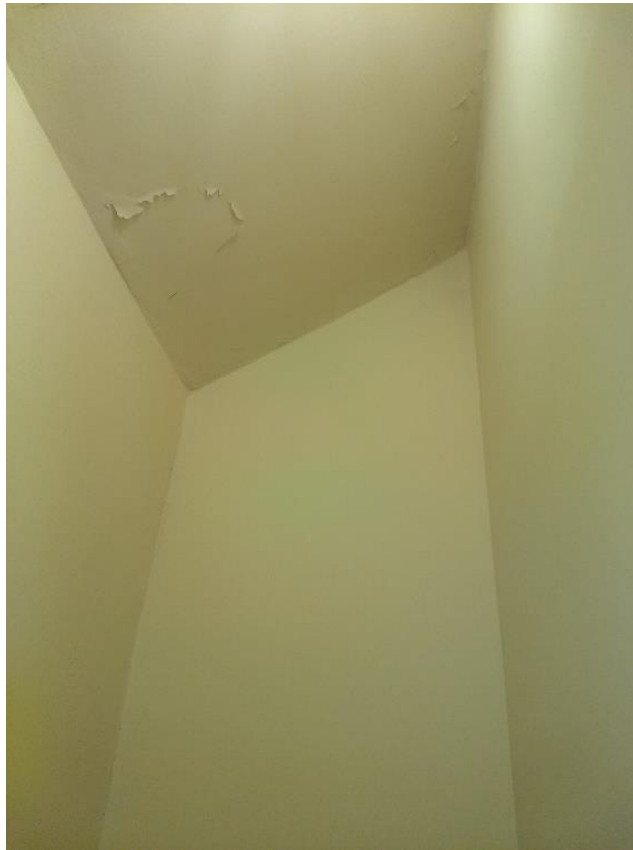


Photo 19 - Crack at the ceiling in the male wet room



Photo 20 - Crack at the ceiling in male wet room



Photo 21 - Crack at the ceiling in female wet room



Photo 22 - Crack at the ceiling in the storeroom



Photo 23 - Crack at the joint between the ceiling in the storeroom and the masonry internal and external walls



Photo 24 - Part of the roof, rafters and ceiling joists appear to be supported on the 300mm internal masonry wall



Photo 25 - The roof has been formed with cut rafters spanning from the ridge timber beam to the external walls



Photo 26 - Part of the roof showing rafters and the purlin close to ceiling level

APPENDIX 2 – EXISTING AND PROPOSED LAYOUTS

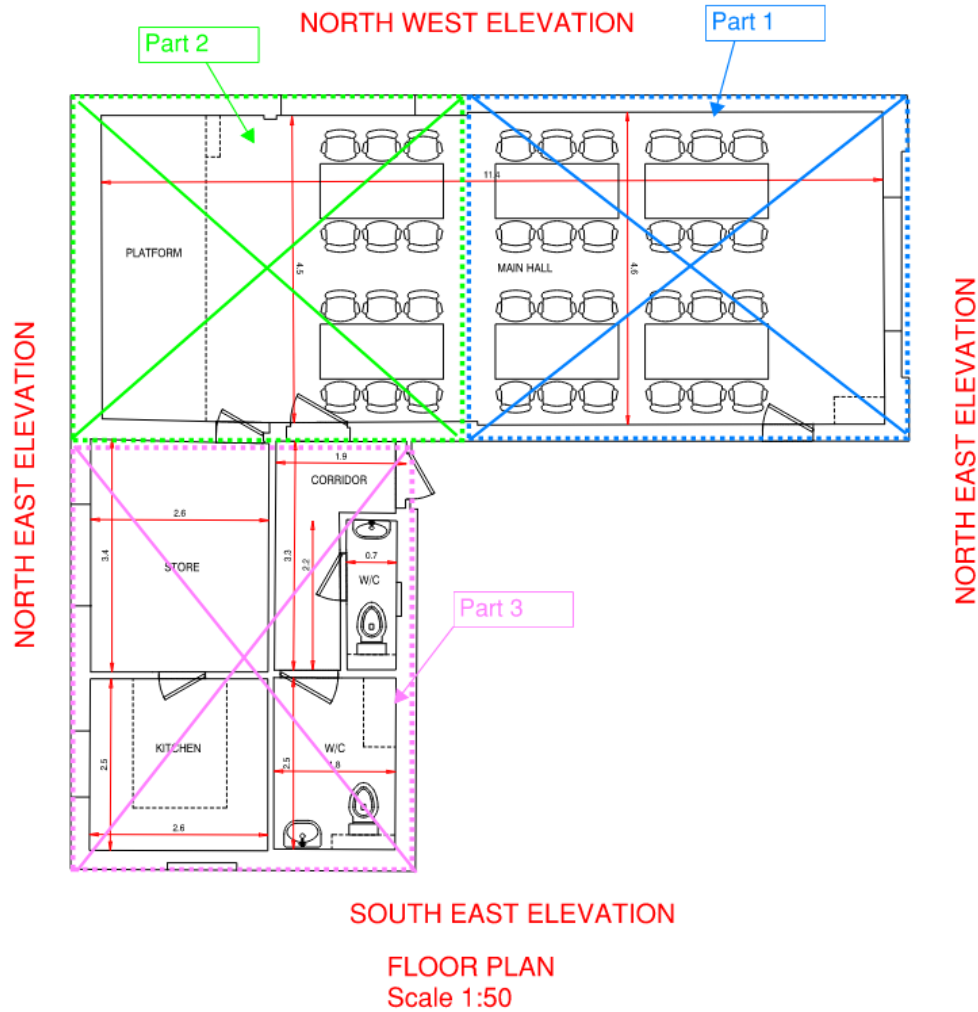
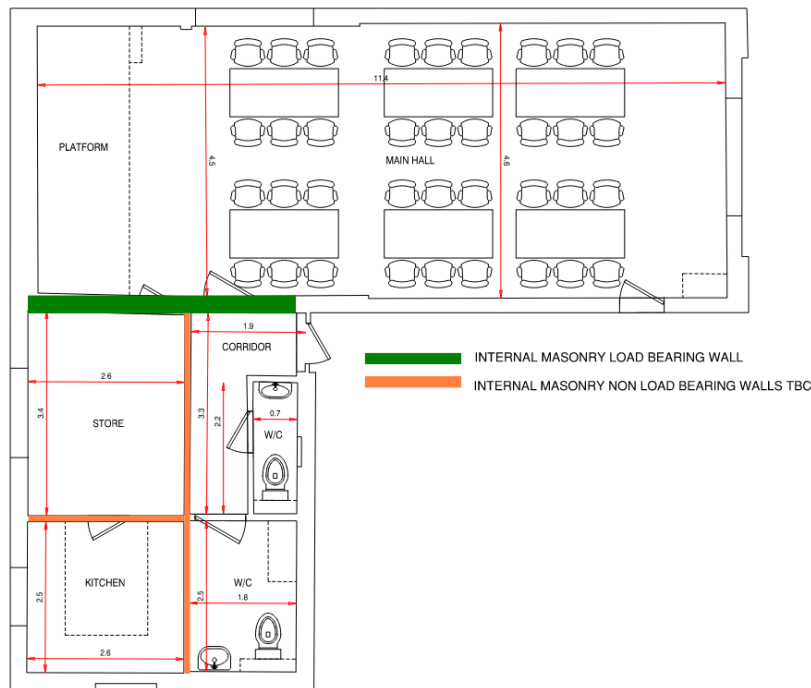


Figure 1 –Existing layout- Parts of the building that appear to have been built at different stages



FLOOR PLAN
Scale 1:50

Figure 2– Existing layout - Internal ma



Figure 3– Proposed layout by Le Trucco design