PEIRIANWYR YMGYNGHORI CYF
Grace & Howe
CONSULTING ENGINEERS LTD

St Mary's Lychgate

Llanerch-y-Medd

Structural Report



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1 Introduction

We were appointed by the Bro Eleth Ministry Area to undertake a structural survey of the lychgate to St Mary's Church, Llanerch-y-Medd.

Alex Evans (Grace & Howe) made a site visit on 25th July 2025. The weather was dry and fine. The survey was visual only made from safely accessible floor levels.

2 Brief and Limitations

It should be noted that:

- This report is based solely on a visual examination of the visible areas during the site visit.
- No tests have been undertaken on the construction materials or checks on the load bearing capacity of structure carried out except where specifically mentioned.
- No finishes, fittings or coverings have been removed or disturbed other than those specifically noted, and no responsibility can be accepted for concealed defects.
- This report shall be for the private and confidential use of the Bro Eleth Ministry Area for whom the report is undertaken, and must not be reproduced in whole or part or relied upon by third parties without the express written permission of Grace & Howe Consulting Engineers Ltd.
- The inspection is visual only and made from safely accessible areas.
- This report is not a specification and it must not be used to prepare estimates.
- Whilst the survey was thorough, it was not possible, without doing damage, to inspect those parts of the structure that were covered or unexposed at the time of the survey, and we are therefore unable to confirm that such parts are free of defects.
- This report is confined solely to the following area(s):
    - Areas of the lychgate visible from safely accessible ground and floor levels.
- Although comments may be made on other areas, such comments must not be taken as a survey of those areas.

3 Sources of Information

The following sources have been referred to for the purposes of this report:

- 'Lychgate to Church of St Mary', List entry no. 24970, Cadw https://cadwpublic-api.azurewebsites.net/reports/listedbuilding/FullReport?lang=en&id=24970 accessed September 2025.
- 'St Mary's Church, Llanerch-y-Medd', NPRN 43617, Coflein Site Record, https://coflein.gov.uk/en/site/43617 accessed September 2025.
- 'Lychgate to Church of St Mary'. PRN 66817. Regional Historic Environment Record, Gwynedd Archeological Trust. https://archwilio.org.uk/arch/query/page.php?watprn=GAT66817&dbname=gat&tbname=core accessed September 2025.

4 Description

The current lychgate to the Church of St Mary dates from the mid-18th century and was extensively re-modelled in the mid-19th century. The lychgate is orientated N-S with the main entrance of the square to the north side. The north gable has a pointed stone arch, and the gable is surmounted by a bellcote. There is a clock to the upper part of the gable There are dressed quoin stones to the corners and to the reveals of the arched opening.

The south elevation has a brick arch with an infilled circular brick opening in the gable above. The walls are constructed in rubble stone. The side walls to the east and west are rendered externally and internally.

Within the lychgate the roof void is accessed through a hatch on the underside. The roof has a timber structure with a slated finish.

A photograph of the square c1955 exists in the Francis Frith Collection showing the lychgate with a row of buildings abutting both sides. These buildings have since been removed leaving the lychgate as a freestanding structure.



Photograph 1: *General view on lychgate from the north east .*

5 Observations

5.1 External

5.1.1 North Elevation

- On the north elevation there are no obvious signs of movement to the arched opening or the quoin stones to the corners. The joints between the dressed stones all appear to be tight.
- The rubble stone facing appears to have been repointed at some point in what appears to be a hard cement mortar. The mortar has failed on the pillar to the west of the opening showing the core behind (see photo. 2).



Photograph 2: *Failed mortar exposing the core behind the facing stone.*

- There is a step back from the north face where the side walls meet the gable wall. A large gap has opened up at the joint on both sides of the gable. The gap is larger at the top of the wall and diminishes towards the base. The gap on the east side is larger than that on the west (see photos 3 and 4).





Photograph 3: *(Left) Separation of the adjoining side wall to the east side.*

Photograph 4: *(Right) Separation of the adjoining side wall to the west side.*

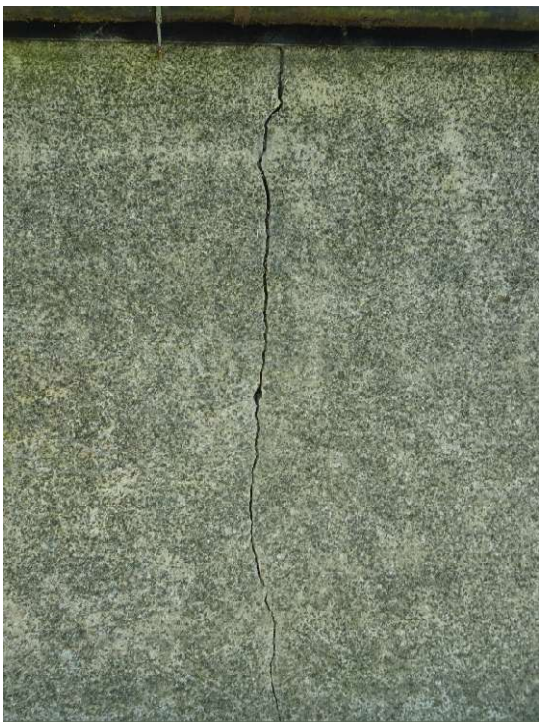
- It was possible to see the rubble stone core through the gap on the east side (photo. 5).



Photograph 5: *Core visible through the crack on the east side of the north gable.*

5.1.2 East Elevation

- The east elevation is rendered with a roughcast finish. There is a downpipe near the north end.
- There are no openings in the elevation.
- There is a full height vertical crack at the centre of the wall which widens with increasing height (see photo. 6).



Photograph 6: *Vertical crack at the centre of the east elevation.*

- The wall face has an outwards lean, with the maximum lean at the centre of the wall at approximately the position of the vertical crack (see photo. 7).



Photograph 7: *Outwards lean to east wall.*

5.1.3 South Elevation

- The south elevation has no dressed stonework to the reveals or corners. There is a date stone which reads '1755' above the brick arch (see photo. 8).



Photograph 8: *South elevation.*

- The arch profile is very shallow. There appears to have been previous pointing works and some possible movement near the springer positions. The mortar joints appear sound at present with no obvious signs of recent movement.
- There is cracking within the rubble stonework above the arch. The crack is diagonal and is over the west half of the arch (see photo. 9).



Photograph 9: *Diagonal crack over west side of south arch.*

- There has been some re-pointing work down the east side of the wall, possibly indicting previous cracking or open joints.

5.1.4 West Elevation

- The west elevation is rendered with a roughcast finish. There is a downpipe near the north end.
- There are no openings in the elevation.
- There is a full height vertical crack at the centre of the wall which widens with increasing height (see photo. 10).



Photograph 10: *Central vertical crack to west elevation.*

- The wall face has an outwards lean, with the maximum lean at the centre of the wall at approximately the position of the vertical crack. The outwards lean and the crack are not as severe as on the east elevation.

5.2 Internal

5.2.1 Ground Level

- At ground level the north and south openings occupy almost the full width of the passage.
- The east and west walls have a smooth render finish with ashlar lines scored into the render.
- On the west wall there is a vertical cracking to various locations in the render, with about three in close proximity near the centre of the wall. There is no obvious lean to the internal face of the wall (see photo. 11).



Photograph 11: *Vertical cracking to internal face of west side wall.*

- There is vertical cracking near the centre of the east wall. There is no obvious lean to the internal face of the wall (see photo. 12).



Photograph 12: *Vertical cracking to internal face of east wall.*

- The ceiling is boarded in sheets of ply. There is a hatch against the west wall (see photo. 13).



Photograph 13: *Ceiling over ground floor passage with access hatch against west face.*

5.2.2 Roof Void

- The roof void was accessed via the hatch in the ceiling. The survey was undertaken visually from the hatch due to uncertainly regarding the integrity of the floor.
- The floor has a covering of floorboards. The joists span E-W.

- The internal faces of the walls are rendered. There are no obvious cracks at the internal corners between the walls.
- There are central square brick infills to the tops of the east and west walls (see photos. 14 and 15).



Photograph 14: *Top of east wall – internal.*



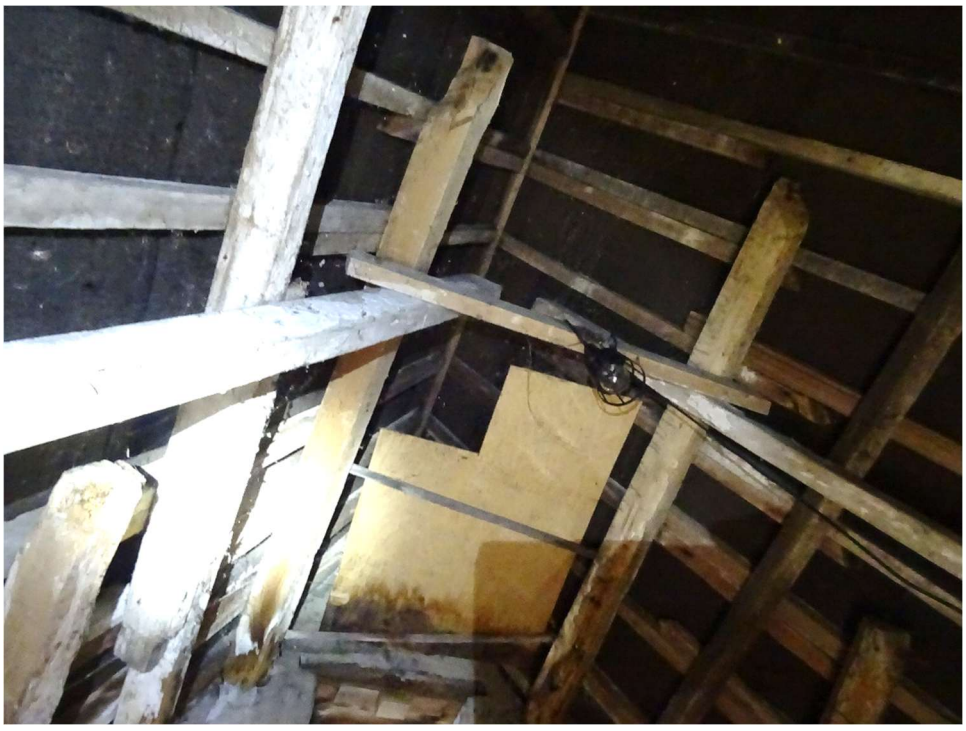
Photograph 15: *Top of west wall – internal.*

- Where the render is missing along the top of the east wall, the rubble stonework appears loose and poorly bedded (see photo. 14).
- The roof structure comprises two timber frames with purlins running N-S which bear on the gable walls.
- The purlins appear to be undersized. They are decayed where they sit in the north gable (see photo. 16).

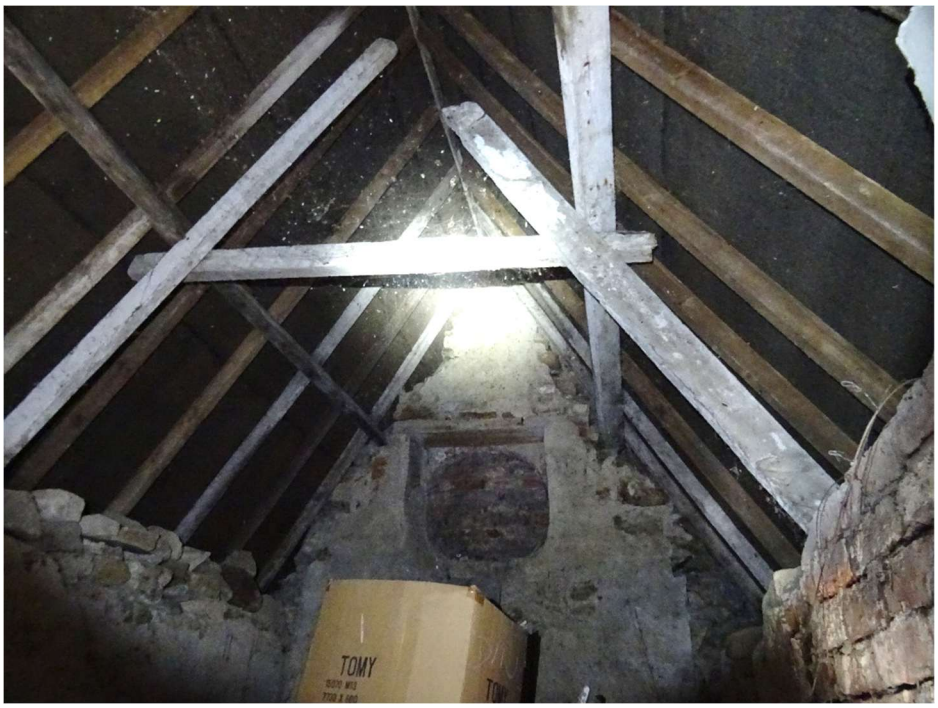


Photograph 16: *Decayed purlin ends to north gable.*

- There are cut ends of larger purlins embedded in the north gable, some of which span onto the north frame. The embedded ends appear decayed.
- There are significant defects to the timber frames. There are no ties at or near the base to restrain the external east and north walls. The principal rafter members stop short of the apex on both frames and do not meet each other. There is a high collar member joining the two principal rafters. The sections to the frames appear to be undersized (see photos 17 and 18).



Photograph 17: *North roof frame.*



Photograph 18: *View on south roof frame with south gable beyond.*

- A number of common rafters have been cut and/or supplemented.

6 Discussion

The main structural concern with the lychgate is the evident outwards movement of the east and west side walls. The cracking patterns and visual assessment to both side walls indicates an outwards rotation with maximum displacements to the upper mid-span locations. The differential movements between the internal and external aces also suggests there has been some separation between the internal and external faces of the side walls.

There are significant defects to the roof structure. As well as decay to the timbers embedded in the north gable, the timber sections are generally undersized. Significantly the roof frames have critical defects, with the principal rafters stopping short of the apex and no tie at or near the base to stabilise the ends.This results in the rafter members of the frames being unrestrained and free to move against the tops of the walls, exerting an outwards thrust where they sit on the outer part of the side walls and causing them to move outwards. As the base of the frames sit on the outer part of the wall it has pushed the outer leaf away from the wall core, causing the separation seen on the elevations.

The purlins which span between the frames and the gable walls also appear to be undersized for their span.

The roof structure is not currently fit for purpose and should be replaced. As the sections are undersized it means that any attempt to repair the structure in situ would result in extensive supplementation with new section, such that a new structure would be simpler to install. A new roof structure should include ties at eaves level, and the frame should be secured to a fixed-in wall plate to prevent roof spread and to provide restraint to the tops of the side walls.

The decay to the timbers at the north gable also suggests that there is a water ingress problem around the copings which needs to be addressed. This would likely require the lifting of the coping stones to install new flashings and weatherproofing details.

The separation of the side walls needs to be addressed by retrospectively installing resin anchored ties through the thickness of the wall at regular horizontal and vertical centres using Helifix Sockfix or Cintec anchors.

There are no obvious indications of settlement or other ground related causes.

7 Recommendations

Taking the above into consideration, the following actions are recommended:

- The roof structure should be replaced with new. The frames should include ties at eaves level and should be secured to a fixed-in wall plate.
- The weather protection details over the north gable should be renewed to prevent water ingress and to protect the embedded timber ends of the roof structure.
- The separation between the inner and outer faces of the side walls should be addressed by installing grouted anchors such as Helifix Sockfix or Cintec Anchors through the thickness of the wall at regular vertical and horizontal centres.

8 Conclusions

The roof structure to the lychgate has significant structural defects which have resulted in the outer faces of the side walls being pushed outwards. As well as the outwards movement to the side walls this has also resulted in separation between the internal and external faces of the walls. Most of the structural sections to the roof are also undersized. The roof structure should be replaced, and the opportunity taken to address the weatherproofing details over the north gable. The separation of the side walls should be remediated by installing grouted anchors at regular vertical and horizontal centres.