Mann Williams
Consulting Civil and Structural Engineers

St Paul's Church

Newport

Structural Condition Survey

Job Number: 12373

Contents

Suitability Codes as stated within QA data describe documents intended use and are in accordance with BS EN ISO 19650-2-2018.

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Quality Assurance

File Name: Report Template _ Updated .docx

Document Issue Details:

Suitability	Revision	Issue Date	Approved By
S2 - For Information	P1	06 August 2024	Jeff Stott MIStructE CEng

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1.0 Introduction

1.1 General

1.1.1 Mann Williams have been asked by Gregory Beale of Planning Heritage on behalf of Andrew Brown to carry out an inspection of St Pauls Church in Newport to provide a check against any degradation since the time of the first Mann Williams reports carried out in 2013-2015.

1.1.2 St Pauls Church is located grade II listed building in central Newport on the junction of Palmyra place and Commercial street.

1.1.3 This report should be read in conjunction with the following previous reports:

a) 6822_R_PR_01
b) 6822_R_PR_02_04
c) 6822_R_PR_03
d) 6822_R_PR_04
e) 6822_R_PR_05

1.2 Recent History

1.2.1 Mann Williams Cardiff have been involved with St Pauls church since late 2013. A brief summary is given below of the key points during this time period.

a) On 25th October 2013 a corbel bracket fell from the ceiling which raised concerns about the structural integrity of the roof. The bracket in question was a cast iron bracket beneath the bearing of Truss 4 (See *6822_R_PR_02_04* for truss locations).

1.2.2 It was found that poor condition of the roof gutters had led to decay in the timber ground supporting the iron corbel as well as the truss bearing above.

1.2.3 It was noted that the corbel did not appear to significantly contribute to the trusses capacity, however there was a risk of other corbels failing due to similar conditions. To mitigate this risk, the other corbels were tied back to the trusses above via steel wire.

1.2.4 Following the emergency works carried out, a more detail inspection was carried out in November of 2013. This inspection identified that a serious failure had occurred at the bearing of Truss 4.

1.2.5 It was identified that faulty parapet gutter had allowed water ingress local to the bearing of Truss 4 leading to decay of the timber bearing.

1.2.6 Following this inspection, propping to the truss was installed in the form of three scaffold towers erected to provide support to the underside of the truss.

1.2.7 It was noted during these inspections that the South bearing of Truss 1 shows signs of decay, with the bottom chord showing signs of distress up to approx. 1.5m from the bearing.

1.2.8 Truss 1 was found to sag towards the centre of the span. This appeared to be due to the additional load on the lower tie due to servicing in this area for the mezzanine spaces.

1.2.9 It was noted that repairs had previously been carried out to the North ends of Truss 2 and 6. These repairs consist of a pair of steel plates connecting to the bottom truss member to the truss rafter. The repair to Truss 2 appeared sound however the Truss 6 showed signs of distress around the repair.

1.2.10 Five of the trusses are constructed with the bottom chord in two parts, linked by a bolted cast iron plate and a half lap joint.

1.2.11 In the case of truss 5, a large crack had formed at this joint and remedial repairs were carried out following the inspection. It was noted that further investigation should be carried out to determine the cause of the failure and whether repairs should also be carried out to the other trusses.

1.2.12 Pull out of the truss members at connection points was noted. It was suggested that the main cause of this may have been the introduction of the ceiling (not original) which caused excessive bowing in the lower chords of the trusses.

1.2.13 The inspection found that decay was present at the South bearings of truss 1 and 4 and the North bearing of Truss 6. However it was noted that other bearings may require repair and should be tested via micro-drill testing. It appears this testing has not yet been undertaken.

1.2.14 A second inspection was carried out in April/May of 2015 which found that the condition of Truss 4 South had deteriorated significantly. It was recommended that repairs are required to the truss bearing.

2.0 Site Visit

2.1 Overview

2.1.1 Mann Williams visited site on the 30th May 2024 to review the situation of the structure with respect to the previous surveys carried out.

2.1.2 The Survey was carried out from ground floor level internally as via access to the lower attic space. Access to the ceiling via mobile scaffold towers was requested but was not available during the visit. As such, a detailed inspection of the propping and truss bearings was not feasible.

2.1.3 Access to the exterior of the roof was not available.

2.2 Scaffold Tower Propping

2.2.1 The scaffold towers in place to provide propping to truss 4 appeared to be in sound condition structurally based only on a visual inspection from floor level, however there appeared to be some issues with the propping closest to the bearing of the truss.

2.2.2 Two of the three scaffold towers were arranged with scaffold boards running perpendicular to the truss, with plywood over. However the propping at the bearing has been arranged with the scaffold boards running parallel to the truss, meaning that the plywood over appears to be spanning between the boards, picking up the load of the truss over.

2.2.3 The arrangement described above should be reviewed on site by the scaffolding contractor and remedied.

2.2.4 The plywood supporting the bearing of Truss 4 shows signs of water damage, which may have lead do decay of the plywood. Though more importantly this evidences the fact that water is still penetrating the structure at this point and is likely causing the condition of the bearing of truss 4 to worsen even further.

2.3 Truss 1 South Bearing

2.3.1 The South Bearing of Truss 1 was inspected from first floor level only, which provided for a closer visual inspection, but no probing could be carried out.

2.3.2 The signs of decay and crushing of the bearing noted previously were still present however the condition did not appear to be significantly worsened since the previous reports.

2.3.3 As has been previously noted, a repair should be carried out to this truss end, utilising steel plates either in a face plate or flitch plate configuration in addition to replacement of the decayed timber with like for like sized timbers.

2.4 Attic Space

2.4.1 From within the lower attic space, it was possible to review the principle trusses, however the combination of the historic pitched ceiling and the newer flat ceiling meant that detailed inspection of the truss bearings and rafter ends was not possible.

2.4.2 It was generally noted from within the roof space that whilst there were numerous signs of historic water ingress which aligned with the previous reports, the roof structure visible did not appear to be actively damp. This may be in part due to the relatively dry weather in the lead up to the inspection.

2.4.3 Each of the truss joints was inspected in order to assess whether there was a change from previous inspections with respect to the extent of joint pull out in the trusses. When compared with the values noted in report 6882_R_02_04 it was found that typically all values were either the same as previously noted, or within a small enough tolerance that the difference is likely due to either measuring inaccuracies or potentially seasonal movement of the timbers.

2.4.4 The measurements of the truss joints suggests that any ongoing deterioration of the trusses is not yet severe enough to have caused global movement in the truss frames. While this offers some reassurance with respect to the performance of the trusses since the last inspection, it would be unwise to interpret the lack of measurable movement at the truss joints to mean that there has been no further degradation to the trusses.

2.4.5 Three sets of ratchet straps have been used to arrest the movement in truss 5 caused be the failing joint in the bottom chord previously recorded. The ratchet straps appear to performing adequately, however they do not represent a permanent solution and a permanent repair should be carried out.

2.5 Ground floor / Hall

2.5.1 It was noted from within the ground floor hall that there was notable water ingress to the arched roof over the Apse. This area of the roof was not visible from the attic space. This should be further investigated in order to identify the condition of the structure over as well as identifying the route of the water ingress.

2.5.2 Other than the bearings of Truss 1 and 4, the South wall showed little signs internally of damp, however the North wall showed signs for damp along much of it's length suggesting that the parapet gutter is likely to have failures along its length.

2.6 Summary / Recommendations

2.6.1 Typically, the building does not appear to have decayed significantly since the previous reports were carried out. However, the issues previously identified have not been remedied and are serious in nature.

2.6.2 Due to the detailing of the truss bearings, they are both difficult to investigate, but also vulnerable to decay caused by water ingress.

2.6.3 Whilst the worst affected timbers have been identified previously, it would be wise to carry out a full assessment of the remaining principle structural elements in order to provide a full scope of works for any repairs to be carried out.

2.6.4 It is recommended that microdrill testing is carried out to all truss bearings by a qualified timber specialist in order to identify the presence of any decay which would not otherwise be picked up without significant intrusive investigations.

2.6.5 Once this testing has been carried out, a full scope of works may be identified, which is like to include, but not be limited to the following items:

a) Repairs of truss bearings using steel plates and replacement timbers
b) Repairs / strengthening of truss bottom chords with existing cast iron splices
c) Repairs to decayed rafter ends and purlins where identified
d) Repair of parapet gutters
e) Investigation and repair of roof over Apse

2.6.6 Overall, there was little degradation seen when comparing to inspection in 2013-2015.