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A timber survey of

CHRIST CHURCH, WOODHOUSE, HILL, HUDDERSFIELD

1 INTRODUCTION

Following instructions from Richard Jaques of Arctic Associates, I visited the building on 11.08.17. The survey is in the form of a schedule of observations (most of which are accompanied by photos) referenced to the plan of the church at the end of the report. Where appropriate, recommendations (which should be carried out in accordance with the timber guidelines – section 4) are shown in bold after the observation.

2 OBSERVATIONS

2.1 Main roof voids

1
Photo 036 looking into the chancel. The ceiling has no secondary support (from ceiling joists for example) and hence no weight was placed on the ceiling.

Many of the common rafters have been replaced here (and throughout all the roofs).

Note - arrowed in the RHS of the picture the tops of the second principle rafters which give the impression of a double truss arrangement - seen from below.

2
Photo 038 looking in to the S transept. Access was not possible to the S wall, although the bearings of the purlins and ceiling beams appear sound – see below.

The common ceiling joists have bowed away from the beam. It seems as if the nails through the common rafters have pulled out of the underside of the ceiling beam. Consequently, the ceiling cannot take any amount of weight.

3 Photo 042 looking into the N transept. Again the ceiling structure seems to have pulled away from the ceiling beam and again no access was attempted. The purlin and ceiling beam bearings appear sound.	
4 Photo 041 showing the structural arrangement at the crossing point of the transepts with the main body of the church.	
5 Photo 044 shows what is presumably one of the original access hatches – now roofed over. (There was one on the N and S pitches).	

6 Photo 048 shows the purlin bearing adjacent to an area of water penetration (ob 17 below). The softwood purlin bearing has lost its outer (probably sapwood) edges within the wall. **Although there is almost certainly a fork of sound heartwood in the wall, this bearing will require additional support to stabilise it. As the detail is clearly difficult to keep dry it may be considered prudent to provide additional support to this purlin which isolates it entirely from the masonry. This could be in the form of wrapping the embedded repaired end or even cutting the purlin where it enters the wall and supporting it with a bracket or similar.**	
2.2 Tower	
7 Photo 051 shows the underside of the SW corner of the floor of the Bell chamber. The first joist is wrapped. **The next 3 joist ends are decayed in their bearings and require additional support.**	
8 Photo 045 shows the floor in the SW corner at Gallery level (below the Clock chamber). The embedded joist bearing in the SW corner and floor boards are wet and decayed in this corner. **See below.**	

Photos 046 shows the underside of the floor at this point. It is likely at least 2 or 3 common joist bearings are decayed in the S wall and the principle floor beam (arrowed opposite) has lost most of its sapwood to wet rot decay within the wall and will therefore require additional support. **Recommendations are as those of ob 6 above.**	
2.3 Chancel	
9 Photo 064 shows a previously repaired truss end. It is not clear how the repair has been carried out due to the boxing. (Close access was not possible to this beam end due to the positioning of the pews below).	
10 Photo 052 shows historic decay (probably dry rot) to the foot of the arched brace and post of the truss. The timber is now dry and the decay is historic. This detail (where the truss post/brace bears onto the corbel) changes from truss to truss and it is not clear whether this is the original detail or a previous repair. The damage is local to the post and arched brace. There are no signs of any decay at cornice level or to the foot of the principle rafter, although it is concealed by the roof structure. It is probable this happened at the same time as the damage which caused the decay to the adjacent truss and may not have been noticed. **The base of the post and arched brace will require repair.**	

11 Photo 056 shows the feet of the arched braces adjacent to a large damp patch in the wall caused by defective rainwater goods externally. These are both later repairs and are sound.	
12 Photo 058 shows decay to the edge of the plate behind the cornice. The decay is historic and the timber in this area is now dry. **However, it would be worth checking the integrity of this principle rafter over the wall head when the opportunity arises. See external detail below.**	
13 Photo 063 shows some decorative damage at the foot of the valley formed with the S transept. All of the timber is dry and was not damaged as far as access was possible. **Again it would be prudent to check the condition of these elements over the wall head when access allows.** **See external detail below.**	

Photo 085 shows the external detail above obs 12 and 13 which is prone to blockage and was holding some detritus and standing water at the time of survey.	
2.4 Transepts and Nave	
14 Photo 067 shows water damage to the hard cementitious plaster (which hasn't disassociated from the substrate as yet). The adjacent rafter foot which is more of a cover strip, is undamaged and currently dry.	
15 Photo 068 shows the foot of the W valley made between the N transept and nave. There are signs of seasoning shakes and possibly historic water ingress although the detail is now sound and dry.	

16 Photo 069 shows some damage to the cornice. Access was not possible as a result of the pews, however the damage is not thought to be structurally significant.	
17 Photo 071 - the arched brace and ceiling joinery were inspected at the point of water damage in the SW corner of the nave. The timber is sound although the plaster-most of which seems to be relatively recent cementitious one-has disassociated from the masonry substrate – although is not as yet being actively shed off the wall. There is some minor, superficial and historic damage to the arched brace on the W wall of the nave. **Various areas of plaster around the church will require replacement. See discussion.**	
18 Photo 070 shows some historic and superficial decay to the back of the inner detailing of the arched brace and post. The damage is not structurally significant.	

19
Access to the roof above the organ was difficult. However, it is possible there may be some damage to the roof structure below the same valley mentioned in obs 12 – 13 above.

Again further inspection would be prudent if the opportunity arises.

2.5 Floor level	
20 Photo 075 shows decayed skirting board (oak) for approximately 1 metre away from the N wall behind the chairs. There is also some movement in the floor which suggests some or all of the floor is suspended. **Further exposure is required at this point which may well reveal further decay to the joists of the subfloor.**	
21 Photo 076 shows some decay to the ends of the wainscoting and presumably the grounds to which it was attached. This has resulted in approximately 1-2 m of the wainscoting which can be moved at its base at the W end of the N transept. **The stability of the wainscoting will slowly deteriorate – even in the absence of water – and should be repaired relatively soon.**	
22 The damage shown in obs 19 and 20 above, is presumably due to the external perimeter conditions-namely the drain and the external perimeter (which seems to fall into the N elevation of the N transept), shown opposite. **One of the air vents is circled opposite – see discussion. It is probable each of these floor vents has its own drain which may well be blocked. If it hasn't already been carried out, a drainage survey would be beneficial – to include all the external perimeter grates.**	

23 Elsewhere the timber pew platforms are in good condition. Photo 078 shows where they were built straight across the existing wood block floor which presumably is still intact below all of the other platforms.	

3 ENVIRONMENTAL DISCUSSION

Much of the internal plaster work is cement-based and some has lost adhesion to the walls locally below the transept valleys and at the wall heads, but most noticeably in the SW corner of the nave. As mentioned above, it is not currently in a state of collapse, but its condition will deteriorate relatively rapidly from this point forward.

Around the perimeter of the building there are grates over openings into the building – ob 21. This may be part of the original passive ventilation system, now covered by the wainscoting and pew platforms.

Basic passive ventilation systems (PVS) such as these were extremely efficient in drawing fresh air in from vents to replace that which had been heated in the building, risen and expelled through vents in the roof. It is assumed that these systems fell out of favour due to rising fuel costs, resulting in buildings being made more air tight. This of course initiated other problems such as condensation, which generally causes more decorative than structural damage – although some types of roof construction do seem more vulnerable to excessive condensation and occasionally timber decay – usually close to cooler parts of the roof. There were no signs of damage in these roof voids which might be attributable to condensation. However, it is understood that during occupation, the windows are prone to excessive condensation (not at all unusual in churches).

The SW corner of the tower is particularly wet – again not unusual. However, in this case it seems that there is no air movement in the tower and as such it has become particularly damp.

Forming openings in the base of the tower and allowing free access for air to travel from ground floor, up through all the levels and out of the louvered vents (by the chimney effect) should help the tower to dry.

Re commissioning the PVS in the church (opening the vents at floor level and the ducts at ceiling-roof level) would result in a church free of condensation, but even more difficult to heat (to a level considered comfortable in the 21st century). It is possible that heat exchangers could be fitted to the ceiling vents, (so any energy could be harvested from the air before it was expelled).

These systems in new builds are 'all the rage', with PVS commonly using dehumidifiers for incoming air and heat exchangers for expelled air. Some systems are sealed, reconditioning and recycling the same air. However, it is not clear if these principles have been applied to an existing (Victorian) system. This would require some more research.

4 TIMBER REPLACEMENT / REPAIR GUIDELINES

- *All guidelines below assume that all water ingress is stopped.*

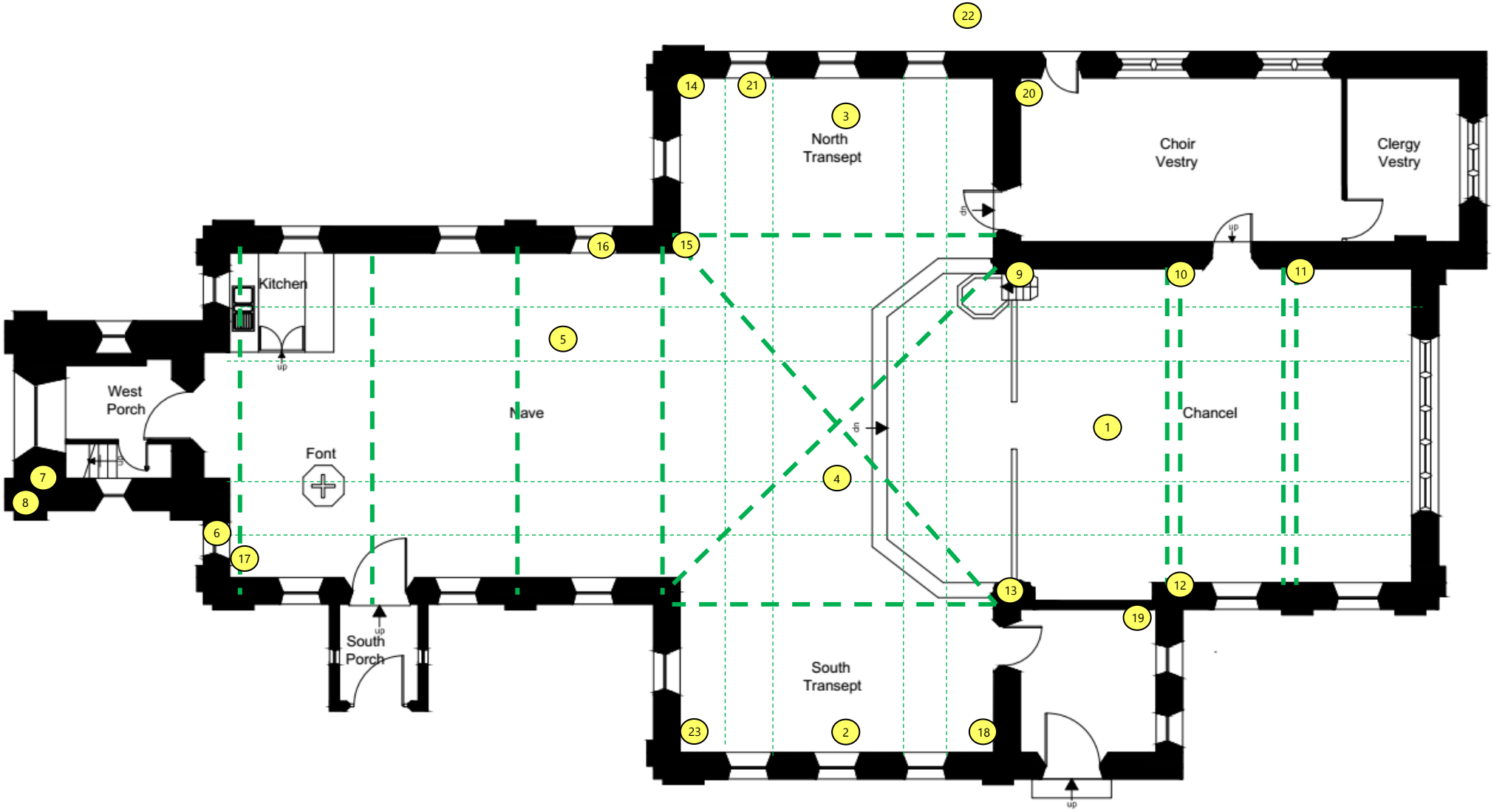
- Timbers for structural repairs or replacement timbers should be vacuum/pressure treated with Tanalith E preservative to comply with Treatment Code TE/BI. Brush treat ends cut on site with a spirit based fungicide or the treatment component recommended by the timber supplier. Cuprinol 5* would be sufficient. The acetylation process also carries a similar time guarantee for protection – see ACCOYA.

- Replace or repair joinery with pre-treated timber or timber which has been dip-treated overnight in a micro-emulsion or spirit based fungicide. Ends cut back after treatment should be thoroughly brush treated with a spirit based preservative.

- All replacement or repair timbers should be isolated from the walls with an impervious membrane. Damp proof membrane would be suitable for structural timbers. However, the membrane should not be allowed to form a dish under timbers in areas vulnerable to water penetration (a wall plate for example).

- Decayed timbers should generally be cut back to sound wood but can be left in situ as long as all structural considerations are met and the area is dry.

Tim Floyd – August 2016



Numbers refer to observations in the text.