St Mary's Episcopal Church, Kirriemuir

Fabric Condition Report

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1.0 Purpose of the Report

1.1 Brief

This report is focused on the church building fabric. The report summarises defects observed on site, suggests probable causes, and makes repair recommendations.

The report follows the most recent quinquennial report by Bell Ingram (2011) on request of the Vestry and a number of growing concerns over the condition of the building fabric.

The following concerns were raised by the Vestry during an initial meeting:

1. Peeling paint finishes to all internal elevations in the Baptistery (painted approximately 5 years ago);
2. Damp and black mould growth to internal wall finishes of the Nave aisle (north and east walls); at high level of the Nave east gable; in the Chancel at high level on the east gable, and at low level at the war memorial on the north wall; in the access stair to the pulpit; and in the Vestry accommodation;
3. Fabric soundness during periods of heavy snow and wind exposure.

In order to improve the appearance of the church, the worse areas of black mould had recently been cleaned using a domestic fungicidal product including the Vestry south wall, the aisle wall, the pulpit stair, and around the altar (east gable). Flaking paintwork has been removed in the Baptistery.

Other issues such as heating; accessibility to the church, and the kitchen and toilet facilities were discussed briefly but do not form the focus of this report. However these issues could be addressed at the next stage of the project.

1.2 Method

The church was inspected on 27 th May and 11 th June 2014 by Sonya Linskaill RIAS RIBA. The weather was dry and partly sunny on both occasions. Access was available to all parts of the church excluding the restricted undercroft below the Nave and roof void above the Nave vaulted ceiling. Roofs were viewed from ladder where possible (to single storey height) or from the roof of the West Tower with aid of binoculars and digital photographs.

1.3 Limitations

The following items do not form part of this report:

Stained glass
Fixtures and fittings
Services including heating and lighting
Grounds and boundary wall.

These items have previously been covered in the quinquennial report, or would require specialist inspection.

2.0 Brief Description of the Church

Denomination: Scottish Episcopal Church
Diocese: St Andrew's, Dunkeld and Dunblane
Address: West Hillbank, Kirriemuir, DD8 4HX
Council: Angus
Former County: Angus
Parish: Kirriemuir Burgh
Date of construction: 1903-5
Listed Building: Category A; HB Number 36899 (1971)
Conservation Area: n/a (the church lies just out with the Kirriemuir Conservation Area)

St Mary's C hurch was constructed from 1903 to replace an earlier Classical-style church (built 1797) destroyed by fire. The church is built in roughly coursed red sandstone rubble in an architectural style described by Sacred Scotland as *"…a finely detailed and entrancing mix of Gothic and Arts & Crafts in a Scottish Revival style."* It was designed by Sir J. Ninian Comper (of Bucknall & Comper, London; 1864-1960).

Comper was a prolific ecclesiastical architect, and St Mary's is significant as Comper's only complete church in Scotland. It is the only A-Grade listed building in Kirriemuir.

The church is believed to have undergone renovation in the 1940s. More recently the church was repaired in 2001. The detail of this most recent repair work was not available for this report but would be worth reviewing as the project proceeds.

The church sits on the hillside to the north of Kirriemuir town centre, the church orientated approximately east-west with its south facing elevation addressing the West Hillbank road.

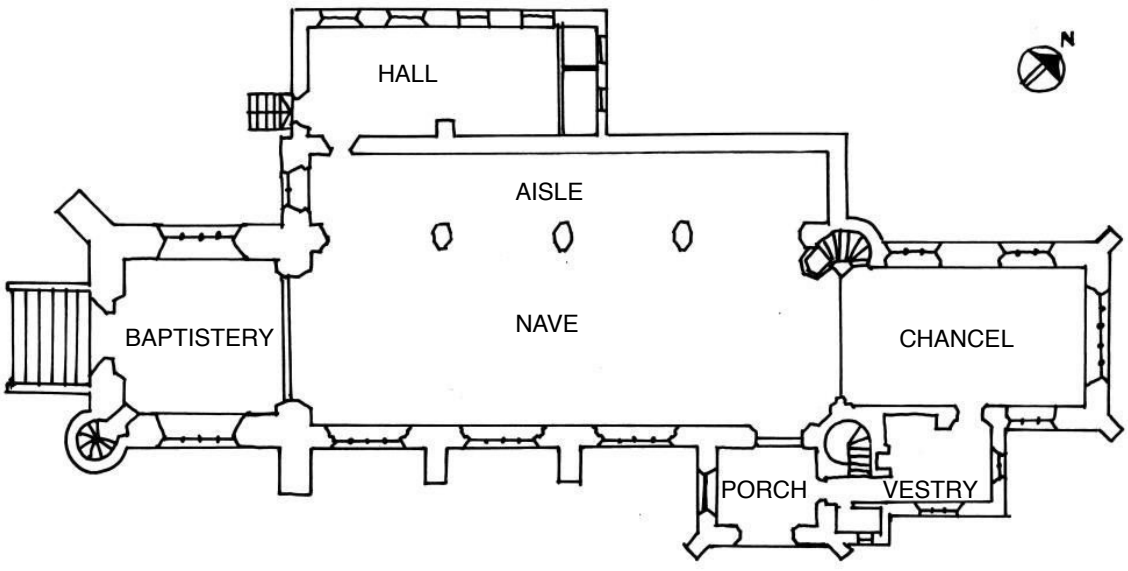

Figure 1: Diagrammatic plan of the church

The church buildings consist of:

The West Tower: a large, square tower which dominates the church's exterior. Below a crenulated parapet, there are large square openings on three sides for the belfry. At ground floor level large pointed-arch windows light the Baptistery with the original west entrance doorway. The Baptistery contains a red sandstone font on a raised platform. There is a small circular stair tower to the SW corner of the tower which gives access to the crypt (basement), store room (first floor), belfry (second floor) and flat roof.

Figure 2: The West Tower, south elevation

The Nave: a 4-bay Nave divided by narrow, pinnacled, 3-stage buttresses. There are three wide, pointed arch windows with thin, organic stone tracery (two with stained glass). The east most bay contains the south entrance doors protected by the entrance porch. The N Nave is asymmetrical with a lower arcaded aisle to the north side, extending the roof significantly on the north elevation. The east end of the aisle has a side chapel with altar. An enclosed, raised sandstone pulpit is positioned between the Nave and Chancel.

Figure 3: View of the Nave looking toward the Chancel

The Porch: A crow stepped gable faces the approach from east entrance gate. The Porch consists of an open vestibule at ground level with double doors leading into the church and an independent side door to the Vestry. The organ loft is housed on the upper level. On the south elevation above the pointed archway is a statue of the Virgin Mary, set within a shallow niche with a small leaded window to either side.

The SE Stair Tower: A stone-capped round stair tower is located where the Chancel, Nave and Porch meet. The tower gives access to the organ loft.

The Vestry: A single storey 'extension' to the east of the Porch consists of a small entrance lobby, toilet and Vestry.

Figure 4: The Porch, SE stair tower and Vestry on the south elevation

The Chancel: Adjoining the eastern end of the Nave with 2 pointed-arch windows on the north and south elevations, one partly obscured by the flat-roofed Vestry. The east gable of the chancel is dominated by a massive pointed-arch tracery stained glass window that frames the altar within. There is a war memorial internally on the north wall.

The NE Stair Tower: a smaller tower sits in the angle between Nave and Chancel giving access from the Chancel to the pulpit.

The Hall: Accessed from the north-west corner of the Nave, the Hall comprises an original part with later extension adjoining to the east. There are simple kitchen and toilet facilities at the eastern end. The Hall is also accessible independent of the church from its west door.

3.0 Summary Observations

The following defects were observed:

3.1 The West Tower

There has been historic movement in the tower particularly on the west and north elevations. Mortar repair of previous cracks is evident and a number of these have reopened (fig 5). There has been replacement of stone lintels in the belfry and other masonry repair in the store room below. The corner stair tower has also experienced movement with cracking through stone steps, the central spine and around the entrance door from the Baptistery (fig 15).

The lead flat roof over the main tower is ageing with splits in the lead especially around the entrance door from the stair (fig 5) and at the welded roll joints.

The masonry which forms the crenulated parapet is in poor condition. The internal face has a render finish which is failing and has been previously patched in a number of places. The render is cracked allowing water ingress to the masonry core. The sandstone copes have open joints and at the NW corner vegetation is forcing joints open more significantly and there is a damaged cope with a loose stone piece on the internal face (fig 5). There are a number of large open joints / reopened cracks on the external masonry face (fig 5).

In the belfry, the internal masonry is damp at high level in all corners. This would indicate water leakage from the lead roof junctions and possibly through the masonry itself. This water ingress is most prevalent at the NW and SW corners, the SW corner being below the flashing at the stair door (fig 5). The timber structure of the roof, which could only be viewed from below, shows signs of prolonged water ingress suggesting that rot could potentially be present.

The stair tower has a solid roof construction with possible bitumen / asphalt coating which has failed causing water damage at the head of the stair (fig 6). In general the internal face of the stair is in poor condition with spalling masonry and failing paint finishes, damp ingress and mould growth in places, and cracking / failure of mortar pointing in numerous places (fig 6).

The Baptistery at the ground level has suffered from flaking paintwork (recently cleaned off; fig 6). It is possible this is a result of penetrating dampness through the core of the wall (this type of rubble construction will contain voids which makes the water ingress easier). Below ground the crypt appears to suffer from a rising water table and a pump has been installed which was found to be disconnected. Water was sitting over part of the floor during the second site visit. Further investigation is required to confirm the cause of the flaking paintwork and the water levels effecting the basement.

Other minor defects include the need for redecoration of the main west entrance doors and roof access door; replacement of broken glass in the store room windows and repair of a cracked cill in the store room south window.

Figure 5: (From top) parapet masonry in poor condition; previous cracking on W elev; plant growth in open joints; cracked cope; water ponding at stair door; water ingress in belfry below stair door.

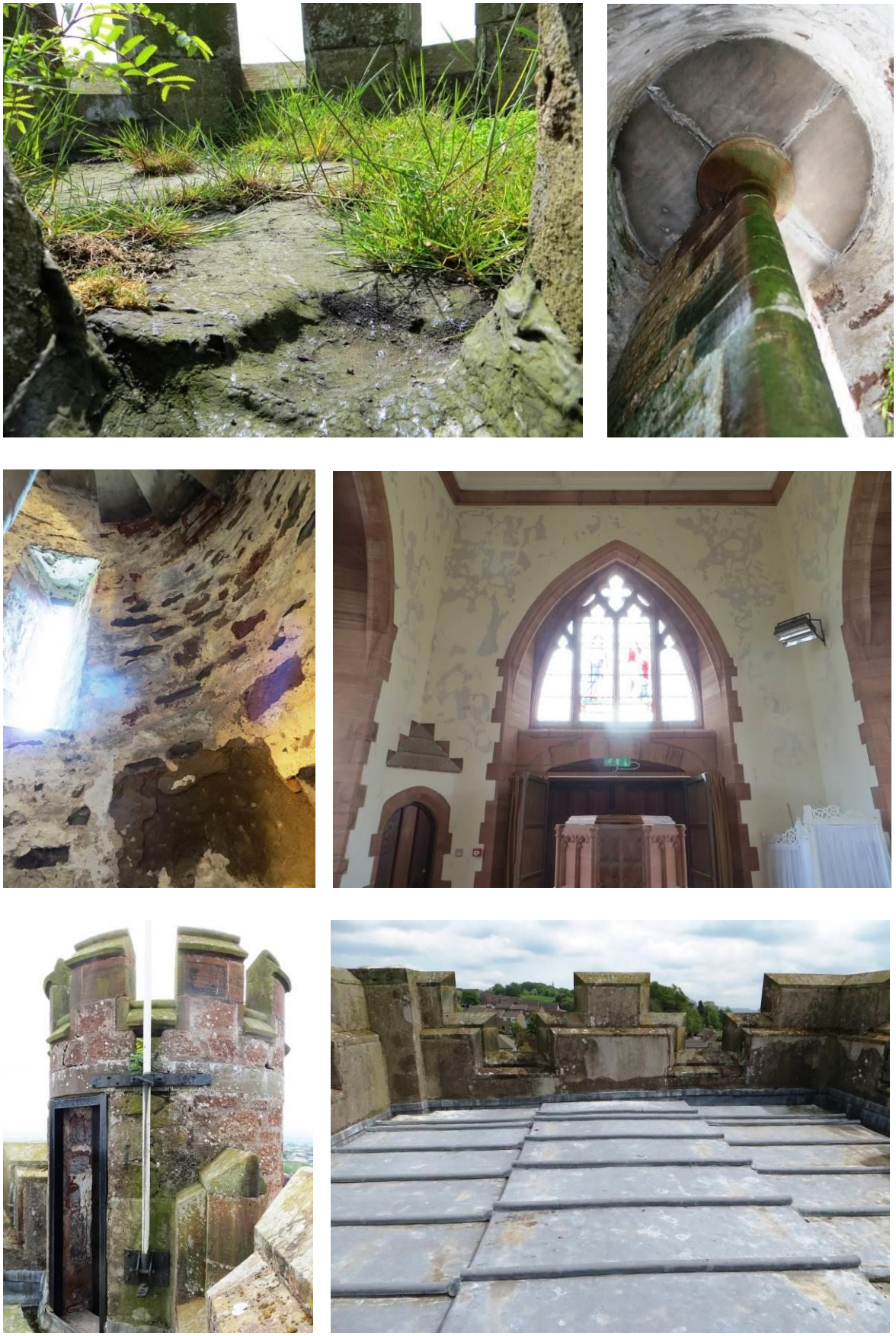

Figure 6: The roof of the stair tower where the roof finish has failed allowing water to penetrate the central spine shown with algae growth; the internal masonry of the tower is spalling in numerous places; the Baptistery has suffered from flaking paint surfaces; the stair tower; the lead roof.

3.2 The Nave

Internally water ingress has caused damage to plaster and paintwork in the following areas:

1. The east gable at high level on both sides of the Nave and extending onto the south wall behind the organ (fig 7);
   Probable cause – Gable wall: failure of the mortar skew fillet below the copes; failure of lead flashing at SE Stair Tower junction; possibly failure of cope joints. South wall: failure or overspill from the rainwater goods at the complex junction of the SE Stair Tower / Porch and Nave (fig 7).

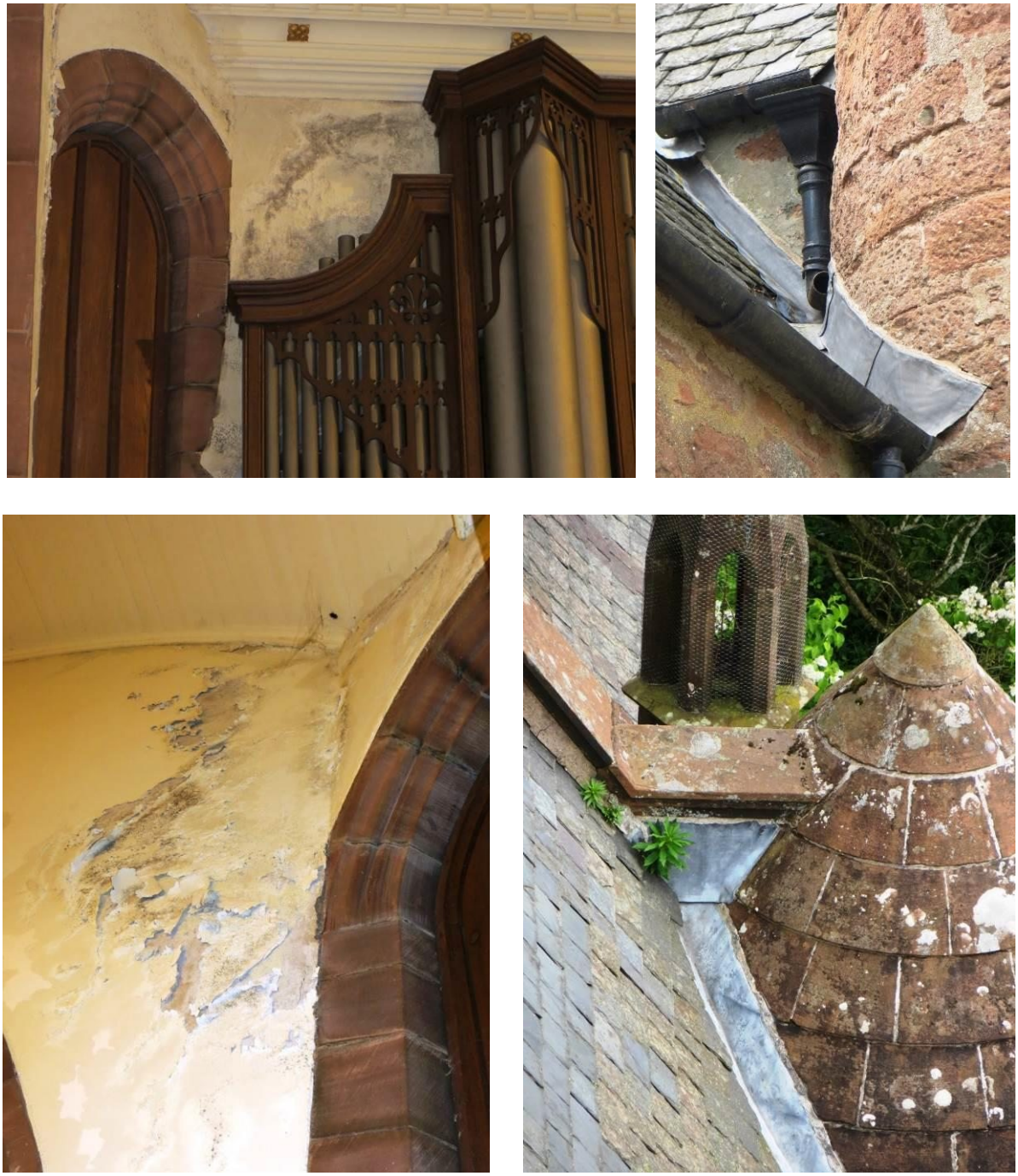

Figure 7: Effects of water penetration on the south wall behind the organ and externally the complex junction of Nave / Tower /Porch; (below) effects of water penetration at the south corner of the east gable possibly a failure of the lead flashing and / or mortar skew fillet below the cope.

2. The east wall of the north aisle above and around the tripartite window; salts leeching through the dressed stonework (fig 8).
   Probable cause: As pt 1. above, possible failure of the mortar skew fillet below the cope and cope joints. Externally the aisle wall which has been heavily overpointed with previous cement pointing repairs at the junction with NE tower. No flashing to the NEW turret and poor condition of wall pointing could be adding to saturation of the masonry.

3. The north wall of the aisle (area recently cleaned of black mould; fig 8).
   Probable cause: defective rainwater down pipe and / or overflowing hopper (fig 8). Rainwater hopper choked with pine needles from adjacent trees (roughly cleared during inspection); alignment of downpipe from the hopper is not true and discharges with an open end over an outlet grille.

Figure 8: Effects of water penetration above and around the window in the north aisle. (below) damaged plasterwork in the north aisle coincides with downpipes and hopper at hall junction.

4. The west wall of the north aisle above the bipartite window (fig 9).
   Probable cause: failure of the mortar skew fillet below the copes; failure of cope joints; masonry below copes in poor repair (fig 9).

5. The south-west corner of the Nave at high level/eaves (fig 9).
   Probable cause: choked lead gutter behind buttress (fig 9).

Figure 9: Effects of water penetration on the west wall of the aisle; the roof junction is only protected by a mortar skew fillet and the masonry to the copes and gable wall head is in need of repair. (below) effects of water penetration at eaves level on the south elev; blocked lead gutter behind the buttress.

In addition, the external masonry has areas of eroded stonework (particularly to the lower stonework and at the north-east corner), and open mortar joints face. This will require repointing, possibly with a small number of stone indents. The clay ridge tiles are in need of rebedding.

Other minor defects include the need for repointing joints in the pulpit masonry; repair of the east bell pull; and redecoration of the south entrance doors.

3.3 The Porch

The bedding mortar of the clay ridge tiles is missing at the junction with the Nave roof. The gable crowsteps and high level masonry are in need of pointing. The lead over flashing at the abutment with the gable wall is of some age and has only a shallow return to the wall face, which could lead to water ingress (fig 10).

Figure 10: Damaged bedding mortar below clay ridge tiles; ageing over flashing at the roof abutment with the gable.

3.4 The SE Stair Tower

Water penetration is causing damage internally to plaster and paintwork especially at high level and around the upper doorway to the Nave (fig 11).
Probable cause: water leaching through stone flag roof and joints; no gutter. As with pt.1 above, rainwater disposal at the complex junction of Porch/ Nave / Tower could be an additional cause if not kept clear or if insufficient during heavy rain / snow. No ventilation.

Figure 11: The stone capped SE tower abuts the Nave / Porch and Chancel; water penetration has damaged the internal plaster finishes particularly around the upper door to the Nave.

3.5 The Vestry

Water penetration / dampness evident internally in all areas:

1. The south wall at high level internally with black mould evident (SE wall recently cleaned of black mould; fig 12).
2. The ceiling over the Vestry lobby is cracked from water leakage.
3. In the small toilet, particularly at the south-west corner at high level.

Probable cause: the lead roof is of some age with a number of poor quality flashings and patching of mortar joints between the lead and masonry at upstands (fig 12).

Figure 12: The Vestry has signs of water penetration and mould growth in a number of areas thought to be caused by multiple failures in the ageing lead roof.

3.6 The Chancel

Internally water ingress is causing damage to plaster and paintwork in the following areas:

1. The east gable wall at high level on both sides and extending downward (lower area recently cleaned of black mould; fig 13).
   Probable cause: the failure of the mortar skew fillet below the copes and damaged/open cope joints. Eroded stonework below gutter at the south-east corner (past defect) could be contributing.
2. Below the war memorial on the north elevation (fig 13).
   Probable cause: staining and erosion of masonry externally indicates a previously leaking rainwater downpipe (fig 13). Masonry may be more pervious despite the pipe no longer showing signs of leaking.

Figure 13: The roof junction is only protected by a mortar skew fillet which has lifted off the slate; the east gable of the Chancel shows signs of water ingress at high level and extending down the wall; (below) signs of water penetration and flaking paint finishes below the war memorial, may be historic from defective rainwater downpipe; externally masonry shows signs of erosion around this pipe.

3.7 The NE Stair Tower

Water ingress is causing damage internally to plaster and paintwork especially to the domed plastered ceiling and also extending downward causing salts to leach through dressed stonework at the bipartite window (fig 14). Extensive black mould reported on internal walls (recently cleaned off).
Probable cause: water leaching through the stone flag roof and joints, with heavy moss build up. No flashings at junctions to Nave and Chancel, only mortar joint; no gutter.

Figure 14: the NE stair tower with stone capped roof and no flashing at junctions with Chancel and east gable wall of Nave; effects of water penetration internally.

3.8 The Hall

No internal problems evident however render in poor condition with loss of top coat in some small areas and other sections appearing to be boss. The rainwater gutter outlet at the east end of cast iron gutter was choked with pine needles from neighbouring trees. As noted above, at the junction with the Nave, the rainwater hopper was choked and alignment of the downpipe is not true. This is thought to be causing damage in the aisle and could affect the Hall. The north gutter shows signs of rusting and is in need of painting. The timber windows of the Hall extension are in poor condition externally.

Figure 15: cast iron gutter in need of painting and is liable to choking from pine needles from neighbouring trees. Render and timber windows in poor repair; (below) hopper at junction of Hall and Nave also liable to choking and the downpipe is out of alignment.

3.9 General observations

There is a lack of ventilation throughout the church with only a few small opening window ventilators in the clear leaded windows: one in the Nave, two in the Vestry, and two in the Baptistery. Heating is reported to be inadequate with only under pew electrical tube heating and overhead halogen style heaters. Both are factors which will make drying out of the fabric slow (both masonry and plaster finishes). Therefore it is possible that some internal defects could be remnants of earlier or sporadic external events, such as leaking or overflowing rainwater goods.

The north elevation is close to the neighbouring boundary and there are a number of tall pine trees which significantly increase overshadowing of the Chancel and Hall as well as increasing the likelihood of choked rainwater goods.

The quinquennial report makes reference to the rainwater goods running to a soakaway. This is not discernable on site and further investigation / reference to previous drawings is required to ascertain the drainage arrangements.

4.0 Summary Recommendations

Elements of the church building have been repaired in the recent past (2001) and the good condition of the slated roofs and new lead roof over the hall are presumed to be evidence of that repair work. A number of lead flashings look to have been renewed at this time (for example around the Nave buttresses) however it is apparent that a number of areas were not tackled and are now reaching the end of their lifespan. Their deterioration appears to be a primary factor causing water ingress and damage to the fabric of the building.

The multiple points of water ingress relate broadly to two defects:

Failure of materials:

1) West Tower lead roof
2) Vestry lead roof

Failure of material and weak details:

3) Roof / wallhead junctions on the Nave and Chancel (mortar skew fillets)
4) Solid roof over the West Tower access stair
5) Stone capped roofs over the SE and NE Stair Towers (loss of pointing; possible ingress through stone)

A number of the fabric defects are aggravated by the design of the details. Mortar skew fillets are a traditional method of sealing the joints between the roof and the wallhead but are vulnerable to leakage and require maintenance and frequent renewal. Similarly lead overflashings are more vulnerable to water penetration than a full lead watergate detail. It is recommended that where repair is necessary replacement is with a lead watergate. The NE Stair Tower has no flashings where it abuts the Nave and Chancel; it is recommended that lead flashings are introduced. The water penetration through the stone roofs is more problematic and may require the stone to be lifted and a lead cap fitted below. Further inspection of the joints and porosity of the stone is required. Consultation regarding listed building consent will be required for any changes to original details such as those recommended above.

In addition to those defects which relate to fabric and / or design failures, a number of items relate to building maintenance. There is the start of water ingress at the south-east corner of the Nave at eaves level from a blocked lead gutter and the damage below the war memorial and to the north aisle wall may also have been the result of choked or damaged rainwater goods. In the latter case the poor alignment of the downpipe may also be a contributory factor.

The majority of the water penetration faults relate to roofs and roof junctions. However, there are also areas of masonry in need of repair, most urgently the parapet of the West Tower. There are also isolated areas in need of repair as detailed in the schedule. The conditions which have caused the paint in the Baptistery to flake off are not clear. This could be a generally high level of humidity in a space which is not well ventilated or heated. The paints or substrate may be impermeable not allowing the wall to 'breathe' and accommodate a level of moisture. It is recommended that further investigation is made

possibly with assistance of thermographic survey (to indicate if the wall has elevated levels of moisture in its core) and stone sampling to indicate the level of porosity of the stone. The sandstone conglomerate is porous and many stones have eroded or spalled surfaces; few have the natural patination which forms over time and provides a natural weather proofing. The mortar pointing is a mixture of original and more than one type of repointing. The style of the random rubblework creates large areas of pointing and overpointing of stone increasing the risk of water ingress and trapping of moisture in the wall core.

Finally, the observed cracking in the West Tower is reported to be historic, with former repairs evident (fig 15). As not all cracking can be determined to be 'historic' and as a number of cracks have reopened, it is recommended that a structural engineer inspect the building and report in particular on the West Tower. The issue of water in the basement of the West Tower should be further investigated at this time.

Section 5.0 of this report provides a proposed outline schedule of works and budget cost. Recommendations are prioritised as follows:

Priority 1: urgent repairs requiring attention within the next 2 years
Priority 2: necessary repairs the location or type of which would be efficient to carry out concurrently with Priority 1 repairs. This includes a number of repairs which if not carried out in the short term, could lead to fabric damage in the longer term.
Priority 3: non-urgent repairs.

Figure 15: Movement cracks through stonework in the West Tower: over internal access door to stair (left) and above west entrance.