CHURCH OF ALL SAINTS, GRAFHAM, CAMBRIDGESHIRE:

(Diocese of Ely)

SOUTH AISLE & NAVE RE-ROOFING (& ASSOCIATED STRUCTURAL REPAIRS)

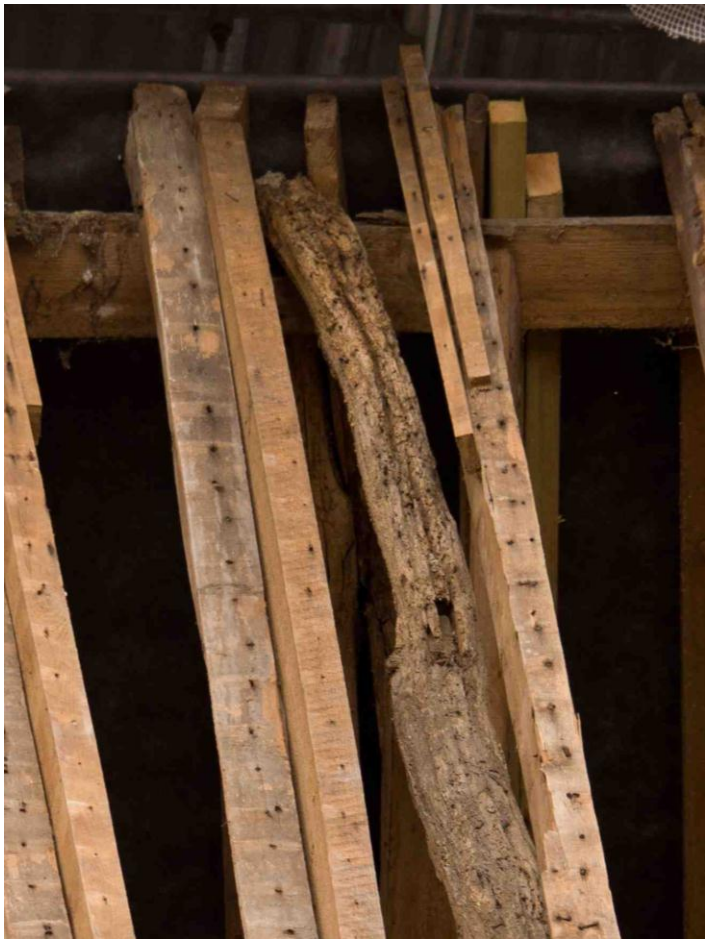
Iain Frearson, Freeland Rees Roberts Architects

A. INTRODUCTION

Brief Description of The Works

The works was split into two main phases (with a small, subsidiary third phase):

Phase I	Investigation work and holding repairs
Phase II	Re-roofing of the repairs to the Nave roof (re-roofing the north slope and repairs to the south slope), re-roofing of the South Aisle roof, structural repairs to the Nave (east end, north side). Both the Nave and South Aisle roof work were regarded as equally urgent and pressing – both were letting-in rainwater, despite the PCC undertaking holding repairs at various times.
Phase III	The third, subsidiary phase consisted of the completion of miscellaneous items left outstanding after the main contractor ceased trading



[Church of All Saints' Grafham. Nave Roof (North Slope). Note all **previous** partnering timbers]

Contract Details (Phases I, II, and III)

Construction Programme:	August 2013 – September 2013
Contract Form:	JCT Minor Works Building Contract (MW with CD) 2011
Tender Basis:	Specification (including schedule of works, drawings, etc.)
No. of Tenderers:	Four contractors (all specialists in church conservation)
Construction Programme:	June 2014 – December 2014
Contract Form:	JCT Minor Works Building Contract (MW with CD) 2011
Tender Basis:	Specification (including schedule of works, drawings, etc.)
No. of Tenderers:	Four contractors (all specialists in church conservation)
Construction Programme:	March 2016 – July 2016
Contract Form:	JCT Minor Works Building Contract (MW with CD) 2011
Tender Basis:	Specification (including schedule of works, drawings, etc.)
No. of Tenderers:	Three contractors (all specialists in church conservation)

People Involved (Phases I, II, and III)

Client	Hazel Powell (Churchwarden), Grafham PCC
Contractor (Phases I & II)	Fairhurst Ward Abbotts
Contractor (Phase III)	Brown and Ralph
Project Architect	Iain Frearson, Freeland Rees Roberts Architects
CDM Co-Ordinator (Ph.I&II)	Simon Wright, AFP Construction Consultants
CDM Principle Designer	Colin Borley, Pimys
Structural Engineer	Ed Morton (and Fran Bowler), The Morton Partnership
Ecologist	Dr. Duncan Painter
Arboriculturalist	Andrew Belson
Asbestos Consultant	Hamish Turpin, Walker and Turpin
Asbestos Removal Contractor	Alliance Asbestos Services
Wall Painting Conservator	Madeleine Katkov
English Heritage	Trudi Hughes (and Ian Harper), English Heritage
Buildings Archaeologist	Jeremy Musson
DAC Secretary	Jane Logan, Secretary to Ely DAC

[Church of All Saints' Grafham. Nave (North Wall). Note structural movement]

Church Details:

DEDICATION:	All Saints
LOCATION:	Church Road, Grafham, Cambridgeshire, PE28 0DY
PARISH LEGAL NAME:	Grafham
DIOCESE:	Ely
MAINTENANCE RESPONSIBILITIES:	Building (Generally): Grafham PCC Churchyard (Open): Grafham PCC
STATUTORY LISTING:	Grade I
LOCAL AUTHORITY:	Huntingdonshire District Council
CONSERVATION AREA:	No
SCHEDULED MONUMENT:	No
TREE PRESERVATION ORDERS:	Yes
PROTECTED SPECIES:	Bats
COUNTY WILDLIFE SITE (OR EQUIVALENT, OR SSSI):	The churchyard is outside the nearby SSSI [Other similar designations: No]
ANY OTHER DESIGNATIONS:	No

[Church of All Saints Grafham. Nave Ceiling, with views looking east and south]

B. BRIEF DESCRIPTION AND HISTORICAL BACKGROUND

Brief Description of the Church

The building is Grade 1 listed. It combines work of the C12, C14, and C15, with alterations and significant repairs of the C16, C17, C18, and C19.

Layout - In plan, the Church has: a Nave (with two clerestory dormer windows to the south side); a North Aisle which matches the length of the Nave; a South Aisle that is approximately half the length of the Nave); a west tower and stone spire (with two tiers of lucarnes or spire lights), a south porch to the Nave, and Chancel. The Tower has a first floor belfry, and a timber bellframe with three bells).

Materials - Walls are of field stones and some limestone rubble, with dressings in limestone. Internally, walls (and the Nave ceiling) are plastered with lime, and painted with limewash. Nave, Chancel, and South Porch roofs are in a (mainly) handmade clay plain tile. The older roof tiles appear to be a Cambridge white tile, with later replacements in a red tile. In places, particularly the South Porch (east slope) and Nave (north slope), a modern machine made red clay tile has been used. The North and South Aisle roofs are in lead. The spire is in coursed ashlar stone.

Historical Background

The church is not mentioned in the Domesday Survey (1086), and the north arcade of the Nave, c. 1250, appears to be the earliest work which remains; but the fact that the Chancel is some half-century later seems to point to an earlier church on the site, although no vestige of it is evident. The south chapel was added early in the 14th century, and towards the end of that century the North Aisle was rebuilt. The tower and spire were built c. 1400, but the stair turret at its south-east angle was added a little later. The rood-stair was built in the 15th century. The porch was built, or rebuilt, in 1657 and again in the early 1900s; and apparently some work was done to the Chancel in 1689.

In 1724 the 'steeple and bell-loft' were much out of repair, and in 1748 the archdeacon recorded 'the whole of the church very bad and nasty.' A new floor, considerably raised, was put down in 1880, and the steeple was pointed in 1884. The church was restored in 1901–3, when most of the walls were underpinned (supporting the suggestion of a long-term problem). At the same time, a new buttress built on the south side of the Chancel, and the South Porch was rebuilt. The spire was pointed in 1906, and the lead on the aisle roofs was recast in 1908.

Fabric At Risk?

Internal plasterwork, decorations, any underlying wall paintings or decorative scheme (dates: Nave mid-C13, Chancel C13, South Aisle C14, North Aisle late-C14, Tower Vice Stair circa C15); Nave timber roof structure (date: 2no. C17 surviving roof trusses, C15 stone corbels, remainder C19); Nave benches (date: circa C19); Font. (date: C14); Organ (date: circa C19?); South Aisle timber roof structure and boarding (date: C16); South Aisle benches (date: circa C19?); Structural masonry of North Arcade (and to a more limited extent, the South Arcade), Chancel Arch, Rood stair, and associated masonry (dates: North Arcade C13, South Arcade late C13 or early C14, Chancel C13 (arch rebuilt circa C19), Rood stair C16).

C. PROJECT DETAILS

Problems Arising

Nave Masonry (East End, North Side)
Structural Engineer Ed Morton of the Morton Partnership has advised that, "*...The church has been affected by some subsidence, principally around the eastern pier forming the junction between the nave, chancel, and north aisle. This is a relatively weak section of masonry due to the loss of core where the rood stair rises within the core which reduces the piers ability to support the thrust from the arches of the north arcading and chancel arch. Therefore as the springing point of the arch is allowed to move slightly this then induces movement to occur within the arches themselves. As well as the movement to this pier it seems likely that at least the eastern column of the arcading has subsided…"*

Following ground investigation work in 2008-2009 (involving cable percussive boreholes and foundation inspection pits), the Structural Engineer recommended the following work:

i) Pinning the large pier of masonry at junction between the Chancel, North Aisle, and Nave, to allow it to act monolithically;
ii) Reinforcement of the thin wall to the east of the roof stair and associated buttress (east wall of the North Aisle) to provide it with greater strength to help resist movement);
iii) Continuation of tree management;
iv) Continuation of monitoring.

All of the above recommendations formed part of the final proposals for the project.

Nave Roof (North Slope)
The condition of this roof slope was very poor indeed:

i) Failing Roof Covering
    a. Rainwater ingress
    b. Failing nail fixings to battens failing, resulting in slippage of battens and risk of cascading of roof tiling – the roof tiling was considered 'live'
    c. Failing tiles generally. Including to ridge (shaling, damaged, missing tiles)
    d. Inability to carry out tiling repairs/maintenance due to poor condition of the roof covering (ie. risk of causing more damage than was able to be repaired)
    e. Tiling at low level was cemented in position, making tiling repairs problematic
    f. High levels of moss on roof helping increase moisture levels in tiling and below in/around the roof battens, roof structure, ceiling structure, etc.

ii) Inadequate ventilation of roof space (torching at all levels prevents ventilation through tiles, and eaves are unventilated, etc.)

iii) Evidence of decay to timber roof structure:
    a. Visibly decayed timber (some historic, some apparently not);
    b. Soft / 'dopey' timber to rafter ends and wall plate;
    c. Wall plate slightly damp to touch;
    d. Build-up of debris on wall top helping reduce ventilation of timbers and harbour moisture;

Nave Roof (South Slope)

The condition of this roof slope was better than the north slope, but there were some problems:

i) Failing Back Gutter Detail To Stair Turret:
   a. Rainwater ingress evident around vice stair;
ii) Failing Ridge tiles (see under "Nave Roof (South Slope)");
iii) Eaves Rainwater Gutter needs re-setting and replacement

South Aisle Roof

The condition of this roof was very poor indeed:

i) Failing roof covering
   a. Lead roof sheeting in very poor condition (beyond end of working life):
   b. Extensive splits and fractures to lead sheet (especially to rolls);
   c. Lead sheet was sagging in places (due to drops in timber boarding below);
   d. Lead had been extensively patched & repaired but was leaking again.
   e. Lead abutment flashings oversized and failing (now repaired)
ii) Possible timber decay to roof boarding/structure
iii) Failing east parapet wall
   a. Failing copings (split/fracture stones, open joints)
   b. Failing flashings (splits to lead, failing pointing):
iv) Eaves Rainwater Gutter needed re-setting and replacement.

The Consequencies Of Not Carrying Out The Proposed Works?

1. Damage to historic fabric was occurring;
2. Damage to historic fabric had been on-going for some time;
3. Damage to historic fabric was accelerating;
4. Other historic fabric not already suffering damage was at risk;
5. The scope and costs of associated work will increase progressively year-on-year.

Due to the condition of the fabric, and despite considerable attempts at repair, further patching-up was not considered economically viable, or indeed practical or sensible (it would not address the problems arising), and leave the future of the building at risk.

[Church of All Saints' Grafham. South Aisle Roof (East End) Location of parapet wall repairs.]

D. CONSERVATION AND REPAIR PHILOSOPHY

Conservation Philosophy Generally

The Church's listing, as a Grade I building, reflects its position as a building of 'exceptional interest', here listed for its architectural, historical, social, and topographical value. The basic conservation philosophy adopted was one of conservation and repairs rather than restoration (ie. to conserve and repair the existing, unless it was otherwise beyond practical or reasonable repair or that it placed other elements at risk). The fabric, fixtures and fittings were to be treated sensitively, and repairs or replacements carried out generally using traditional methods and materials. The building's archaeology was to be retained wherever possible. Otherwise, in consultation with the Diocesan Archaeological Advisor and the project's own buildings archaeologist, it was to be carefully recorded and relevant samples retained for future reference (though this proved unnecessary for this particular project, as no major replacement was required).

The general project approach adopted assumed that the Church, like any other building worked as a spatial environmental system – an interaction of many elements including its materials and method of construction, the environment, its use, etc. – and that being able to successfully address the problems that had arisen required that the building had to be understood as a whole. This philosophy informed more than just the initial assessment of the building and its problems – it was thought essential both to the selection of the appropriate methods of conservation and repair, and to the adaptation and modification of these methods as the work progressed (ie. as a greater understanding of the building and its problems were gained).

[Church of All Saints' Grafham. North Aisle (East End) Structural work pre- and during repairs]

E. BRIEF SUMMARY OF THE WORKS

INVESTIGATION WORK (PHASE I)

Nave roof
- Investigation of condition of tiling & condition of Tower vice stair back gutter
- Tiling Maintenance;

South Aisle Roof
- Investigation of condition of South Aisle roof boarding/structure;

Nave (Interior)
- Inspection of fractured plaster for loose material;

Other
- Drain survey (by specialist drain company)
- Inspection of trees by Arboriculturalist
- Inspection of walls for historic wall paintings
- Historical research (by specialist buildings archaeologist);
- Liaison (re-bats) with Natural England, the Bat Conservation Trust, and an ecologist (in connection with the need for a licence to carry out the work – need avoided).

ROOFS AND EXTERNAL WALLS (PHASE II)

Nave Roof (North Slope):
- Re-roofing (and associated repairs) with improved ventilation

Nave Roof (South Slope):
- Re-roofing (and associated repairs) with improved ventilation
- Reconfiguring the back gutter to the Tower vice stair

South Aisle Roof (East End):
- Repairs to lead roof

Tower (East Elevation):
- Minor repairs to masonry (incl. pointing repairs)

North Aisle Roof:
- Minor leadwork repairs, and masonry repairs to copings, etc.
- Provision of new rainwater downpipe & gully to north elev.

South Porch Roof:
- Repair to box gutter, etc.

Provision of new roof alarm system

INTERIOR ACCOMMODATION (PHASE II)

Nave:
- Internal redecoration (incl. plaster repairs)

North Aisle:
- Localised plaster repairs (and associated internal redecoration)

Chancel:
- Localised plaster repairs (and associated internal redecoration)

South Aisle
- Localised plaster repairs (and associated internal redecoration)

Structural repairs at east end of North Aisle (around the Roof Stair)

MISCELLANEOUS ITEMS (PHASE III)

Completion of miscellaneous items, following the previous main contractor ceasing trading.