Funded by
Historic England

The Value of Maintenance?

Project Report

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

Compiled By: James Phillips BA(Hons), BArch, RIBA CA

Date of Report: 29/03/2019

Revision: 3

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

Contents

NOTE:

The assessment provided in this report is based only on the information contained within the study sample and is affected by the specific details of the churches assessed. Figures quoted in this report are to be used for guidance only and are not to be extrapolated beyond the context of the report.

It should also be noted that the report uses 'church' to refer to the church building and 'Church' to refer to the people responsible for the upkeep of the building.

APEC Architects were commissioned by Historic England to undertake an analysis of a sample of Quinquennial Inspection reports and evaluate the estimated repair liability and the value of maintenance and minor repair to these buildings. All views expressed in this report are those of the authors.

Funded by Historic England

1. Executive Summary

1.1. Following a public tender in January 2019, Historic England appointed APEC Architects Ltd (APEC) and Greenwood Projects Ltd (Greenwoods) to undertake a research project that seeks to evaluate the estimated repair liability of a sample of churches, the impact of 'stitch in time' repairs on the condition of the building fabric and the cost impact of delaying repair work and maintenance.

1.2. During February and March 2019, APEC and Greenwoods assessed the condition of a sample of 30 church buildings, looking back over a set of Quinquennial Inspection Reports (QIRs) for each site. Each defect was noted, along with its cause, and the necessary repair for each defect was then costed in order to ascertain each Church's repair liability. This process was repeated for each church QIR in order to follow the progress of defects, where not resolved. In addition, expenditure was recorded where the Church had carried out work.

1.3. In order to aid assessment, each church was categorised according to its listing grade and status in relation to the Heritage at Risk Record (HAR). Each defect was also categorised by building element and cause of defect.

1.4. The complete set of costings allowed for assessment of the impact of repair and maintenance, taken as an average across various categories. This assessment allowed a number of conclusions to be reached:

1.4.1. <u>Poor maintenance and repair results in increased cost liability, prone to rapid escalation</u>

There is a clear separation between the cost liability of Churches that regularly perform repair work and maintenance tasks, and those where this work is minimal. Not only are the costs far greater for churches that delay repair and maintenance, but also the deterioration is noted to generally escalate from one QIR to the next, as defects have a consequential impact on other building fabric. This results in cost liability escalating and it becomes increasingly difficult to budget for the necessary work. Defects still occur in well-maintained churches, but regular repair keeps these at a stable rate. This enables budgeting for work to be far more consistent and predictable. It was noted that once churches reach a critical point of deterioration, the costs increase rapidly, and even relatively high, regular, expenditure cannot bring the building back to a stable condition. In such cases, only major schemes of work can address the issues faced. As such, the Churches that undertake regular maintenance spend less in the long-term.

1.4.2. <u>Delaying repair results in a significantly increased cost liability for Churches</u>

There is a clear impact on cost caused by delaying repair. Across the sample of churches in the study, the cost that would have been incurred if all defects were rectified when first identified is approximately **£6,950,000**. The total estimated cost associated with delaying repair is **£1,200,000**, increasing the total cost of repair to **£8,150,000**. This is due to the condition of the fabric in question deteriorating, which requires more repair work as time progresses.

In addition to this, there is further damage from consequential repairs (where one issue causes another defect elsewhere in the building fabric) to consider. This leads to a greater number of defects being identified from one QIR to the next. This is seen in the cost increase between

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

initial QIR reports and last QIR reports of **£1,800,000** across the study. This figure also does not take account of any spending during the study period.

When broken down into 'regularly maintained' and 'minimal maintenance' churches, it is clear that the churches that carry out regular works have far less cost associated with delayed repair or increased number of defects (refer to section 6.2 for further details).

1.4.3. Roofs and rainwater goods/drainage are the primary cause of defects and consequential decay

As well as assessing the data on a church-by-church basis, the study assessed the rate of deterioration of different building elements. It was found that defects to roofs and rainwater goods deteriorated rapidly between QIRs. Delaying repairs to these elements resulted in a more rapid increase in cost liability. Not only are these elements costly to repair in themselves, but they were also found to be the principal cause of defects in masonry and interiors. These consequential defects can also escalate rapidly, so the importance of regular maintenance and repair to roofs and rainwater goods is clear. Where not affected by saturation, masonry and interior defects were found to deteriorate far slower, allowing the Church to resolve issues in a more programmed manner.

1.4.4. Based on the project sample, different ages of church experience broadly the same issues

Assessment of the churches by age category (Medieval and Victorian/Pre-WW1) identified that most churches faced the same issues in relation to typical defects and the cost of repair. Whilst the age of the building did not appear to be a defining factor, the size and complexity of the building were.

1.5. Whilst there has long been an understanding that regular maintenance and repair is beneficial for the long-term condition of a church's building fabric, this study has been able to use estimated cost data to demonstrate the importance of this approach. It is clear that those Churches that do not promptly attend to defects are increasing the risk of far greater cost liability as a result.

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

2. Introduction

2.1. Project Scope

2.1.1. Regular maintenance is recognised as 'the routine work necessary to keep the fabric of a place in good order' (Practical Building Conservation – Conservation Basics 2013). It stops small issues causing great damage or escalating into expensive and challenging crises. It will not prevent major problems caused by materials coming to the end of their life, structural failure or violent damage by storm, fire or vandals, but regular maintenance coupled with 'stitch in time repairs' to address small problems keeps a building in the best possible health for the long term. However, there is no recent research to provide evidence of the potential economic benefit of maintenance and proactive minor repairs or the trajectory of deterioration where they are not done.

2.1.2. This research project was commissioned to explore whether three key questions could be addressed by a desk-based analysis of a series of quinquennial inspection reports for a sample of 30 listed churches:

I. What is the current estimated repair cost for necessary capital works on this sample of historic places of worship?

II. What would have been the cost of timely maintenance and minor 'stitch in time' type repairs if they had been done when identified in the fabric report/s as being necessary?

III. Would prompt attention to maintenance and repair issues have prevented or slowed down the development of major repair needs or are some of these the result of material, structural or design failures and could not have been managed or averted by maintenance?

2.1.3. The project was publicly tendered in January 2019, with a completion date of 29th March 2019. The contract was awarded to APEC Architects Ltd as Historic Building Experts and Greenwood Projects Ltd as Quantity Surveyors.

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by Historic England

3. Project Methodology

3.1 Project Setup and Selection of Churches for the Study

3.1.1. The 30 places of worship involved in the project were selected by Historic England to represent four groups of building:

- Those that have been on the Heritage at Risk Register (HAR) for more than three years
- Those added to the HAR in 2018
- Those assessed by Historic England for inclusion on the HAR in 2012 but were not considered to be at risk so were not added to the Register
- Those not assessed by Historic England in 2012 because the most recent quinquennial inspection report indicated that they were in good or fair condition.

3.1.2. Within the sample Historic England sought to represent:

- Each listed grade in the same proportion as places of worship nationally (approximately one third of each grade).
- As broad a geographical spread as possible to provide a range of materials, building types and climate across England.
- Buildings from a range of different periods: pre-medieval, medieval, post medieval and 19th century up to 1914.
- Different Christian denominations, although in practice this was not feasible because only the Church of England has a statutory requirement for quinquennial fabric inspections. In the end the sample included only one non-Church of England building.

3.1.3. The selection was done randomly from buildings within each criteria and Historic England contacted the dioceses in which they were set to request a copy of the last three quinquennial inspection reports. These were provided digitally to APEC Architects for analysis. Many Diocesan Advisory Committee Secretaries worked hard to provide these reports in a very short space of time, some having to visit archives or contact parishes directly. Historic England is very grateful to them for their willingness to help and enthusiasm for the project.

3.1.4. It was decided not to include any post-1914 buildings in the sample because:

- The materials, design, construction methods and technological issues are radically different to those of earlier buildings
- There is a small number of listed 20th century buildings: to have included a token example would not have properly reflected the issues they face and to have included more may have skewed the findings

3.1.5. There may be a case for examining the methodology and considering whether it would be appropriate to use or adapt it to repeat the project with a group of diverse 20th century buildings to provide a parallel dataset.

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

3.2 Analysis of the Quinquennial Inspection Reports (QIRs)

3.2.1. The process undertaken for this research project was to read through and analyse a series of different QIRs for 30 separate church buildings. This enabled the research team to take a view of each building over a length of time, track defects and repairs, and identify the impact of maintenance and repair (or the lack of). Each defect was separately recorded and categorised by element and urgency, and tracked from one QIR to the next. Once categorised and listed, each defect was analysed by the Quantity Surveyor to assign a cost to the repair, along with noting expenditure, where carried out. This enabled the cost of the repair to be assessed over time, to see where delay in resolving an issue leads to greater damage and associated cost.

3.2.2. Between two and four QIRs were provided for each church in the study, with 70% of churches having three QIRs available.

3.2.3. The same Accredited Conservation Architect has carried out analysis of the QIRs for each of the 30 churches within the study, in order to ensure consistency in the assessment of each defect and the Church's response to recommendations made by the church inspectors.

3.2.4. Whilst some Churches maintain the same church inspector throughout the study period, it is common for the QIRs to be produced by different inspectors. As QIRs tend to be written on an elemental basis, it is possible in most cases to track defects and repairs from one report to the next, even if there is a different author. Where a defect or repair was not traceable from one report to the next, the architect carrying out the assessment used their best judgment to establish the likely outcome, based on photographic evidence, record of work carried out at the same time or nearby, and the general approach by the Church to issues of maintenance and repair.

3.2.5. As far as possible, each unresolved defect was assessed from one QIR to the next to judge whether the condition of the affected item had grown worse or the area affected by the defect had increased. This formed the basis of analysis on whether delaying repairs or maintenance results in greater cost for the Church.

3.2.6. The assessment used the categories of urgency stated in each original QIR, rather than the architect applying their judgment. On occasion, defects may become less or more urgent from one QIR to the next, depending on the view of different inspectors, rather than as a result of any change to the defect in question. This was important to record, as the urgency stated by the inspector has an impact on the response from the Church group. The cost assigned to each defect was not impacted by urgency rating; instead it was determined by description given and photographic evidence where provided.

3.2.7. Different inspectors use different codes to describe urgency of repair in number of years. These were all converted to the same coding system for the purpose of this project. Urgency ratings are as follows:

- A – Urgent
- B – Within 12 months
- C – Within 12-24 months
- D – Within the quinquennium

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by Historic England

- E – Desirable repair with no timescale
- X – Requires further investigation/survey
- M – Item of ongoing maintenance

3.2.8. On the rare occasion that urgency was not stated for the items recommended for repair, it was assumed that all items listed were to be attended to within the quinquennium and were therefore graded category D.

3.2.9. For a few of the churches included in the study, the QIRs vary significantly in their content and detail. This meant that the condition of a church appears to have got notably better or worse, where in fact the condition could be seen to be fairly constant, but open to different interpretation by the inspector. Whilst comparison was carried out regardless of this, the cost appraisals of these churches were omitted from wider comparative analysis, as the figures skew the overall results.

3.3 Definition of Terms Used

3.3.1. In the assessment of each church, the defects identified in the QIRs were categorised by both building element and cause of the defect. Given the wide range of buildings covered by the study, each experiencing different issues, the category headings had to cover a broad range of issues. This report, and the separate document compiling the reports for each individual church, uses these categories in the analysis of the Value of Maintenance. To aid interpretation and understanding, the below definitions are provided for the category headings used. Also provided below are the definitions of other terms and abbreviations used frequently throughout this report.

Elemental Categories:

3.3.2. ***Masonry***: This category encompasses the walls of the building regardless of type of masonry, and decorative elements of the building formed from masonry, e.g. external stone hood moulds to windows, but not including the interior finish applied to the masonry wall. Timber frame elements of a building, for example a belfry, are covered by other category headings.

3.3.3. ***Roofs***: This covers the roof coverings and structure of the roof, regardless of material, along with flashings and other such waterproofing details necessary for the correct function of the roof. This does not include interior decorative finishes, such as plaster, applied to the underside of the roof structure.

3.3.4. ***Structural Stability***: This item covers elements of the building exhibiting structural failure leading to collapse or movement of the entire element. Structural movement exhibited in other elements, such as a crack in a masonry wall, is not included, instead being included in the appropriate category heading (in the case of the example, masonry).

3.3.5. ***Rainwater Goods and Drainage***: This covers all elements of above and below ground rainwater handling, both visible and concealed. This also covers ancillary items associated with the correct operation of these elements, such as flashings and fixing brackets.

Funded by
Historic England

3.3.6. ***Interior***: This covers all internal finishes and fittings, where not otherwise covered by another category heading.

3.3.7. ***Windows***: This covers all glazing, along with associated framing and supports. Where present, it also includes ventilation hoppers, openable elements, louvres and shutters etc. It does not include masonry elements surrounding the window, which are covered under 'masonry'.

3.3.8. ***Services***: This covers all piped and wired connections to and within the building, along with all associated fittings and plant. This does not include safety items such as lightning protection and firefighting equipment, which are covered by 'sundry'.

3.3.9. ***Sundry Items***: This covers all other items not falling under the category headings above.

Cause of Defect Categories:

3.3.10. ***Lack of Maintenance***: This covers an item where defects have occurred through lack of maintenance, or where it is clear that typical maintenance tasks would have prevented the defect noted from occurring, for example peeling paintwork, or leaves blocking a gully.

3.3.11. ***Delayed Repair***: This is where a repair or maintenance item has been highlighted in a previous QIR, but has not been actioned. This also includes items where additional surveys have been recommended but not carried out.

3.3.12. ***Material Failure***: This is used for an item where the material used is exhibiting signs of failure, for example spalling stonework or rotting timber. It is noted that the original cause of this failure can be quite varied.

3.3.13. ***Structural Failure / Movement***: This covers items where structural movement or failure has occurred within a building element.

3.3.14. ***Design Failure***: This is where the design of an element makes it inherently prone to failure. This category heading is also used where the poor installation of a material or element has led to failure or defect.

3.3.15. ***Weather***: This category is used where defects have been caused by serious weather events, such as storms or lightning strikes. It is not used to describe typical weathering of materials, as in such cases defects may have been caused by other factors, such as poor detailing.

3.3.16. ***Anti-Social Behaviour***: This covers items of theft, deliberate damage, graffiti or other such examples of vandalism.

3.3.17. ***Undefined***: This covers all other items where the cause of the defect is not included in the text of the QIR, or where the cause does not fit into one of the categories outlined above. It is also used where a defect has numerous causes and where there is not one clear primary cause.

Other terms and abbreviations:

3.3.18. ***church***: The church building

3.3.19. ***Church***: The people responsible for the upkeep of the church

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

3.3.20. ***HAR***: Heritage at Risk Register

3.3.21. ***QIR***: Quinquennial Inspection Report

3.3.22. ***Cost Liability/Cost***: The sum estimated to be required to rectify an identified defect(s)

3.3.23. ***Expenditure***: The sum spent by a Church, as identified in a QIR

3.3.24. ***Inspector***: The person who carried out the inspection of the building and produced the QIR.

3.4 Costing the Defects Identified

3.4.1. The costing is a desktop exercise based on historic QIRs of which between 2 and 4 were provided for each of the 30 churches.

3.4.2. Costs have been based on the descriptions and photographs (where provided) contained within the reports and categorised strictly in accordance with the criteria established by the Conservation Architect as noted above. A number of the QIRs contained estimated costs by the inspecting Architect and while these have been helpful in some cases to establish the extent of the work they have been reviewed and the costs have not necessarily been taken literally. One QIR contained details of specific expenditure during the previous QIR period, which was helpful in informing the estimated cost for the listed work.

3.4.3. For the basis of analysis and comparison, costs have been set at current cost levels in the first quarter of 2019 (i.e.1Q19). Historic costs have been increased to reflect inflation broadly in line with the BCIS All in Tender Price Index. No separate allowance has been made for contingencies/risk or regional adjustments.

3.4.4. Both professional fees and VAT have been excluded from the totals and should be allowed for in addition to the estimates given (less any adjustment for sums which may be recoverable under the Listed Places of Worship Scheme).

3.4.5. No adjustment has been made for items of work that could be undertaken by volunteers. For the purpose of analysis these have all been costed.

3.4.6. Large items of replacement and repair (e.g. roof coverings and masonry repairs) include an allowance for access scaffolding on the basis that this would always be necessary. With smaller or individual items of repair or maintenance this is not practical and therefore the cost of access has not been included.

3.4.7. Expenditure within the QIR period has been included on the basis of whether the remedial items have been undertaken. A subjective assessment of any additional expenditure for items not included in the QIR has been made from details of any work identified in the QIRs as being undertaken within the period.

Funded by
Historic England

4. Conclusions by Building Element

4.1. The categorisation of each defect by element allowed conclusions to be drawn about the rate of decay of different parts of the building, and where 'stitch in time' repairs or regular maintenance can have more of a significant impact. This section of the report details findings and observations specific to each building element, with associated cost analysis and examples from churches within the study, where relevant.

4.2. Masonry

4.2.1. Across the sample churches, defects noted in masonry primarily stem from saturation of walls. This is most commonly as a result of defective rainwater goods and roof finishes, either through lack of maintenance (blockages, leaking joints etc.) or due to not carrying out a repair on these items in a timely manner. A number of churches have poor drainage around the perimeter leading to saturation of the surrounding ground, and eventually the base of masonry walls too.

4.2.2. Whilst saturation of walls is the cause of a lot of the deterioration noted, the maintenance and repair work carried out to the wall can have a notable impact on how quickly the saturated wall deteriorates.

4.2.3. It is noted that a great number of the churches in the study have hard cement pointing, much of which seems to date back a number of decades when the damage that this type of pointing can cause was less understood. Combined with saturated masonry, this causes significant and relatively quick deterioration of masonry. It would be preferable in most cases for this pointing to be removed as a matter of urgency. It also highlights the importance of the Church being informed of the requirements of traditional construction so that well-meaning pointing repairs are not carried out with inappropriate materials. Related to this, open joints are slow to be addressed at a number of different churches, which further contribute to water being able to pass into the wall.

4.2.4. The other impact of saturation of walls is that it causes embedded iron cramps to rust, expand and cause stonework to crack or become loose. This is the main cause of cracking observed; other movement or structural failure was very rare.

4.2.5. Given that water saturation is the principal cause of deterioration of masonry, it is reasonable to state that masonry is an area of 'consequential deterioration', vulnerable to failure if issues with rainwater goods and roofs are left unaddressed.

4.2.6. Those churches in which the walls were in general dry experienced much slower deterioration of masonry, in line with typical weathering.

4.2.7. There were instances where inherent design issues, such as the combination of sandstone and limestone on the same façade, had caused deterioration to which the Church could only respond, rather than do anything proactive to prevent it.

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

4.2.8. The following graphs (Figures 01 & 02) illustrate the average cost and expenditure associated with masonry for a sample of churches that have had minimal maintenance, compared with a sample of churches that have had regular maintenance and repair. The churches where minimal repair has been carried out incurred a significant increase in cost liability across the study period. This was partly due to the drop in expenditure indicated, but also likely represents the consequential decay of masonry as a result of defects to rainwater goods and roofs not being addressed. It is clear that for the regularly maintained churches, an increase in expenditure led to a decrease in cost liability.

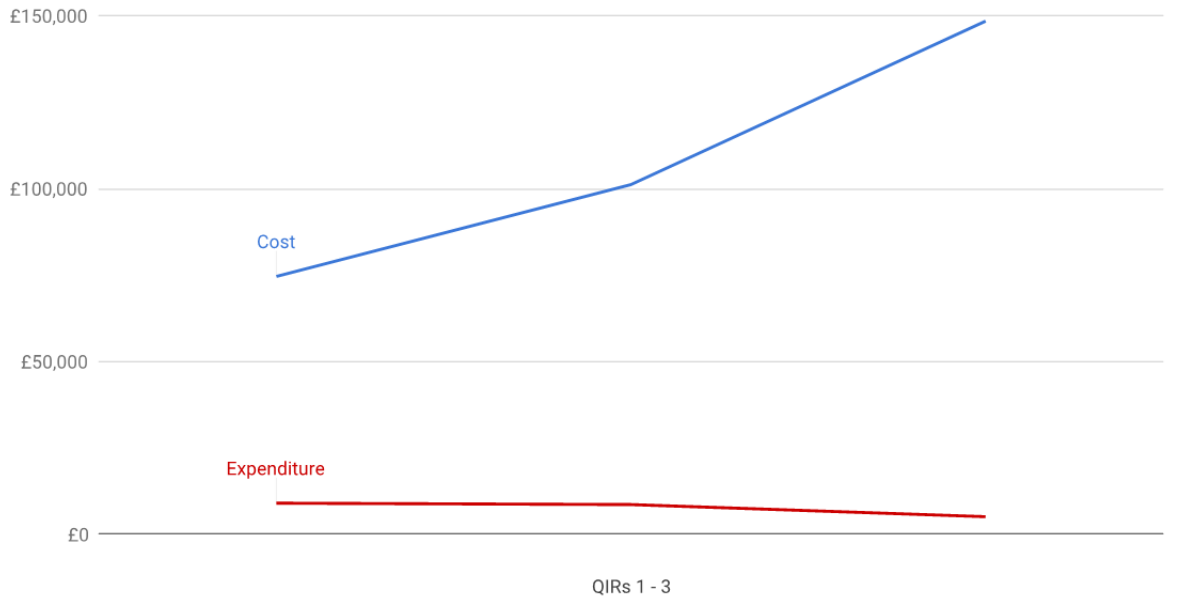

Figure 01- Average Cost and Expenditure by QI for Masonry – 12 churches with minimal maintenance/repair

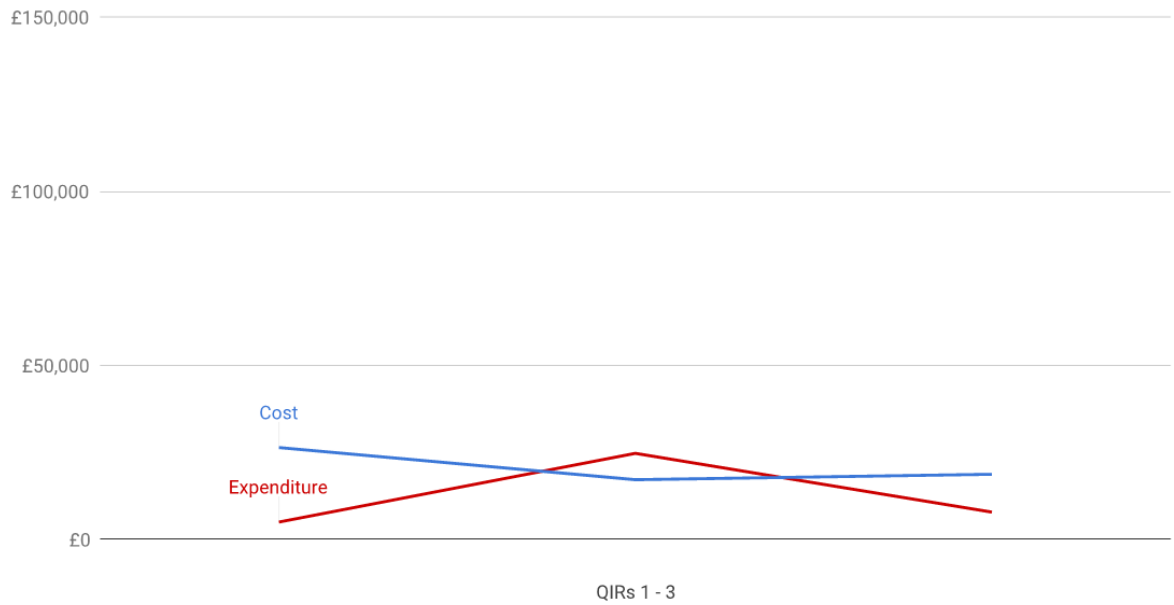

Figure 02- Average Cost and Expenditure by QI for Masonry – 9 churches with regular maintenance/repair

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

4.3. Roofs

4.3.1. Across the study period, most roof failures were due to the covering reaching the end of its design life. Until that point, few issues occur if the roof is correctly maintained, though the eventual recovering of a roof can be far more expensive than most work that the Church has to undertake.

4.3.2. For slate roofs, defects are primarily due to the failing of nail fixings, which becomes more frequent as the roof reaches the end of its design life. There were examples of battens failing as a result of water penetration through slipped/missing/damaged tiles, or due to battens being undersized in the first place, though this was not common.

4.3.3. Based on the progress of defects on the churches in the study, it would appear that patch repairs can be effective to delay the need to replace a roof for 5-10 years once it has reached the end of its life. Beyond that, however, the number of slipped slates gets significantly greater with each quinquennium, even when repairs have been carried out. Combined with the cost of access, this makes ongoing repair unsustainable.

4.3.4. Example 1:

> The first QIR identified 28 slipped tiles with an estimated cost to repair of **£650**.
>
> During the quinquennium, 300 tiles were replaced at an estimated cost of **£10,000**. However, by the second QIR a further 33 tiles were noted as having slipped at an estimated cost of **£1,000**.
>
> Despite the expenditure, the roof was deteriorating too fast for patch repair to be financially sustainable. A new roof would have been more cost effective if planning for it had been started as soon as the issues were noticed: the first round of repairs would have bought the Church time to plan and fundraise and saved the expense of the further expenditure on patch repairs.

4.3.5. It appeared quite common that Churches only look to address a roof replacement when such a need becomes urgent. It would be advisable for the cause of slipped slates or tiles to be established when they occur, in order that sufficient notice of the roof approaching the end of its life can be given, to allow the Church the necessary time to raise the funds. Even more beneficial would be the establishment of a 'roof fund' by which the church set aside money each year of the roof's life, in order to pay for its replacement.

4.3.6. The knock-on impact of roof failure can vary depending on the type of roof construction. However, water ingress can result in rapid deterioration of the condition of the building.

4.3.7. Example 2:

> The slate roof was not under-felted, and so water from a few slipped tiles penetrated straight through to ceiling level, causing the plaster ceiling to collapse.

Funded by
Historic England

4.3.8. Example 3:

Water had penetrated through into the roof void and, over a longer period of time, resulted in the rafter feet becoming rotten.

4.3.9. Lead roofs are similarly susceptible to failure at the end of their design life. It was noted on a number of churches that older lead roofs were not installed to current standards, typically with lead sheets being overly long and wide, with tight roll joints. These 'design defects' resulted in cracking and splitting as the leadwork aged, letting water into the roof structure.

4.3.10. Lead roofs are also susceptible to theft and a number of the churches in this study experienced theft. Whilst the Church can only do so much to prevent this from happening, it is worth noting that not only does theft cause immediate damage and distress, but dealing with the replacement of the stolen roof, even if paid for by insurance, has a negative effect on the time and resources available to deal with other identified defects. This problem seemed to be more recognised and in the newer QIRs it is noted that some of these roofs had been replaced with terne coated steel alternatives to circumnavigate this risk and the associated cost.

4.3.11. Installed correctly, a new roof finish should serve a church well for many decades. However, there is a sample church in the study that highlights the importance of ensuring this is done correctly. Immediately prior to the study period, a new roof was installed on this church. Subsequently, each of the QI inspectors noted that the installation of the roof was poor and attributed a number of defects to this. As a result the Church had to make further expenditure on an element that should have been sound following complete replacement. The correct design, specification and skilled installation, are critical to ensuring a sound investment is made.

4.3.12. Along with rainwater goods, roofs are critical to the integrity of any building. The knock-on effects of not dealing with a problem with the roof are often the wide and rapid spread of defects to other areas of building fabric.

Funded by Historic England

The following graphs (Figures 03 & 04) illustrate the average cost and expenditure associated with roofs for a sample of churches that have had minimal maintenance, compared with a sample of churches that had regular maintenance and repair. It is clear in both graphs that as expenditure reduces, cost increases and vice versa. The cost of repair was greater for the Churches carrying out minimal maintenance and increased across the study period. The expenditure the regularly maintained churches were much closer to the cost liability than those churches with minimal maintenance.

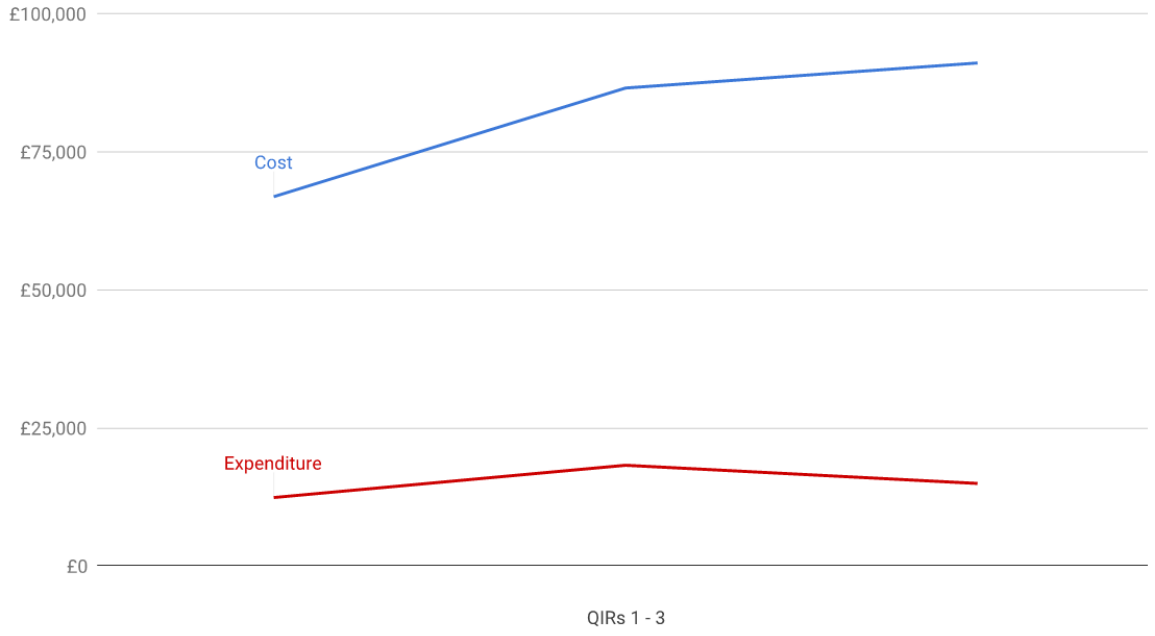

Figure 03- Average Cost and Expenditure by QI for Roofs – 12 churches with minimal maintenance/repair

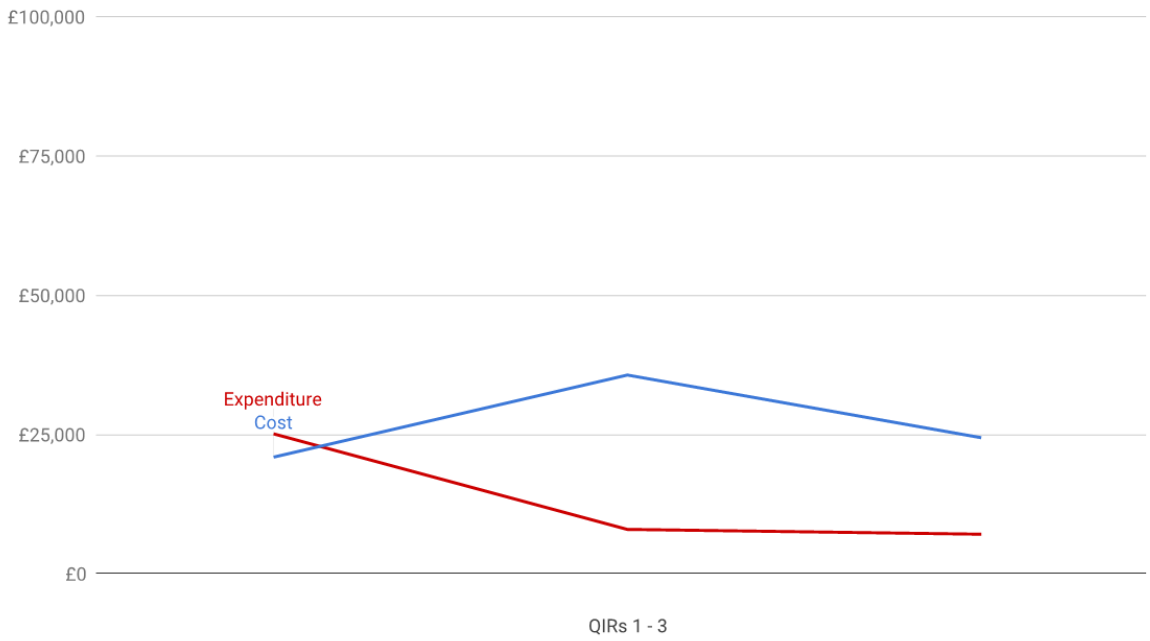

Figure 04- Average Cost and Expenditure by QI for Roofs – 9 churches with regular maintenance/repair

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

4.4. Rainwater Goods and Drainage

4.4.1. Issues with rainwater goods were common across many of the churches in the study period. It Regular maintenance of this key component is crucial for continued correct operation, even before looking at addressing defects in the goods.

4.4.2. Due to the vital role these goods play in moving water away from the building fabric, defects with rainwater goods and drainage can be seen to be the primary cause of consequential defects in other building fabric.

4.4.3. All but one of the churches in the category 'On the Heritage at Risk Register for over 3 years' experienced extensive failings in the rainwater goods as a result of lack of maintenance, difficult to access rainwater goods and undersized rainwater goods. Lack of maintenance was by far the most common cause of failure, and combined with some undersized elements in particular, led to extensive and recurrent issues. As a result of this, all of these churches exhibited extensive saturation of the walls at high level (failing gutters) and at low level (failing gullies and leaks from high level goods). This led to a range of issues across the buildings, including: dry rot to the roof structure, vegetation growth, detaching interior plasterwork and deterioration of internal finishes, rotting in internal floors, masonry defects, and movement.

4.4.4. Whilst the size of some of the churches makes volunteer maintenance of rainwater goods and drainage impractical, it is clear that where there is not a culture of carrying out maintenance, even the easier to manage items, such as unblocking ground level gullies, are neglected. As this is an ongoing issue, Churches would be well advised to set up a regular contract with a local builder to undertake maintenance, where they are unable to do so themselves.

4.4.5. Example 4:

> This church was one of the few in the study noted as having a regular maintenance contract in place for their rainwater goods. The Church spent a few hundred pounds per quinquennium on this, but had notably far fewer defects than any other church in the study. In particular, there were no issues attributed to water penetration of the fabric. As a result the building is only demonstrating isolated 'wear and tear' faults.

4.4.6. Whilst clearance of debris and vegetation from rainwater goods is a key part of regular maintenance, it was not the only maintenance item identified as being required in this study. Numerous churches with cast iron rainwater goods show signs of failure due to rusting of goods as a result of poor decorative condition. Simple issues such as leaking joints and missing support brackets were also fairly common and caused considerable damage in relation to their estimated cost of repair. Whilst redecorating is not needed as regularly as clearing out of debris, it could be considered once per quinquennium, when access is in place.

4.4.7. Example 5:

> The cost of carrying out repairs as a result of not attending to the requirement for redecoration of cast iron rainwater goods in the first QIR led to a **150%** increase in estimated cost compared with the initial decoration works.

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

4.4.8. Failure to act on recommendations to carry out repairs can have significant cost implications. This is particularly the case for concealed rainwater goods and parapet gutters, where leaking results in water directly entering the building, rather than on faced-fixed gutters where water tends to fall primarily to air.

4.4.9. Example 6:

> It was recommended in the first QIR that the Church carry out an inspection and localised repair to its lead lined parapet gutters as a number of splits in the lead were noted, and some flashings had started to slip. By the next QIR it was noted that no repair had taken place; the gutter was choked with debris, joints were open, and flashings completely missing. The lack of repair saw estimated costs increase from approximately **£1,250** to **£20,000** in the 5-year period. It was also noted that further cost was likely to occur as rot to the timber substructure was expected to be evident once the roof was uncovered.

4.4.10. As well as poor maintenance and repair, several churches were noted to have had poorly designed rainwater goods. This was typically due to goods being undersized, difficult to access for maintenance, or both. Whilst some of these issues cannot be resolved, inspectors are often able to suggest ways of improving the design to mitigate risk.

4.4.11. Example 7:

> Although numerous defects were exhibited in this church, it was felt that the inherent poor design of the drainage, including lead pipework built into the masonry, were the cause of most of the damage noted throughout the church. As a result the estimated cost of repair for the whole church has gone from approximately **£200,000** to **£925,000** in the period of three QIRs. Although the Church did not have the means to pay for the work to be carried out, it was clear that some redesign and refurbishment to these goods when issues were first identified would have been more cost effective than rectifying the subsequent damage. This is an extreme example, but the cumulative cost associated purely with delaying repair was estimated to be **£640,000**.

4.4.12. There are Churches within the study which took the opportunity, when carrying out other high level works, to improve on inherent design defects by simplifying rainwater routes, increasing the number of outlets, widening parapet gutters etc. This takes advantage of access already in place (which is otherwise expensive) and is of real long-term benefit for the future condition of the church fabric.

4.4.13. The following graphs (Figures 05 & 06) illustrate the average cost and expenditure associated with rainwater goods and drainage for a sample of churches that have had minimal maintenance, compared with a sample of churches that have had regular maintenance and repair. The graphs show that the regularly maintained churches' expenditure was closely aligned with the cost liability, whereas, in contrast, there was a much lower expenditure on the

Funded by
Historic England

minimal maintenance churches compared to cost liability. However, it can be seen that as the expenditure increases, the rate of deterioration notably slows.

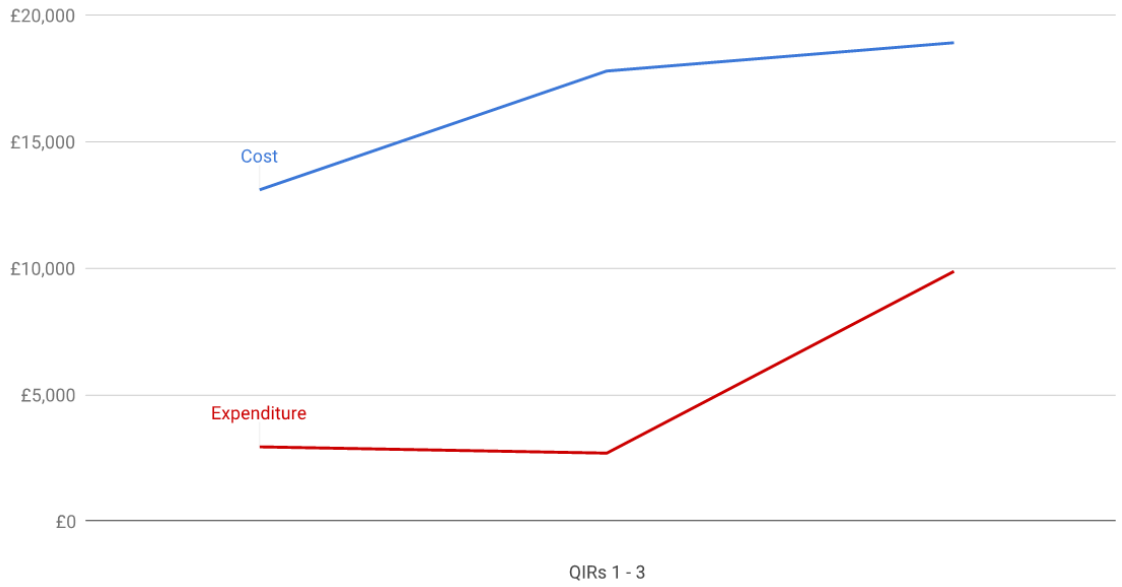

Figure 05- Average Cost and Expenditure by QI for Rainwater Goods and Drainage – 12 churches with minimal maintenance/repair

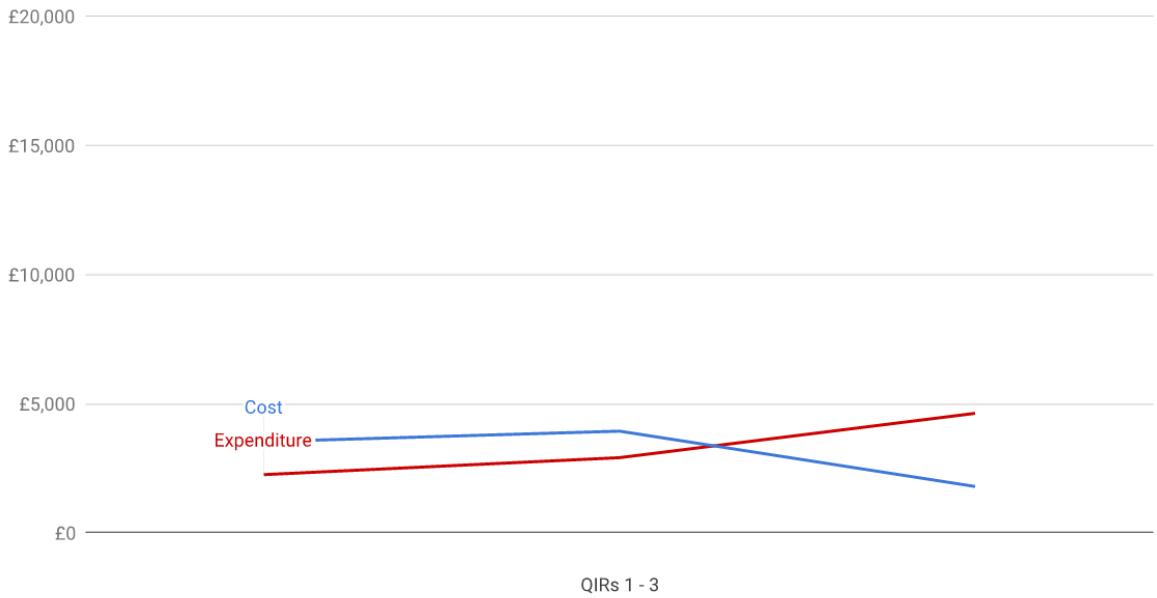

Figure 06- Average Cost and Expenditure by QI for Rainwater Goods and Drainage – 9 churches with regular maintenance/repair

4.5. Structural Stability

4.5.1. Across the study sample there is comparatively little cost associated with items of structural stability that are not associated with another element, e.g. saturated ground from broken drainage causing movement. This indicates that structurally, most churches were intrinsically

Funded by Historic England

sound, which is possibly to be expected for the age of churches studied (Pre-Medieval to Victorian), where any major issues were likely to have arisen and been rectified long ago.

4.5.2. Signs of cracking and structural movement tended to be minor and were not progressed from one QIR to the next.

4.5.3. Although not present in the project sample, structural failure could have significant consequences if not correctly identified and addressed. It was noted that in a number of cases, Churches were advised to seek the advice of a structural engineer, but did not appear to act upon this.

4.5.4. As the presence of structural stability issues was quite uncommon across the sample churches, the comparison graphs have not been included for this category, as the spread of data was not sufficient for further conclusions to be drawn from them.

4.6. Interior

4.6.1. As may be expected, deterioration of interior elements was notably at a much slower rate than external elements, due to items mainly being subjected to wear and tear, rather than weathering. This includes items such as loose floor tiles, handrails that needed securing, and fading paint finishes. This type of deterioration was fairly rarely identified in the QIR reports, as it typically takes place over a longer time scale than that of the study period.

4.6.2. Most instances of deterioration of interior elements were as a result of water ingress, high levels of damp, and saturation of the building fabric. Interior deterioration was therefore almost always an area of consequential decay, usually following on from failure of the roof and rainwater goods/drainage. If a Church ensures that those elements are in good working order, it will probably prevent most interior defects from occurring.

4.6.3. Example 8:

> Grant-funded major works to replace the roof of the church and overhaul of all the rainwater goods took place during the study period. By the final QIR this was noted to have had a positive impact on the fabric with the interior areas of damp having notably dried out, halting further deterioration and enabling repairs / redecoration to take place.

4.6.4. Numerous inspectors noted that a large number of churches in the study had poor levels of internal ventilation. Several of the churches were only open or used occasionally and were closed the rest of the time, making ventilation a real problem, often caused by poor maintenance of opening ventilators. This type of defect is discussed further as part of the 'Window' element of this report. The lack of ventilation combined with the presence of moisture leads to a persistently damp environment from which issues of rot and wood boring beetle decay can occur.

4.6.5. Saturation of the masonry is very common when defects to rainwater goods occur, leading to frequent internal defect of decaying or detaching plasterwork. Similarly, defective roofs resulted in deterioration of internal ceiling finishes. Not only does this cause damage to the

Funded by
Historic England

plasterwork itself, but also often puts significant decorations, monuments and other fixtures and fittings at risk.

4.6.6. Example 9:

> Widespread and prolonged deterioration of the roof and rainwater goods of this church resulted in extensive water ingress into the interior. This resulted in large outbreaks of dry and wet rot in areas of the floor, balconies and roof, failure of large areas of wall plaster and failure of lath and plaster ceilings with associated decorative cornices.
>
> There was also evidence of wood boring beetle attack and mildew on some ceilings. The result of not addressing the defective rainwater goods and roof was that the estimated cost of interior repair increased from approximately **£45,000** to **£140,000** during the study period.

4.6.7. The other internal element vulnerable to deterioration and apparent in a number of the churches included in the study was timber suspended floors. Once a church becomes damp, or the ground beneath it becomes saturated as a result of faulty or inadequate drainage, moisture can become trapped in the voids beneath, which can lead to the floor structure rotting. This can be compounded by poor maintenance of the perimeter of the church with vegetation blocking ventilation grilles, and often inadequate levels of ventilation to concealed voids.

4.6.8. As noted in the 'Roofs' section, timber roof constructions were particularly vulnerable to roof leaks, and timber paneling to these roofs was also affected by rot/decay.

4.6.9. In a number of cases, damp internal environments also resulted in wood boring beetle attacks in items of timber furniture and fittings within the church.

4.6.10. The following graphs (Figure 07 & 08) illustrate the average cost and expenditure associated with the interior for a sample of churches that have had minimal maintenance, compared with a sample of Churches that had undertaken regular maintenance and repair. The common pattern of increasing cost liability for churches that carried out minimal maintenance was again apparent. The graphs also appear to validate the observation that churches where roofs and rainwater goods were in good condition had fewer interior defects when compared to those with minimal repair. For those churches with minimal maintenance, there is a common trend between the graph below and the corresponding graphs for roofs and rainwater goods.

Funded by
Historic England

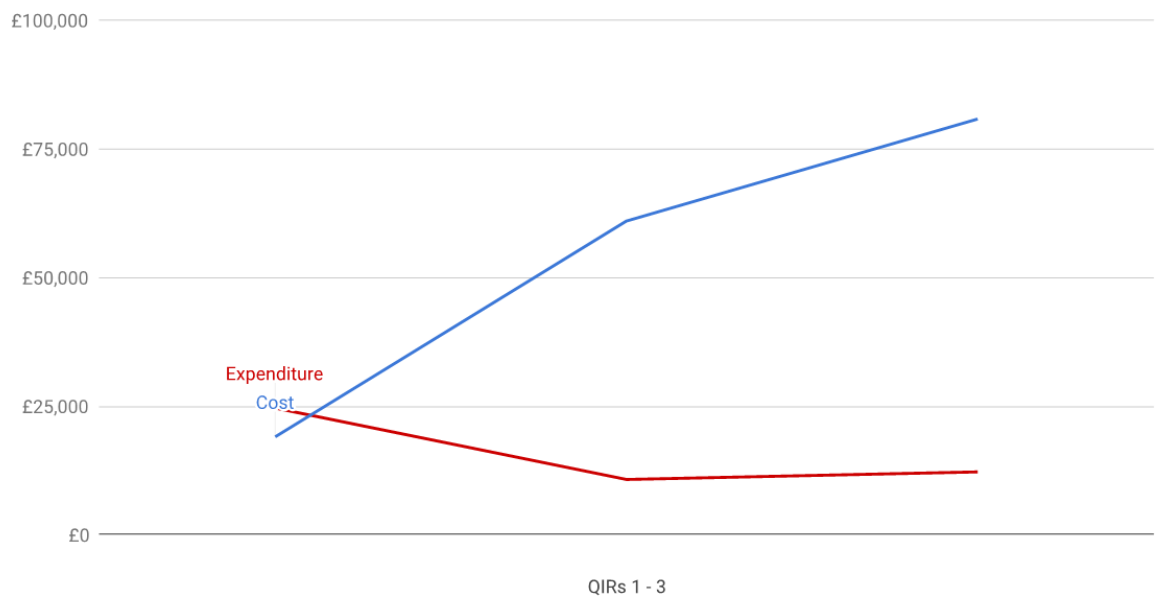

Figure 07- Average Cost and Expenditure by QI for Interior – 12 churches with minimal maintenance/repair

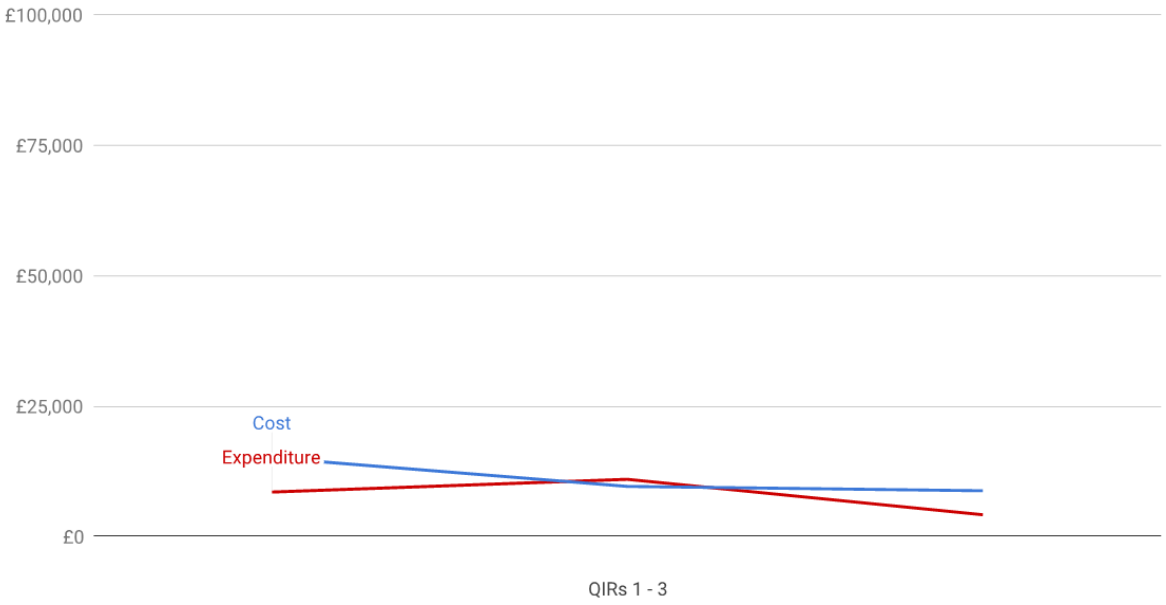

Figure 08- Average Cost and Expenditure by QI for Interior – 9 churches with regular maintenance/repair

4.7. Windows

4.7.1. Deterioration of windows was generally gradual and did not lead to substantial failure on any of the churches within this study.

4.7.2. The most common defects noted were rusting of metalwork, ferramenta and protective grilles. Although isolated glass panes were noted to be cracked, none fully failed or exposed the church interior to the weather, except for the occasional case of vandalism. Some sagging of leaded

Funded by Historic England

windows was noted where connections to ferramenta bars had failed, but again this seemed to be fairly gradual decay.

4.7.3. As most defects related to rusting metalwork, the regular maintenance of decorative finishes could have helped to prevent much of the issues noted. On churches where rusting metalwork was noted, it was usually throughout the church, indicating that the issue was lack of a maintenance programme incorporating windows, rather than it just being difficult to access specific windows. As with decorative finishes on metal rainwater goods, it would be prudent for Churches to engage a contractor to undertake high-level decorative work each quinquennium.

4.7.4. The most common consequential defect of rusting metalwork was damage to stone tracery into which it was embedded. Often this was metalwork that had been in place for a long while, since the use of ferrous metal was more common than it is today. It would be beneficial to replace such elements with non-ferrous alternatives.

4.7.5. As well as the inadequate decoration of metalwork, lack of maintenance also extended to the poor condition of openable vents within glazing. The ventilation these provide is critical to preventing a damp interior, but they are often noted as being seized shut or otherwise inoperable. Easing of these elements should also form part of regular maintenance activities.

4.7.6. Although deterioration of windows was generally slow, there is a risk that significant areas of glazing, particularly stained glass work, could be lost as a result of a lack of action. The significance of the window should be a consideration in determining the urgency of repairs.

4.7.7. The following graphs (Figure 09 & 10) illustrate the average cost and expenditure associated with windows for a sample of churches that have had minimal maintenance, compared with a sample of churches that have had regular maintenance and repair. The graphs for the two types of churches are more similar in this category, which is reflective of the low priority that window repairs are often assigned. As noted on the previous graphs, there was generally a link between increased expenditure and reduced cost, and vice versa.

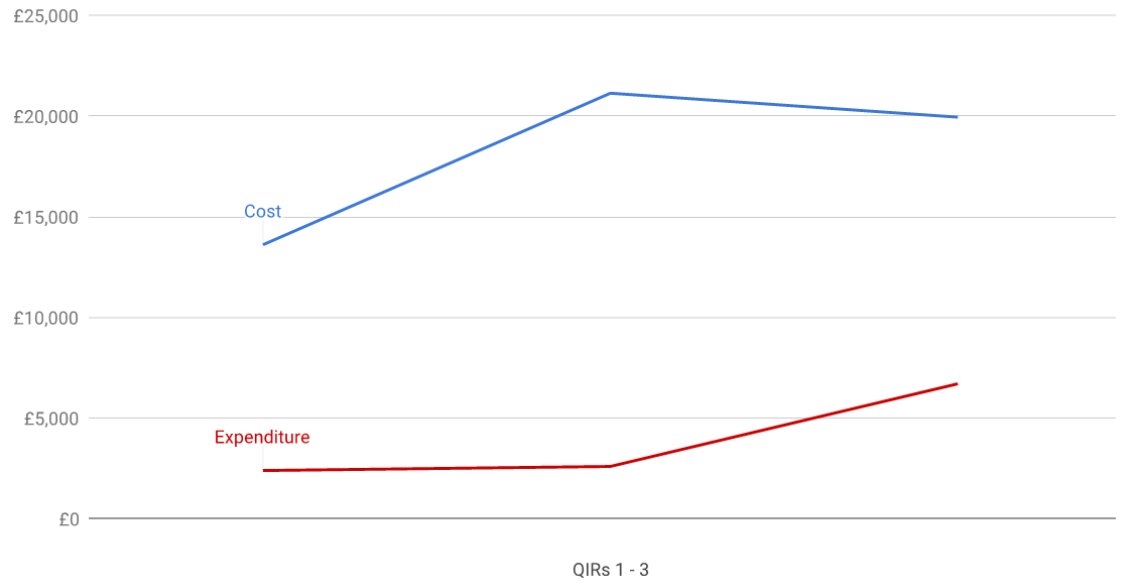

Figure 09 - Average Cost and Expenditure by QI for Windows – 12 churches with minimal maintenance/repair

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

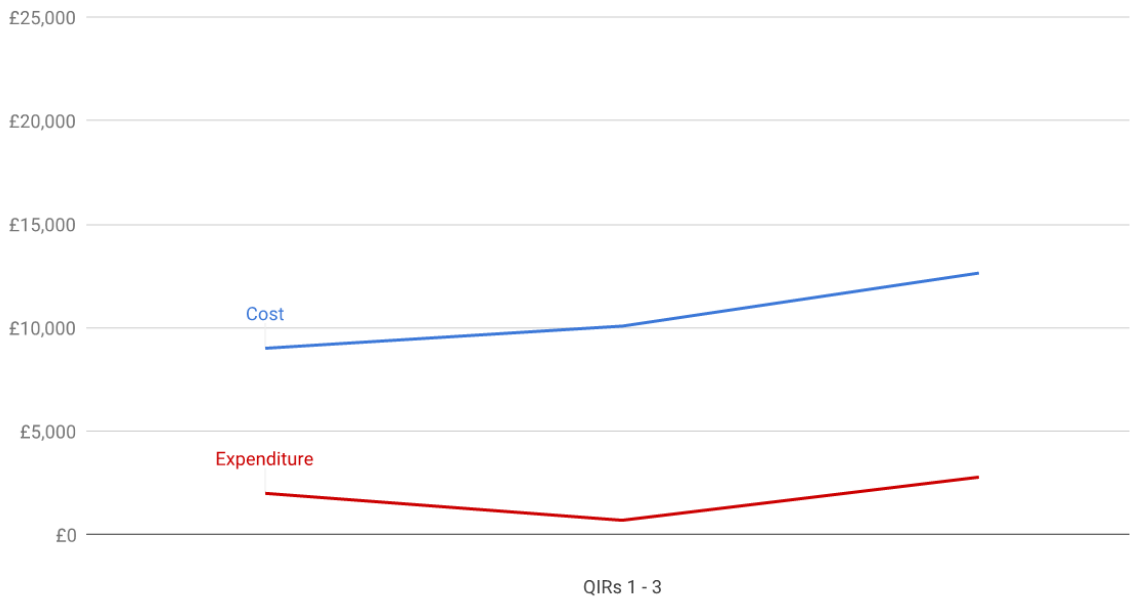

Figure 10 - Average Cost and Expenditure by QI for Windows – 9 churches with regular maintenance/repair

4.8. Services

4.8.1. Services are an element of the building that are, on the whole, independent of the condition of the rest of the building fabric. Often defects noted were due to sudden failures of plant or were recommendations for renewal as the age and condition of the installation made it unsafe, or they were no longer compliant with best practice. Occasionally, leaking pipework lead to consequential defects but that was rare, with only one church in the study in which this was a notable factor.

4.8.2. The response to maintenance of services differed by type. On the whole, Churches were quick to resolve issues relating to heating and a number of churches had new boiler installations during the period. This was often noted as expenditure carried out between QIRs as a sudden requirement, rather than in response to a defect noted in an inspection. This could have been due to the lack of heating having a tangible impact on the users of a church and therefore being more urgently addressed, than the other less visible defects, which may have had more serious consequences for the building and long-term comfort of its users.

4.8.3. Electrical systems, on the other hand, were generally poorly maintained. Most QIRs noted that churches had not had a recent Fixed Electrical Installation tests or Portable Appliance Tests (PAT tests) despite these being a legal requirement. A number of churches had visibly dangerous wiring installations and fixtures that had not been addressed. Such items run the risk of fire and may also invalidate insurances. Where subsequent QIRs reported on tests that had been carried out following recommendation, there had often been elements of the system marked unsatisfactory and needing urgent attention.

Funded by
Historic England

4.8.4. Example 10:

> Inspection of the Fixed Wiring Installation found that the installation was unsatisfactory and required a complete re-wire and replacement of various fittings. The estimated cost attributed to this was approximately **£25,000**.

4.8.5. There were not any notable defects with other fixed services, such as water or gas supply, observed in the study.

4.8.6. Inspectors often listed areas where fixed services could be improved, which are for the purpose of improving the quality of the space, operation of the church, or accessibility (such as better audio, lighting and hearing loops). Whilst these are important they play a small role in the upkeep of the building fabric and were consequently often only graded as 'desirable'.

4.8.7. The following graphs (Figure 11 & 12) illustrate the average cost and expenditure associated with services for a sample of churches that have had minimal maintenance, compared with a sample of churches that had regular maintenance and repair. The two graphs below are broadly similar, reflective of 'services' being an area of building fabric that is generally disconnected from the impact of defects elsewhere. Service repairs tend to be quite isolated items (e.g. an old boiler being replaced), so there is a much clearer relationship between expenditure and cost, without the impact of deterioration noted in the other elemental categories.

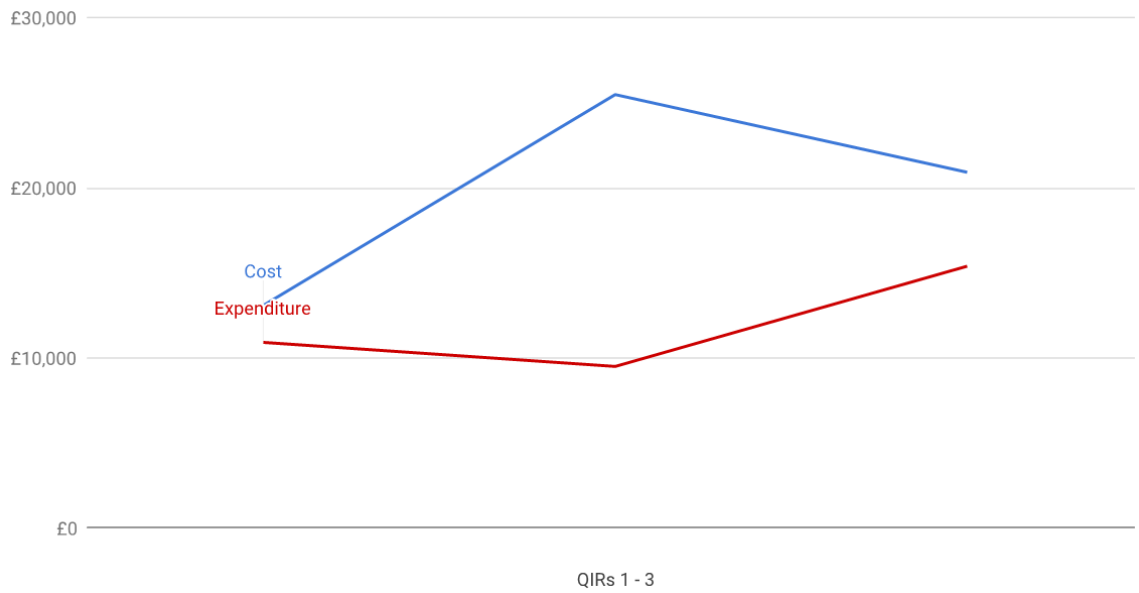

Figure 11 - Average Cost and Expenditure by QI for Services – 12 churches with minimal maintenance/repair

Funded by
Historic England

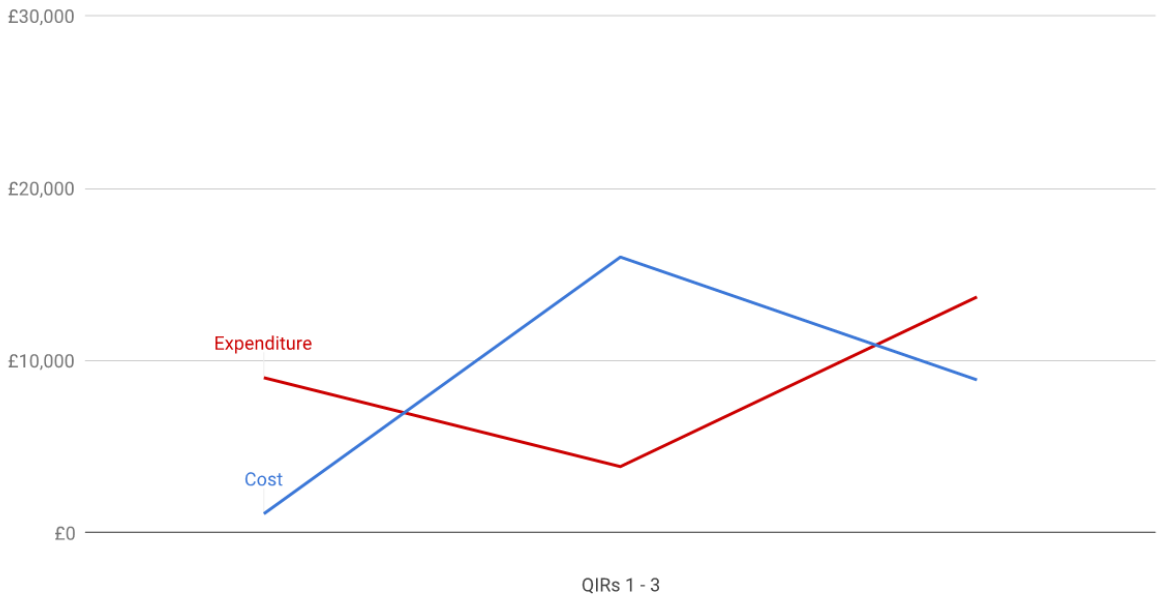

Figure 12 - Average Cost and Expenditure by QI for Services – 9 churches with regular maintenance/repair

4.9. Sundry Items

4.9.1. By definition, the 'Sundry' category covers a wide range of items not included in one of the main elemental categories. This covers items such as:

- Works to external doors / sundry timberwork.
- Works to timber structure, when not defined by another category.
- Improved accessibility provisions.
- Works to the churchyard, including; monitoring tombs/graves/memorials, works to trees, work to surfaces/paths, work to gates and lych gates/other such free-standing structures, landscaping, boundary walls, trees, railings, handrails, guarding and other vegetation.
- Work to bells, clocks and organs.
- Sundry ventilation work.
- Security and fire systems.
- Bird/pest control and access restriction.
- Safe access systems for maintenance.
- Asbestos.
- Lightning conductors.
- Compiling missing/outdated Log Books, audits and plans/strategies.

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by Historic England

4.9.2. With such a varied list it is difficult to reach general conclusions that apply to most churches. However, there are a few items that apply to a number of different churches to varying extents.

4.9.3. A reasonable number of churches within the study were fitted with lightning conductor systems but it was a common finding that they had not been tested and, in a number of cases, they were clearly not compliant with current standards. Like with electrical systems, not only could this be of detriment to the building were it to be struck by lightning, but it also potentially invalidates the church's insurance cover.

4.9.4. Most churches in the study had some form of church grounds. Except for items like grass cutting, which tend to be kept on top of, the approach to maintenance of the grounds is similar to the approach taken by the Church to the repair and maintenance of the church itself. It is often noted that the grounds, and particularly structures within them, receive less maintenance and repair than the main building. This is the case even for churches that are well maintained. This could potentially be a result of limited funds, and except for where safety or building fabric is at risk, is probably a sensible approach to budgeting where capital is limited. However, as with the main building fabric, costs could escalate as a result of lack of action. Churches may not all be aware of their legal liability in the event of an accident involving unsafe structures or memorials in their grounds.

4.9.5. Example 11:

> This church was well maintained and the Church was responsive to the need for repairs on the main building. However, the lych gate repairs had been left outstanding and had progressed from failing in the tiling to requiring extensive rebuilding. The estimated cost therefore increased from approximately **£5,000** to **£12,000**.

4.9.6. The most frequently identified immediate threat to the fabric of churches was the presence of trees and vegetation against or near to the structure. This can cause significant damage to masonry and drainage. Reports gave the impression that Churches don't tend to identify this as an issue since such vegetation can often appear to be quite attractive, but across the study Churches were fairly responsive to carrying out work, when the inspector highlighted it.

4.9.7. Boundary walls, railings and gates were often identified as being in poor condition and in need of regular maintenance work. This was generally fairly low-cost decorating work, providing the extent of decay hadn't led to failure. There was one church in the study with separately listed boundary walls where maintenance and repair had been mostly neglected throughout the study period, resulting in the collapse of some sections of the wall. Not only is this costly to repair but is a potential safety issue for the public. In a similar way, grave stones and tombs are at risk of causing injury through failure. It would be beneficial to inspect these as part of regular maintenance.

4.9.8. As was identified with windows, external doors were often poorly maintained, with areas of rot and poor decoration apparent. This included the associated ironmongery that is often rusting or in need of easing. Unlike windows, for which there can be access issues, doors are an easier

Funded by Historic England

item to maintain, therefore it would be preferable to redecorate and maintain them each quinquennium, to prevent unnecessary deterioration.

4.9.9. As found in the 'Services' section, Churches across the study were quite poor at complying with their regulatory requirements and could potentially benefit from receiving greater clarity and guidance on the matter. Items such as asbestos reports and fire risk assessments were usually not in place or up to date. Whilst the cost of commissioning these may seem high to Churches, it is important they are clear on their legal duties and potential consequences if not compliant.

4.9.10. It was quite common across the churches in the study to find that areas of the building were either inaccessible for inspection and maintenance, or had ladders in place which were not safe to use. The replacement or installation of these items was rarely identified as particularly urgent in isolation but could have had significant benefits in terms of improved maintenance to areas such as towers and roofs that often suffer from blockages. Such installations also aid the early identification of faults, which is critical for minimising the consequential cost of defects.

4.9.11. A number of churches had work carried out to bells, clocks and organs in the study period. Whilst these items were all displaying defects, these were isolated to the items themselves. Often their repair was part of a unique campaign, such as a 'millennium clock scheme' or similar. It is for this reason that the results on expenditure on sundry items should be treated with some caution, as this category includes a number of 'special' projects not linked to the fabric condition of the building.

4.9.12. The following graphs (Figure 13 & 14) illustrate the average cost and expenditure associated with sundry items for a sample of churches that have had minimal maintenance, compared with a sample of churches that had regular maintenance and repair. The graphs below show that the difference in amount between expenditure and cost liability for churches with minimal maintenance was far greater for those receiving regular repair.

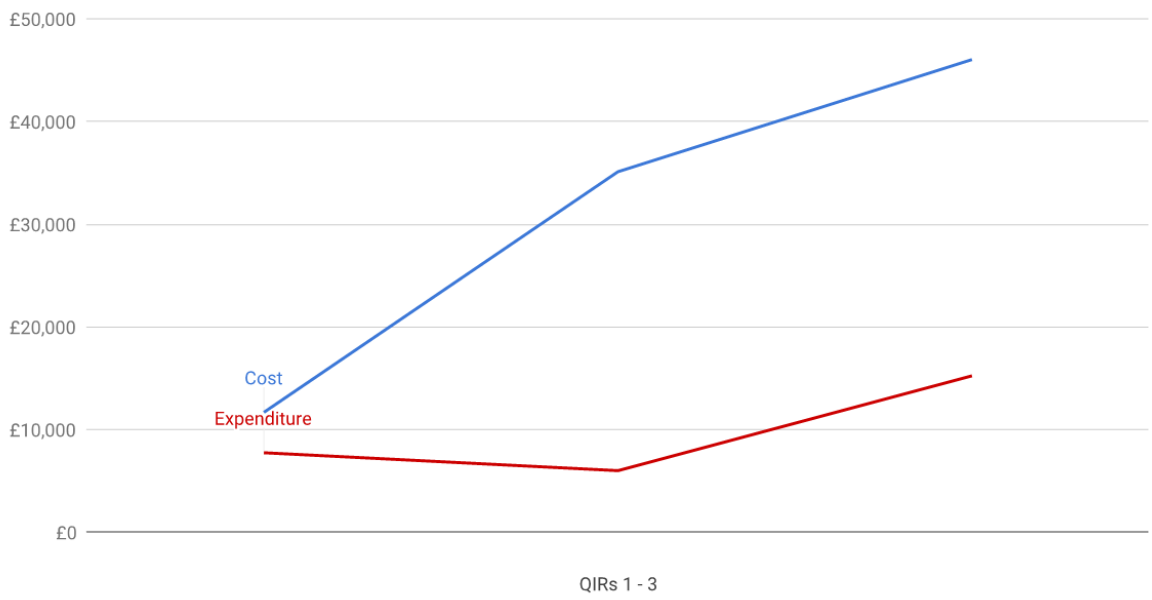

Figure 13 - Average Cost and Expenditure by QI for Sundry Items – 12 churches with minimal maintenance/repair

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

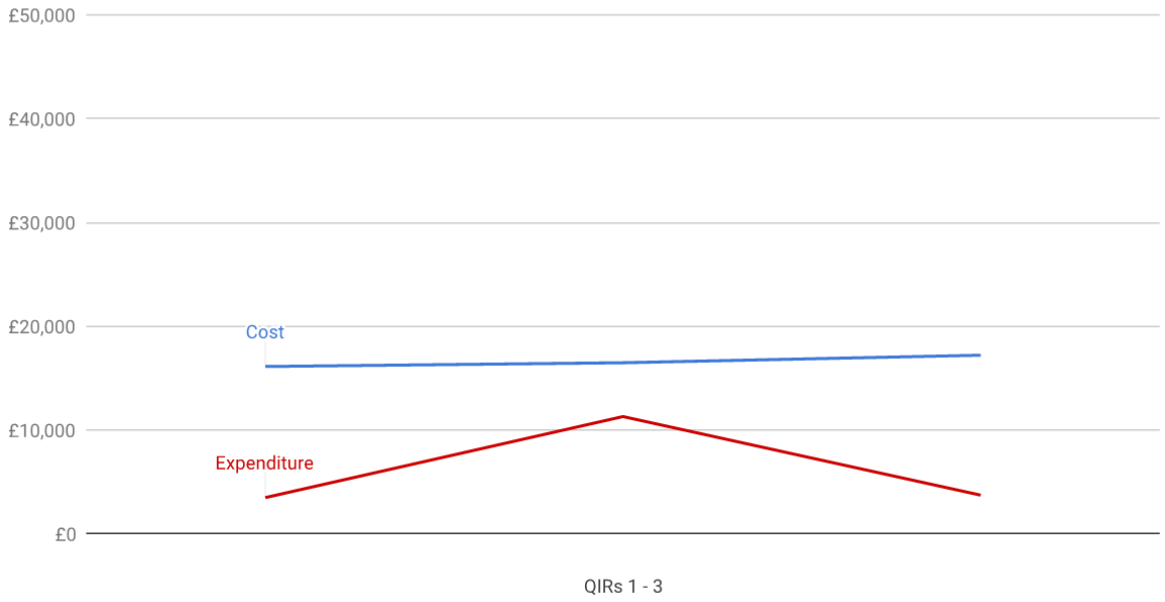

Figure 14 - Average Cost and Expenditure by QI for Sundry Items – 9 churches with regular maintenance/repair

Funded by
Historic England

5. Comparison of Churches by Category

5.1. The churches identified for inclusion in this research project were taken from as broad a sample as possible (refer to the 'Methodology' section of this report for further details), covering a range of different ages of church, conditions, listings and locations. Given the extent of data collected and analysed, it was possible to carry out assessments not just by building element, or by churches that show evidence of good or poor maintenance/repair, but by other defining characteristics. This section of the report draws conclusions about the condition of churches and maintenance requirements, based on other criteria that define them.

5.2. Age Category

5.2.1. The study covered 30 churches from four periods: Early Medieval, Medieval, Post Medieval and Victorian/Pre WW1. There were no Modern churches included in the study sample.

5.2.2. Of the churches assessed, 1 was Early Medieval, 11 were Medieval, 1 was Post Medieval and 17 were Victorian/Pre WW1. As Early and Post Medieval categories only cover one church each, they have not been analysed within this section, as there is not wide enough a spread of data to give a meaningful result.

5.2.3. The graphs on the following pages (Figures 15 to 18) show the cost against expenditure for Medieval and Victorian/Pre WW1 churches, first as a total figure, and then separated by element. This is taken from the sample of each age category, so includes a mixture of churches in good and in poor condition.

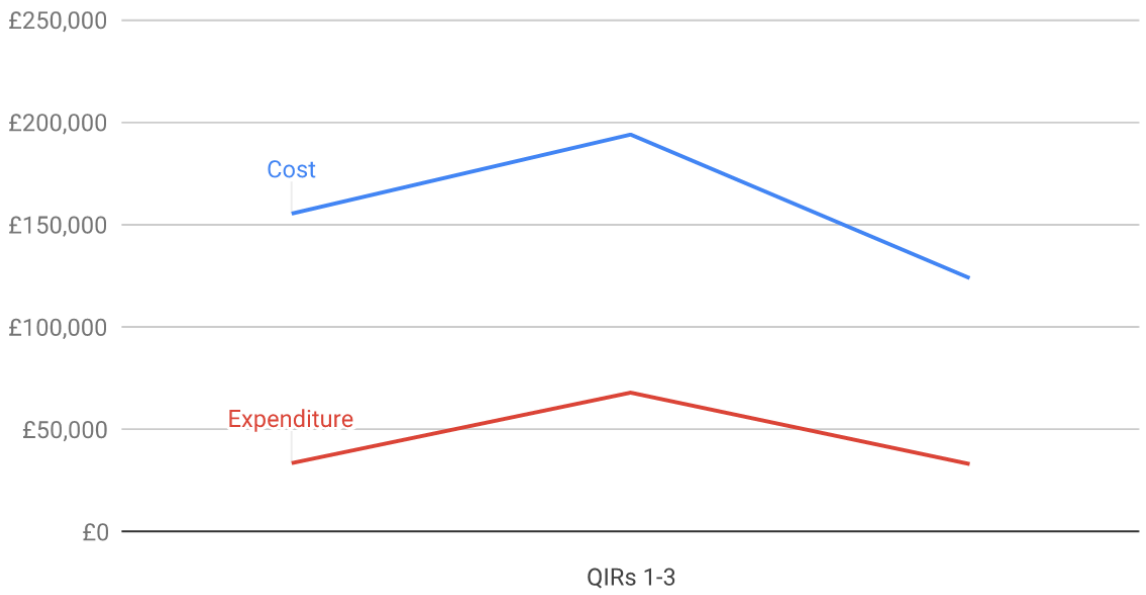

Figure 15 - Average Cost and Expenditure by QI for Medieval churches

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

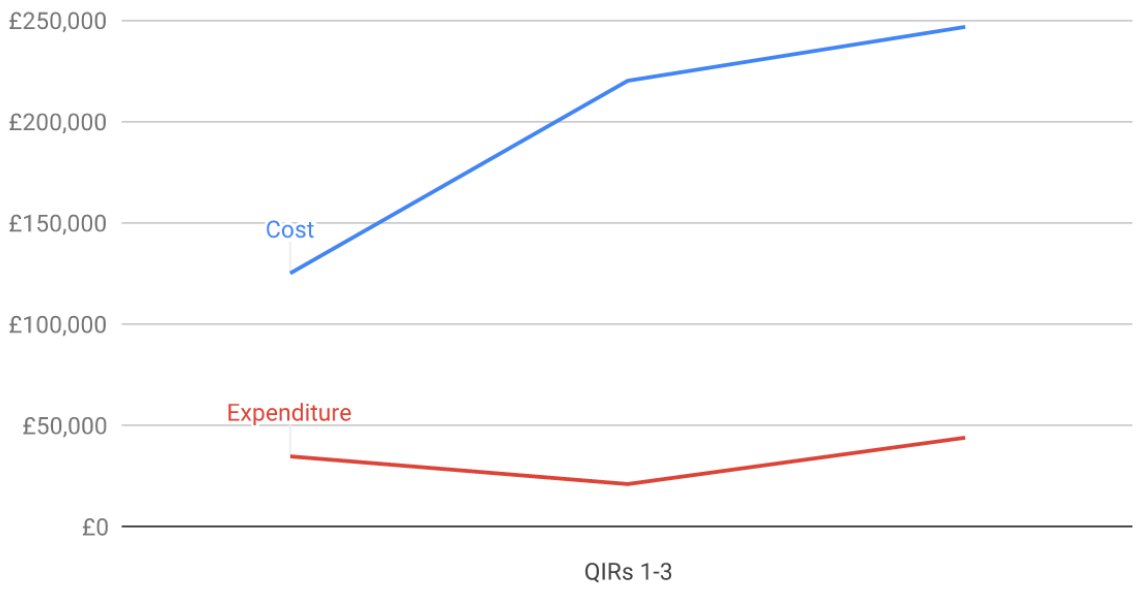

Figure 16 - Average Cost and Expenditure by QI for Victorian/Pre WW1 churches

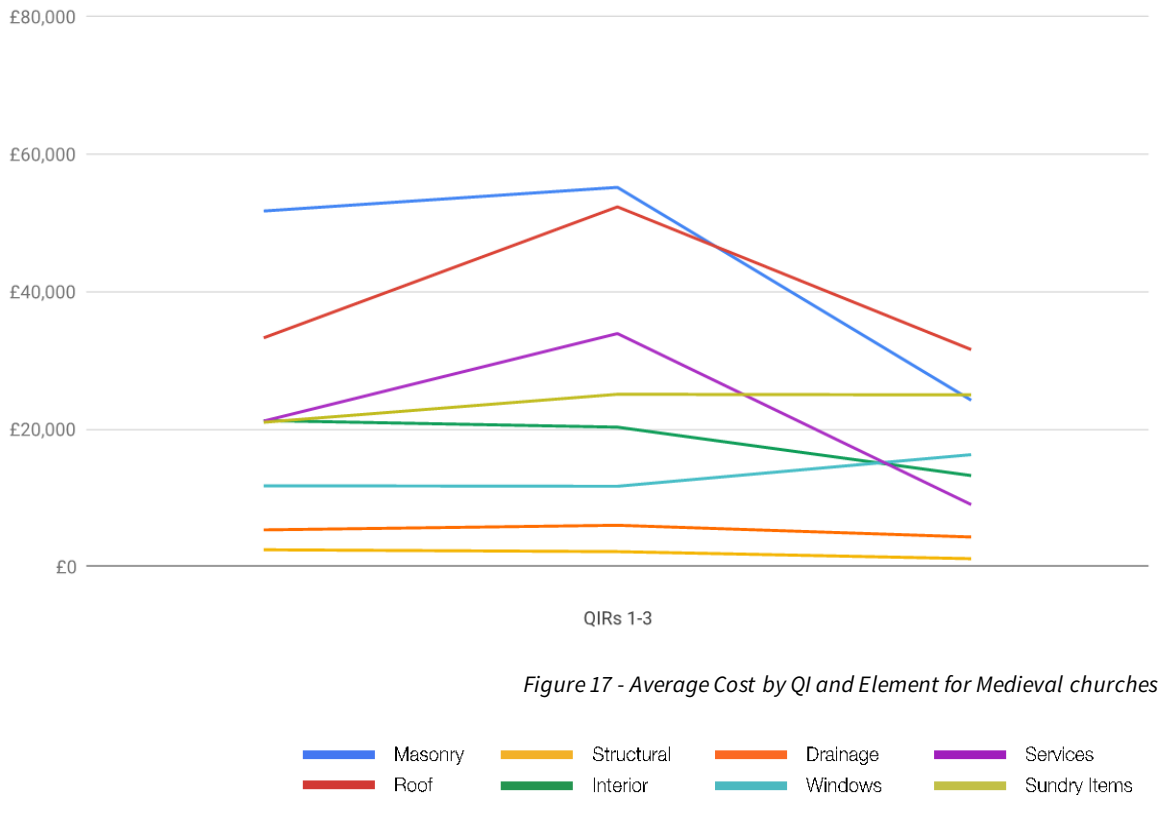

Figure 17 - Average Cost by QI and Element for Medieval churches

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

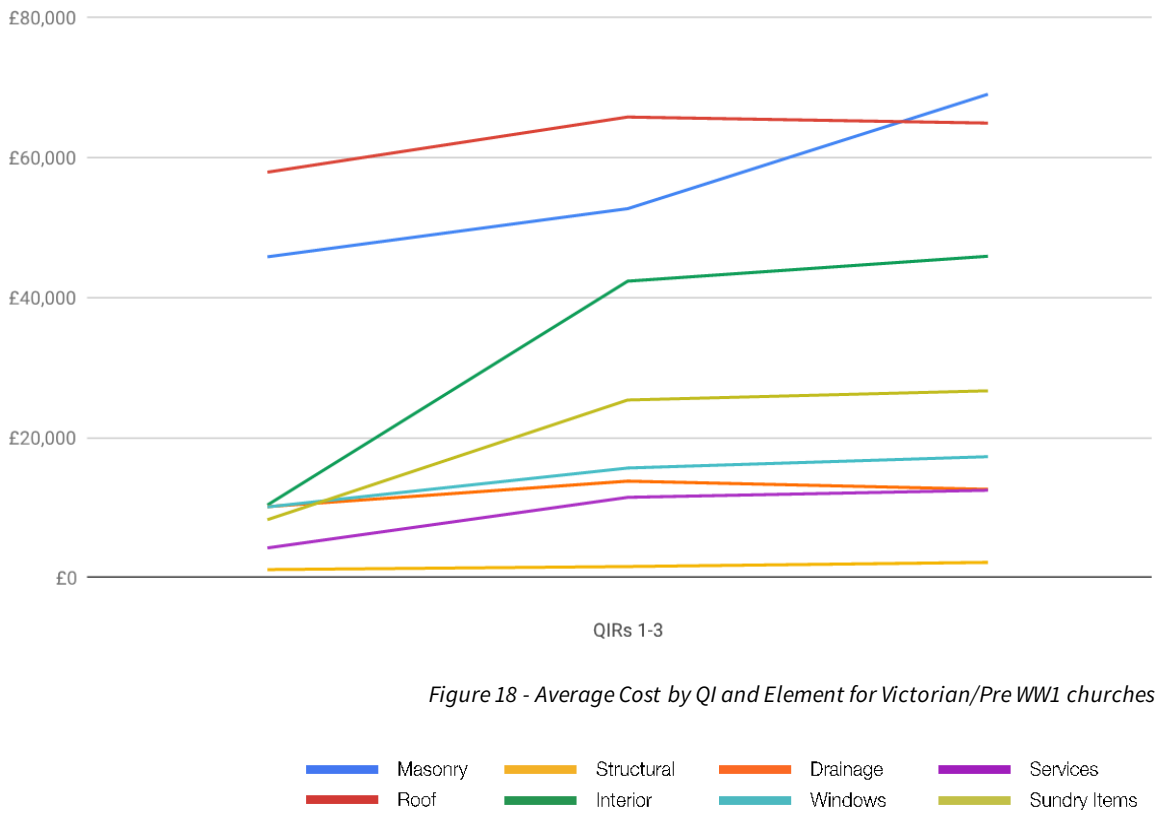

Figure 18 - Average Cost by QI and Element for Victorian/Pre WW1 churches

5.2.4. At a basic level these graphs demonstrate that the cost of repair on Victorian/Pre WW1 churches is greater than that on Medieval churches. However, as a generalisation Victorian/Pre WW1 churches are larger and usually more detailed or complex than Medieval churches. In this study, the Victorian/Pre WW1 churches have been more often large urban churches in comparison to the more frequently rural smaller Medieval churches. Given this, it is not overly surprising that the Victorian churches cost more to maintain.

5.2.5. Despite this, the graphs are actually quite similar, with roofs and masonry representing the biggest costs, with interior being prominent as well. It can therefore be said that the defects faced by most churches are quite similar, regardless of age, and it is the size and complexity of the building that determines running cost.

5.2.6. Even a church in a good state of repair has considerable annual costs associated with keeping it in a stable condition. This is in addition to any works involving major repair or which deal with material/design failure. By looking at the churches that have been well maintained in each category, it was possible to give a very broad estimate for the cost of dealing with typical repairs during each quinquennium:

- Medieval Church – up to £35,000
- Victorian Church – up to £20,000

5.2.7. It should be noted that this is based only on the sample of this study and is affected by the specific details of the churches assessed. It is a broad-brush figure, to be used as basic guidance only.

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by Historic England

In addition to the above figures, there needs to be added the cost of routine maintenance tasks where they were not identified in the QIRs (such as servicing the boiler and drain clearance), along with all legally required tests and inspections. These tests include but are not limited to: electrical system testing, lightning conductor testing, fire risk assurance, gas checks and PAT testing. It should also be noted that the cost of access can be considerable and is not included in these figures.

5.3. Heritage at Risk Category

5.3.1. The 30 churches assessed as part of the study fall fairly evenly into the following categories, based on their Heritage at Risk Register (HAR) status:

- Church that has been on HAR for over 3 Years (8 churches)
- Church that was added to the HAR in 2018 (8 churches)
- Church that was assessed in 2012 but not deemed HAR (7 churches)
- Church that was not assessed in 2012 (7 churches)

5.3.2. The nature of the Heritage at Risk Register means that those churches on the register have already been identified as being in a poor condition. However, it is still beneficial to compare the churches in each category as part of developing an understanding of the rate of deterioration once defects go un-repaired. It is also worth noting that just because a church has not yet been added to the HAR, it does not mean that it is currently in good order, or is being repaired and maintained as its condition requires.

The graphs on the following pages (Figures 19 to 22) demonstrate the overall estimated cost and expenditure from one QIR to the next for each HAR category, taken as an average of the churches in that category.

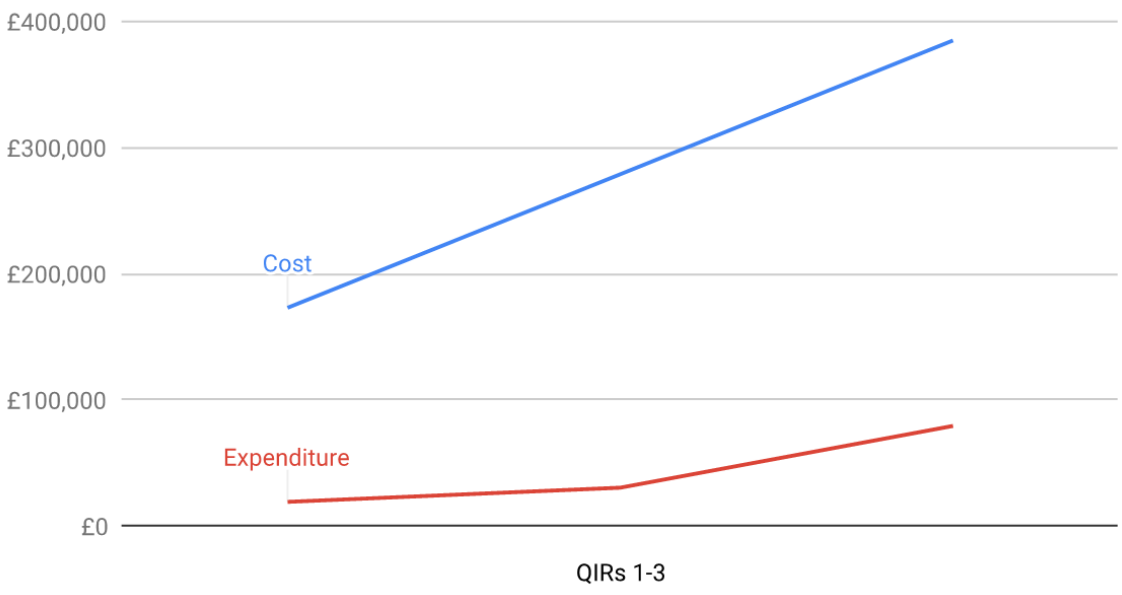

Figure 19 - Average Cost and Expenditure by QI for churches on HAR for over 3 years

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

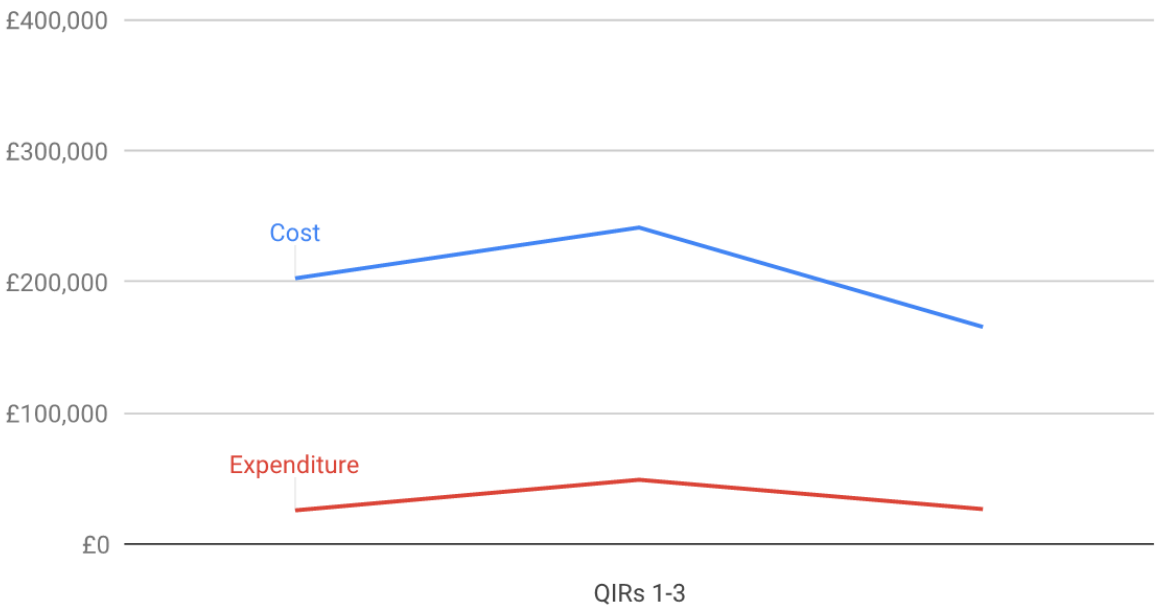

Figure 20 - Average Cost and Expenditure by QI for churches added to HAR in 2018

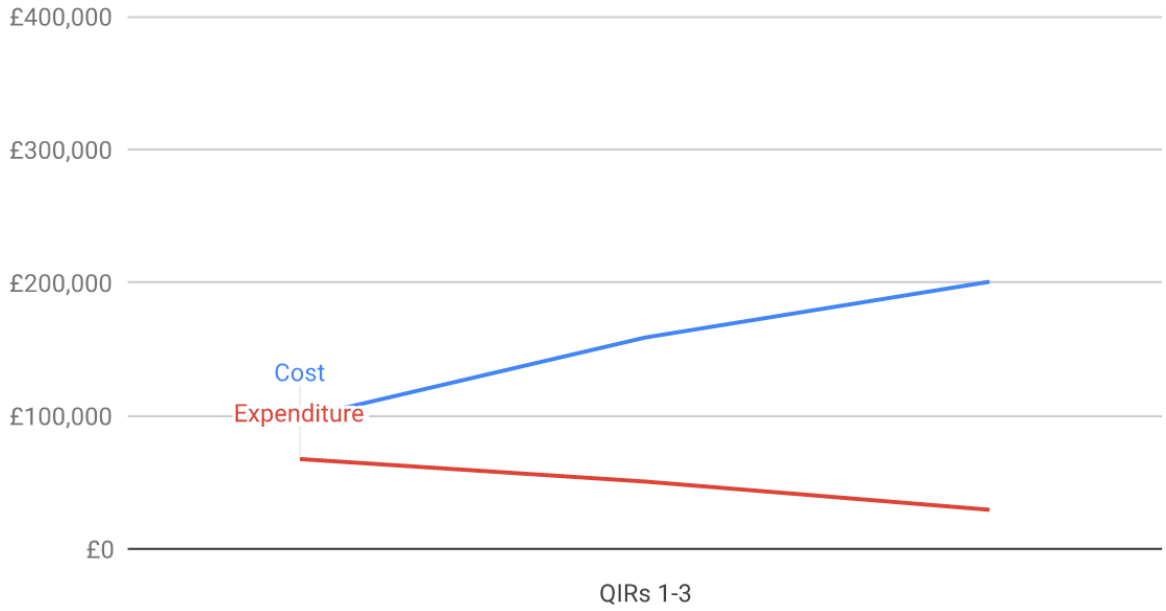

Figure 21 - Average Cost and Expenditure by QI for churches assessed in 2012 but not HAR

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

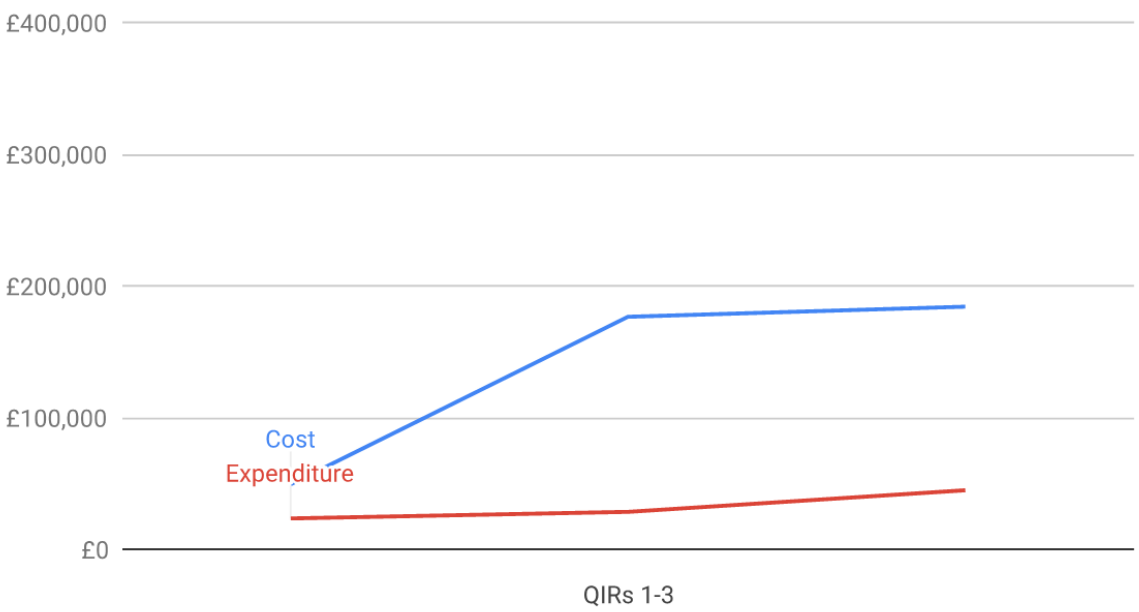

Figure 22 - Average Cost and Expenditure by QI for churches not assessed in 2012 for HAR

5.3.3. In all but the first category (Churches on HAR for over 3 years) the range of cost and expenditure, as an average of the churches in each category, is in broadly the same region (£100,000 to £250,000). In all cases the average cost of repairs is 4 to 5 times greater than the expenditure on repairs in the same period. No Church in the study has, or has spent, the necessary funds required to completely resolve the defects noted at any one time. It is therefore imperative that funds are spent wisely to ensure that expenditure has the greatest possible beneficial impact.

5.3.4. Perhaps the most interesting graph is the one for 'Churches on the HAR for over 3 years'. Being on the HAR, you would expect these churches to need the greatest amount of repair. However, this graph also demonstrates that these churches are experiencing rapid deterioration; there is a significant increase in the cost estimate from one QIR to the next. Alongside the increasing cost of repair, expenditure increases at a similar rate, with Churches in this category spending far more than in the other categories on repair by the final QIR. This cost analysis confirms the general impression given in the QIRs for these churches; that there is a point of disrepair, beyond which costs escalate rapidly, and it is then practically impossible to stabilise the condition of the church with a rolling programme of repair. Once at this point, these buildings require a large capital sum associated with a major scheme of works to reverse their deterioration. It is this rapid demand on expenditure that most churches cannot fund on their own. Ensuring that the church does not reach this 'point of no return' is critical, and is best achieved through timely and informed repair and maintenance.

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by Historic England

5.4. Initial Cause of Defect Category

5.4.1. Each defect identified and priced was assigned a category identifying the cause of initial defect. These categories are: Lack of Maintenance, Material Failure, Structural Failure / Movement, Design Failure, Weather, Anti-Social Behaviour and Undefined. Refer to '3 – Project Methodology' for definitions of these terms.

5.4.2. When looking at the total cost of repairs across the study period, the breakdown by each initial cause category is as shown in Figure 23.

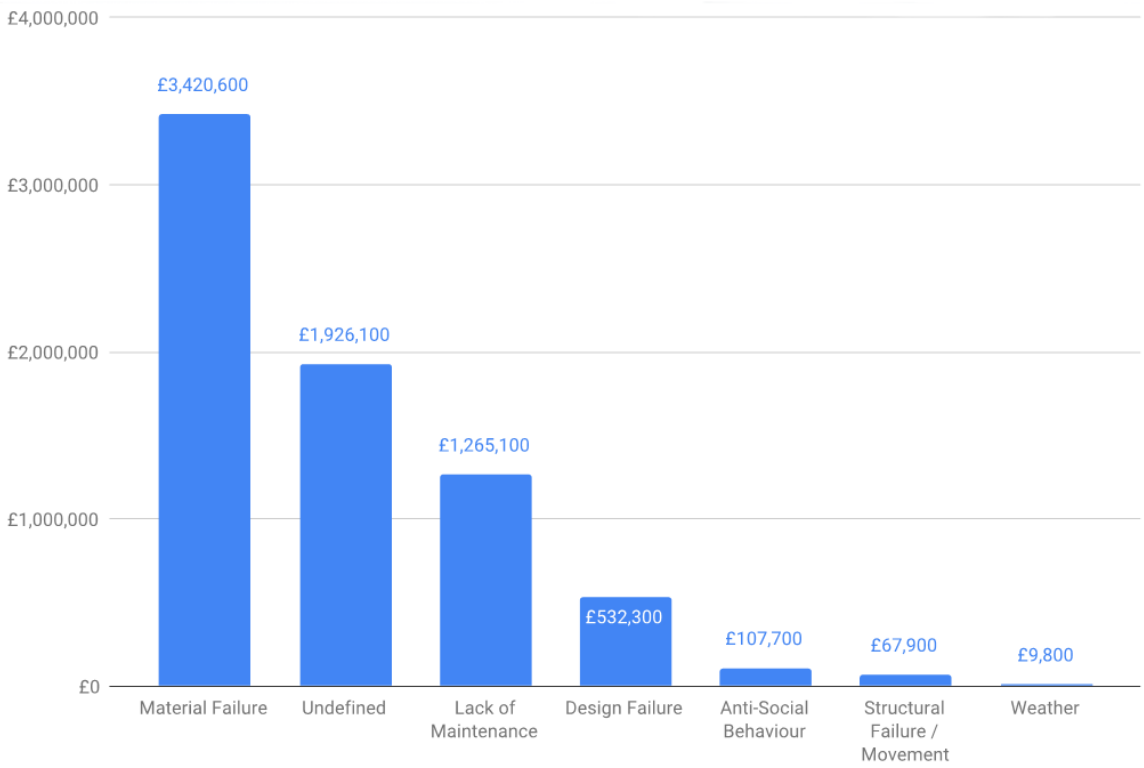

Figure 23 – Total Estimated Current Costs of Repair from Initial Cause

5.4.3. Material Failure was the cause of defect incurring the most cost across the study. However, as explained in the 'Methodology' section, this is quite a broad category in that it encompasses failure or defect of materials right across the fabric of the church. It is also important to recognise that the initial cause of this failure may have been due to one of the other causes e.g. lack of maintenance, but where this was not apparent during the study period, this could not be determined.

5.4.4. Similarly the 'Undefined' category, representing the second largest total cost, is fairly broad in the defects it covers, and by its nature is difficult to draw conclusions from. To reiterate a point made earlier in this report, this is not to say that the inspector or the Church were not aware of the cause of defects, just that it was not apparent from the information contained within the QIRs, on which this study is based.

5.4.5. Of most interest in relation to this study, is that the third costliest category representing an estimated cost of just over **£1,250,000**, are the defects that arose as a direct result of Lack of Maintenance. This is nearly 18% of the total cost to repair all defects when first identified. This

Funded by
Historic England

is a considerable sum, and would be avoidable if the correct maintenance regimes were universally in place. It is also of note that this is the estimated cost of the initial cause of defect only, not accounting for delay or consequential defects. If Churches are able to resolve the issue of insufficient maintenance, there is the potential for considerable savings, allowing funds to be directed towards other areas of repair.

Funded by Historic England

6. The Value of Maintenance

6.1. How Valuable is Regular Maintenance and Repair?

6.1.1. This research project set out to assess whether regular maintenance and a pro-active response to maintenance requirements can reduce the long-term cost liability of a church. It also sought to identify how ignoring these 'stitch in time' repairs and neglecting regular maintenance can affect a church, and how quickly the fabric could deteriorate as a result. The starkest demonstration of the findings is the comparison of the elemental cost of repairs of a well-maintained church, compared to one with minimal maintenance.

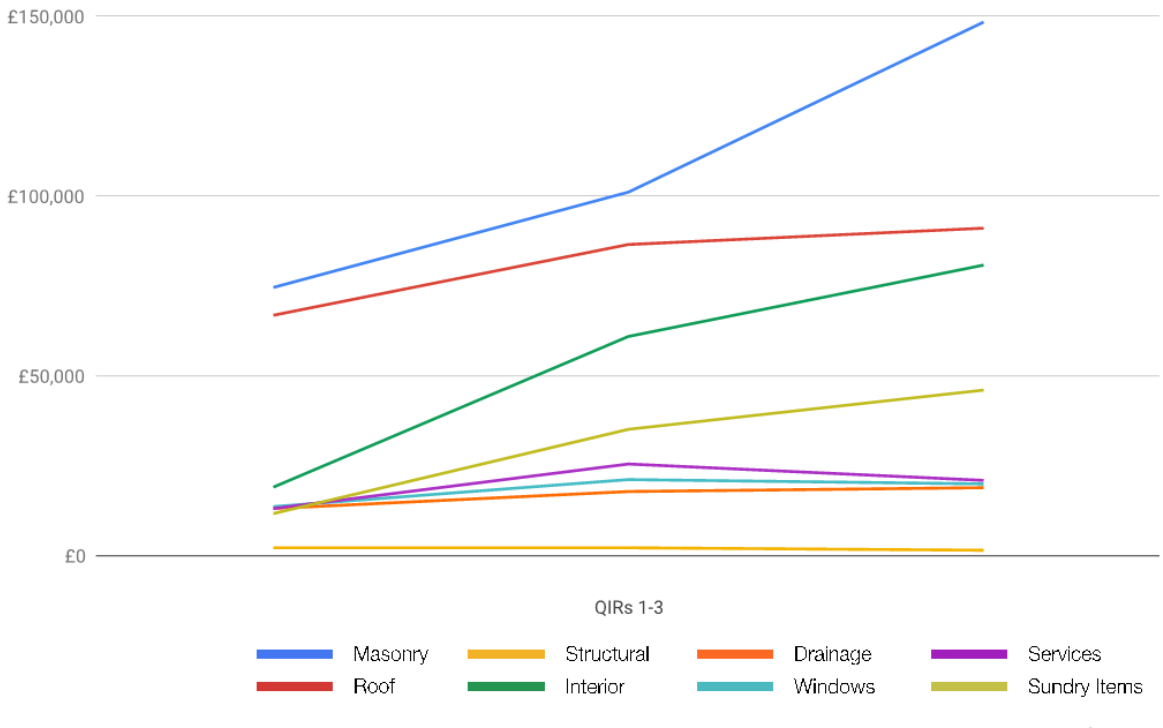

Figure 24 – Average Cost by QI and Element – 12 churches with minimal maintenance/repair

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by Historic England

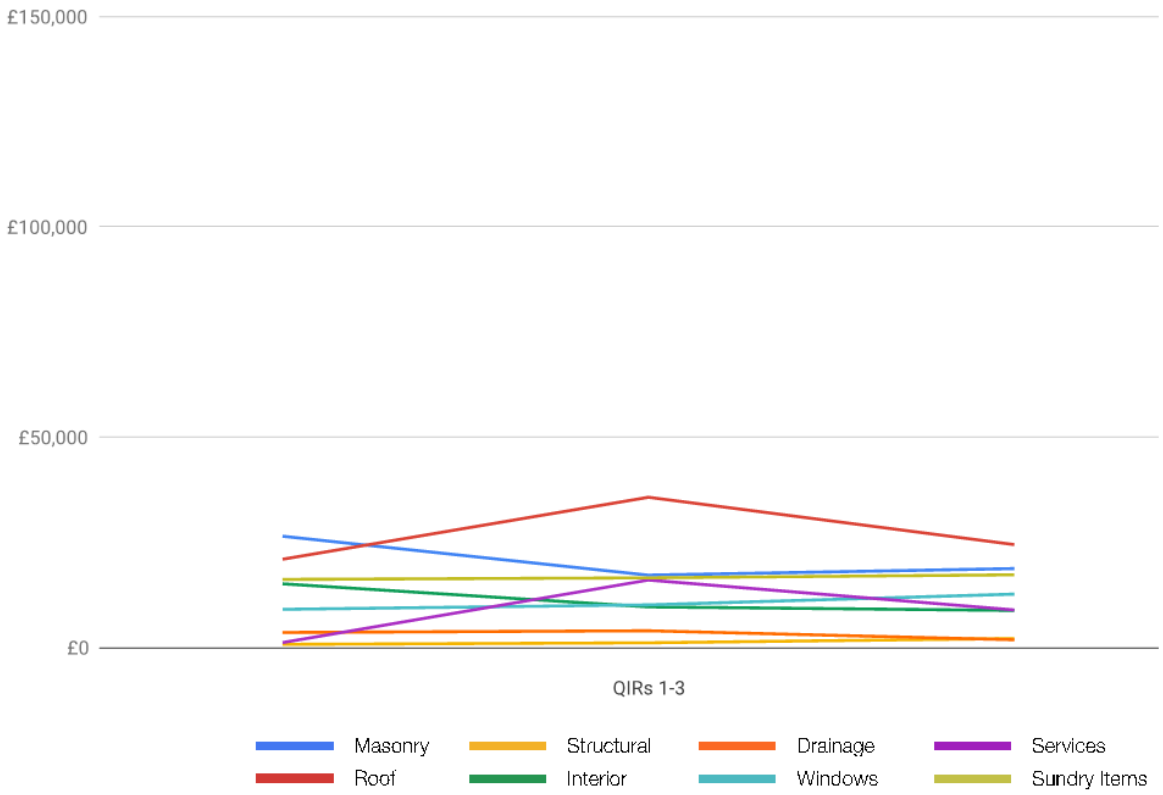

Figure 25 – Average Cost by QI and Element – 9 churches with regular maintenance/repair

6.1.2. Across all elements, the cost liabilities for the churches that were poorly maintained and repaired were significantly higher than those that received regular attention. Although those churches also experienced sudden costs due to wear and tear failures, by carrying out regular repair and maintenance, the expenditure across each quinquennium was much more consistent, making it easier to predict and budget for.

6.1.3. Of particular note is the trajectory of 'masonry' and 'interior'; the two key elements that are susceptible to consequential defects as a result of defects in roofs and rainwater goods. Figure 24 demonstrates a significant increase in estimated cost from one QIR to the next, which is attributed to the increasing impact of unresolved roof and rainwater goods defects. It is interesting to observe that whilst the cost of roof repairs increases as more of the roof fails and needs replacement, the cost line for rainwater goods remains relatively constant (although still higher than for the well-maintained churches). This is because, in isolation, once rainwater goods reach a point of failure where they require complete overhaul, the cost will not increase to the kind of levels for roof repair. It is the consequential damage in other elements where the cost increase arises, not the basic cost of repairing the rainwater goods themselves.

6.1.4. Whilst the difference in cost of repair between regularly and minimally maintained churches is quite large, the expenditure for each category is far closer. All buildings require repair and it is expected that buildings of the age, complexity and intricacy of those in the study would require a reasonable level of expenditure just to keep them at a stable condition. What this identifies is that if the required funds are not available to address the defects identified, then it can quickly

Funded by
Historic England

move beyond the point where it is affordable. Once maintenance and repair has been delayed, it can soon become difficult to bring the condition of the building back to a stable level without a significant capital injection.

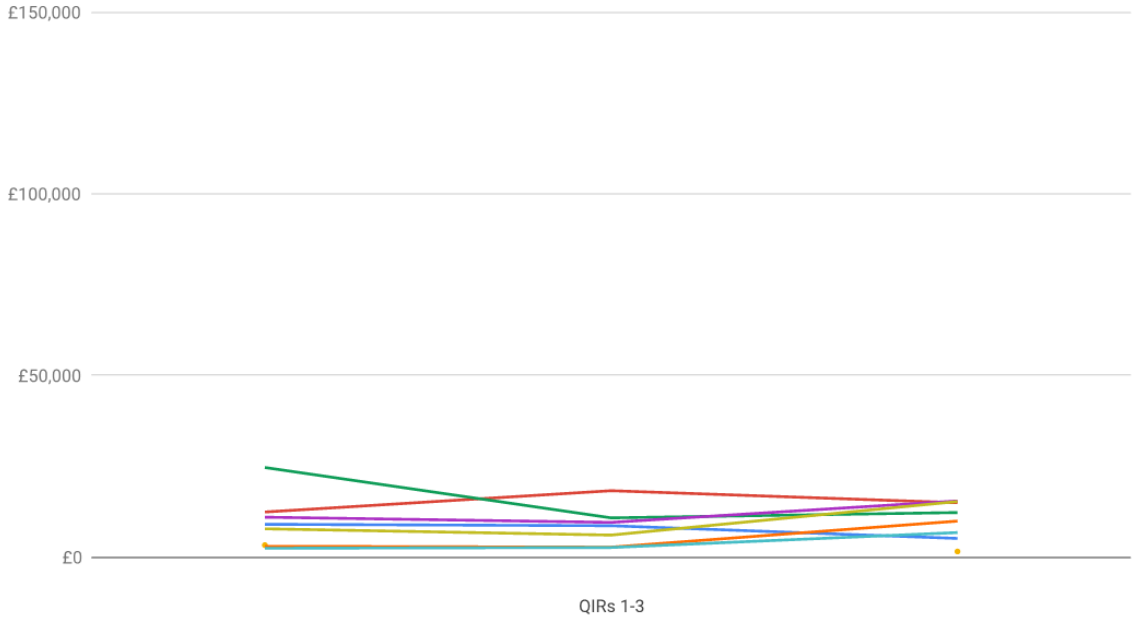

Figure 26 – Average Expenditure by QI and Element – 12 churches with minimal maintenance/repair

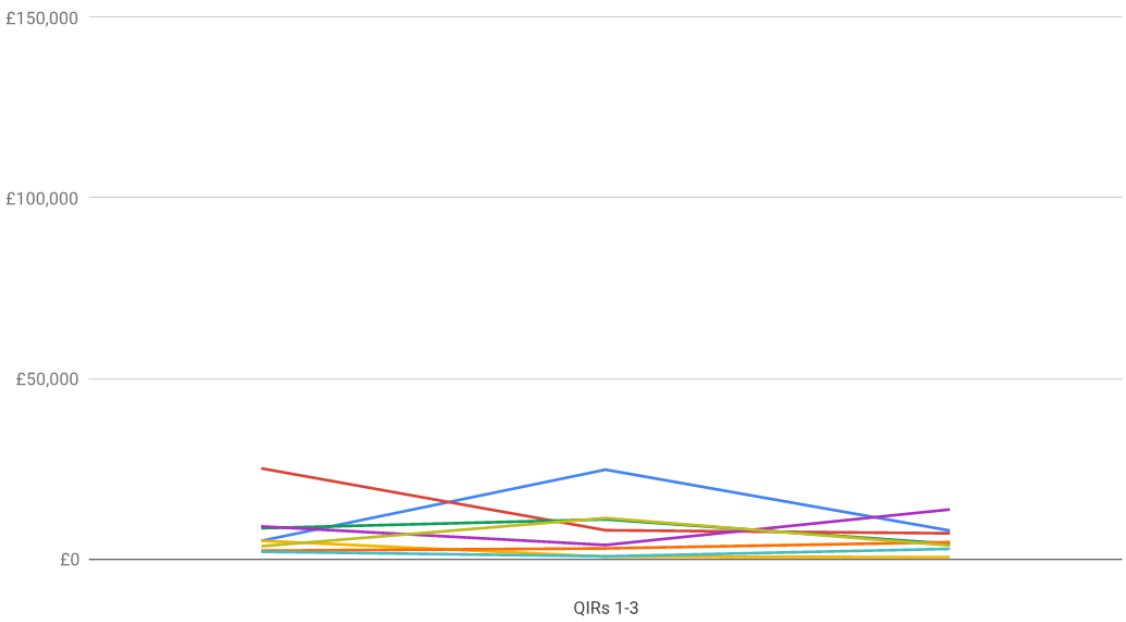

Figure 27 – Average Expenditure by QI and Element – 9 churches with regular maintenance/repair

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

6.1.5. It is important to stress that where churches had been identified as minimally maintained or repaired, it is not necessarily the fault of the people responsible and it is not intended as a criticism of their actions. Lack of funds is an issue common to many churches, and a number of those in poor condition have very small congregations, with limited means. In addition to this, the availability of congregation members to carry out voluntary maintenance varies from church to church, and can have a significant impact on the condition of the building. It can also be the case that long-term neglect has fallen to the current custodians to rectify, but has gone beyond the point where it is financially possible to do so. It is therefore prudent to identify the top priorities for a church, based on the funds available, which will have the most beneficial impact. The identification of potential funding sources is also critical and both of these areas are where advice of the church's inspector can be crucial in aiding the process. For churches in poor condition, it is necessary and correct for the inspector to identify all visible defects, but it can be overwhelming for a church to know how to begin repairs when confronted with a long list of 'urgent' actions. Additional ordering by priority may assist the Churches in receipt of QIRs.

6.2. What is the Cost Impact of Not Carrying Out Repairs in a Timely Manner?

6.2.1. Part of the assessment of the Value of Maintenance is the determination of the cost impact of not carrying out repairs in a timely manner. In order to determine this, defects were tracked from one QIR to the next and any change in the condition or extent of the defect was noted and costed. As all costs were calculated on today's values (Q1 2019), without inflation, any difference between QIR costs was due to the increased cost associated with delaying repair.

6.2.2. As with elemental cost, the impact of the cumulative cost of repair as a result of delayed work was best assessed by comparing Churches that regularly carried out maintenance and repair with those where such work was minimal.

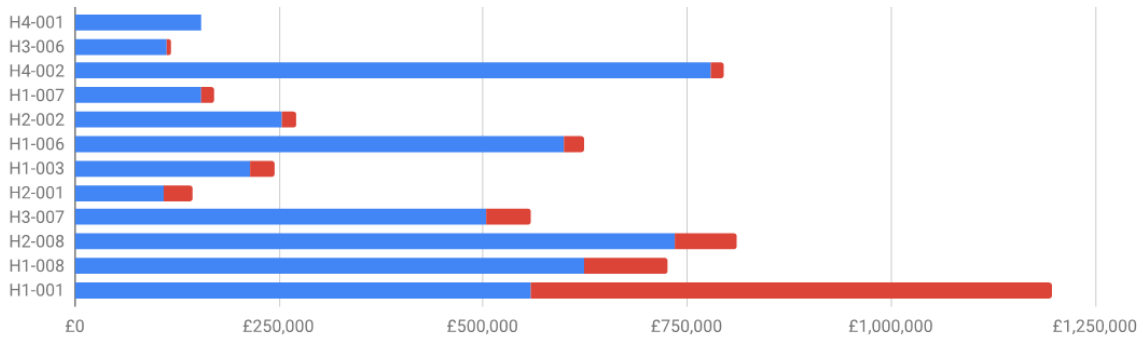

Figure 28 – Cumulative Cost of Delayed Repair – 12 churches with minimal maintenance/repair

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

Figure 29 – Cumulative Cost of Delayed Repair – 9 churches with regular maintenance/repair

6.2.3. Figures 28 and 29 compare the initial cost of defects with the final cost, where change in cost was purely associated in worsening condition as a result of the lack of timely maintenance and repair. This increase in cost is shown in red on these graphs. At a basic level, this increase was all avoidable cost, though obviously available resources and funding do limit what is possible. This is why even the well maintained churches have sums of cumulative cost. However, it is clear that, when reviewing the percentage of the initial cost, churches where minimal maintenance and repair was carried out experienced much greater increase in cost liability as a result of not carrying out work in a timely fashion.

6.2.4. These graphs only demonstrate part of the cost associated with delaying repair. The costs shown on the graphs are the totals of cumulative costs of delay for individual items in isolation. For example, this may be that the initial cost was for a small amount of slipped slates, which by the end had increased as the number of slipped slates increased due to lack of repair. What it doesn't account for, however, is the consequential damage as a result of this, e.g. a plaster ceiling collapsing as a result of water ingress through these slipped slates. This is difficult to quantify on a cause and effect basis, as many issues have numerous causes. However, it was clear from the text of the QIRs that this consequential damage does occur and so the overall cost impact of delaying repair can be considerably greater than demonstrated on the previous graphs and can indeed be many times the cost of the original repair. The impact is best demonstrated by the overall increase in cost of the total cost liability of a church over the study period.

6.2.5. Example 12:

This church suffered from numerous issues with rainwater goods and saturated ground due to poor drainage. Despite the Church carrying out some repair and maintenance work, the major repairs to these items remained outstanding. As a result of this, walls became saturated, internal plaster finishes and murals were deteriorated, ground movement occurred causing cracking, and the floor was warping and rotting in places. This consequential damage resulted in the overall estimated defect cost liability rising from **£150,000** to **£200,000** in the study period, despite expenditure of around **£80,000**.

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by Historic England

6.2.6. It is clear that delaying repair can cause a dramatic increase in cost and the extent of defects. Ideally, all repairs would be completed within the quinquennium at the urgency stated by the inspector, but it is accepted that this is likely to be unrealistic. It is therefore imperative that priority is given to repairs that are likely to escalate and cause the most consequential damage, as this is where cost increase can be the most extreme.

6.3. Further Observations from Individual Church Data

6.3.1. In addition to the general trends that can be identified from the project data, there were certain Churches within the study that experienced one-off events, or approached works in a certain way, from which further conclusions could be drawn. These churches are identified and assessed below.

6.3.2. Example 13:

The inspector for this church described the church's overall condition as going from 'fair' to 'poor' between the two QIRs available. Although a number of defects were listed and recommended repairs noted, very little work was carried out. However, it was noted that despite this, the chancel received £20,000 of reordering, not associated with any defects. Whilst it is acknowledged that the church's liturgical function is of high importance, such projects would be better delayed when repair works are urgently required. In the period the estimated cost of repair rose from **£525,000** to **£775,000** of which **£75,000** was purely attributed to the extra costs incurred from delaying repairs, as opposed to new defects arising.

6.3.3. Example 14:

The Church carried out a significant amount of repair work across the study period, following the recommendations of the inspector. This proactive approach brought the estimated cost liability of defects down from approximately **£190,000** to **£158,000**. However, with difficulty of access in mind, the Church could not afford to carry out high-level repairs without external funding. The Church applied for a grant to pay for the works but was turned down. As a result, despite the Church's positive approach to repair and maintenance, the work had not been carried out and the extent of deterioration increased. As a result, the estimated cost liability for the church increased to **£170,000** by the end of the study period.

6.3.4. Example 15:

This church was well maintained and it could be seen by the work carried out that they were responsive to the recommendations of the inspector. However, an unexpected event, in this case a lead theft, can divert a church's resources with negative consequences on other defects that would otherwise have been addressed by routine maintenance and repair. Even where there is not a financial demand for dealing with unexpected events, due to insurance cover, the impact in time and disruption can be great. Measures to mitigate risk of this kind of unexpected repair arising are important in order for a Church to be able to budget and programme works.

It should be noted that figures in this report are based only on the study sample of 30 buildings and are affected by the specific details of the sample assessed.

Funded by
Historic England

6.3.5. Example 16:

Immediately prior to the study period the Church recovered the building's roof in order to address continual failure as a result of the previous roof reaching the end of its design life. However, in the QIRs it is noted by all inspectors that the quality of the new roof installation was poor, with works to rectify defective flashings and slates being identified, despite it being new. Whilst this was identified as **£750** of defect cost at present, it was noted that defects seemed to be ongoing, placing a financial demand on the Church for an element believed to have been resolved. This highlights the importance of correct and informed specification and installation.

The other issue of note on this church is the lack of coordination when addressing different defects and the impact this has on cost. The high-level rainwater goods had long required overhauling to address defects, but this was not carried out when the roof replacement took place. As a result, the condition of the rainwater goods further deteriorated leading to blockages and additional failings. The cost of access to high-level items is considerable, so by not coordinating the work, not only must the Church find additional funds for rectifying the further deterioration, but also the access costs as well.

6.3.6. Example 17:

This Church demonstrated a pro-active approach to the maintenance and repair of the church. In particular, it is evident from the QIRs that there was a programmed approach to tackling issues, with preference given to the most urgent repairs, but with defects being addressed in groups where there is a logic to carrying out different repairs together. For example, halfway through the study period the Church carried out a major programme of repair to the tower, but whilst access was in place they also took the opportunity to reroute poorly designed rainwater goods in order to reduce the risk of failure and to allow easier maintenance in the future. This approach proved to be successful in bringing down the estimated cost liability of defects for comparatively low expenditure (**£75,000** to **£42,000** to **£38,000** across the study period).

Funded by
Historic England

7. Other Observations

7.1.1. It is not the purpose of this study to make recommendations on the format and content of QIRs, nor is it to produce a strategy for Churches to follow in order to minimise cost or better approach areas of repair. The research team also recognises that all churches are unique, and have a unique set of demands placed upon them, both in terms of the building fabric need and financial limitations.

7.1.2. However, having assessed 30 different churches and around 90 QIRs, there are some common themes that are applicable to many churches. It is, therefore, prudent to include our observations of these in this report, as it may help to inform decisions on repair and maintenance. This section of the report lists these, as follows.

7.1.3. It has long been recognised that the correct upkeep of roofs, rainwater goods and drainage is crucial to maintaining the condition of a building. However, assigning costs to this through this research project has highlighted how substantial the cost of repair can be, and that these elements are vulnerable to rapid deterioration, with the associated rapid escalation of cost. Perhaps most significantly, failures in roofs, rainwater goods and drainage are the primary cause of consequential failure for other areas of the building fabric, notably masonry and the interior. This is of upmost importance to a Church's understanding of the importance of regular maintenance and timely repair, with the appreciation that the cost of not acting can be many times that of the cost of the initial work. The positive benefit of a Church having regular maintenance contracts in place, as well as a list of trades 'on call' to any urgent defects cannot be overstated.

7.1.4. With one notable exception, the failure of roofs across the study sample was due to the coverings reaching the end of their design life. Once first signs of this occur, there is a period of 5-10 years where patch repair is successful before the deterioration escalates to such a point where recovering is more cost effective. It is therefore important that, where possible, the causes of failure are identified when defects first occur, to help the Church identify when recovering of a roof will be necessary, e.g. spotting the first signs of nail fatigue or lead that is reaching the end of its repairable life. Replacement of a roof is a high cost item and many Churches struggle with raising the necessary funds for replacement, when fundraising is left until recovering is urgently required. Ideally Churches would set aside funds each year across the life of a roof to pay for its eventual replacement. If this is not possible, early identification that a roof is approaching the end of its life would allow funds to raised year-on-year during the 5-10 years that 'stitch in time' repairs are possible and possible grant sources identified.

7.1.5. There were occasions where QIRs noted minor roof and rainwater goods repairs as low priority or merely desirable. This research project has shown that in numerous cases these low priority repairs escalate to urgent within the quinquennium. Given the extent of damage and associated cost with these defects it may be prudent for all defects noted in these elements to automatically be assigned a higher urgency rating.

7.1.6. The cost of access to high-level items is considerable and usually represents a large proportion of the overall cost associated with a scheme of repair. Churches should take advantage of any

Funded by Historic England

access in place to address other areas of repair or maintenance in the adjacent area. Whilst this will add to project cost, the overall cost of repair will be far less as a result of making best economic use of the access equipment. Churches are advised to seek the advice of the QIR inspector as to what works and improvements could take place as part of the work package, whilst access is in place.

7.1.7. It is noted that access to maintain high-level gutters is an issue. It is highly beneficial for Churches to have contracts in place for the clearing of rainwater goods a few times a year. However, even on well-maintained churches, this rarely seems to be coordinated with other items of high-level maintenance. It would be of benefit for Churches to ensure that at least once per quinquennium, these contractors also carry out any required high-level redecoration works to rainwater goods and windows etc. Again this achieves maximum value from the access.

7.1.8. Churches only have limited funds available to spend on repair works and this is a particular challenge for Churches with small attendance or located in less affluent areas. Such churches tend to have more defects identified in the QIRs than those with larger congregations. Any Church receiving a QIR with a very long list of urgent repairs may feel it is overwhelming. This situation often leads to little work being undertaken at all. For the churches in poor condition further guidance as to which repairs would provide the most positive impact with the funds available would be beneficial and encouraging. Further ranking of remaining repairs could then be rated accordingly.

7.1.9. A majority of churches have suffered deterioration as a result of hard pointing to masonry. Whilst all inspectors note this as an issue, the reason why this is detrimental is not always explained to the Church. It highlights a deficiency in the Church's understanding of the requirements of traditional construction. Greater advice and explanation across the industry would help ensure that those church members carrying out well-meaning repairs and maintenance do not compromise the building in doing so.

7.1.10. Almost universally across the study Churches are not achieving compliance with their legal requirements, particularly in relation to testing of electrical systems, fire regulations and asbestos management. Whilst most QIRs identify these items, it is often as a separate section of the report, outside the main body of the text. Where included in the list of recommendations, it is often not stated why these tests/audits/assessments are important. Greater emphasis should be placed on these items, with supporting information to make sure the Church are aware that these items are a legal requirement. It would also be prudent to note that the Church might be invalidating its insurance by not carrying out these tests. The testing and upgrading of lightning conductors is another item that is similarly neglected.

7.1.11. Although each church is individual, and the inspector is best placed to make recommendations on urgency of repair, the findings of this study in relation to which elements deteriorate quicker than other, can hopefully help to inform the urgency assigned to various defects in future QIRS.

7.1.12. There is benefit to the Church in understanding the impact of delayed repair on the condition of the building. It would therefore be useful to the Church's understanding if the inspector, when noting outstanding items since the last QIR, could make specific reference to the extent of deterioration since the last report and the impact of this.