HLF's Review of Grantee Engagement with HLF Environmental Outcomes

Final Report

7 February 2017
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Contents

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2 Revision History

Revision Ref / Date Issued	Amendments	Issued to
Draft final / 7 December 2016		**Sara Crofts**
Final / 27 January 2017	Revised analysis of application, case papers, and e-surveys, revised lessons learned	Sara Crofts
Final / 7 February 2017	Minor spelling and grammar changes; and clarification on findings	Sara Crofts

3 Contract

This report describes work commissioned by Sara Crofts, on behalf of Heritage Lottery Fund, by a letter dated 7 June 2016. Rachel Brisley, Rachelle Ngai and Matthew Williams of JBA Consulting and Scott Dickinson of Scott Dickinson & Co Ltd carried out this work.

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4 Purpose

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JBA Consulting has no liability regarding the use of this report except to the Heritage Lottery Fund.

5 Acknowledgements

We would like to thank all the Heritage Lottery Fund grantees who provided us with their time to respond to the e-survey and speak to us.

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6 Executive Summary

6.1 Background

The Heritage Lottery Fund (HLF) is committed to supporting projects that are environmentally sustainable and take steps to minimise the use of resources and avoid negative impacts for the environment, where possible. HLF encourages grant-funded organisations to avoid negative environmentally sustainable impacts through its target outcomes and its environmental guidance.

HLF first introduced environmental guidance in 2008, 'Planning greener heritage projects' with support from Constructing Excellence to demonstrate its environmental sustainable commitment. The guidance was further updated in 2012 and re-named 'Reducing environmental impacts: Good-practice guidance' to reflect HLF's outcomes assessment framework that includes the outcome 'environmental impacts will be reduced'. The update was more succinct, with similar information and considerations for grantees whilst reducing the document length to less than half the length of the 2009 guidance.

HLF commissioned JBA Consulting, working with Scott Dickinson & Co. in July 2016 to undertake a review of grantees' engagement with its environmental guidance. The review was intended to investigate how HLF-funded organisations' awareness of its environmental impact guidelines has changed since 2012. Additionally, the review investigated the extent to which HLF (and other) guidance documents are now being followed and sustainable measures employed in HLF-funded projects. The review looks back to a previous research study conducted in 2012 that was undertaken to investigate HLF-funded organisations' awareness of its environmental impact guidelines and standards. The previous research study[1] included an email survey to 100 grantees and the production of 25 case studies to provide a more in-depth analysis of grantee activity and experience.

6.2 Methodology

A mixed method research approach was utilised comprising both quantitative and qualitative research techniques. An e-survey of a sample of 60 currently funded projects was conducted to assess the environmental measures being developed/implemented and the usefulness of HLF guidance. Progress reported in the e-survey was compared with the original intentions of these 60 projects set out in their application forms and highlighted in HLF case papers. Findings from the e-survey were compared with the findings from the previous survey undertaken in 2012 to identify if and how approaches to reduce negative environmental impacts had changed. From the survey, eight projects were selected (based on willingness to participate) to be the subject of case studies. The purpose of the case studies was to undertake a more detailed investigation of project achievements, challenges and lessons in relation to the selection, development and implementation of environmental measures and to obtain grantees' views on the usefulness of the guidance. These case studies were informed by a review of HLF case papers, applications and interviews with grantees.

In addition, the 25 case studies undertaken in 2012 were contacted and 22 updated, again through a review of HLF case studies and grantee interviews. The overall project approach is summarised overleaf in Figure 1.

The following limitations with the approach were identified and these should be considered within the project's findings:

- There was a slow response rate in all communication with grantees which delayed the overall programme and study completion. The response rate to the e-survey was lower than in 2012 but at overall 50% still represents a good rate overall.

1 https://www.hlf.org.uk/environmental-impact-guidance-and-strategy-review

Securing interviews with updated and new case studies took several attempts and less than half of projects that responded positively to requests for volunteer case studies in the e-survey, responded and agreed to be interviewed.

- Updating the case studies from 2012 was compromised in some instances by a loss of institutional memory as the staff members involved in project development had moved on.
- In the 2012 analysis, if the application forms stated that a specific environmental measure was planned and the e-survey did not state that this measure had been implemented, it was assumed that grantees were not fulfilling the project's intentions. However, it may be possible that some projects were not yet at delivery phase and so had not yet implemented the measures. This needs to be taken into account in considering the comparison of responses from the 2012 and 2016 surveys.

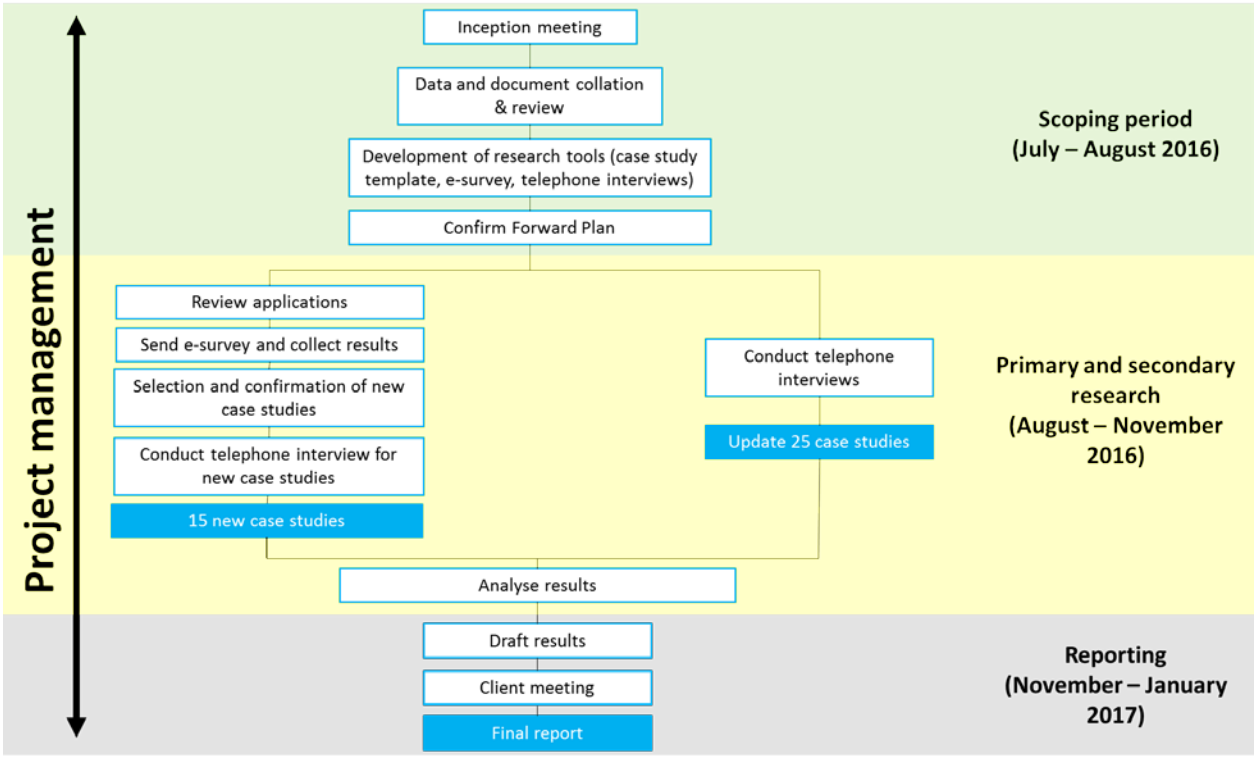

Figure 1: Project approach

6.3 Findings

Summary findings are provided in Section 3 of the report with the more detailed e-survey outputs provided in Appendix A and the new and updated case studies provided in separate documents.

Of the 58 invitations sent out to complete the e-survey, 32 responded (55%) with two incomplete. This was a slightly lower response rate than the 2012 research; however, still a high response rate for a non-mandatory survey. Two key findings were highlighted from the review of current projects (e-survey and comparison of e-survey results with application information):

- The percentage of environmental initiatives investigated and/or implemented decreased in all subject areas of the HLF guidance from 2012 to 2016, except for waste**;**
- The HLF guidance is generally viewed as having less impact now than in 2012; and
- Comparing the applications, e-surveys, and case papers shows that the majority of grantees are incorporating (or have incorporated) the environmental sustainability

initiatives described in their applications or case papers into the project delivery stage.

We suggest that these changes could be explained by the following factors:

- Environmental initiatives may not be reported as they are considered to be 'standard' actions required as part of the permitting or planning process, or via Building Regulations;
- It is becoming more common for contractors to manage and deliver innovative environmental sustainability initiative; and
- There were differences in the characteristics of the sample population.

6.4 Achievements and challenges

53% of the 32 respondents of the e-survey stated that environmental measures are 'mostly' or 'totally' complementary to achieving heritage outcomes. Similarly, the 2012 research found a similar trend. Most initiatives are working effectively and achieving the expected benefits. Several achievements were informed by qualitative evidence and cost savings. Achievements identified by the 2016 e-survey include:

- 92% of new build project grantees and 86% of repair or refurbishment grantees specified that they were considering or implementing energy-efficient light fittings;
- 75% of new build project grantees and 79% of repair and refurbishment grantees specified that they were considering or implementing energy-efficient heating or cooling systems;
- All respondents who considered or implemented a water-saving measure had low-flush WCs and low flow taps or push taps;
- All respondents who implemented a measure to protect or enhance biodiversity within the project conducted a formal ecology survey of the site. All surveys that identified sensitive species, such as bats or Great Crested Newts programmed work to minimise disturbance and measures to protect their habitats;
- 90% of grantees who implemented measures to minimise the environmental impact of materials identified prioritising local materials/suppliers where possible.

In addition, the case studies identified that a number of highly innovative initiatives have been very successful (e.g. Archimedes screw, passive first design approach, sewage digester) encouraging organisations to further increase their capacity. The case studies also highlight the potential to achieve multiple benefits: heritage, environmental and social.

Most of the key challenges identified by the case studies related to technical issues associated with the measures implemented. In some cases, this resulted in perverse outcomes that are contrary to environmental objectives (e.g. overheating) or increased costs resulting from poorly installed or inadequately maintained equipment. Several grantees reported how the HLF Guidance had been helpful in emphasising the use of Option Appraisal Studies prior to the selection and installation of such systems to avoid these issues in the future.

The e-survey also showed that when respondents stated that they did not consider or implement an environmental initiative in a specific category, most justified this by stating it was because the environmental initiative was not relevant to the scheme. For example, they did not consider or implement any energy efficiency or conservation initiatives because the project is not a building-based project, it does not consume energy, and it is purely activity-based.

Case study participants suggested that the HLF Guidance could be more helpful if it highlighted how measures are relevant to different types of projects and used case studies to demonstrate this.

6.5 **Lessons**

The key lessons identified from the study are summarised below:

6.5.1 General

- Obtaining professional or technical advice, or conducting an environmental audit helped to identify potential cost and resource savings and implement successful environmental initiatives. 48% of the survey respondents obtained professional or technical advice and on average, considered or implemented more environmental measures across the seven categories.
- Early and continual engagement with a number of stakeholders and regulators could minimise challenges to the uptake and implementation of environmental initiatives.
- Conducting feasibility reports and option appraisal reports that consider the practical operation of measures is recommended for any significant initiatives planned to ensure that these are cost-effective and appropriate for the project and its maintenance regime.
- Whilst a number of examples of innovative solutions have been identified, generally a conservative approach that builds in contingency is the recommended approach.
- Where planning permission is required, early pre-application discussions with local planning authority officers are recommended to obtain a clear understanding of the measures that are viable or not with regards to potential heritage impacts.
- Environmental measures cannot be implemented as an afterthought. Time needs to be devoted to their consideration at the development stage including engaging with stakeholders to ensure the success of environmental measures.

6.5.2 E-survey, applications, case papers and HLF Guidance

- Grantees are likely to prioritise preserving or enhancing the heritage of their site over environmental initiatives such as minimising the environmental impacts of building materials, or increasing biodiversity, conserving water, or renewable initiatives where the initiative will have an obvious aesthetic or structural impact on a building or site.
- 'Cost implications' were more often cited in the 2012 than 2016 research as the reason for not implementing a measure. There may be many reasons for this result. It could indicate that the costs of implementing these measures has reduced.
- During several telephone interviews, the HLF guidance was cited as a helpful framework for the type of environmental initiatives to consider or implement.
- Obtaining professional or technical advice, or conducting an environmental audit helped to identify potential cost and resource savings and implement successful environmental initiatives.
- For very large projects that also received funding from the European Regional Development Fund (ERDF), then the HLF guidance had no impact as the ERDF requirements are far more stringent. Similarly, projects delivered by large organisations such as the National Trust are required to meet their own organisation's requirements that again exceed those of the HLF guidance.
- A number of grantees were not clear on how the HLF guidance added to statutory requirements that already exist such as local planning policies and Building Regulations requirements.
- Most grantees had used the advice in developing their applications, however once funding had been approved the majority felt that meetings and discussions with HLF officers were more useful in implementing the initiatives and overcoming challenges than the guidance itself.
- A number of projects had undertaking Options Appraisal studies as a result of the HLF guidance and found these helpful in selecting appropriate environmental measures, or in some cases, deciding not to proceed with measures on feasibility and/or cost grounds.

- Several grantees felt that the guidance could be more helpful if it provided more information on ‘how’ to build in environmental measures rather than ‘what’ to do and more signposting.
- Many grantees highlighted that as they already have a strong environmental ethos and expert technical advisors, the guidance did not make a significant difference to the overall outcomes.

6.6 Recommendations

In this Section, we set out a number of recommendations regarding the HLF Guidance to make this more useful and useable by grantees. We also suggest a number of alternative approaches that HLF may wish to adopt to help grantees reduce negative environmental impacts.

6.6.1 Changes or additions to HLF's environmental guidance

- Narrow and define the audience - tailoring the guidance to a range of audiences, along with providing a more 'how-to' guidance and information on maintenance and monitoring (see points below) should make this more appropriate and useable for all applicants and grantees.
- Maintenance and monitoring - more guidance is needed on how to provide maintenance and monitoring for the installation and implementation of environmental measures. Maintenance and monitoring approaches need to be taken into account in any Options appraisals or feasibility studies to ensure that the final recommendations are appropriate for the project and its organisation.
- More signposting should help keep the guidance concise, but provide more resources for applicants without unnecessary duplication. The guidance should emphasise any new innovations where heritage and environmental initiatives work together; this should help those applicants that consider environmental initiatives to be irrelevant to their projects.
- More practical 'how to' guidance for grantees on how to consider or implement environmental sustainability initiatives would be useful to those who would like a better understanding of the feasibility, implementation, management and maintenance process, or those who do not have the budget for technical expertise.

6.6.2 Other initiatives

- We suggest that Section 4 of the Second Round application could include an explicit question asking applicants how they intend to address the outcome 'negative environmental impacts will be reduced'.
- In line with some grantees' suggestion, we would recommend creating a forum to share experiences, identify challenges and share information on how these have been overcome. It would be greatly beneficial for grantees who are looking for help, or unique and innovative solutions.
- Lastly, we would also recommend further production of case studies. A number of grantees involved in the telephone interviews suggested that case studies produced by other HLF-funded projects would help them gain some ideas to implement environmental initiatives and avoid or overcome some of the challenges that may arise.

7 Introduction

7.1 Context and commission

The Heritage Lottery Fund (HLF) is committed to supporting projects that are environmentally sustainable and take steps to minimise the use of resources and avoid negative impacts for the environment, where possible. HLF encourages grant-funded organisations to avoid negative environmentally sustainable impacts through its target outcomes and its environmental guidance.

HLF first introduced environmental guidance in 2008, 'Planning greener heritage projects' with support from Constructing Excellence to demonstrate its environmental sustainable commitment. The guidance was further updated in 2012, 'Reducing environmental impacts: Good-practice guidance' to reflect HLF's outcomes assessment framework that includes the outcome 'environmental impacts will be reduced'. The update was more succinct, with similar information and considerations for grantees whilst reducing the document length by more than half of the 2009 guidance.

All HLF-funded projects are required to comply with statutory requirements such as Building Regulations, local authority planning policies, and EU directives such as the Floods Directive and the Water Framework Directive. The guidance highlights many of these requirements, but also provides additional advice to ensure that all HLF-funded projects reduce environment impacts in relation to minimising and adopting sustainable approaches across eight areas:

- Whole life costing
- Energy efficiency (new build or refurb)
- Water
- Building materials
- Soil
- Timber
- Biodiversity
- Sustainable transport

HLF commissioned JBA Consulting, working with Scott Dickinson & Co., in July 2016 to undertake a review of grantees' engagement with its environmental guidance. The review was intended to investigate how HLF-funded organisations' awareness of its environmental impact guidelines has changed since 2012, the extent to which HLF (and other) guidance documents are now being followed and sustainable measures employed in HLF-funded projects. The review looks back to a previous research study conducted in 2012 that was undertaken to investigate HLF-funded organisations' awareness of its environmental impact guidelines and standards. The previous research study[2] included an email survey to 100 grantees and the production of 25 case studies to provide a more in-depth analysis of grantee activity and experience. The survey results revealed that the majority of grantees that responded had considered initiatives relating to some of the guidance sections and most of these were looking to implement measures to improve energy efficiency and renewable energy technologies. Additionally, it was found that certain environmental measures had not been addressed for reasons ranging from ‘not relevant to the scheme’ to ‘cost implications. 25 case studies were produced to further investigate the effectiveness of the environmental guidance; a list of these case studies is available in Appendix B of the research study report.

The overall aim of this commission is to review the impact of the 2012 update to 'Reducing environmental impacts: Good-practice guidance' on grantees engagement with environmental measures through a survey of existing grantees, the selection and

2 https://www.hlf.org.uk/environmental-impact-guidance-and-strategy-review

development of new case studies and an update of the original 2012 research case studies.

7.2 Aims and objectives

The overall research questions identified in the brief are:

- How have HLF-funded organisations' awareness of its environmental impact guidelines and expectations changed since 2012?
- To what extent is HLF (and other) guidance now being followed and sustainable measures employed in HLF-funded projects?

In order to answer these research questions, the following objectives have been investigated:

- Identifying the level of grantee engagement with considering and/or implementing different types of environmental initiatives and its importance to heritage projects;
- Exploring awareness of appropriate guidance;
- Comparing proposal aspirations and project implementation.

7.3 Wider context

Although this research project has specific research questions and objectives, the results and outcomes may have wider consequences. This research can help to inform how HLF can improve its support to grantees in relation to minimising environmental impacts by refocusing on where they need help above and beyond statutory requirements such as Building Regulations and Planning Policy.

8 Methodology and programme

8.1 Approach

The overall project approach is summarised below.

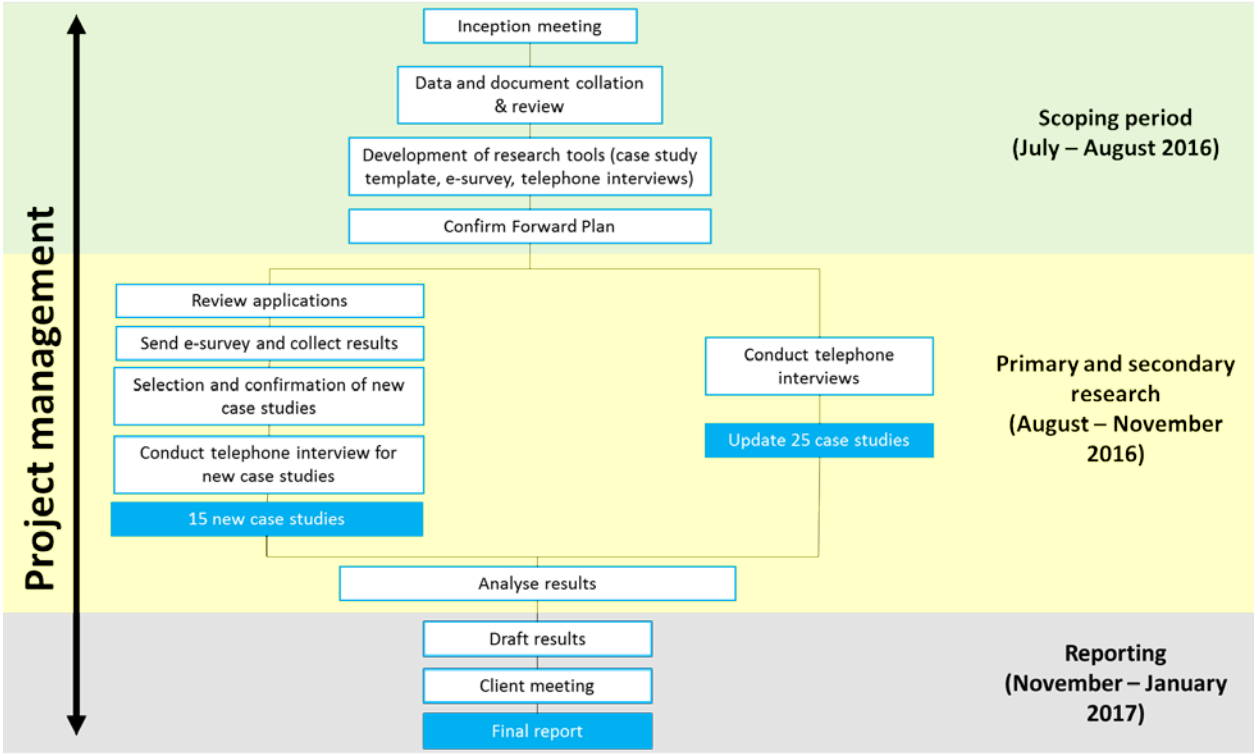

Figure 3-1: Project approach

8.2 Programme

These activities were conducted from 8 July 2016 to 27 January 2017. The following table provides a summary of the tasks, outputs, and completion date.

Task	Output	Completion date
Inception meeting	Meeting help Action note circulated after 5 days	20 July 2016
Data and document collection and review	Data register	29 July 2016
Internal team workshop	Workshop held	02 August 2016
Development of research tools	E-survey Case study template Telephone interview questions Update case study template	11 August 2016
Confirm Forward Plan	Forward Plan	15 August 2016
Review applications	Set of research data	18 August 2016
Send e-survey, collate and analyse results	Set of research data	17 October 2016
Selection of new case studies	15 case studies	26 October 2016

Task	Output	Completion date
Conduct telephone interviews for new case studies	Set of research data	18 November 2016
Write new 15 case studies	15 new case studies	30 November 2016
Conduct telephone interviews for updating 25 case studies	Set of research data	21 October 2016
Update 25 case studies	25 updated case studies	14 November 2016
Client meeting	Meeting held Action note circulated after 5 days	8 November 2016
Draft final report	Draft report	7 December 2016
Conference call with client	Meeting held Action note circulated after 1 day	16 December 2016
Final report	Final report	27 January 2017

Table 3-1: Timetable

8.3 Detailed Methodology

The approach shown in Section 3.1 illustrates how we conducted our research. Below we provide more details on each of the tasks within our programme.

8.3.1 Inception meeting and selecting projects

The HLF provided a sample of 60 HLF project applications that had progressed to a reasonable level from its current Strategic Framework. This sample included a cross-section of project types, locations, grant bands, and levels of engagement with environmental sustainability issues.

Two of the projects were de-scoped by HLF on the basis that they were no longer being funded by HLF by the time this research was being conducted.

8.3.2 Data and document collection and review

HLF provided the application forms and case papers for each of the 58 projects. The 25 case studies and associated case papers for these were also provided. All the contact details, data, and documents were reviewed to inform the development of the e-survey for the 58 project applications and interview questions for updating the 25 case studies.

8.3.3 Development of research tools

A draft copy of the e-survey questions, case study template, and report template (outputs) were provided to HLF and refined after feedback.

The case study template was used for both the new case studies selected following the e-survey, and to update the case studies from the 2012 research.

8.3.4 E-survey

The degree to which HLF-funded organisations' awareness of its environmental impact guidelines and expectations have changed since 2012 was assessed by conducting an e-survey to compare results with the previously referenced Faithful + Gould 'Review of HLF's Environmental Impact Guidance and Strategy'.

The 2012 report was used to inform the e-survey questions to ensure that responses were comparable; several additional qualitative questions were included regarding the relevance, benefits and practicality of the HLF guidance. The final list of questions was confirmed by the HLF after feedback from the draft and can be found in Appendix C.

The online survey was created using SurveyMonkey and email invitations were sent to all 58 project contacts provided by HLF. The initial deadline for survey completion was 29 September 2016; however, due to a low response rate and a number of requests by project contacts, the deadline was extended to 17 October 2016. Two email reminders from JBA Consulting and one follow-up from HLF were sent to encourage survey completion prior to the first deadline. After the first deadline, 26 project contacts that had not yet responded were contacted by telephone in order to encourage them to complete the survey. Although many of these stated they would, only two completed the survey.

Of the 58 projects contacted, there were 32 respondents, of which two were incomplete surveys. The responses had a varied level of detail.

8.3.5 Review applications and case papers

Second Round Application forms and case papers for the 58 projects were reviewed to establish the levels of grantee engagement with the principle of 'sustainability' and its importance in heritage project. This helped provide an insight to the grantees' awareness of appropriate guidance, from HLF and others on implementing sustainability measures in heritage projects and to determine the extent to which proposals to reduce negative environmental outcomes stated in the applications were being implemented in project delivery. It also helped provide insights from the perspective of the case officer and any assessment of the HLF's environmental outcomes (if available).

This review focused on Section 4 of the application form - 'Project Outcomes'. In particular, we identified any mention of achieving the outcome 'negative environmental impacts will be reduced' in 4b 'What difference will your project make for people?' and 4c 'What difference will your project make for communities?' We also reviewed Section 4 Project Outcomes of the case paper as this is where any environmental measures considered and/or implemented would be described.

This review of applications and case papers assisted the analysis in determining the extent to which proposals to reduce negative environmental outcomes stated in the applications or identified in the case papers were being or had been incorporated into the project delivery. The review was also intended to reveal any additional environmental sustainability initiatives being implemented that were not evident from the e-survey.

8.3.6 Telephone interviews and new case studies

Within the e-survey, one of the questions (Q6) asked respondents if they would be keen to be considered for a case study with successful environmental sustainability measures. From the 32 respondents, 17 said yes. We contacted all 17 by e-mail asking if they would participate in a telephone interview to inform a case study of their project. After two email reminders and multiple telephone calls, five did not respond, four did not think they were suitable to develop a case study and eight were interviewed and developed into case studies.

Based on the analysis of the response to the e-survey, the telephone interview, and the application form and case paper, case studies were produced to provide reference material for HLF that can offer potential lessons learned (achievements and challenges) in relation to the consideration and/or implementation of measures set out in the HLF guidance. Each case study provides a brief description of the project, but also sets out project achievements in relation to the HLF's eight environmental sustainability categories. These cover:

- Whole life costing
- Energy efficiency (new build or refurb)
- Water

- Building materials
- Soil
- Timber
- Biodiversity
- Sustainable transport

8.3.7 Updated case studies

The 25 case studies completed in the 2012 research were to be updated during this research project to obtain a fuller picture of project experience in achieving environmental sustainability initiatives. In order to update these case studies, HLF provided us with the contact details and the existing case study for each. HLF de-scoped one project due to inappropriate timing.

22 of the 24 grantees responded to invitations to participate in telephone interviews and these were conducted. The case studies were based on intelligence from the telephone interview, case paper and any other material provided by the grantee. The same case study template was used as for the new case studies.

8.3.8 Data analysis

To provide a detailed analysis of the e-survey and grantee applications and case papers, a number of measures were analysed:

- Comparison between responses from 2012 survey to 2016 survey
- Cross-tabular analysis with the HLF project category and status of project
- Variations between proposals in application forms, case papers and responses based on experience during or after a project delivery
- Reference to alternative sources of guidance
- Areas where more guidance and/or additional guidance may be required

To provide a detailed analysis of the case studies, the following measures were analysed:

- Key messages regarding awareness of environmental issues
- Usefulness of guidance in addressing environmental issues
- Achievements and challenges faced by projects
- Lessons learned from project delivery
- Suggestions regarding changes or additions to HLF's environmental guidance

8.4 Limitations

There are several limitations to conducting a research project that requires participation from third parties.

In all communication to grantees, there was a slow response rate. This related to the e-survey, requests for telephone interviews for new case studies and updating the case studies from 2012. Reminder emails and follow up telephone calls were undertaken to try and increase the response rate.

The e-survey was intended to collect both quantitative and qualitative data. The survey was made as simple as possible for ease of completion; however, the quality and number of qualitative questions answers was limited. Therefore, the qualitative data may be interesting, but cannot be viewed as a trend without the input from the case studies.

Updating the case studies from 2012 was compromised in some instances by a loss of institutional memory as the staff members involved in project development had moved on. This limited the insights that could be obtained regarding the experience of selecting and implementing environmental measures.

The format of the new 2012 HLF guidance differed from the 2009 version leading the questions to be slightly altered to fit the 2012 guidance. The 2012 guidance has energy efficiency and conservation split into two categories: new build/extension and conservation/refurb while just energy efficiency is found in the 2009 guidance.

Finally, in the 2012 analysis, if the application forms stated that a specific environmental measure was planned and the e-survey did not state that this measure had been implemented, it was assumed that grantees were not fulfilling the project's intentions. However, it may just have been that projects were not yet at delivery phase, or still in the delivery / implementation phase and so had not yet implemented the measures or it was omitted from the e-survey by accident. The analysis of the 2016 surveys and its associated applications and case papers did not make this assumption. This assumption also needs to be taken into account in considering the comparison of responses from the 2012 and 2016 surveys.

9 Findings

9.1 Overview

This section describes and analyses the results from the e-survey, comparing these to the findings from the 2012 research. It also discusses the achievements, challenges and lessons learned from the new and updated case studies.

9.2 Current projects review

9.2.1 E-survey

9.2.1.1 Overview

This section provides an overview of the types of projects covered by the e-survey, the environmental sustainability initiatives considered or implemented, sections of the guidance being addressed and a summary of findings. All these findings are compared to the 2012 research.

In 2012, 100 invitations were sent out to complete the e-survey, and 61 responded (61%), with 12 incomplete. The research in 2016 sent out 58 invitations and 32 responded (55%) with two incomplete. As such, there was a slightly lower response rate than the 2012 research; however, still a high response rate for a non-mandatory survey. This high response rate can probably be attributed to HLF being the projects' funder.

Below is a breakdown of the survey respondents by project category as identified in their e-survey response[3]. The 2012 breakdown by project category is also included for comparison.

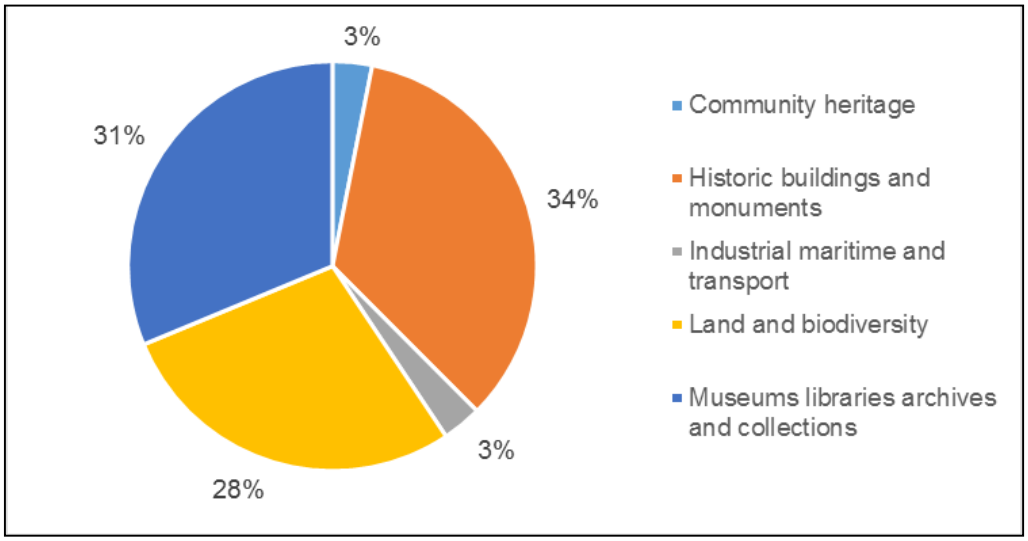

Figure 4-1: Project category for e-survey respondents in 2016

3 Project categories are officially determined by the projects case officer. However, for these results, we asked the grantees to determine their own project category.

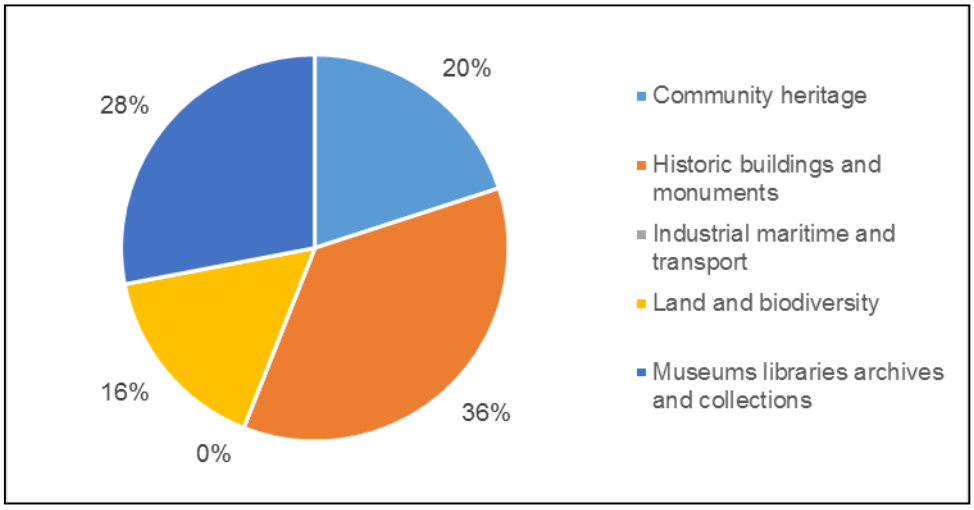

Figure 4-2: Project category for e-survey respondents in 2012

In the 2016 research, historic buildings and monuments comprised the largest proportion of projects (34%); however, there is a good spread across the other categories. Community heritage and industrial maritime and transport had the lowest proportion at 3% each (one respondent). The split of projects that responded to the e-survey was similar to the 2012 research[4]. Historic buildings and monuments also made up the highest proportion. However, there was a much higher proportion of projects within the Community heritage category (20% in 2012 vs 3% in 2016). There were also no projects representing the Industrial maritime and transport category in 2012.

Project respondents were also reviewed in relation to their current progress and implementation status to investigate if this had any impact on environmental measures underway. The largest proportion of projects were in the Implementation / Delivery phase (69%), with 25% of projects completed and only 6% in the Project Design / Development stage. With a majority of the projects within the project design / development and completed phase, the grantees would be expected to have a clear understanding of the environmental measures considered or implemented.

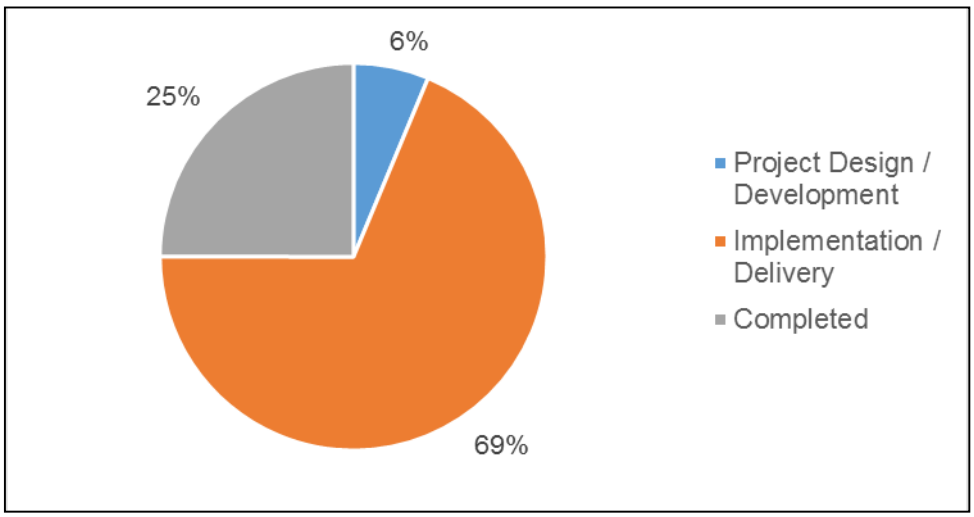

Figure 4-3: Status of project of e-survey respondents in 2016

Lastly, 81% of the survey respondents were in the lower end of the project grant band (£100k to £2m). Only 3% of the respondents (1 respondent) had a grant from the HLF of greater than £5 million. See overleaf for further breakdown. Unfortunately, the 2012

4 It is unknown if the project categories in the 2012 research were determined by the e-survey respondents or the HLF case officers.

research did not identify the grant band of the respondents so a comparison was not possible.

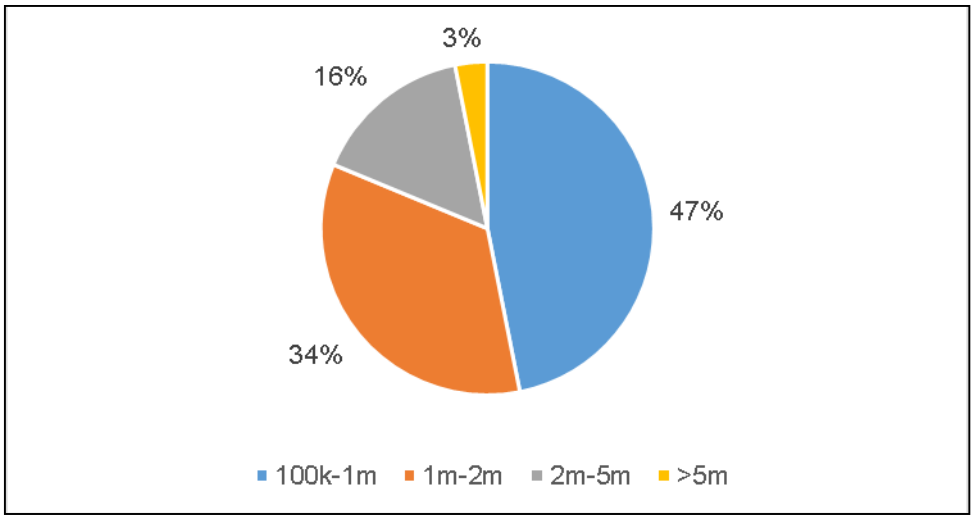

Figure 4-4: Grants received for e-survey respondents in 2016

9.2.1.2 Environmental sustainability measures

Below is an overview of the environmental sustainability initiatives considered and/or implemented by survey respondents comparing the 2016 and 2012 results. It shows how HLF-funded organisations' awareness of its environmental impact guidelines and expectations have changed since 2012.

Respondents were only given a yes or no option. If they answered yes, one set of questions was provided to ask for further details about these measures; if they answered no, another set of questions was provided to understand why they were not considered and/or implemented.

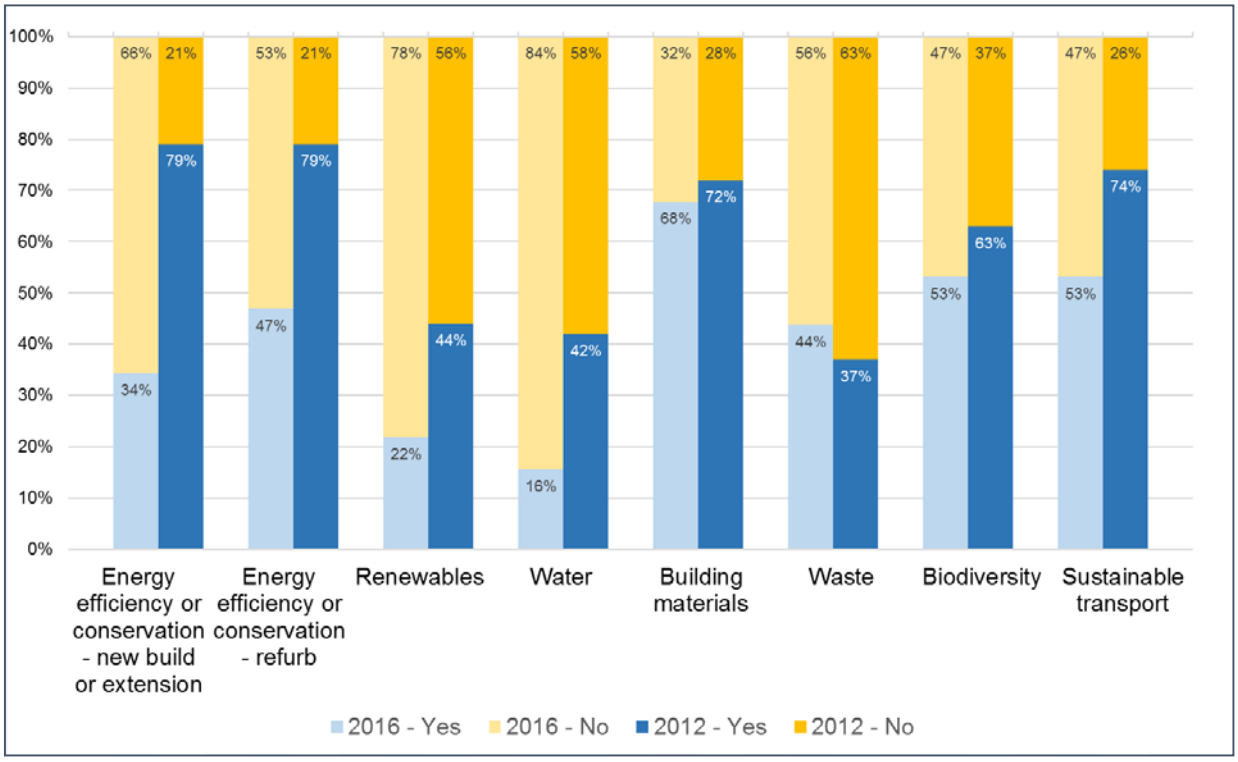

Figure 4-5: Environmental sustainability initiatives investigated or implemented

Overall, the percentage of environmental initiatives investigated and/or implemented decreased in all subject areas of the HLF guidance from 2012 to 2016, except for waste. The highest proportion of environmental initiatives investigated and/or implemented was Building materials in 2016 at 68% of respondents. In 2012 the highest proportion of environmental initiatives investigated and/or implemented was energy efficiency (79%). There was one project of the 32 respondents that had considered or implemented an environmental initiative from all categories. However, the results suggest that the overall number of environmental initiatives investigated and/or implemented has decreased.

9.2.1.3 No implementation of environmental measures

Two of the 32 e-survey respondents did not consider or implement any environmental initiatives within any of the eight categories.

In both the 2012 and 2016 research, survey respondents that did not consider or implement environmental sustainability initiatives in any of the seven categories could choose a number of reasons why:

- Not relevant to scheme
- Cost implications
- Conflict with the heritage needs or sensitivity of the site
- Lack of technical expertise
- Other (please specify)

The two projects that did not consider or implement any environmental measures stated this was because they were not relevant to the scheme.

Below is a graph that represents the 2016 research.

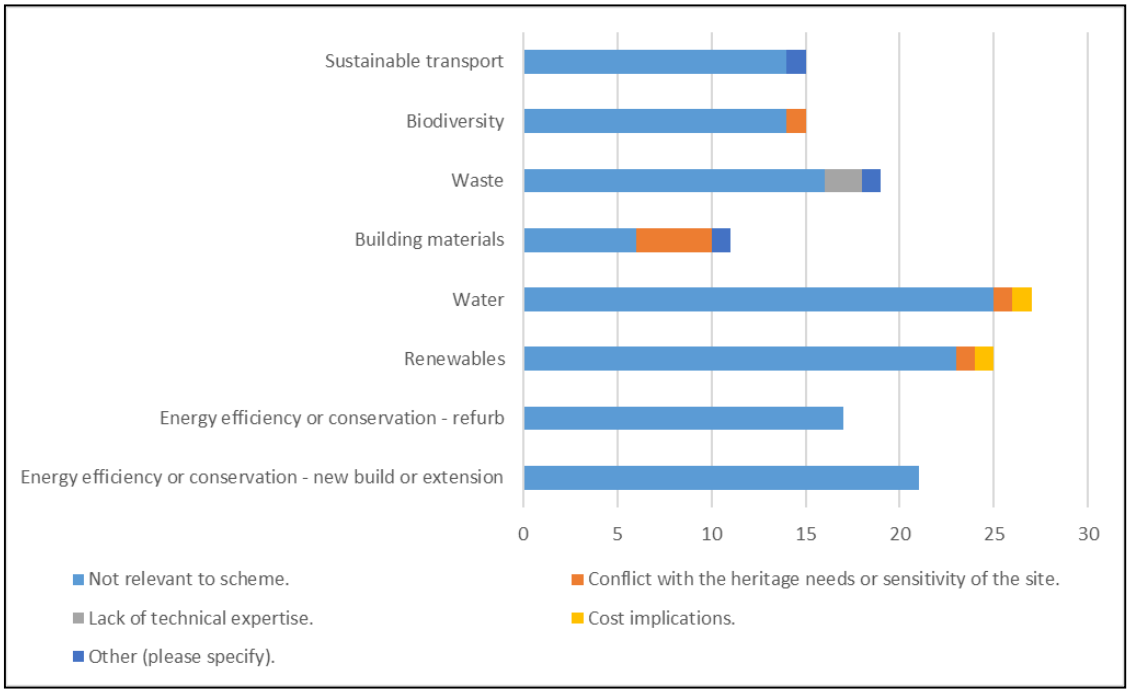

Figure 4-6: Reasons why environmental initiatives were not considered or implemented within the project (2016 research)

Four respondents stated that environmental initiatives associated with minimising the environmental impacts of building materials (such as reusing materials on site, prioritising local materials/suppliers and others) were not considered because it was in 'conflict with heritage needs or sensitivity of the site'.

Two projects identified cost implications as a reason for not considering or implementing an environmental sustainability initiative. Where cost implications were selected as a reason, respondents were given a range of percentages of the cost of initiative in comparison to the total project costs. The Galleries of Justice Museum stated they were unable to implement renewable energy initiatives because of cost implications in which they identified in the e-survey that the initiative would be less than 10% of the total project costs. This response implies the initiative was discounted due to a formal or informal cost analysis. The Aberglasney Restoration also identified cost implications for not implementing a rainwater harvesting system. The system would cost less than 10% of the total project costs. However, the case study interviews revealed that since water is not an integral to the project of restoring heritage and promoting heritage skills through learning and training, the cost of installation outweighed the benefits.

A 'lack of technical expertise' was also identified as a reason for not implementing waste initiatives.

Lastly, two respondents specified 'Other'. Campbeltown Community Business Ltd's Centenary Project representative stated that they had not considered any waste reduction measure yet because they were still developing operational matters. The Polli:Nation project representative stated they did not consider or implement any sustainable materials or timber initiatives because they "encouraged use of local materials/seed/plants etc. by schools rather than as a requirement".

Below are the results from the 2012 research. Similarly, 'not relevant to scheme' was the most common reason for not considering or implementing a specific environmental initiative within the project.

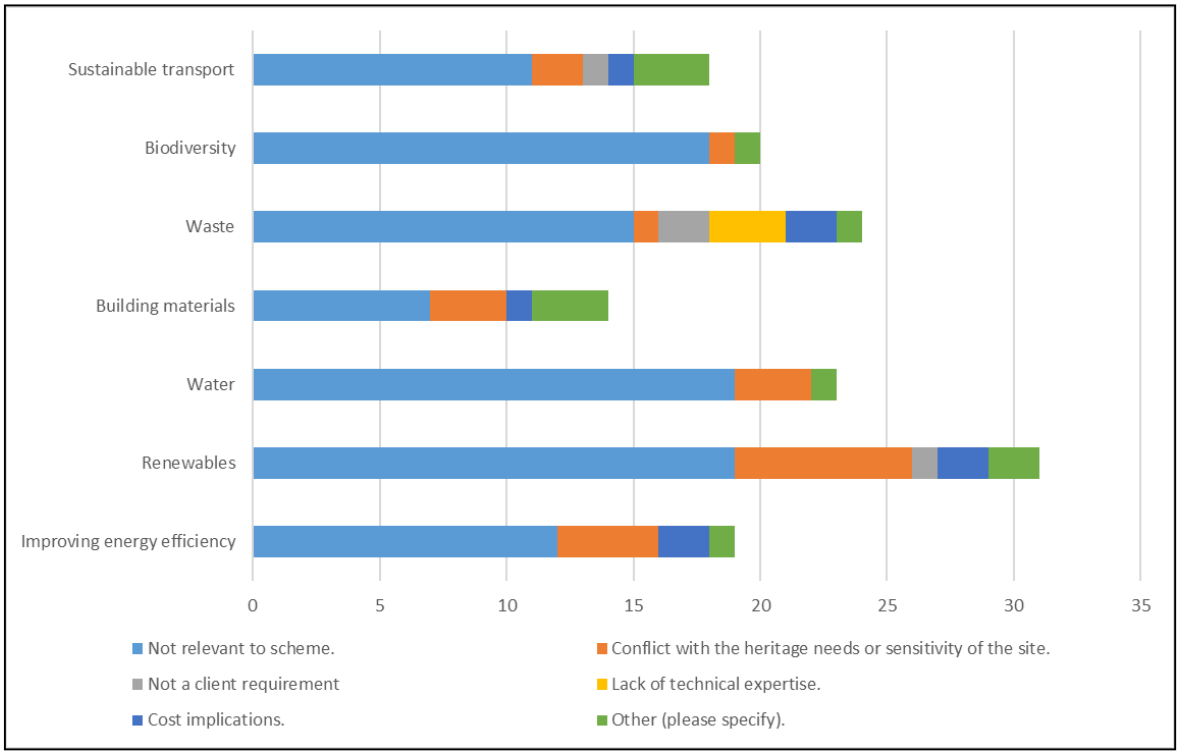

Figure 4-7: Reasons why environmental initiatives were not considered or implemented within the project (2012 research)

The second most common reason for not considering or implementing an environmental initiative was 'conflict with the heritage need or sensitivity of the site'. Similarly, 'lack of technical expertise' was also the only reason identified for not considering or implementing a waste initiative, supporting the need for more guidance or signposting in this category. 'Cost implications' were also more often cited in the 2012 than the 2016 research for not implementing a measure.

To supplement this element of the research, we undertook telephone consultations with three grantees that had identified just one or no sustainability measures in their application form and e-survey. They were asked why additional measures had not been considered and the following responses were given:

- All three of the grantee organisations have strong sustainability objectives and undertake many activities to meet these in relation to the use of materials, minimising and re-using waste, sustainable travel etc. However, the actual projects, being activity based, did not lead to any additional environmental measures over and above what the grantee organisation would usually do and the HLF guidance did not suggest any environmental measures that are not already incorporated into the day to day running of the organisation.
- The HLF guidance is perceived as being very focused on new-build construction and restoration capital projects and therefore can be dismissed by those undertaking more activity focused projects. It was suggested that if the guidance was more tailored to different types of project, there may be more take up.
- One grantee queried why HLF is so strongly opposed to print media on sustainability grounds as apps are likely to have a limited lifespan and digital communications have a carbon footprint.

9.2.2 Comparing e-survey, application form, and case paper information

The review of the HLF application forms (Section 4b and 4c) provided useful information on the grantees' approach to achieving the 'reducing environmental impacts' outcome. In applications completed before 2008, Section 4e also asked the grantee "How will your project affect the environment?"; the current application form from 2008 had removed this

question as it should be covered in the question 'What difference will your project make?" (Section 4b and 4c). The responses to these Sections of the applications helped to establish levels of grantee engagement with the principle of 'sustainability' and its importance in heritage projects.

Case papers were also reviewed. These provide a summary assessment by the case officer outlining project progress to date and including detailed information about the heritage importance and project outcomes, including any recommendations. Environmental measures were most likely to be identified within Section 4 Project Outcomes so this was the section that we reviewed.

By comparing the grantees response to the e-survey and Section 4 of the Second Round Application and Section 4 of the case papers, we were able to determine the extent to which proposals to reduce negative environmental outcomes stated in applications were being or had been incorporated into the project delivery phase and the extent to which they were discussed with the case officer. The exercise also enabled us to determine if any environmental sustainability initiatives were not mentioned in either the application, e-survey, or case papers to explore the HLFs decision-making and assessments. All the projects analysed were post-2008 as determined by the decision date and consequently should have the post-2008 application question "What different will you make?" (Section 4b and 4c). However, a number of applications were found with the Section 4e question "How will your project affect the environment?" (that was contained in the application form until 2008). As there is an evidence lack of consistency within the sample population, we are unable to identify which projects had which version of the application. Also, each project had a decision date following the publication of HLF's 'Planning greener heritage projects' so we could not compare projects that had used different versions of the guidance.

It should be noted that grantees often categorised their projects quite differently from the HLF case offices as evidenced by the following table. Throughout our analysis, we used the grantees' choice of project categories for our analysis.

Project category	Number of projects categorised by HLF case officers	Number of projects categorised by grantees/e-survey respondents
Community heritage	1	8
Historic buildings and monuments	11	10
Industrial maritime and transport	1	1
Land and biodiversity	9	8
Museum libraries archives and collections	10	5
Total	32	32

Table 4-1: Project category by HLF case officers vs. grantees

Table 4-1 summarises the analysis between the application, case papers and e-survey. With 32 respondents of the e-survey and their associated application and case papers, we identified 113 separate occasions in which an environmental measure in one of the seven categories was mentioned.

Comparing the applications, e-surveys and case papers shows that the majority of grantees are incorporating (or have incorporated) the environmental sustainability initiatives described in their applications or case papers into the project delivery stage. The Table below shows that there were six environmental initiatives cited in only the application

and case paper, but not in the e-survey (Total A/CP); six environmental initiatives cited only in the application (sum of 'Total only A'); and six environmental initiatives cited only in the case paper (sum of 'Total only CP'). A total of 25 environmental initiatives were cited in the e-survey, application, and case papers (sum of 'Total A/CP/S').

There were a large number of environmental initiatives (45 of 113) only identified in the e-survey, and not the applications or case papers. Environmental measures in building materials and timber and construction waste had the largest number of environmental measures identified only in the e-survey: 13 and 12 respectively. These categories included measures such as reusing materials on site; prioritising local materials/suppliers; salvaging/reclaiming off site where possible which make sense financially and often a part of the responsibility of the contractor.

Analysis of application	Total A/CP/S	Total A/CP	Total A/S	Total CP/S	Total only A	Total only CP	Total only S
Energy efficiency or conservation	8	0	3	0	2	0	4
Renewables	1	0	0	2	0	0	4
Water efficiency	0	3	0	0	0	2	5
Building materials & timber	3	1	2	3	1	0	13
Construction waste	0	0	1	1	1	0	12
Biodiversity	9	0	2	4	0	0	2
Visitor transport	5	2	2	4	2	4	5

Table 4-2: Summary of analysis of applications, case papers, and e-survey responses

9.2.3 Summary analysis of current projects

The e-survey indicates a decrease in the consideration, installation, or implementation of an environmental sustainability initiative from the 2009 research conducted by Faithful + Gould.

We suggest that these changes could be explained by the following factors.

Firstly, environmental initiatives may not be reported as they are considered to be 'standard' actions required as part of the permitting or planning process, or via Building Regulations. The e-survey started each category asking the grantee if they had investigated or implemented an initiative within the category e.g. energy efficiency. No suggestions of what these initiatives may be were made discussed unless the response was "Yes". Consequently, grantees may not have considered measures that are part of the permitting or planning process, or Building Regulations as environmental measures that should be highlighted. For example, capital projects must have a site waste management plan, or consider the ecology within and surrounding their site. The energy efficiency of buildings is within the requirements of Building Regulations. From further discussion for case studies, a number of grantees acknowledged this reasoning. One project manager stated that considering and implementing environmental initiatives were now common place in all capital projects, similar to the uptake of accessibility measures previously.

Additionally, it is becoming more common for contractors to manage and deliver innovative environmental sustainability initiative. For example, the Polli:Nation project stated they did

not consider or implement any sustainable materials or timber initiatives because they "encouraged use of local materials/seed/plants etc. by schools rather than as a requirement". This project passed on their responsibility to ensure local materials were used by their supply chain, in this case schools. Many organisations now have procurement policies which require their contractors fulfil their environmentally sustainable requirements, such as prioritising local suppliers, sustainably sourced materials, and many others. The additional interviews undertaken with grantees that did not identify any or only one environmental initiative all had sustainability policies that were adhered to within the project, but they did not incorporate any additional environmental initiatives over and above what they were already doing as a result of the project. These type of procurement policies were also identified frequently in the updated case studies in Appendix B.

Another reason for a reduction of environmental measures over time may be differences in the characteristic of the sample population. Although we were able to compare the project category between the 2012 and 2016 sample population, they were not categorised into capital investments, or built projects and activity-based projects. The projects chosen for 2016 research may not have had environmental initiatives applicable to the project. A larger proportion of e-survey respondents in the 2016 research who did not consider or implement an environmental initiative in any of the eight categories determined it would 'not [be] relevant to scheme' in comparison to 2012.

For example, we looked into the 2016 results for energy efficiency or conservation initiatives in more detail. Of the 32 respondents, 16 stated that they did not have any energy efficiency or conservation initiatives for either a new build or a repair/refurb. These 16 consisted of:

- 7 in the land and biodiversity category
- 6 in community heritage
- 1 in Industrial maritime and transport
- 1 in Museum libraries archives and collections
- 1 in historic buildings and monuments

Of these 16, we looked into the application for more detail to find that not all of these projects have associated buildings or physical infrastructure. Some were activity-based projects and consequently would not have considered or implemented any energy efficiency or conservation initiatives[5]. In comparison, the 2012 research had 79% of e-survey respondents consider or implement an energy efficiency or conservation measure and 20% claimed it was not applicable to their project where the majority fell into the landscape/biodiversity or community heritage categories. The 2016 research had a larger sample population in which energy efficiency or conservation was not relevant to the project, in comparison to the 2012 research.

9.3 New case studies

9.3.1 Overview

The e-survey included a question asking if grantees were willing for their projects to be the subject of case studies. 17 replied positively, but once contacted just eight responded. As case studies have been undertaken on projects that were willing to be involved, rather than selected on the basis of demonstrating a range of location, heritage type, grant category etc. these results should not be considered as representative of the whole grantee population.

Without prejudice to the above, projects do show a reasonable range of locations and categories as summarised in the table below, although there are no projects with very large grants.

[5] Note the project categories were determined by the project contacts filling in the e-survey, rather than provided by the HLF.

Location	No. projects
East Midlands	1
North West	1
Scotland	1
South East	1
Wales	2
West Midlands	2

Heritage category	No. projects
£100k v- £1m	5
£1m - £2m	2
£2m - £5m	0
£5m+	0

Heritage category	No. projects
Community Heritage	1
Historic buildings and monuments	3
Industrial, maritime and transport	0
Land and biodiversity	3
Museum, libraries archives and collection	1

Table 4-3: Summary of New Case Studies

All projects have implemented several environmental measures with all building projects incorporating energy efficiency measures. Building materials measures were incorporated into most projects, but only two had incorporated renewables measures.

9.3.2 Case study achievements

As projects are still at the implementation / delivery stage, realised achievements on the ground are limited. However, the following have been identified.

- As several of the projects are focused on land and biodiversity, **substantial biodiversity gains are expected**. These include the RSPB's Acquisition of Hazeley Heath that has achieved all the biodiversity aims set out in the application process with a positive **improvement in biodiversity indicators** through a change in land management practices and observation of key species. Similarly, the purchase of woodland by the Warwickshire Wildlife Trust is expected to **improve its carbon storage and protect and enhance its biodiversity**. The Trust is planting an additional 6,000 trees this winter. The Keep Wales Tidy project using community engagement to safeguard Wales' hedgerows should achieve **social and environmental benefits by better managing hedgerows through** engagement with landowners and the local community.
- Specific initiatives highlighted include the **anaerobic sewage digester** installed by the Aberglasney Restoration Trust for its heritage horticultural training and plant production facility. The digester is currently taking 50% of local sewage with future plans to increase this to 100%. Ultimately, the Trust plans to produce clean water from 40,000 people's sewage. The restoration of the Campbeltown Picture House has integrated new technologies including **solar PV, biomass boilers, and an energy-efficient heating and ventilation system** in an early 20th century

building. Old rural cinemas are often known for their poor ventilation; the new highly energy-efficient heating and ventilation system in the Picture House is expected to be a success.

- An unexpected success for the Hereford Cathedral project has been the **protection of the lichens, mosses, and bryophytes on the roof**. This has brought an additional educational element to the project, allowing visitors to observe these nationally important colonies and learn how they can be protected.

9.3.3 Case study challenges

All projects considered that environmental and heritage objectives are largely complementary, and for those projects that were focusing on environmental issues, particularly land and biodiversity, they were seen as totally complementary. The main challenges associated with incorporating environmental measures related to technical issues associated with energy efficiency and renewables measures and unexpected challenges requiring HLF approval that took some time to secure. Both the Galleries of Justice Museum and Campbeltown Community Business Ltd experienced some challenges in relation to technical issues associated with renewable energy and energy efficiency measures and systems. These largely related to whether the proposed technologies were suitable for the site, the availability of appropriate fuel sources and the appropriateness of using domestic systems in large buildings for public use. These challenges were overcome through additional research and the development of holistic energy and design strategies to ensure that all elements were taken into account.

The Hereford Cathedral Trust had expected to be able to use its roof tiles, but they were in such a poor condition that this was not possible. The Trust sought HLF's approval to sell these rather than send to landfill. The process for approval took a long period of time and had a cost impact as the tiles had to be stored in the Cathedral's car park. By selling the tiles to a salvage yard, the costs of the new stone tiles were slightly offset.

9.3.4 Usefulness of guidance/other guidance

Grantees views on the HLF environmental guidance ranged from 'of limited value' to having 'a major influence' on the project approach. Grantees that sit within large organisations/networks such as RSPB and Wildlife Trusts were less likely to value the HLF guidance than smaller grantees such as the Aberglasney Restoration Trust and the Galleries of Justice Museum probably because the larger organisations, especially those that have an environmental focus, are likely to have their own corporate guidance that places higher requirements than the HLF guidance.

Particular issues that grantees highlighted with the HLF guidance included a perceived focus on built, or capital projects. It was suggested that guidance on biodiversity and sustainable transport could be improved. Recommendations for future development of the guidance included the following:

- Case studies to demonstrate how other heritage projects have incorporated environmental measures. It was suggested that information sharing can help build confidence in implementing certain environmental initiatives.
- Guidance on how to complete simple energy and water audits. These should include the initial planning and a review stage where design elements can be updated in the model to determine how the energy system will likely function, including a financial element.
- Providing guidance of an appropriate scale and complexity for all HLF-funded projects: maybe this should be more customised and proportionate to the size and type of project
- Guidance on waste disposal in relation to the responsible disposal of construction materials/waste would be useful.
- Include a list of approved environmental contractors that projects should use.

9.3.5 Case study lessons

The review of the new case studies undertaken as part of this project has identified the following lessons for others:

- Undertaking feasibility studies at an early stage provides essential information on viability and gives the applicant and stakeholders confidence in the environmental measures and their expected outcomes. For example, the feasibility study commissioned by the Aberglasney Restoration Trust led to the installation of an anaerobic sewage digester that is so successful that there are future plans already to increase capacity. A feasibility study can provide the direction and confidence for an organisation to consider and implement different technologies and systems to improve the financial and environmental sustainability of the organisation's future.
- Building relationships with stakeholder, experts, and other local species groups are important for land and biodiversity projects. Working with the previous landowner allowed the Warwickshire Wildlife Trust to understand what is needed to be restored from previous conditions. Local surveyors also had first-hand knowledge of the site as they had been surveying the site for two stakeholders.
- Environmental measures cannot be implemented as an afterthought. Time needs to be devoted to their consideration at the development stage including engaging with stakeholders to ensure the success of environmental measures. Keep Wales Tidy and the Woodland Trust spent a lot time within the development stage to ensure successful engagement with the landowners.
- Early consultation can aid the planning process and reduce any objections. The hydropower microsystem proposed by the Warwick Bridge Corn Mill project requires consent from the Environment Agency for a number of difference licenses, including an abstraction and impoundment license. Since the licenses are time limited, informal consultation with the Environment Agency was conducted to ensure there would be minimal obstacles to obtaining these licenses. The application for the licenses will be submitted once the final designs are confirmed.
- The unexpected challenge and success of protecting the important colony of bryophytes and lichens has taught the Hereford Cathedral Trust, and other heritage buildings, to look at the roof at the development stage.

9.4 Updated case studies

9.4.1 Overview

25 case studies were produced as part of the 2012 study to highlight progress made in terms of the planned implementation of environmental measures and also a review of the usefulness, or otherwise, of the HLF's guidance. For this project, it was agreed that these case studies should be updated providing additional on progress, achievements and challenges since 2012. All 25 were contacted and 22 responded and participated in interviews with the project team. Insights gained from these interviews, together with the original case studies and project case notes, were used to update the case studies. These updated case studies are provided in a separate document; here we provide a brief overview of their content, achievements, challenges and lessons identified.

Appendix B provides detail on each of the 22 updated case studies; this information is further summarised and analysed in the table and commentary below:

Location	No. projects
East of England	2
East Midlands	2
London	4
North East	1

Location	No. projects
Northern Ireland	1
Scotland	1
South East	2
South West	2
Wales	2
West Midlands	2
Yorkshire	3

Heritage category	No. projects
£100k v- £1m	6
£1m - £2m	5
£2m - £5m	7
£5m+	4

Heritage category	No. projects
Community Heritage	5
Historic buildings and monuments	10
Industrial, maritime and transport	1
Land and biodiversity	2
Museum, libraries archives and collection	5

Table 4-4: Summary of Updated Case Studies

Table 4-4 shows a good spread across heritage categories, grant categories and geographies; however, these findings are not necessarily representative of the whole population due to the small number and the fact that these projects were selected on the basis of offering potential lessons in relation to the implementation, or omission, of measures set out in the HLF guidance.

The majority of projects had implemented the environmental initiatives planned in 2012. All building related projects incorporated energy efficiency measures, whilst the measures least implemented related to whole life costing and soil. This may be due to the nature of the projects (with regards to soil) and the fact that whole life costing can be difficult to undertake with initiatives that do not have guaranteed levels of benefits.

Water and construction waste were the measures most often incorporated but not identified in the original case studies. In some cases, the applicants were not aware of why this had occurred as such measures had always been intended, construction waste management plans were implemented in all construction projects as these are required under the Site Waste Management Plans Regulations 2008. Applicants may not have highlighted these previously due to them being a requirement rather than a specific environmental initiative.

Renewable energy was the measure most often omitted (but originally proposed) primarily on cost and practicality grounds. We asked applicants if this was as a result of reduced financial incentives, but this was not explicitly identified as a justification. In general, more detailed feasibility/option appraisal studies had identified that renewable measures were not viable.

9.4.2 Case study achievements

9.4.2.1 Implementation of initiatives achieving benefits and cost-savings

As the above table demonstrates, an impressive number of environmental measures were implemented across all projects. The majority of these are working effectively and achieving the expected benefits. Most projects considered environmental and heritage objectives to be complementary as well as environmental measures helping to improve cost-efficiencies. For example, the National Trust's project 'A Shared Vision for a New Stowe' installed a biomass boiler and the Trust is now in a position to sell energy back to the grid.

The re-use of original materials clearly meets both heritage objectives in terms of the authenticity of heritage buildings and environmental objectives - minimising waste and minimising the use of raw materials. For example, the major Lincoln Castle Revealed Project led by Lincoln County Castle re-used 88% of material on site. All of the original ironmongery and flooring was re-installed, 95% of the Castle wall walkway slabs were reclaimed original slabs and 95% of the prison brickwork remains original.

Rainwater harvesting systems had a mixed success rate but again these can fit well with heritage objectives. For example, the rainwater harvesting system used in the aforementioned National Trust project in Stowe uses rainwater to water the garden and grey water recycling in the visitor toilets. Also, the Wentworth Castle project re-created the original Victorian design with hollow supporting columns in the Conservatory capturing rain water that is then used to water the plants and flush the toilets.

Biodiversity benefits were seen across the majority of projects with all grantees taking this subject seriously and undertaking ecology surveys, putting in place appropriate measures where bats were identified and enhancing habitats for other protected species such as Greater Crested Newts. The RSPB project in Minsmere concerning nature discovery demonstrated how, with careful planning and management, it is possible to increase visitor numbers and enhance natural heritage and biodiversity. This was achieved by undertaking a full ecological survey that provided detailed data on key species then designing the construction, visitor access and routes to avoid adverse impacts on wildlife. The project enhanced the habitat of the Stone Curlew, a bird of national significance and has been successful in attracting another breeding pair within 400m of the visitor centre. Within the last decade, the population has grown from a single breeding pair to ten.

Where costs have been monitored, most projects have been able to show cost-savings as a result of the implementation of environmental measures. For example, prior to the HLF funded restoration and repair project, English Heritage's Kenwood House had annual running costs of around £125k. Following project completion, with increased opening hours, more staff, higher energy costs and more amenities to run, e.g. a lift, annual running costs had only risen to £129k. This cost-saving is largely attributed to the energy efficiency measures introduced: a new boiler and building management system to control temperature.

The British Museum World Conservation and Exhibition Centre (WCEC) obtained a BREEAM 'Excellent' award that not only generated a sense of achievement among the team but also helped the British Museum use the WCEC project as an example of how all of it projects should be managed in future. In practical terms, the project has had a direct impact on the British Museum's approach to the use of energy-efficient LED lighting and its approach to future works, e.g., not simply replacing like-for-like but ensuring energy-efficient measures, such as additional insulation, form part of future re-development. Furthermore, the building has enabled changes in working practices that are more energy efficient (e.g., flexible working is now possible due to open plan working environments that were not previously available) and members of staff have changed their own behaviour as a result of coming into contact with the energy and waste efficiency measures that have been built into the project, for example, the WCEC recently achieved a 100% recycling rate, twice the rate achieved elsewhere in the British Museum.

9.4.2.2 Innovative measures

A number of project demonstrated particularly innovative environmental measures that have been successfully implemented and complement heritage objectives. Examples include:

- The restoration and interpretation of Ynysangharad War Memorial Park Lido in Rhondda Cynon Taf included the use of a **liquid pool cover** rather than a thermal blanket to reduce the impact on the heritage assets. The liquid pool cover produces a film on the surface that is broken up when the pool is in use, but re-forms when the pool surface is still. This was selected following the completion of a Pool Cover Options study. The study report identified that for the same level of heat loss prevention, the liquid pool cover costs were less than a fifth of the plastic pool cover cost and had much less detrimental visual impact on the site's heritage.
- The Heart of Staveley project identified the **restoration of the Georgian water drainage system to a modern day rainwater harvesting system** as its largest achievement. This water saving initiative is extremely complementary to restoring its heritage, cost savings, and ensuring greater water security now and in the future.
- The Renewable Heritage Trust saw the potential to install the **first Archimedes Screw turbine in the country** in the weir associated with the restoration of Howsham Mill, generating renewable power and sustainable income. A second Archimedes Screw will be installed on site in the near future and as a result of the successful installation, many other businesses are installing them across the country and they are now the preferred turbine of the Environment Agency. In 2014, the project was awarded the Heritage Angel award for the best restoration of an industrial building by English Heritage, the Heritage Hero award by the Heritage Alliance, and highly commended by The Georgian Society. Ryedale District Council also awarded it Rural Green project of 2013.
- Hexham Abbey Heritage was successful in installing **environmental measures at the Grade 1 listed Abbey without compromising heritage objectives**. These measures included concealed heating and ventilation to the exhibition space via low energy and demand driven systems and the installation of solar heating panels. Whilst there were some challenges with the local planning authority, permission was granted for the solar heating panels on the basis that these would not be visible to the public and therefore would not significantly impact the heritage of the site.
- The new Welcome Building at Westonbirt Arboretum, the UK's National Arboretum, achieved a **BREEAM 'Excellent' rating of 74.9%.** The overall project was longlisted for the Wood Awards, and the CPRE in Gloucestershire gave the project an award, citing its restoration of lowland that included using the sites own topsoil (thereby minimising the risk of contamination) and working with volunteers to seed the area in a way that developed their understanding of local flora. Surveys of flora and fauna indicate that populations are growing slowly. Furthermore, the project has had a significant visual impact by returning the lowland meadow to its original appearance, visitor and membership numbers have exceeded expectations and the Welcome Building showcases the use of timber and provides amenities for visitors, thereby reducing the need for portable toilets etc.

9.4.2.3 Multiple benefits: heritage, environment and social sustainability

The above sections have demonstrated how projects have worked to install environmental measures that are complementary to heritage benefits. Most grantees considered environmental and heritage objectives to be largely mutually reinforcing with the only issue being around visual impact, particularly in relation to listed buildings. In addition, the cost-benefits of environmental measures, particularly those aiming to increase energy efficiency and re-use materials were identified as a welcome benefit. The case studies also revealed that additional benefits were achieved in relation to social sustainability. This included

appointing local suppliers, increasing local volunteers and providing educational opportunities for local schools and communities.

Examples are highlighted below:

- The Renewable Heritage Trust that restored Howsham Mill identified specific project benefits of **providing educational programmes** to teach students about the River Derwent, agricultural heritage, renewables and generating electricity.
- Montgomeryshire Wildlife Trust highlighted that since the opening of the Dyfi 360 landscape project in 2014, over 100,000 visitors have had close access to nesting ospreys, along with the chance to get close to a range of other species, including rare dragonflies. This project also overcome a major challenge of building an observatory on a peat bog. This was achieved through a stilts system constructed with the **assistance of volunteer climbers** through a hoist system that utilised nearby trees for leverage.
- The refurbishment of the 250-year-old Bishop's Castle Town Hall emphasised community, local history and heritage benefits as well as reviving its economic importance for local businesses and groups. Environmental benefits to the community include project use of **local contractors and materials and continuing use and active promotion of local suppliers** and services as part of the Town Hall Trust business plan and the Trust's Environmental Policy.
- Victoria and Albert Museum Europe 1600-1800 Galleries adopted an innovative passive first approach and control of the environmental strategy. They installed a system that **reduces energy costs significantly whilst avoiding housing objects in glass cases and low-lit rooms ensuring no rapid environmental fluctuations**. The approach creates a passive system that tightly controls temperature and humidity.

9.4.3 Case study challenges

9.4.3.1 Hi-tech environmental measures

Around a quarter of the case studies reported challenges that had resulted from hi-tech environmental measures being installed that were difficult to maintain and repair and in some cases had cost more than conventional systems (Stowe, Abbotsford Trust, Hastings Pier, National Horseracing Museum, Tank Museum, World at Wentworth). This mainly related to building management heating and ventilation systems and rainwater harvesting systems. Grantees considered that the availability of HLF funding and the focus on environmental measures had led to some very sophisticated systems being installed that involved elements such as automatic window opening, humidity regulation etc. that caused major problems when they did not operate correctly. This was exacerbated by there being very few firms able to repair or advise on these systems. Encouraging, or requiring the use of Option Appraisal Studies that include operational considerations prior to the selection and installation of such systems could help avoid these issues in the future.

9.4.3.2 Sustainable transport

Almost all projects encouraged sustainable visitor travel by promoting public transport, providing cycle racks and some providing financial incentives (free cup of tea at Stowe if you travel by public transport). However, it is recognised that many of the projects are situated in fairly rural and sometimes quite remote locations that are difficult to access by public transport. One particularly successful example was Lincoln County Council's joint initiative with Virgin Trains East Coast (VTEC). VTEC offered six dates to provide a special direct service to support Lincoln Castle Revealed, Magna Carta and other events in the city. In addition, the Community Rail in the City Event in May 2016 also offered an excellent opportunity to promote Lincoln by Rail. Finally, the “Lincoln – it’s faster by rail” stand at Kings Cross was very well received by the public and Lincoln Castle supported paid-for advertising on the two large digital screens in the main concourse area, as well as a ‘takeover’ of the northern ticket barriers at Kings Cross Underground. The Abbotsford

Trust has also achieved a high level of awareness of sustainable travel options amongst its visitors. This has been supported by the construction of a new nearby rail line in 2015 and a bus stop located in the park with direct access to the railway station.

9.4.3.3 Overheating of new buildings

Energy efficient buildings should achieve a reduction in greenhouse gas emissions and a reduction in cost leading to more affordable warmth. However, in some new and recently refurbished buildings with high levels of insulation and air tightness, the unintended negative impact can be overheating. This was highlighted by a number of grantees in relation to new buildings constructed to high environmental standards, in some cases the overheating was currently only a minor concern but it was suggested that this could become more serious with climate change resulting in higher temperatures. Projects highlighting this issue included Bishop's Castle Town Hall and Hastings Pier.

9.4.3.4 Renewables payback

Renewable energy measures are generally only installed where there is an understanding of the payback period, that is, how long it takes for the value of energy produced to exceed the capital and running costs of the specific measure and that the organisation installing the measure accepts the payback period and can manage this financially. In several cases, grantees had intended to install renewable energy measures, but following detailed options appraisals, had decided not to due to the payback period or other practicality issues, sometimes related to heritage impact. This applied to: The Piece Hall, Heart of Staveley Project, the World at Wentworth and the Ynysangharad War Memorial Park Lido.

9.4.4 Usefulness of guidance/other guidance

Grantees considered the HLF guidance had varied degrees of usefulness. For very large projects that also had funding from European Structural Funds (ERDF) then the HLF guidance had no impact as the ERDF requirements are far more stringent, for example, all new build projects are required to meet the BREEAM Excellent rating[6]. In addition, the National Trust has environmental policies and requirements that exceed the HLF guidance, for example in relation to energy efficiency in historic buildings[7] and therefore the guidance is not likely to have much impact on projects where the National Trust is the applicant.

A number of grantees were not clear on how the HLF guidance added to statutory requirements that already exist such as local planning policies and Building Regulations requirements. It was suggested that HLF guidance should only be highlighting any recommended aspects over and above existing requirements.

Most grantees had used the advice in developing their applications, however once funding had been approved the majority felt that meetings and discussions with HLF officers were more useful in implementing the initiatives and overcoming challenges than the guidance itself.

A number of projects had undertaking Options Appraisal studies as a result of the HLF guidance. In some cases, this led to less environmental measures than had been originally planned but they were more realistic and practical meaning that challenges and unnecessary costs were avoided.

Several grantees felt that the guidance could be more helpful if it provided more information on 'how' to build in environmental measures rather than 'what' to do. It was suggested case studies demonstrating how other heritage projects had incorporated environmental

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6 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/453888/England_ERDF_operational_programme_FINAL_140815.pdf

7 http://www.ihbc.org.uk/branches_files/nwest/docs/Nigel%20Blades%20FTEC%20Oct%2009.pdf

measures would be useful plus signposting to other organisations for more information and practical tools for example BRE and the Carbon Trust.

Overall, grantees were positive about the guidance, but many highlighted that as they already have a strong environmental ethos and expert technical advisors, it did not make a significant to the overall outcomes.

9.4.5 Case study lessons

From the review of the updated case studies, we have identified the following lessons:

- The availability of funding has led, in some instances, to very expensive, hi-tech, environmental systems that are challenging to operate and maintain. Option Appraisal studies are important to assess the advantages and disadvantages of such systems with a focus on practical operation. The close involvement of maintenance teams throughout project development, implementation and operation should help avoid these situations arising as should a thorough understanding of existing buildings and how these will operate with new systems and new build initiatives.
- As far as possible, environmental initiatives should be integrated into the fabric/design of the build itself. A holistic approach from the outset, rather than seeing environmental measures as 'add-ons' should achieve effective outcomes. Again, grantees stressed the importance of early Options Appraisals in which all aspects of environmental initiatives were analysed during the design stage and built into the proposal if feasible and beneficial. At this stage, payback periods can be assessed and decisions taken on whether the business case justifies the incorporation of measures with long payback periods.
- Whilst a number of examples of innovative solutions have been identified, generally a conservative approach that builds in contingency is the recommended approach. Again Option Appraisal studies will assist as will robust project management ensuring that the schedule of works meets funder's deadlines, and that sufficient 'slack' is built into the timetable to cope with delays due to bad weather.
- A number of projects identified overheating problems that had resulted from passive ventilation systems and highly energy efficient buildings. The potential for overheating should be taken into account in the technical assessment of such studies and consideration given to climate change and the likelihood of future increases in temperature.
- Where planning permission is required, early pre-application discussions with local planning authority officers are recommended to obtain a clear understanding of the measures that are viable or not with regards to potential heritage impacts. This should avoid spending time on developing proposals that will not be acceptable or ignoring options that might have been acceptable.

10 Achievements and challenges

10.1 Achievements

53% of the 32 respondents of the e-survey stated that environmental measures are mostly or totally complementary. Similarly, the 2012 research found a similar trend. Most initiatives are working effectively and achieving the expected benefits. A number of achievements were informed by qualitative evidence and cost savings. Achievements identified by the 2016 e-survey include:

- 92% of new build project grantees and 86% of repair or refurbishment grantees specified that they were considering or implementing energy-efficient light fittings.
- 75% of new build project grantees and 79% of repair and refurbishment grantees specified that they were considering or implementing energy-efficient heating or cooling systems.
- All respondents who considered or implemented a water-saving measure had low-flush WCs and low flow taps or push taps.
- All respondents who implemented a measure to protect or enhance biodiversity within the project conducted a formal ecology survey of the site. All surveys that identified sensitive species, such as bats or Great Crested Newts programmed work to minimise disturbance and measures to protect their habitats.
- 90% of grantees who implemented measures to minimise the environmental impact of materials identified prioritising local materials/suppliers where possible.

The high uptake of a number of environmental measures and initiatives demonstrate that requirements for construction or refurbishment of buildings are including more environmentally-friendly options, such as LED lighting, low flush WCs and low flow taps or push taps. These measures and initiatives are low-cost and enable cost savings.

In addition, a number of highly innovative initiatives have been very successful (i.e. Archimedes screw, passive first design approach, sewage digester) encouraging organisations to further increase their capacity. It has been noted that the majority of grantees consider environmental measures to be complementary to the refurbishment of historic buildings, helping the organisation achieve their expected successes. The case studies highlight the potential to achieve multiple benefits of heritage objectives, and environment and social sustainability.

10.2 Challenges

Most of the key challenges identified by the case studies related to technical issues associated with the measures implemented. In some cases, this resulted in perverse outcomes that are contrary to environmental objectives (e.g. overheating) or increased costs resulting from poorly installed or inadequately maintained equipment. The HLF Guidance can aid in emphasising the use of Option Appraisal Studies prior to the selection and installation of such systems to avoid these issues in the future. These can also assist with assessing payback periods for renewables and other measures to identify whether the costs required can be recouped within acceptable timescales.

The main reason given for specific environmental measures not being considered or implemented was because they were 'not relevant to the scheme'. The HLF Guidance could potentially highlight more clearly how measures are relevant to different types of projects and use case studies to demonstrate this. For example, a number of projects in rural areas identified that increasing sustainable transport is 'not relevant to scheme'. The HLF Guidance can aid in suggesting ideas, or signposting to other guidance for specific areas, such as the Capability Brown's Sustainable Travel Toolkit.

11 Lessons learned

11.1 Overview

The e-survey and application analysis and telephone interviews for case studies have drawn out the lessons learned of the grantees selected to participate in this research. These are summarised below:

11.1.1 General

- Early and continual engagement with a number of stakeholders and regulators should help minimise challenges to the uptake and implementation of environmental initiatives.
- Conducting feasibility reports and option appraisal reports that consider the practical operation of measures should be undertaken for any significant initiatives planned to help ensure that these are cost-effective and appropriate for the project and its maintenance regime.
- Whilst a number of examples of innovative solutions have been identified, generally a conservative approach that builds in contingency is the recommended approach.
- Where planning permission is required, early pre-application discussions with local planning authority officers are recommended to obtain a clear understanding of the measures that are viable or not with regards to potential heritage impacts.
- Environmental measures should not be implemented as an afterthought. Time needs to be devoted to their consideration at the development stage including engaging with stakeholders to ensure the success of environmental measures.

11.1.2 Guidance Specific

11.1.2.1 E-survey, applications, and case papers

- Grantees are likely to prioritise preserving or enhancing the heritage of their site over environmental initiatives such as minimising the environmental impacts of building materials, or increasing biodiversity, conserving water, or renewable initiatives where the initiative will have an obvious aesthetic or structural impact on a building or site.
- 'Cost implications' were more often cited in the 2012 than 2016 research as the reason for not implementing a measure. There may be many reasons for this result. It could indicate that the costs of implementing these measures has reduced. Some projects passed on responsibility to contractors to ensure local materials were used within their supply chain.
- A further look into the e-survey responses identified a wider variety of environmental initiatives that have become more commonplace (i.e.installing LED lights, adding insulation, minimising construction waste to reduce costs) that may not have been mentioned in the applications or case papers.

11.1.2.2 Case studies

- During several telephone interviews, the HLF guidance was cited as a helpful framework for the type of environmental initiatives to consider or implement.
- Obtaining professional or technical advice, or conducting an environmental audit helped to identify potential cost and resource savings and implement successful environmental initiatives.
- For very large projects that also received funding from the European Regional Development Fund (ERDF), then the HLF guidance had no impact as the ERDF requirements are far more stringent. Similarly, projects delivered by large organisations such as the National Trust are required to meet their own organisation's requirements that again exceed those of the HLF guidance.

- A number of grantees were not clear on how the HLF guidance added to statutory requirements that already exist such as local planning policies and Building Regulations requirements.
- Most grantees had used the advice in developing their applications, however once funding had been approved the majority felt that meetings and discussions with HLF officers were more useful in implementing the initiatives and overcoming challenges than the guidance itself.
- A number of projects had undertaking Options Appraisal studies as a result of the HLF guidance and found these helpful in selecting appropriate environmental measures, or in some cases, deciding not to proceed with measures on feasibility and/or cost grounds.
- Several grantees felt that the guidance could be more helpful if it provided more information on 'how' to build in environmental measures rather than 'what' to do and more signposting.
- Many grantees highlighted that as they already have a strong environmental ethos and expert technical advisors, the guidance did not make a significant difference to the overall outcomes.

11.2 Influence and value of the HLF Guidance

The e-survey asked a number of questions regarding the extent to which the HLF Guidance and other guidance had been followed. In each of the sections relating to the specific categories of environmental measures, the e-survey asked if the HLF guidance (and others) was useful. An example of this question for the energy efficiency and conservation section was "Did the HLF 'Reducing Environmental Impacts - Good Practice Guidance' help you to investigate or implement measures to improve energy efficiency or energy conservation?" and "Please specify which, if any, other guidance you used to investigate or implement measures to improve energy efficiency or energy conservation".

Grantees considered the water and renewables sections to be most useful, with the least useful being waste and building materials. In regards to waste and building materials, this may suggest that they did not rely on HLF guidance for advice, or may have passed it onto the contractors. The waste section of the HLF guidance was found to be the least useful in the 2016 e-survey; however, waste was the category with the second highest number of considered or implement environmental initiatives identified in the e-survey. See below for further breakdown.

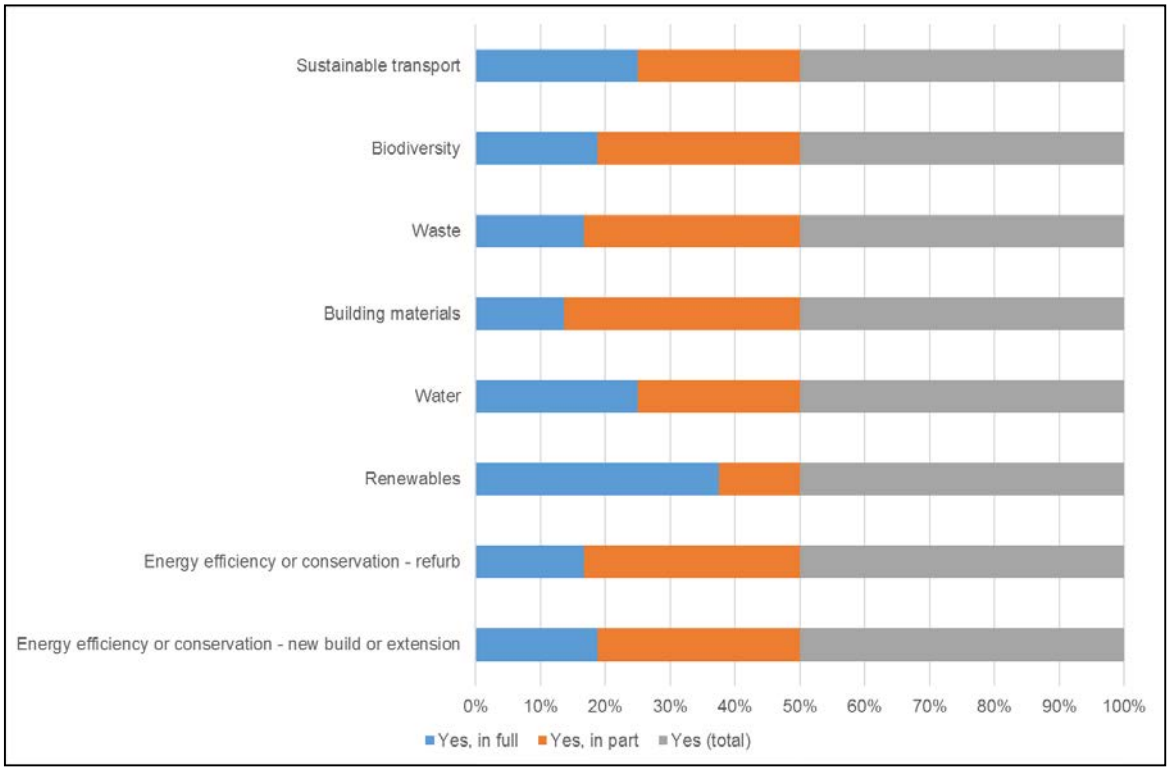

Figure 6-1: Usefulness of the HLF Guidance (2016 research)

The one e-survey respondent (Imperial War Museum's project on the First World War Centenary Cultural Programme) that had a grant from the HLF greater than £5 million stated that they considered or implemented an environmental sustainability initiative in two categories: minimising environmental impacts from building materials and encouraging sustainable transport. However, the grantee respondent did not identify the HLF guidance as being useful in those two sections in considering or implementing their initiatives. This may be due to the fact that such a large project would have funding from other grant regimes that have higher environmental requirements (e.g. ERDF) or was run by a large organisation such as the Wildlife Trust that has its own requirements, that again exceed those of the HLF Guidance.

In addition to assessing the usefulness of the HLF guidance per section, we asked if the HLF guidance influenced grantees' approach to considering the environmental impact of the project to determine how it has changed since 2012. 8% of the respondents from the 2016 research found that the HLF guidance had no influence to their approach in considering environmental impact. Only 15% of the respondents from the 2016 research found the HLF guidance to have limited influence. A number of these projects are activity based project (5 of the 7 projects who stated the HLF guidance had no influence are activity-based projects), indicating the HLF guidance may not be fitted for activity based projects. For example, the Imperial War Museum stated in its response to the e-survey that the HLF guidance had limited influence on considering or implementing environmental sustainability initiatives in the First World War Centenary Cultural Programme.

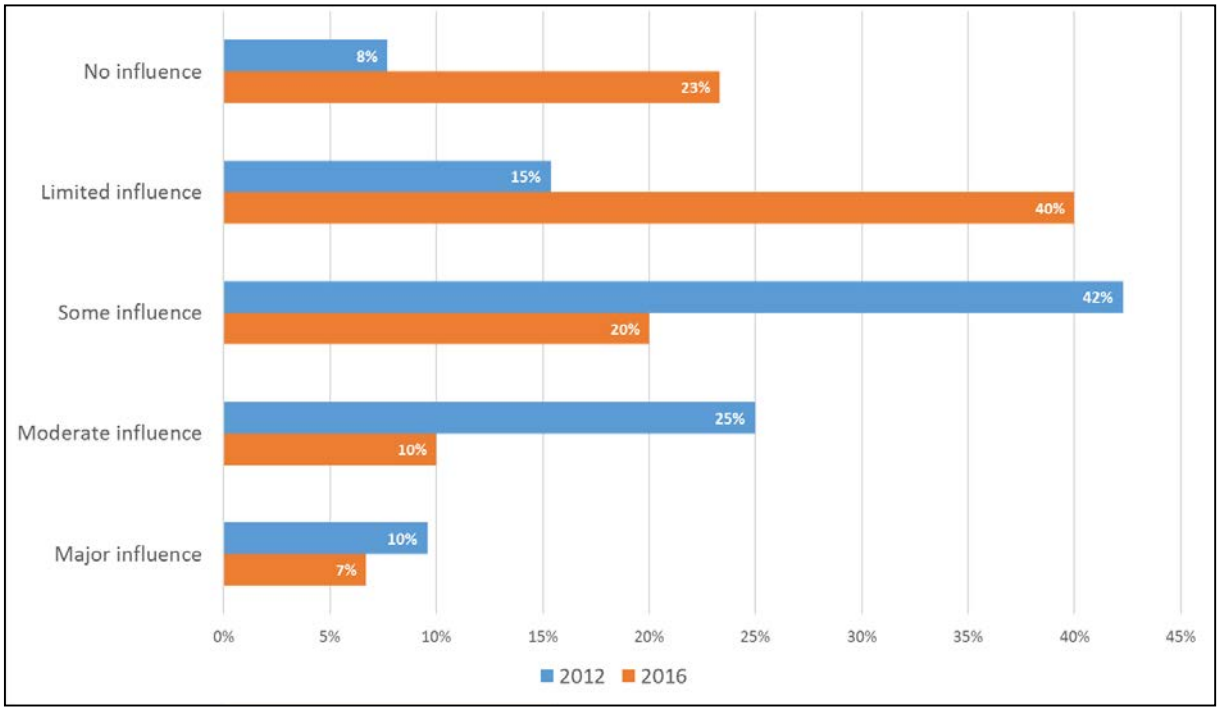

Figure 6-2: The extent of the HLF Reducing Environmental Impacts - Good Practice Guidance influence the approach to considering or implementing the environmental initiatives of your project

The graph above clearly shows that the influence and value of the guidance appears to have decreased from 2012. The majority of respondents in 2016 considered the guidance to have limited influence (40%), while in 2012, the majority considered guidance had some influence (42%).

11.3 Other guidance

The e-survey also asked grantees about other guidance that had been used to inform the development or implementation of environmental sustainability initiatives. Responses to this question highlighted the following guidance sources:

- Adaptation Scotland
- BCIS 'Occupancy Cost of religious buildings'
- Biomass Energy Centre
- BREEAM assessment
- Cycling UK
- Natural England
- Scottish Natural Heritage
- Sustrans
- Experience of the professional design team
- Planning officers and specialists (e.g. Biodiversity Officer) at local authorities

12 Recommendations

In this Section, we set out a number of recommendations regarding the HLF Guidance to make this more useful and useable by grantees and also identified other approaches that HLF may wish to take, to help grantees achieve the outcome of 'negative environmental impacts will be reduced'.

12.1 Changes or additions to HLF's environmental guidance

12.1.1 Narrow and define the audience

Currently, the guidance is intended to be designed to be applicable to all types of projects, but is largely seen as being only relevant to capital projects. However, the research revealed that a number of the larger projects with ERDF funding, or others had stricter environmental guidelines (such as BREEAM) to be followed and consequently, the HLF guidance had little influence. A number of projects that struggled to consider or implement environmental sustainability initiatives were ones without an environmental aspect directly within their project, or did not have the budget to explore these aspects with the architects, consultants, project managers, or contractors. Tailoring the guidance to this audience, along with providing a more 'how-to' guidance and information on maintenance and monitoring (see points below) will increase their confidence in considering and implementing environmental initiatives. This should also encourage less capital focused projects to consider how environmental impacts could be minimised.

12.1.2 Maintenance and monitoring

More guidance is needed on how to provide maintenance and monitoring for the installation and implementation of environmental measures. Many applicants who have installed measures, such as biomass boilers and rainwater harvesting, did not have any maintenance and monitoring plans. They often trusted the developer's or contractor's suggestions without any feasibility study, or mid-project review to ensure it was the most appropriate system. Maintenance and monitoring approaches need to be taken into account in any Options appraisals or feasibility studies to ensure that the final recommendations are appropriate for the project and its organisation.

The HLF guidance could also give more advice in relation to monitoring approaches to enable better assessment of costs and benefits. It is more straightforward for aspects such as energy and water, but determining how to monitor those arriving by green transport (bus, rail, or cycle) may be more difficult. A part of the feasibility process is determining a baseline, modelled or using primary data, and determining changes will be measured.

12.1.3 More signposting

More signposting should help keep the guidance concise whilst providing more resources for applicants without unnecessary duplication. HLF is well informed about the other resources available to the heritage community so it should be quite straightforward to identify a number of key resources in relation to specific issues or challenges. During the telephone interviews, some grantees even suggested providing a 'HLF-approved supplier list' for environmental consultants and contractors.

A majority of the reasons why environmental initiatives were not considered or implemented within the project for the eight categories outlined in the HLF guidance were because it was 'not relevant to scheme'. This reason suggests that projects cannot minimise environmental impact or that grantees cannot identify any negative environmental impact that the project needs to address. The guidance should emphasise any new innovations where heritage and environmental initiatives work together. For example, many applicants found it difficult to consider or implement sustainable transport. However, Capability Brown has just published 'Mr. Brown's Green Directions: A Sustainable Travel Toolkit' to provide support and guidance and grantees could be informed of this to assist with their sustainable transport plans.

A 'lack of technical expertise' was also identified as a reason for not implementing waste initiatives. This response would suggest more guidance, or signposting, would be needed in this category.

12.1.4 'How to' guidance

More practical 'how to' guidance for grantees on how to consider or implement environmental sustainability initiatives would useful to those who would like a better understanding of the feasibility, implementation, and management and maintenance process, or those who do not have the budget for technical expertise. Case studies could help illustrate the guidance to provide lessons and/or examples of how the environmental sustainability initiatives have been successful to others.

It would be unreasonable to create a methodology for every type of measure, system, or equipment. However, providing an approach (e.g. decision tree) for different measures along with signposting would be sufficient to help organisations how and why environmental initiatives could benefit their project. For example, energy and water measures have a similar approach of conducting an audit to understand the inputs and outputs, determining the scale of savings achievable, identifying the correct solutions, conducting a financial analysis, and implementation.

12.2 Other initiatives

12.2.1 Update to the Section 4 of the Second Round Application

We suggest that Section 4 of the Second Round application could include an explicit question asking applicants how they intend to address the outcome 'negative environmental impacts will be reduced'. Requiring a response to this question should encourage applicants to ensure they are doing everything possible to reduce negative environmental impacts and provide more detail. By highlighting the HLF guidance at this stage, more applicants may be encouraged to use this to develop, implement and share their plans.

12.2.2 Knowledge sharing

We recommend creating a forum for the grantees to share their knowledge and experiences. Some grantees did suggest that a grantee forum to share experiences, identify challenges, and share information on how these challenges have been overcome would be beneficial. For example, the interview with the lead mechanical engineer for the V&A's Europe 1600-1800 Galleries introduced the innovative passive first approach that could be applicable to other museums. Sharing this system would reduce perceptions that objects in museums need to be in a highly mechanized ventilation system and all objects stored in glass boxes require low-lighting.

12.2.3 Publish case studies

We also recommend publishing case studies and maintaining a directory for grantees and others to draw lessons and contacts. A number of grantees involved in the telephone interviews suggested that case studies produced by other HLF-funded projects would help them gain some ideas to implement environmental initiatives and avoid some challenges. Case studies could have tags categorising them by different types of use of buildings, activity-based projects, grant sizes, project categories, and the category of environmental initiatives according to the HLF guidance. These tags could be key words and be easily searchable for grantees to find an appropriate case study. For example, by categorising the case studies into project categories would allow historic buildings and monuments projects to see other projects of a similar nature. A less formalised version is currently occurring. For example, the project manager for The Centenary Project: Restoration of the Picture cited that he was using lessons learned and gained confidence from the success of installing a biomass boiler in a nearby historic cinema.

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