What value?

Archaeological evaluation and mitigation in Worcestershire 1990-2014

worcestershire county council

Worcester CITY COUNCIL

Final Report
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What Value? Archaeological evaluation & mitigation in Worcestershire 1990-2014

Project Report

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Appendices

Note: On 1st April 2015 the Historic Buildings and Monuments Commission for England changed its common name from English Heritage to Historic England. This document therefore contains references to publications and policies produced under both titles: these should be understood to pertain to the same organisation.

Figures and Tables

Acknowledgements

The project was a collaborative effort: Emma Hancox wrote the project design, led project inception, and contributed to the final report; Aisling Nash led project delivery, reading 350 reports on development-led fieldwork, distilling them into a spreadsheet for analysis using GIS and Excel, carrying out some of the analysis and writing parts of the final report. Rachel Edwards wrote parts of the report and carried out elements of the analysis. Adrian Scruby contributed the case study summaries. James Dinn undertook the analysis of evaluations in Worcester City, contributed elements relating to Worcester to the main report, and authored the separate report on Worcester City. Victoria Bryant oversaw the project and provided invaluable support throughout. Further assistance was provided by Oliver Russell, Mike Glyde, Maggi Noke and Adam Mindykowski.

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Abbreviations and glossary

ASLF	Aggregates Levy Sustainability Fund
B	Bromsgrove District
CIfA	Chartered Institute for Archaeologists, see IfA, IFA
CMHTS	Central Marches Historic Towns Survey
DAC	Diocesan Advisory Committee
DBA	Desk-based assessment
GIS	Geographic Information System
HER	Historic Environment Record. Worcestershire has two HERs, one that covers the County, excluding Worcester City, and one that covers Worcester City. Both HERs share a joint software platform. Reference to 'the HER' in this document should be assumed to refer to both HERs unless otherwise stated.
HLC	Historic Landscape Characterisation
IFA, IfA	Institute of Field Archaeologists, subsequently Institute for Archaeologists. Since 2014 Chartered Institute for Archaeologists (see CIfA)
Lidar	Light Detection and Ranging
MH	Malvern Hills District
NPPF	National Planning Policy Framework
OAU	Oxford Archaeological Unit (now Oxford Archaeology). See also Hey and Lacey 2001.
PPG15	Planning Policy Guidance note 15
PPG16	Planning Policy Guidance note 16
PPS5	Planning Policy Statement no 5
R	Redditch District
SMC	Scheduled Monument Consent
SMR	Sites and Monuments Record. Precursor to HER
WAAS	Worcestershire Archive and Archaeology Service
WF	Wyre Forest District
WMRRF	West Midlands Regional Research Framework
WSI	Written Scheme of Investigation
Wy	Wychavon District

1 Introduction

1.1 Background

Since 1990 archaeology has been a material consideration in the planning and development control system in England. Over this time national planning policy for archaeology has evolved from Planning Policy Guidance note 16 (PPG16), alongside PPG15 (which widened the scope from just below-ground archaeology to the historic environment as a whole, including historic buildings and standing structures) through Planning Policy Statement 5 (PPS5). This was replaced in 2012 by the National Planning Policy Framework, which covers all aspects of planning policy, including the management of the historic environment (see Chapter Four below for further discussion). These national policies and guidance provide a framework for the local planning policies which in turn have changed and developed over the past two and a half decades.

The national and local policies have been the basis for archaeological advice on planning applications across Worcestershire. This specialist advice is provided by the Historic Environment Planning Advisory Section of Worcestershire County Council and the Planning Archaeologist for Worcester City Council, using the data in the Historic Environment Records (HERs) combined with a wealth of professional expertise. Archaeological advice relating to development has been provided by Worcestershire County Council to local planning authorities, strategic planners and developers in Worcestershire for some 40 years. Worcester City Council has made its own provision for 25 years (previously advice to Worcester City Council was also provided by the County Council).

This project was conceived in response to a need to assess the archaeological development management advice in Worcestershire which coincided with the 25th anniversary of PPG16. As a result of public sector budget cuts many local authorities have critically assessed their processes in order to become more cost-effective and efficient. The archaeological services within those local authorities have been part of this process. With funding provided by Historic England, the project reviewed the effectiveness of archaeological development management advice from 1990 to 2014 in all six districts of Worcestershire.

The project teams assessed the reports on all development-led archaeological projects carried out over the study period (1990-2014 for Worcester City Council; 1990-2012 for Worcestershire County Council). The work was carried out to improve understanding of the effects on planning advice of the changing national and local planning frameworks, of enhanced HER data and of Historic England funded characterisation studies. It also aimed to understand how effective strategies have been across different landscapes, for a range of sites of different periods particularly with regard to the most effective site identification and excavation techniques at a local level.

1.2 Aims and Objectives

The project aimed to improve the effectiveness and efficiency of archaeological decision making in the development management process, and thereby to increase the quality of information from future archaeological fieldwork.

The objectives of the project were:

1. to create a robust evidence base which will allow us to develop an overview of curatorial responses to the historic environment which takes proper account of the different types of deposits and the different techniques most appropriate to them (for example urban and rural sites, artefact poor periods, environmentally rich sites) based on the information in the HER and other resources and the expert knowledge of contractors and curators;

2. to fill a significant gap in our understanding of the impact that archaeological mitigation through the planning process has had on our understanding of the historic environment;

3. in light of this new knowledge, to determine where and how curatorial procedures and methods should be developed or altered and create a strategic framework that identifies priorities and supports and justifies appropriate responses;

4. to allow curatorial archaeologists to draft briefs which better reflect not just the approach (evaluation, watching brief, excavation, survey) but the nature of the deposits, the period and the most appropriate archaeological techniques;

5. to run seminars for contractors and planners working in the region, sharing the results of the project and demonstrating the value of development management led archaeological mitigation;

6. to disseminate information to district planning staff and county strategic planning staff to explain the rationale of changes of approach resulting from the project;

7. to provide a reasoned basis for detailed good practice guidance.

1.3 Scope

To assess archaeological development management advice for this project, it was decided to focus on the field evaluations which had taken place from 1990. CIfA defines an archaeological field evaluation as:

> *'a limited programme of non-intrusive and/or intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land, inter-tidal zone or underwater. If such archaeological remains are present field evaluation defines their character, extent, quality and preservation, and enables an assessment of their significance in a local, regional, national or international context as appropriate.'* (CIfA Standard and Guidance for archaeological field evaluation, 2014)

Archaeological evaluations can be carried out at various stages within the planning process: pre-application, pre-determination or as a condition of planning permission. They are defined pieces of work and their results can tell us much about the effectiveness of both the advice which provides the context for the work and the evaluation itself. Where evaluations have led to further work in mitigation of the impacts of development, these interventions (watching briefs and excavation) were included in the dataset to assess the effectiveness of the original evaluation.

The timeframe covered by the project varies slightly between the County and the City due to the availability of evaluation reports. For the County, the project assessed evaluations and further work carried out between 1990 and 2012. For Worcester City, evaluations undertaken between 1990 and 2014 could be included.

Detailed analysis of individual sites such as that carried out by Hey and Lacey (2001) falls outside the scope of the project. It is recognised that such an analysis would be beneficial especially if a variety of sites across a region are examined.

1.4 Project Interfaces

This project coincided with a national move towards the critical analysis of archaeological development management strategies. A number of other projects have recently completed, or are coming to a close, that have clear interfaces with the evidence presented here. More details are presented in the relevant sections, where the interfaces arise.

The Roman Rural Settlement Project

This project (http://archaeologydataservice.ac.uk/archives/view/romangl/) was undertaken by Cotswold Archaeology and funded by Historic England, with the aim of achieving a comprehensive reassessment of Roman Britain outside the towns and cities. An extensive range of published and unpublished data from the 19th century onwards was assessed, but the project also included all relevant 'grey literature' reports from developer-led excavations since 1990. Alongside the reassessment of the archaeology, the quality of data produced through grey literature was examined to understand value and the challenges faced in using it for period synthesis. Much of the evidence uncovered in this national project tallies with local conclusions and recommendations.

Evaluation of Archaeological Decision-making Processes and Sampling Strategies

In 2001 Oxford Archaeology Unit (OAU) undertook a survey of twelve large-scale archaeological excavations, based on a wide range of periods and types, to assess the suitability of various techniques used. In addition, the authors looked at the issue of sample percentage versus cost in order to establish best value. All the sites were subsequently stripped and the true nature of the archaeology was assessed against that predicted.

No sites within Worcestershire were assessed in this manner, but there are clear parallels between the two projects and these are discussed in Chapter 7. The Worcestershire (County) case studies focus on evaluations where more extensive archaeology was uncovered in the mitigation work than predicted and whether changes in practise could reduce this risk in future.

Assessing the Value of Community-Generated Research

In 2014 Historic England funded WAAS to establish the value of historic environment research being undertaken by community groups to enhance HERs and Research Frameworks. This project was not about assessing the quality of people's research, rather its potential value to improve the way professional archaeologists determine priorities and inform decisions on planning issues, research priorities and strategies for safeguarding the historic environment.

Amongst the conclusions, the research found that

> *'There appears to be a growth in the volume of research undertaken at least partly in order to attempt to take ownership of planning and development issues, often in response to perceived shortcomings and capacity issues within local authorities. However, much of this appears to be undertaken on a case-by-case basis with little opportunity for researchers to feed into strategic plans; potentially valuable research that could feed into local placemaking and planning initiatives is therefore not entering research resources.'*

The project concluded that there is an urgent need for clear pathways, guidance and transparency regarding the role of the historic environment in the planning process, and for the sector to improve communication of relevant bodies' roles and responsibilities. The goal should be the provision of clear, concise, accessible information about the management of the historic environment, promoted and signposted through local networks.

There is not just a need to communicate with communities about the planning process, but opportunities for community groups to be involved in the evidence gathering and synthesis of the existing data. There are clear synergies between the two sectors and the project recommended the creation of a framework to highlight and support the opportunities for mutual benefit.

4G2 Ploughzone Archaeology – Historic Environment Record Case Studies

Oxford Archaeology was commissioned in 2013 (Hind *et al* 2014) by Historic England 'to look at how accessible ploughzone archaeology is within Historic Environment Records and how this data is used within Local Planning Authorities'. They concluded that there is much data that 'could make the key difference when it comes to development control and management decisions', but that this data is not being integrated into HERs in a way that makes it easily accessible for Planning Archaeologists to use.

The issue of ploughzone archaeology is also a concern in Worcestershire, not because the relevant data is not integrated, but because there may be missed opportunities to gather and synthesise this data. Fieldwalking and metal detecting could be better used within the development management context, and there are clear opportunities for joined up work with communities. In line with the point above, small local initiatives could be encouraged to include specific 'mini-projects' that can be combined to improve understanding. The Cambridge Currently Occupied Rural Settlements model (CORS http://www.access.arch.cam.ac.uk/reports/cors) is advancing the knowledge and understanding of medieval settlement origins and development in this way. A similar concept could be introduced in Worcestershire.

2 Project context

The county of Worcestershire is located in the heart of England bordering Herefordshire, Shropshire, Staffordshire, the West Midlands Metropolitan Area, Warwickshire and Gloucestershire. Two main rivers run through the county, the Severn and the Avon. The Malvern Hills lie to the west, and the Cotswolds to the south-east, both designated Areas of Outstanding Natural Beauty. The north of the county borders the West Midlands conurbation. Worcestershire is a two-tier county with six districts, namely Bromsgrove, Malvern Hills, Redditch, Worcester City, Wychavon, and Wyre Forest (Figure 1). Worcester City is the main administrative and employment centre in Worcestershire, supplemented by the towns of Kidderminster, Redditch, Bromsgrove, Stourport-on-Severn, Malvern, Evesham and Droitwich Spa. By area Worcestershire is largely a rural county, although around 70% of the population lives in urban areas. Wychavon and Malvern Hills are the two most rural districts (Worcestershire County Council 2011). Worcestershire has not been subject to the high levels of development pressure found in London and the south-east of England; nevertheless, development related to housing, light industry, aggregates quarrying, transport and utilities has resulted in development-led archaeological fieldwork since 1990 and before.

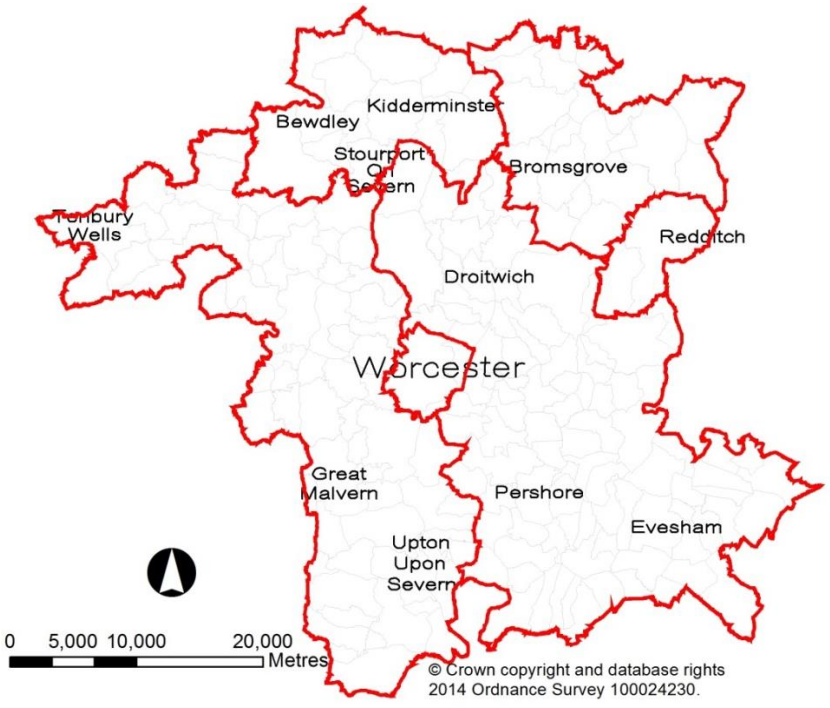

Figure 1: The county of Worcestershire with administrative boundaries

As a two-tier non-metropolitan county, Worcestershire County Council provides some strategic planning functions relating to matters such as minerals and waste. In relation to archaeology, the County Council holds and manages the Historic Environment Record (HER) for five districts, and advises these Local Planning Authorities in relation to archaeology and development. The sixth district, Worcester City Council, has its own Planning archaeologist and runs its own HER on a shared platform. From 1974 to 1998 Worcestershire was part of a larger two-tier authority, Hereford and Worcester County Council. Archaeological advice was provided in the same way as it is now for Worcestershire County Council for all districts other than the two cities of Hereford and Worcester.

The different settings in which the County and Worcester City planning archaeology teams work has consequences: in Worcestershire, whilst there are informal agreements in place between the County and the districts about the planning archaeology service, the district councils do not generally keep the County Council Planning Archaeologists informed about the implementation of the advice in planning permissions. The County Council Planning Archaeologists are informed when archaeological interventions take place, however, and liaise with archaeological contractors and monitor work as required. In Worcester City, as the Planning Archaeologist is now based in the planning department, and has always been an integrated part of a much smaller team, it has always been possible for the City's Planning archaeologist to know the outcome of the planning advice he has given.

Different districts have different approaches in relation to development management and liaison with Planning Archaeologists from the County, and these approaches have varied over the years. At times, some districts have prioritised speed of determining planning applications, which has made the provision of archaeological advice challenging, especially in the 1990s before computerisation, GIS, email etc. There can be variation in responsiveness between different case officers; high staff turnover can be an issue, especially if pressure on resources prevents effective handover from ensuring continued integration of county advice on archaeology.

Geological, archaeological and historical context

Worcestershire has geological deposits dating from the Pre-Cambrian, Ordovician, Silurian, Devonian, Carboniferous, Permian, Triassic and Jurassic periods. The county has varied soils and topography with many local areas of deeply stratified, waterlogged organic and environmental deposits including nationally significant areas of potential Palaeolithic remains. The Severn and Avon rivers have long been recognised as foci for all periods in terms of transport, settlement and resource exploitation, and more recent research has suggested that they may also represent cultural boundaries on a more regional/national scale. There are extensive areas of later prehistoric and Romano-British occupation and the modern landscape preserves extensive evidence of post-Roman rural and urban landuse. The county has a varied pattern of settlement which is evident in the distribution and character of many villages, hamlets and farmsteads. There is a broad division between areas of dispersed settlement, across most of the county compared with nucleated settlement, in the south-east, Vale of Evesham area. However, across Worcestershire, considerable settlement diversity is apparent, with many subtle contrasts evident between small settlements and their landscape context. Worcestershire has important archaeological deposits relating to early industry including salt production at Droitwich, the beginnings of the industrial revolution including metalworking, needle manufacture and carpet production together with the development of canals and canal towns.

3 National, regional and local frameworks

Management of the historic environment within the planning process is subject to a number of national, regional and local frameworks. These include planning legislation, research frameworks together with the evidence bases and toolkits which are used to support the decisions taken by Planning Archaeologists. These various aspects are discussed below.

3.1 Legislative frameworks

Planning legislation and associated government guidance has changed over the last 25 years. These changes have contributed to the transformation of field evaluation and archaeological development management from variable and locally determined practices to a more universally understood suite of approaches to the assessment and determination of archaeological significance.

Planning Policy Guidance 16, operative 1990-2010 (Department of the Environment 1990)

Para 8 – Where nationally important archaeological remains, whether scheduled or not, and their settings, are affected by proposed development there should be a presumption in favour of their physical preservation. Cases involving archaeological remains of lesser importance will not always be so clear cut and planning authorities will need to weight the relative importance of archaeology against other factors …

'Introduces the need to determine whether remains are nationally important, and to consider the level of importance of 'archaeological remains of lesser importance'.

Para 21 - Where early discussions with local planning authorities or the developer's own research indicate that important archaeological remains may exist, it is reasonable for the planning authority to request the prospective developer to arrange for an archaeological field evaluation before any decision on the planning application is taken. This sort of evaluation is quite distinct from full archaeological excavation. It is normally a rapid and inexpensive operation, involving ground survey and small-scale trial trenching …

Sets a test of justification for requiring archaeological field evaluation, and constraints on the scale of evaluation fieldwork.

Para 22 - Local planning authorities can expect developers to provide the results of such assessments and evaluations as part of their application for sites where there is good reason to believe there are remains of archaeological importance.

Sets a slightly different test of justification for requiring archaeological field evaluation

Planning Policy Statement 5 Planning for the historic environment, operative 2010-2012 (Department of Communities and Local Government 2010)

Policy HE6: Information requirements for applications for consent affecting heritage assets.

HE6.1 Local planning authorities should require an applicant to provide a description of the significance of the heritage assets affected and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage asset

and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset. As a minimum the relevant historic environment record should have been consulted and the heritage assets themselves should have been assessed using appropriate expertise where necessary given the application's impact. Where an application site includes, or is considered to have the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where desk-based research is insufficient to properly assess the interest, a field evaluation.

Broadly followed by NPPF para 128.

National Planning Policy Framework, operative 2012 to date (Department of Communities and Local Government 2012).

128. In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. … Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.

'The requirement for field evaluation 'where necessary' should also be understood with reference to 'proportionate to the assets' [potential] importance' and 'no more than is sufficient to understand …'

3.2 Guidance & Standards

Managing significance in decision-taking in the historic environment (Historic England good practice advice in planning: 2 - 2015)

7 - Heritage assets may be affected by direct physical change or by change in their setting. Being able to properly assess the nature, extent and importance of the significance of a heritage asset and the contribution of its setting early in the process is very important to an applicant in order to conceive of and design a successful development and to the local planning authority in order to make decisions in line with legal requirements and the objectives of the development plan and the policy requirements of the NPPF.

As there is nothing in the online PPG, these paragraphs provide the essential explanation to support NPPF para 128. The separation between nature, extent and importance is key.

8 - Understanding the **nature of the significance** is important to understanding the need for and best means of conservation. For example, a modern building of high architectural interest will have quite different sensitivities from an archaeological site where the interest arises from the possibility of gaining new understanding of the past.

As stated, 'nature' seems to be intended to refer to a high-level distinction between classes of heritage assets. However it could also be construed to refer to physical nature, for instance, archaeological assets with substantial structures, as opposed to deposits only, to sites with

waterlogged or anoxic remains, or to other unusual circumstances, such as very deep deposits or large cut features.

9 - Understanding the **extent of that significance** is also important because this can, among other things, lead to a better understanding of how adaptable the asset may be and therefore improve viability and the prospects for long term conservation.

Physical extent both horizontally and vertically, including presence/absence, and the likelihood of such.

10 - Understanding the **level of significance** is important as it provides the essential guide to how the policies should be applied. This is intrinsic to decision-taking where there is unavoidable conflict with other planning objectives.

This is the most difficult part of archaeological field evaluation. As set out below, the evaluation should provide sufficient information to allow a definition of 'equivalent significance to scheduled monuments', where appropriate, as well as an understanding of lower levels of significance.

11 - To accord with the NPPF, an applicant will need to undertake an assessment of significance to inform the application process to an extent necessary to understand the potential impact (positive or negative) of the proposal and to a level of thoroughness proportionate to the relative importance of the asset whose fabric or setting is affected.

In specifying evaluation, this requires an assessment of the potential relative importance of assets which have not been seen, to understand the necessary extent of work.

12.5 - Carry out additional investigations if initial research has established an archaeological, architectural, artistic, and/or historic interest but where the extent, nature or importance needs to be established more clearly before decisions can be made about change to the site. This may include documentary research.

Part of the process leading to a consideration of requirements for evaluation.

12.6 - Where an archaeological desk-based assessment is insufficient to assess the archaeological interest of a heritage asset fully, consider whether an on-site field evaluation would provide the necessary information.

Clarifies that part of the consideration is whether evaluation (either now, or potentially later) can be specified to provide the information. This will include consideration of site constraints as well as recognition that a sampling exercise is valid.

Chartered Institute for Archaeologists: Standards and Guidance (December 2014)
(http://www.archaeologists.net/codes/cifa)

CIfA has produced a range of Standards and Guidance documents that are binding on all members, and on all working for CIfA Registered Organisations. These are frequently cited but less often actually read, although they are extremely pertinent to all archaeological work and are almost universally used in specifying, commissioning and carrying out archaeological evaluation. Those most relevant to development-led work in Worcestershire are:

- Standard and guidance for archaeological advice by historic environment services
- Standard and guidance for commissioning work on, or providing consultancy advice on, archaeology and the historic environment
- Standard and guidance for historic environment desk-based assessment
- Standard and guidance for archaeological field evaluation
- Standard and guidance for geophysical survey
- Standard and guidance for an archaeological watching brief
- Standard and guidance for archaeological excavation
- Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives
- Standard and guidance for the archaeological investigation and recording of standing buildings or structures
- Standard and guidance for the collection, documentation, conservation and research of archaeological materials
- Standard and guidance for stewardship for the historic environment

3.3 Research frameworks, evidence bases and toolkits for planning

A number of research frameworks together with synthesis projects have been undertaken in Worcestershire and Worcester City over the last 25 years. These, together with technological advances, have contributed to the development of the HER in both the County and City over this time period. The existing frameworks and synthesis projects are described below together with a more detailed look at the HER in the County.

Regional

The ***West Midlands Regional Research Framework*** (WMRRF) was part of a nationwide English Heritage-funded strategy, and developed out of a series of seminars held in 2002-03. Period-based research papers were produced for the seminars, and these were drawn together into a Research Framework published in 2011 (Watt 2011). The original seminar papers are gradually being updated and published in a series of period-based printed volumes (Garwood 2007, Hurst in press, White forthcoming). Whilst the WMRRF provides an invaluable background, it is broad in scope, so does not necessarily provide the level of detail needed for individual sites. Furthermore, although one of the volumes of papers has been published and two more are in press or forthcoming, there has been little progress with the early medieval, medieval and post-medieval volumes.

Worcestershire

The ***Central Marches Historic Towns Survey*** was carried out between 1992 and 1996 as part of the national Extensive Urban Survey programme instigated and funded by English Heritage. Archaeological and historical evidence relating to each of thirteen historic towns in Worcestershire was synthesised and a report written on each town to provide high-quality information about the archaeological potential for archaeologists and local planning authorities. These reports still provide a sound framework for work in the thirteen towns, but some require updating as a result of work that has been carried out over the past 23 years. The CMHTS is discussed further in section **Error! Reference source not found.** below, and a summary is vailable alongside the project report downloads at http://archaeologydataservice.ac.uk/archives/view/marches_eus_2005/.

The ***Worcestershire Aggregates Resource Assessment*** was carried out by Worcestershire Historic Environment and Archaeology Service (WHEAS) and Cotswold Archaeology with funding from English Heritage. The project comprised an assessment and synthesis of existing data, targeted enhancement of the HER, and compilation of research agenda to support the provision of informed advice on future applications for aggregates extraction (Jackson and Dalwood 2007). A summary of the project can be found at http://archaeologydataservice.ac.uk/archives/view/worcsagg_eh_2007/index.cfm.

Palaeolithic Worcestershire

The Shotton Project, a collaboration led by the University of Birmingham in 2003, aimed to re-evaluate the evidence for the Palaeolithic period in the west midlands, and importantly to develop a framework for communication and further research. As an unfunded addition to the project, Worcestershire HER worked with Quaternary scientists and archaeologists to classify the river terraces into dated groups, making the geology more accessible to non-specialists (Buteux, Keen and Lang 2005, 42-50). In addition some new sites were added onto the HER. This was recognised as a simple but effective approach to the problem of making Palaeolithic data accessible to a non-specialist audience, but lack of funds had meant that this work was not fully integrated into the HER and so had not realised its full potential.

In 2013/14 Historic England funded a research project ***Putting the Palaeolithic into Worcestershire's HER.*** The research identified over 170 sites across Worcestershire where Palaeolithic remains have been recorded, which produced over 50 environmental deposits containing plant micro and molluscan remains, over 170 lithic implements (stone tools) including 60 well-preserved hand axes, and over 2500 faunal remains containing numerous examples of woolly mammoth bone, woolly rhinoceros, reindeer, wild pigs, bison and even evidence of lions roaming the countryside. This project set out to enhance the Palaeolithic within Worcestershire's HER and to produce a toolkit that could be used by strategic planners and researchers in general.

The project demonstrates two key points relevant to development management. Firstly, it demonstrates the value of detailed synthesis of existing information for any period, and the ability this has for understanding potential and survival. Secondly, specifically for the Palaeolithic, it has provided us with an accessible evidence base that allows a rapid check of whether a development site may impact on archaeology/environmental remains of this date. The nature of the period means that for the most part this is only relevant for large-scale infrastructure or quarry sites, however, there are a few particularly sensitive areas.

The Worcestershire Tithe and Inclosure Map Project

The project has resulted in the creation of a research resource that makes these 18th and 19th century maps, and the information held in the apportionment/award documents, accessible as a digital research tool. The project was started in 1991 initially to provide a transcription of the maps showing field names for use in advance of archaeological work within the county, as part of the Historic Environment Record (HER). The project went digital in 2002 using a Geographical Information System (GIS), and 'heads-up' digitising the maps in to the GIS, to work with a database of the apportionment/award information making this information more accessible.

Not only has this project helped preserve the original maps and documents but it also allows more detailed research and querying of the data with other landscape data, such as geology and soils. For example, this has been used to investigate limekilns in Worcestershire, to compare the location of lime-kiln field names and underlying geology with other historic maps and information. It also allows research in to place-names and former land use and has been used as part of characterisation projects where further information regarding past land use and ownership is important, such as the orchards project. Not all of the tithe maps in the county have been digitised but already this resource has already proved useful in family history research and is frequently consulted as part of HER searches in advance of development and to answer academic and private research questions.

The Tithe Project, alongside the other historic digitised maps, allows Planning Archaeologists to carry out map regressions in seconds. Used in conjunction with Historic Landscape Characterisation, geology layers, contours, flood mapping, Lidar etc, it creates a powerful tool for understanding past landuse and archaeological potential.

Historic Environment Assessment and Characterisation

There is now a suite of products that includes the Historic Environment Assessment (HEA, 2009-10): a strategic assessment of broad character, survival, potential and sensitivity to large-scale landscape change. The project evidence base has been embedded into the local planning policies of all but one district, therefore, informing specific historic environment policies and reasoned justification. The county Historic Landscape Characterisation (HLC, 2012) project nests within the HEA providing a much more detailed assessment of character that captures the diverse, fine-grained character of Worcestershire's landscape. Output from the project has been widely applied, including: Green Infrastructure concept plans; assessments of habitat potential and research connected with the development of historic farmsteads. The Historic Farmsteads Characterisation work was carried out as part of a West Midlands regional programme, which is now progressing towards the production of assessment guidance for farmsteads facing the potential of development or re-development. Worcestershire has been the pilot county for this phase of work and has helped to shape what will become a national template for assessment guidance.

Two English Heritage funded pilot projects have been undertaken examining the application of characterisation methodologies within the contexts of the Localism agenda:

The ***Worcestershire Villages Historic Environment Resource Assessment*** ('Villages') undertook an extensive characterisation of two settlements, Alvechurch and Kempsey, producing a methodology, product, and insights aimed at supporting local communities in the promotion of historic environment and historic character within Neighbourhood Planning. The ***Historic Environment Action Plans*** ('HEAP') pilot examined how characterisation approaches could be used to deliver assessment frameworks to both professionals and local communities for the benefit of historic environment and historic landscape character. This again had

interfaces with Neighbourhood Planning, and promoted the use of holistic landscape-management strategies such as Green Infrastructure and landscape characterisation.

The following two projects were published too recently to have affected the development-led archaeological interventions analysed for the present project; however, they have and will contribute to future projects undertaken in Worcestershire.

The 2014 ***Worcestershire Farmsteads Guidance*** incorporates a series of questions to help guide those researching the development of farmsteads, landscapes and settlements in Worcestershire, and which are relevant to those carrying out detailed appraisals (Lake, Hathaway and Robson-Glyde 2014).

The ***Synthesis of Rural Buildings in their Setting*** project incorporates a research framework for deepening understanding of England's rich array of buildings - within the context of their immediate setting and settlement as well as local, regional and national landscapes - and discovering and enjoying what makes one place different from another. This has recently been completed, and will be available online (Hathaway and Lake 2016).

Worcester City

A formal research framework for Worcester City was first published in 2007 (Worcester City Council 2007a), but the earliest framework for the city was a synthetic volume of the *Transactions of the Worcestershire Archaeological Society* published in 1969, 'The origins of Worcester' by Barker (1969). This review volume by Barker was followed by a framework for medieval Worcester published by Carver (1980), and later Baker and Holt's synthesis of the city's development (research carried out in the late 1980s and early 1990s, part-published as Baker et al 1992, but not fully published until 2004). This combined archaeological with historical understanding, and set a research agenda which has been refined rather than overturned by the results of more recent work.

The creation of the Worcester Urban Archaeological Database (now HER) from 1998, followed by the publication of the Archaeological resource assessment and research framework (Worcester City Council 2007a), have allowed for greater consolidation of the results of earlier work. Most importantly, this process created a well-structured and academically robust framework for archaeological understanding at a time when the amount of fieldwork taking place was increasing to unprecedented levels. The 2007 research framework set out 155 Research Priorities to be addressed through archaeological work in the city. These vary from overarching multiperiod or cross-period themes to some priorities which are specific to individual sites. Resourcing has not allowed for the initially-proposed 5-year review of the research framework, though there is some provision for more informal development, as additional research priorities are added from time to time. This process has, to date, added an additional 28 research priorities to the original 155.

3.4 Historic Environment Records

The Worcestershire and Worcester City Historic Environment Records (HERs) are the principal evidence base used in development management, developed over almost 50 years. As stated above, Worcester City has developed their own HER since 1998 and both HERs operate on a shared platform. Worcester City's HER has been greatly informed by the work done by the Archaeological resource assessment and research framework and many of the developments over the last 25 years in terms of technology can be applied to both HERs.

The advent of databases, digital mapping, GIS and more recently 3D modelling has radically changed how historic environment data is managed. This, combined with the ability to overlay historic mapping with HER and other third party data, such as Lidar, has significantly facilitated rapid archaeological assessments.

Development of the Worcestershire HER since 1990

The Worcestershire HER (excluding Worcester City) has been greatly developed and enhanced over the last 25 years. In 1990, the SMR in Worcestershire consisted of paper maps with traced paper overlays upon which records were identified spatially as points. Some information was recorded on a flat file database on a single computer but this could not hold all the relevant data for each site, so the paper records had to be checked for every record to gain a more complete picture. At this time, there was no easy access to tithe maps.

The Central Marches Historic Towns Survey, undertaken between 1992 and 1995, was the first major project to enhance the SMR and subsequently support planning advice. In 1998, Worcestershire's SMR formally became a HER with a transfer to HBSMR software with a linked GIS system. The HER was now fully computerised with the ability to see HER data spatially. The monument and event records were also separated at this time allowing easier identification of where archaeological fieldwork had been carried out and when. 2001 saw the transfer of the HER from HBSMR to an in-house bespoke database which allowed more flexibility of design. Subsequently, in 2011, the HER was transferred to a new and improved version of HBSMR which has since been through a number of software upgrades.

Against this backdrop, several large enhancement and data cleaning projects were undertaken between 2001 and 2013. In 2002, the Tithe Map project was started, and this has resulted in the gradual transformation of tithe map and apportionment data into a GIS layer funded by HLF community projects. At the time of writing 43 tithe maps, four enclosure maps and five estate maps have been completed. This, together with the provision of historic mapping by Landmark allows map regression to be carried out significantly faster and more easily than previously. Major cleaning of event records and digitisation of fieldwork reports in 2003 facilitated access to this information thereby giving Planning Archaeologists a more complete history of a site in fieldwork terms. This was further enhanced in 2005 when the finds and environmental index was launched. This consisted of a bespoke tab built in to the event record module to allow an overview of finds and environmental data to be recorded. Characterisation projects such as Historic Landscape Characterisation, Historic Farmstead Characterisation and Putting the Palaeolithic in Worcestershire's HER have all enhanced the HER allowing it to become a significantly more comprehensive and robust evidence base. These projects have all generated HER records with corresponding polygons within the GIS. Ongoing checking and cleaning of HER records continues.

In 1998 the HER in Worcestershire was regarded as amongst the worst in England in terms of its data and IT system. In 2016, it is regarded as one of the best not just in terms of the data it holds but also the service provided. HER searches are produced in the form of a report with a detailed summary of the data thereby allowing consultants and contractors to immediately cut through the often large amounts of records produced. Ongoing cleaning of records combined with a wide range of externally funded enhancement projects allow Planning Archaeologists to provide advice which is supported by a robust evidence base.

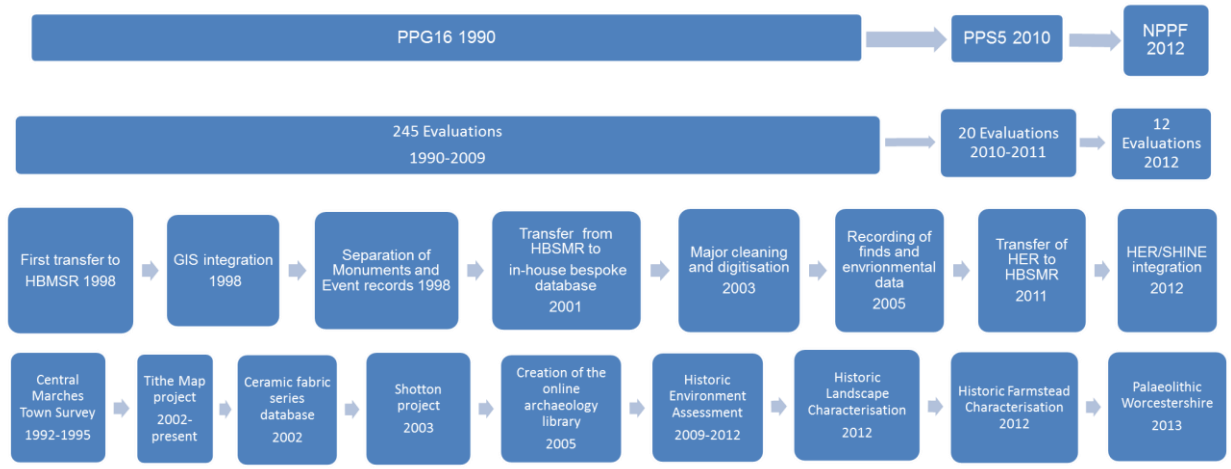

Figure 2: Timeline of legislation and Worcestershire HER milestones

4 The evidence base

The history of archaeological work varies between the County and the City with separate provision for archaeological planning advice in Worcester City since 1990 and informally since the late 1970's. As a result, separate datasets have been established for this project with two distinct analyses being carried out. The information available on development projects for Worcester City is greater, thereby allowing more in-depth analysis to be carried out for this part of the project. In addition, the project design set out distinct questions for Worcester City and these, together with more general analysis are addressed in Section 5.4 below.

The methodology employed in compiling the dataset for the other five Worcestershire districts is summarised in Appendix 1. The complete report prepared for Worcester City including the methodology for compiling this dataset, is available as Appendix 2.

4.1 Scoring

The primary objective of an evaluation is to determine the presence or absence of archaeological deposits, the nature of those deposits where they exist and their significance. In order to determine whether the evaluations were effective/successful at answering these questions, those evaluations which led onto further work were assessed in both Worcestershire and Worcester City. The assessment criteria for both areas were the same; did the evaluation predict the extent, feature type, period and density of archaeological deposits subsequently found during mitigation? The scoring method to answer this was slightly different in each area and is described below.

Worcestershire

The information gained at the evaluation stage serves to determine if a mitigation strategy is required in addition to informing the structure of that strategy. The question of significance, however, is a tricky one. Assessing significance against national criteria can be difficult to achieve during the evaluation stage, particularly where the sample rate is small i.e. under 4%. As seen in Figures 9 & 10, the average sample size in Worcestershire only reached 4% consistently in recent years. In those evaluations which can be targeted i.e. where cropmarks exist or good geophysical results have been achieved, then significance can be more readily assessed.

During data gathering for the project in Worcestershire, the strategies and methods adopted for further work were recorded and the original evaluations assessed to determine their success rate in identifying the extent, type and dating of archaeological deposits. The question of significance was taken out of the equation when data gathering as it was felt that it was more beneficial to determine whether the evaluation actually produced reliable data or not. There are instances where the original evaluation did not uncover what was subsequently discovered during mitigation, therefore, it was felt that the over-riding question to be asked of the data was whether the original evaluation was effective at determining the extent, type and dating of archaeological deposits.

Of the 281 Worcestershire evaluations, further work that could be assessed was carried out on 47 sites, 17% of the total. To determine if evaluations adequately identified the archaeology that was found during the subsequent further work, the original evaluations were assessed according to simple criteria. The results of the evaluations and the results of the further work were compared to determine if the original work had successfully predicted the extent, type, period and density of archaeological features present. The assessment used a five-point scale from a very low prediction rate (1) to very high (5). Each of the four categories was given a score and the average taken for the evaluation. If a score of 3 or more was achieved overall, the evaluation was deemed to have been effective as it had broadly predicted the extent, type, period and density of the archaeological deposits. The question of whether the evaluation met CIfA standards was not asked of the data. Due to the long time period over which these evaluations were carried out, it was not possible to determine whether all evaluations met the standards required for archaeological work without delving into each site archive. As stated in the introduction above, the quality of the archaeological work was not commented on and therefore, this did not form part of the criteria for scoring.

Worcester City

43 cases were identified from the main dataset as being assessable and were all scored for effectiveness by comparing the results achieved from mitigation with the assessment of the site's archaeological resource as established by evaluation. The agreed method for this used four indicators: extent, feature type, period and density. For Worcester, the scoring was weighted (in a similar way to Monuments Protection Programme scoring) to try to clarify distinctions between more and less successful projects. This was only partially effective as the anticipated separation of scores did not emerge, with a marked tendency to cluster on particular values (e.g. 26, 31).
The following scoring matrix was used, giving a theoretical minimum score of 0 and maximum of 64.

0	Completely ineffective and/or very unreliable
1	Largely ineffective and/or unreliable
4	Moderately effective and reliable
9	Very effective and reliable
16	Completely effective and reliable

Table 1: Scoring

In each case the score allocated was based on an assessment of the similarities and differences between what was known (or in some cases predicted) after evaluation, and what was identified during mitigation, using the indicators of monuments, periods (structures and deposits), and finds. In practice nearly all the scores given were either a 1, 4, or 9; a score of 16 was only achieved once, and 0 not at all. The total scoring spanned 13 to 43.

4.2 Characterising the evidence base – Worcestershire & Worcester City

Study data

The data used for the project consisted of a total of 447 evaluations across all six districts of Worcestershire.

In the five districts of Worcestershire excluding Worcester City 338 evaluations were carried out between 1990 and 2012. Of these, 281 were assessed in detail (see Appendix 1 for selection criteria). Figure 3 illustrates the numbers carried out each year, showing the initial increase in projects as PPG16 was implemented and archaeological evaluation became accepted as part of the development control system. This chart also reveals the effects of the recessions in 1993 and 2008, resulting in reductions in numbers of projects in subsequent years in each case. Forty-seven of the evaluations were followed by further archaeological investigations that could be used to assess the effectiveness of the evaluations.

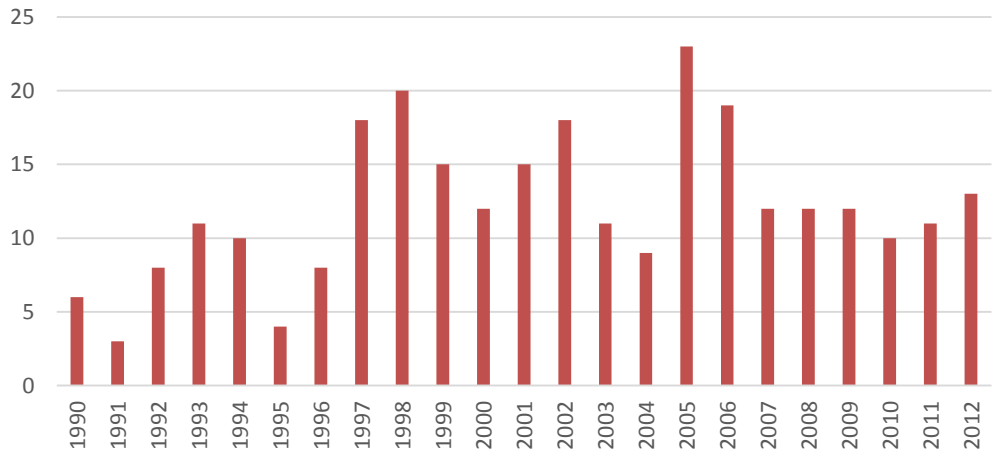

Figure 3: Number of evaluations by year in Worcestershire

In Worcester City, 173 evaluations took place between 1990 and 2014, of which 166 were addressed by the project (see Section 4.3 for detail of selection). Here too the fall in numbers of projects following the 2008 recession can clearly be seen. Forty-three were followed by further archaeological investigations that could be used to assess the effectiveness of the evaluations.

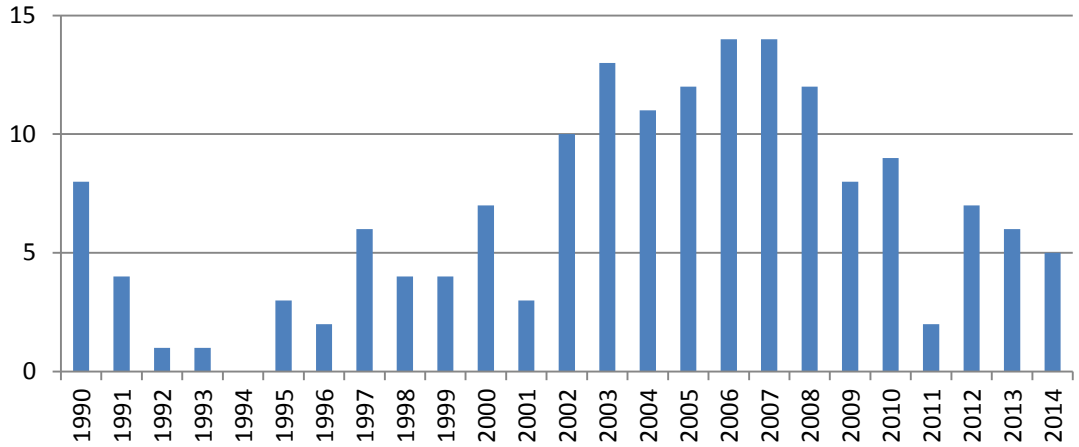

Figure 4: Number of evaluations by year in Worcester City

Planning Stages

Table 3 summarises when the evaluations were carried out within the planning process. The dataset included pre-application evaluations, carried out on behalf of a developer to support an application for planning permission; pre-determination evaluations required following submission of a planning application in order to aid the decision making by the local planning authority, and evaluations required as a condition of planning permission. Thirty-eight are listed as unknown as no information was given in reports or on the HER about what stage they were carried out in the planning process. A small number of evaluations were carried out as a result of Diocesan Advisory Committee (DAC) and Scheduled Monument Consent (SMC) considerations and two sites were evaluated ahead of flood alleviation schemes (utility).

Planning stage	Number (Worcestershire)	% of all evaluations	Number (Worcester)	% of all evaluations
Pre-determination	137	49%	84	51%
Pre-application	39	14%	9	5%
Condition	58	21%	70	42%
Unknown	38	14%	0	0%
DAC	4	1%	0	0%
SMC	3	1%	1	1%
Utility	2	1%	2	1%
Total	281	100%	166	100%

Table 2: Planning stages for Worcestershire evaluations

Figure 5 illustrates the planning stages at which projects were carried out over time in five-year bands, excluding the unknown, DAC, SMC and Utility projects. This can be compared with data from Worcester City, illustrated in Section 5.4 figure 28.

From 1995 to 2012 Figure 4 shows a gradual increase in pre-application and conditioned evaluations, and a decrease particularly between 2005-09 and 2010-12 in pre-determination evaluations. A similar trend can be seen in Worcester City, showing there as an increase in conditioned work (Section 5.4, figure 28). This trend reflects the national government aim of reducing the time it takes for planning applications to be determined.

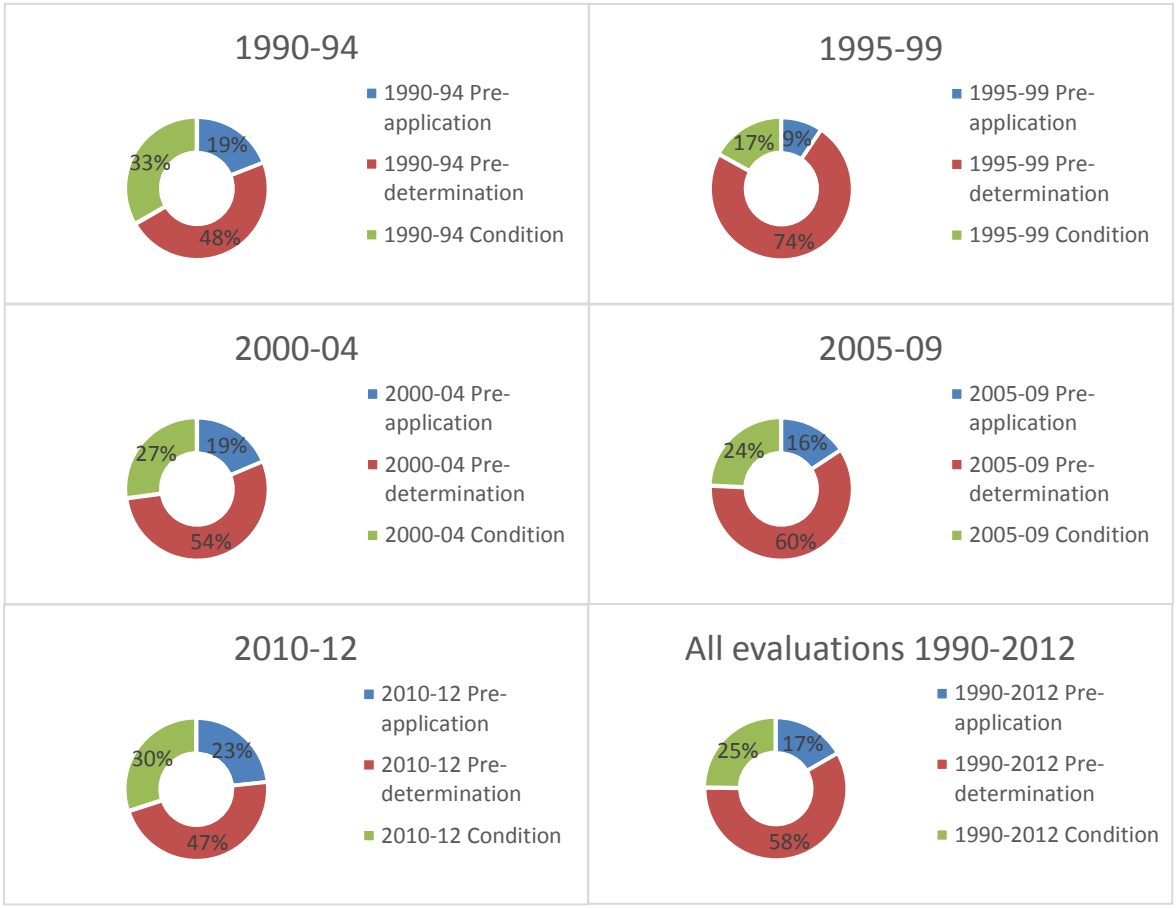

Figure 5: Planning stages for Worcestershire evaluations (excluding Worcester City)

Geographical Location

Figure 6 illustrates the locations of the 281 evaluations in the five Worcestershire districts, and Figure 7 the locations of the 166 in Worcester City. Both figures show how development-led archaeological work is concentrated in towns and the historic centre of the City of Worcester. Across Worcestershire, as Figure 6 shows, no evaluations were carried out during the study period in many of the rural areas, particularly in the north-west, whilst the Severn and Avon valleys, the south-east and to some extent the north-east of the county have seen more development-led archaeological intervention.

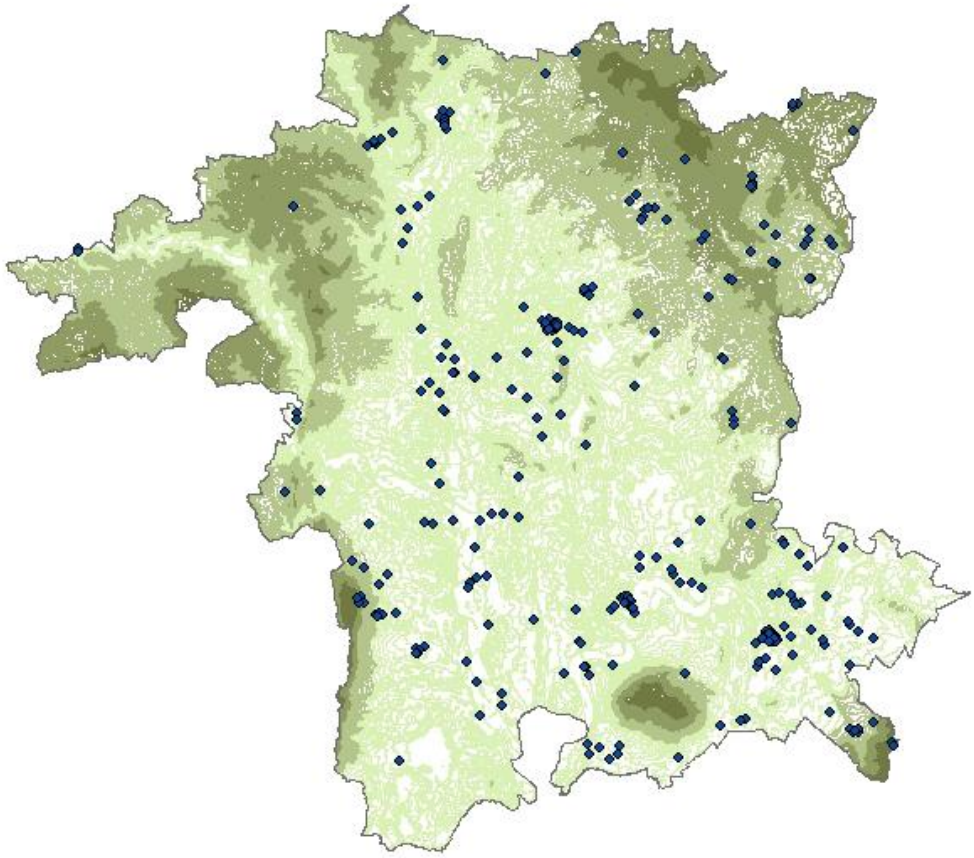

Figure 6: Geographical locations of evaluations in Worcestershire (excluding Worcester City)

The project identified a bias within the locations of evaluations that is not just due to the distribution of modern development, but results from a long-standing variation in archaeological knowledge and understanding across the County. The south-east of the County contains significant areas of gravel terraces where cropmarks show up well, large parts are arable in nature and have been fieldwalked regularly since the 19th century. Settlement is nucleated and villages often have existed since before Domesday, so settlement-edge remains are commonplace. There was also a reasonable level of antiquarian interest, that sparked more recent local fieldwork in the mid- to latter half of the 20th century. Community groups including the South Worcestershire Archaeology Group have continued this interest and investigated several sites outside the planning process. These have provided evidence to support planning advice. With this background of known archaeology at the start of the 1990s, evidence and understanding has allowed for targeted evaluations to be recommended and to successfully find archaeological deposits. This perpetuated the cycle and there is a concentration of evaluations and subsequent mitigation in the south east.

Conversely the northern half of the County is made up of large areas of small-scale enclosure over heavy clay soils. It is pastoral in nature and in places densely wooded. Settlement is dispersed. In the absence of clear cropmark evidence, without extensive fieldwalking and with no other evidence of settlement, it is more challenging to successfully recommend archaeological intervention. Whilst there has been little development in the north-west of the County, the north-east has seen significant growth, particularly around the urban cores of historic towns and infill within dispersed settlement. It has been less easy to recommend mitigation here, in the absence of known deposits or of potential indicated by nearby cropmarks or fieldwalking finds.

Although it is likely that the light, fertile soils of the Avon and Lower Severn were more densely populated in earlier periods, there is clear evidence, through projects like the Grow with Wyre HLF Lidar Survey, that significant, widespread and well-preserved archaeological remains do survive as earthworks in extensive wooded landscapes. Also, thanks to a single fieldworker, 90% of the entire County's Mesolithic worked flint has been found in the fields outside Hagley. Whilst this is a clear collection bias, it is also evidence that archaeological remains from this period can be found when looked for.

In Worcester City (Figure 7), much of the work has been focused on the historic suburbs and the fringes of the city centre. The report on this work (Section 4.3, below) examines trends in the data across six zones defined for this project to illustrate the different effects of development in areas of different archaeological focus and potential.

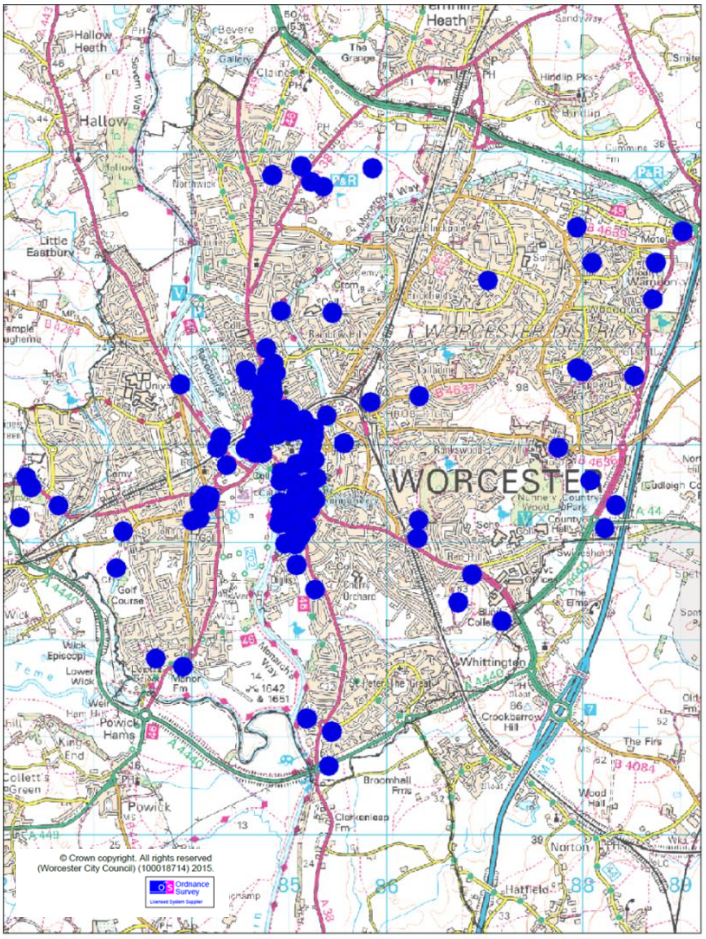

Figure7: Locations of Worcester City evaluations

Geology

Figure 8 shows the evaluations in Worcestershire in the context of the underlying solid geological deposits. Although there is a correspondence between the geological deposits of the north-western part of the county and very low numbers of evaluations, this results from a combination of a much lower level of development in this area and a lower level of archaeological knowledge (see above).

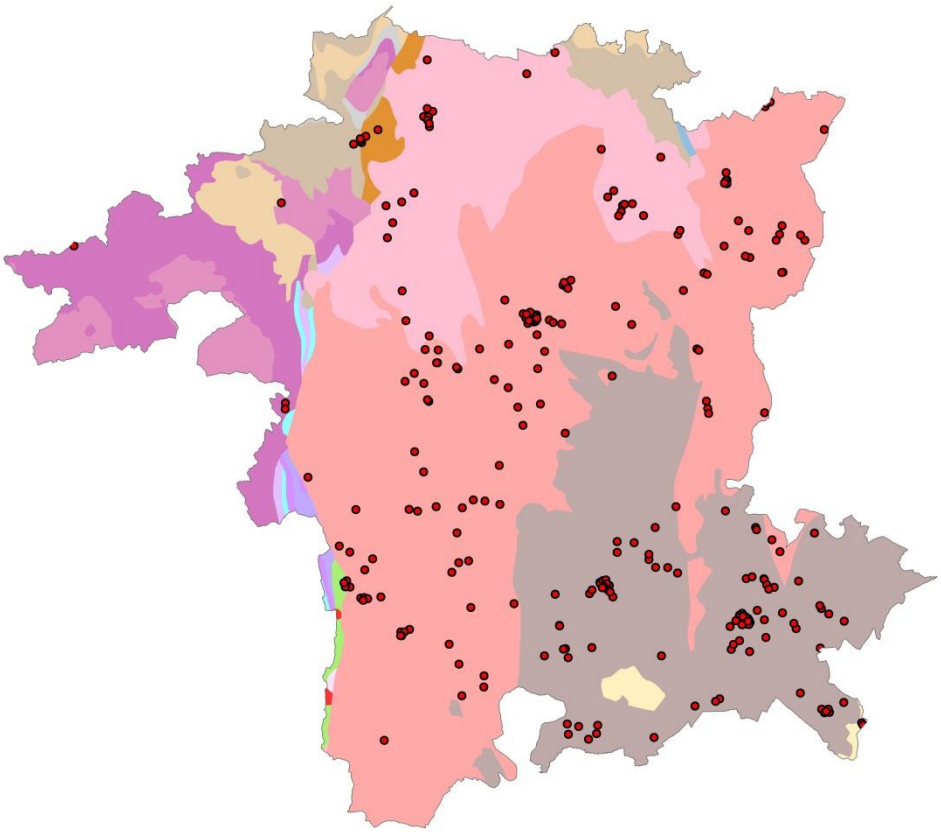

Figure 8: Geology of Worcestershire and locations of evaluations (excluding Worcester City)

Legend

- ARCHAEOLOGICAL EVALUATIONS

BEDROCK GEOLOGY

- GREAT OOLITE GROUP - SANDSTONE, LIMESTONE AND ARGILLACEOUS ROCKS
- INFERIOR OOLITE GROUP - LIMESTONE, SANDSTONE, SILTSTONE AND MUDSTONE
- LIAS GROUP - MUDSTONE, SILTSTONE, LIMESTONE AND SANDSTONE
- TRIASSIC ROCKS (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE AND SANDSTONE
- TRIASSIC ROCKS (UNDIFFERENTIATED) - SANDSTONE AND CONGLOMERATE, INTERBEDDED
- PERMIAN ROCKS (UNDIFFERENTIATED) - SANDSTONE AND CONGLOMERATE, INTERBEDDED
- SOUTH WALES UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE, SANDSTONE, COAL, IRONSTONE AND FERR
- PENNINE MIDDLE COAL MEASURES FORMATION AND SOUTH WALES MIDDLE COAL MEASURES FORMATION
- WARWICKSHIRE GROUP - MUDSTONE, SILTSTONE, SANDSTONE, COAL, IRONSTONE AND FERRICRETE
- WARWICKSHIRE GROUP - SILTSTONE AND SANDSTONE WITH SUBORDINATE MUDSTONE
- PENNINE LOWER COAL MEASURES FORMATION AND SOUTH WALES LOWER COAL MEASURES FORMATION
- MILLSTONE GRIT GROUP [SEE ALSO MIGR] - MUDSTONE, SILTSTONE AND SANDSTONE
- DINANTIAN ROCKS (UNDIFFERENTIATED) - LIMESTONE WITH SUBORDINATE SANDSTONE AND ARGILLACEOUS ROCKS
- UNNAMED IGNEOUS INTRUSION, CARBONIFEROUS TO PERMIAN - MAFIC IGNEOUS-ROCK
- UPPER DEVONIAN ROCKS (UNDIFFERENTIATED) - SANDSTONE AND CONGLOMERATE, INTERBEDDED
- LOWER DEVONIAN ROCKS (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE AND SANDSTONE
- LOWER DEVONIAN ROCKS (UNDIFFERENTIATED) - SANDSTONE AND CONGLOMERATE, INTERBEDDED
- PRIDOLI ROCKS (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE AND SANDSTONE
- PRIDOLI ROCKS (UNDIFFERENTIATED) - SANDSTONE AND CONGLOMERATE, INTERBEDDED
- LUDLOW ROCKS (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE AND SANDSTONE
- WENLOCK ROCKS (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE AND SANDSTONE
- LLANDOVERY ROCKS (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE AND SANDSTONE
- LLANDOVERY ROCKS (UNDIFFERENTIATED) - SANDSTONE AND CONGLOMERATE, INTERBEDDED
- SILURIAN ROCKS (UNDIFFERENTIATED) - LIMESTONE, MUDSTONE AND CALCAREOUS MUDSTONE
- CARADOC ROCKS (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE AND SANDSTONE
- ARENIG ROCKS (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE AND SANDSTONE
- TREMADOC ROCKS (UNDIFFERENTIATED) - MUDSTONE, SILTSTONE AND SANDSTONE
- UNNAMED EXTRUSIVE ROCKS, NEOPROTEROZOIC - MAFIC LAVA AND MAFIC TUFF
- UNNAMED IGNEOUS INTRUSION, NEOPROTEROZOIC - FELSIC-ROCK
- UNNAMED IGNEOUS INTRUSION, NEOPROTEROZOIC - MAFIC IGNEOUS-ROCK

Evaluation techniques

The main evaluation techniques are summarised in Table 4. In the majority of cases (80% in Worcestershire, 91% in Worcester City) trenching was the only technique used. Evaluation trench types were categorised as constrained, targeted or grid array. Grid included both regular rectilinear arrays and irregular trench layouts. The majority of evaluations used some form of grid array, contrasting with the picture in Worcester City. This, however, reflects the landuse in the areas evaluated, as a greater proportion of Worcestershire evaluations were carried out on greenfield sites where there are fewer constraints on where trenches can be placed. Three evaluations did not include trenching and these were not included in the main dataset for analysis (see Appendix 1).

Evaluation technique	Number (Worcestershire)	% of all evaluations	Number (Worcester)	% of all evaluations
Standard - constrained	33	12%	114	69%
Standard - grid	155	55%	25	15%
Standard - targeted	87	31%	22	13%
Standard - topsoil strip	1	<1%	0	0%
Test pits	4	1%	3	2%
Top soil strip	1	<1%	0	0%
No trenching	3	1%	2	1%
Total	284	100%	166	100%

Table 3: Main techniques for evaluations in Worcestershire

In Worcester City (Section 5.4) the analysis differentiated between irregular and rectilinear 'classic' grid arrays for trenches. Fewer than 5% of evaluations made use of the rectilinear grid; an overall average of 10% of evaluations used haphazard grid arrays, increasing to over 30% of recent evaluations. In a limited number of cases it was possible to target anticipated features (usually cropmarks or geophysical anomalies). Targeted trenching accounted for about 15% overall, though it was much more frequent in early (pre-2000) evaluations, at around 36%. By far the majority of trench evaluations, however, were constrained by one or more factors, including nearly all evaluations in the city centre (overall, 69%, and as high as 84% in 2000-04).

Other techniques

In Worcestershire, geophysical survey was used in 45 evaluations (16%), fieldwalking in 19 (7%), and other techniques in 17 evaluations (6%). The techniques used in addition to trenching included three evaluations where three techniques were used in addition to trenching; ten evaluations that used both geophysics and fieldwalking; seven that used geophysics and one other technique; and three that used fieldwalking and one other technique. The other techniques used included were test pits, augering, boreholes, geotechnical survey, metal detecting, earthwork survey, topographic survey and walkover survey.

In Worcester City (Section 5.4), in 32 evaluations (19%) other techniques apart from trenching have been used. These comprised geophysics (magnetometry and ground-penetrating radar), other intrusive techniques (auger holes, observation of developer's site investigation), and finds retrieval techniques (fieldwalking and metal detecting). In only three of these evaluations were two additional techniques used as well as trenching. Five evaluations did not use trenching: two of these used boreholes only (due to deep deposits) and three were based on trial pits, with no trenching. There is no clear indication that the use of other techniques has altered; although the

percentage in the 1990-94 time band is much higher (36%) than the average (19%) this is based on a small sample.

Sample size

The proportion (%) of each development area that was sampled by trenching was calculated, to give a sample fraction for each evaluation. The average (mean) of these values was then calculated. It was possible to establish the sample size for 250 of the evaluations in Worcestershire (for 31 evaluations in the county information about the development area could not be ascertained, and therefore it was impossible to calculate the sample size). The average (mean) sample size for Worcestershire evaluations was 3.31%. For Worcester City, the average (mean) of all evaluation sample sizes was 4.96% (see Section 4.3).

The discrepancy between average sample sizes in the five districts advised by Worcestershire County Council and the average for Worcester City is partly due to the difference in the context of evaluations. Section 5.4 below compares the sample fractions for evaluations in different zones of the City, showing that the three city centre zones all had higher sample fractions when compared with greenfield sites and those outside the centre. Development sites in urban areas are generally smaller, and evaluation trenching tends to cover a larger proportion of such sites, especially as deposits tend to be deeper and of higher quality, making it less challenging to argue for a higher sample fraction.

Figure 9 and figure 10 show the change in sample size over time for Worcestershire excluding Worcester City. The average sample sizes for the early years of PPG16 were in line with national trends for the time at around 2%, although the yearly averages make it apparent that there were some very low samples and a few higher examples that have brought the average up. These figures show that the sample size has tended to increase in later years, particularly after the publication of the OAU study. However, in the light of the conclusions of that study, it is sobering to note that the Worcestershire figures have only reached an average of 4% in the most recent time band (Figure 9), and the figure for 2012 was below 3%.

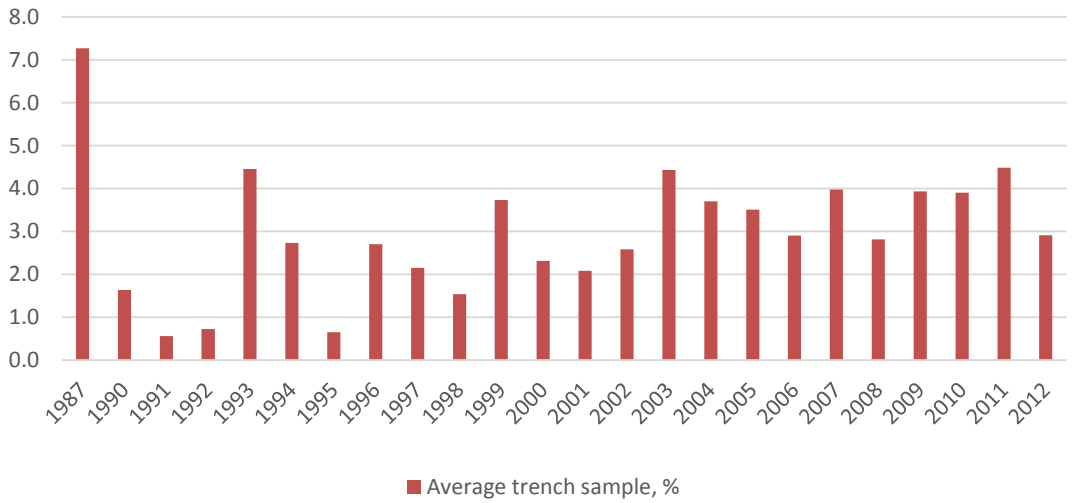

Figure 9: Average trench sample by year (excluding Worcester City)

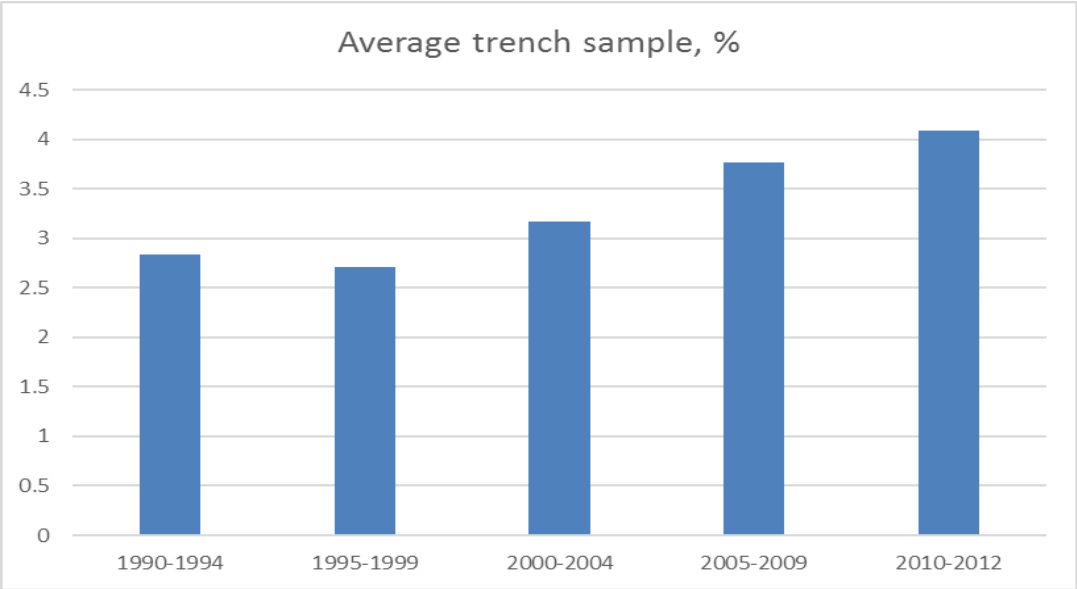

Figure 10: Average trench sample by five-year band (excluding Worcester City

4.3 Analysing the evidence base – Worcestershire

Evaluated potential and planning stages

Comparing the evaluated potential with the planning stage at which each project was carried out reveals a predictable pattern in relation to the pre-application and conditioned archaeological interventions (Figure 11). As might be expected, the highest proportion of high potential sites was identified during pre-application investigations. The trigger for a pre-application investigation would generally be information on the HER indicating an area predicted to have good potential for archaeological deposits, or alternatively, a very extensive site. Similarly, archaeological work can be required as a condition of a planning application rather than in advance of determination if what is known about the expected archaeological deposits is not sufficient to justify such work. The quality of archaeological deposits or their level of preservation might be in question. The fact that a high proportion of low potential sites were identified at pre-determination stage needs to be considered alongside the definition used for low potential: few or no archaeological deposits were found or archaeological deposits that had been heavily truncated by later disturbance.

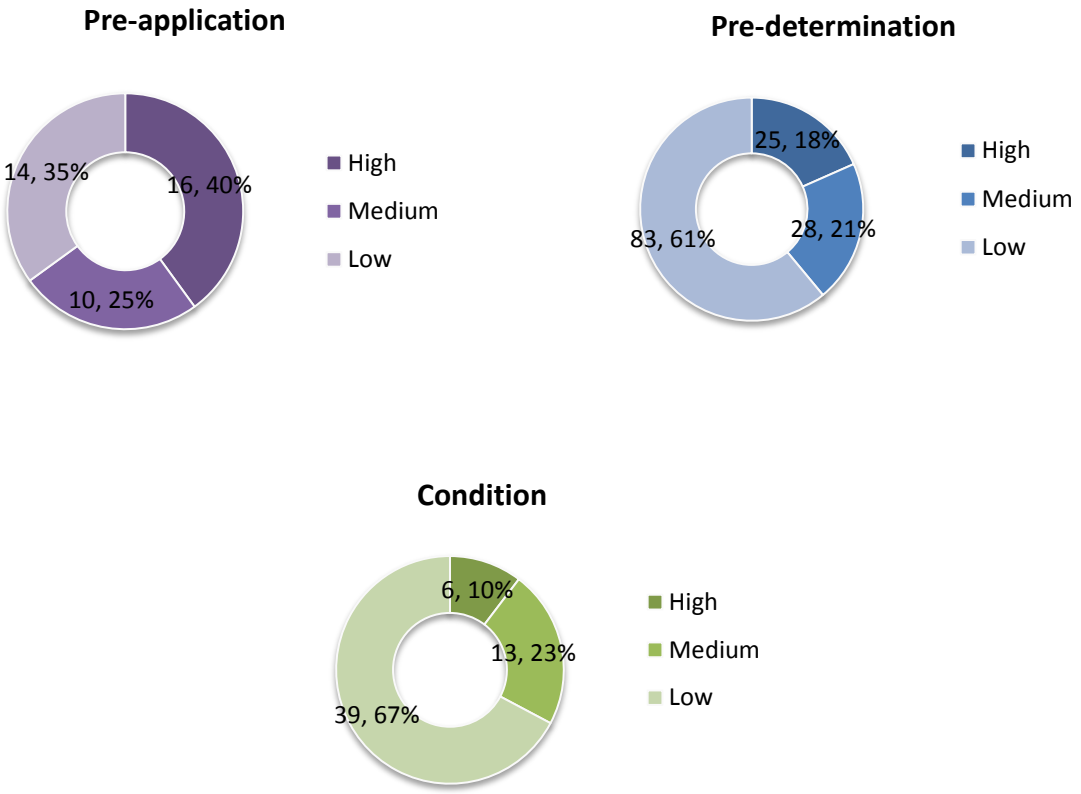

Figure 11: Evaluated archaeological potential and planning stages, Worcestershire evaluations (excluding Worcester City)

Techniques and effectiveness

Geophysical survey

Figure 12 and Table 5 examine the relationship between the use of geophysical survey and the effectiveness of the 47 evaluations that were followed by further investigation for Worcestershire. It is clear that there is no significant difference between the cases where geophysical survey was carried out and those where it was not. The fact that geophysical survey was only used in eleven cases means that the slightly higher proportion of effective evaluations is not a reliable indicator for all cases.

Although the small numbers involved mean the proportions need to be regarded as general indications, the tentative results do accord with the general impression that in Worcestershire geophysical survey has a variable success rate, so is no more effective than evaluation alone. To investigate this in greater depth would require significantly more sites where open area excavation or strip, map and sample including any 'blank' areas tested the results of geophysical survey. The small numbers meant that it was not possible to examine the effects of site type, date or the underlying geology/soil on the effectiveness of geophysical survey.

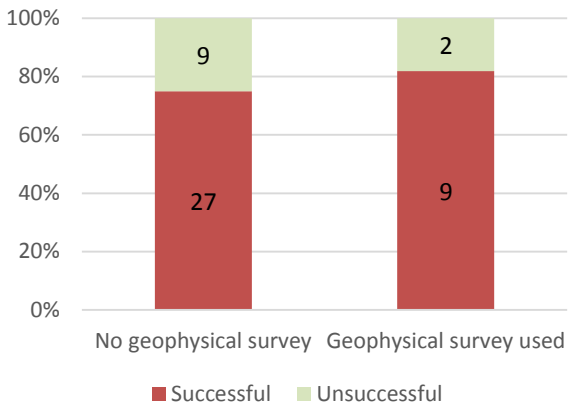

Figure 12: Effectiveness of evaluations and geophysical survey

	Effective	Ineffective	Total	Effective	Ineffective	Total
	Number			%		
No geophysical survey	27	9	36	75%	25%	100%
Geophysical survey used	9	2	11	82%	18%	100%
Total	36	11	47	77%	23%	100%

Table 4: Effectiveness of evaluations and geophysical survey

Planning archaeologists covering all six districts of Worcestershire have reported pressure from archaeological consultants and contracting organisations not to require archaeological trenching of areas where the results of geophysical survey have been blank. However, the variable effectiveness of geophysical survey in the county indicates that this is inadvisable. Furthermore, it indicates that geophysical survey cannot be regarded as an effective alternative to trenching, so should not be used as a method of arguing for lower trenching sample rates.

Fieldwalking

In the five districts excluding Worcester City, fieldwalking was used in just nineteen cases overall (7%), including only five of the 47 cases where evaluation trenching was tested by subsequent further work. Although in four of the five cases the evaluation plus fieldwalking combination was effective, the numbers are so small that this cannot be regarded as an indicative of effectiveness on a broader scale. Nor is it possible to draw firm conclusions about whether site type, date, or the underlying geology or soil have affected the effectiveness of fieldwalking alongside evaluation trenching. However, as was noted above, 16% of the evaluations that recorded prehistoric remains included fieldwalking, indicating its effectiveness for archaeological remains of these periods.

Fieldwalking has been successfully used outside development-led fieldwork in Worcestershire, and in particular has identified scatters of prehistoric worked flint in ploughsoil with no surviving archaeological features. In some cases artefact scatters without underlying features reflect manuring patterns and thus patterns of redeposition, but in other cases these are the only surviving remains of archaeological features that have been completely ploughed out. In areas where good results are known from previous fieldwork, it is particularly important for fieldwalking to be considered as an evaluation technique, alongside trenching. In circumstances where ground conditions permit these results suggest it should be considered, although it is regarded as difficult to arrange in practice by archaeological contractors and consultants.

Archaeological planning advisors in some counties pay specific attention to 'ploughzone archaeology', as is discussed by Jill Hind, Gary Jones and Klara Spandl (2014, 15-16). In one of the counties contributing to their study 'a wider topsoil strip routinely follows when trenched evaluation produces finds, to specifically examine the ploughzone archaeology', and another uses bucket sampling of evaluation trenches (2014, 15). They note:

'There is a perception that requiring fieldwalking to be used as a tool for decision making has reduced dramatically over the last 20 years. … However fieldwalking and metal detecting, as well as bucket sampling and test pits, are employed, … depending on the nature of the site. It was intimated that generally in the commercial field of archaeology, the importance of topsoil layers is not often appreciated.

… All recognised that the high cost and long timescales involved in fieldwalking, in comparison with other non-intrusive survey methods, is an important factor in its declining use in developer-funded projects. … the timescales involved are greatly affected by seasonal factors. Artefact visibility is only possible when crop growth is at a very low level and is greatly improved if the field surface has weathered for a period of several weeks after ploughing. This results in a narrow optimum survey window within the agricultural year, which may vary from field to field if different crops are sown. It can therefore be difficult to mesh fieldwalking survey requirements with the urgency of the development planning process.' (2014,15)

Metal detecting

In the five Worcestershire districts, metal detecting was used in only sixteen of the 281 cases, and in just three of the 47 cases with further work. Elsewhere in England this is regarded as a useful and effective additional means of identifying sites of periods from which metal finds are identified, e.g. Romano-British.

Trench types

The results of the project for the five districts of Worcestershire did not indicate any difference between the effectiveness of targeted trenches and grid layouts (Table 6 and Figure 13), with each proving successful three times out of four. Although it would appear from the data that constrained trenches were the most successful layout, this only relates to two evaluations, so the 100% success rate should not be regarded as meaningful.

Trench type	**Effective**	**Ineffective**	**Total**	**Effective**	**Ineffective**	**Total**
	Number			**% of each trench type**		
Standard - constrained	2	0	2	100%	0%	100%
Standard - grid	19	6	25	76%	24%	100%
Standard - targeted	15	5	20	75%	25%	100%

Table 5: Effectiveness of different evaluation trench types

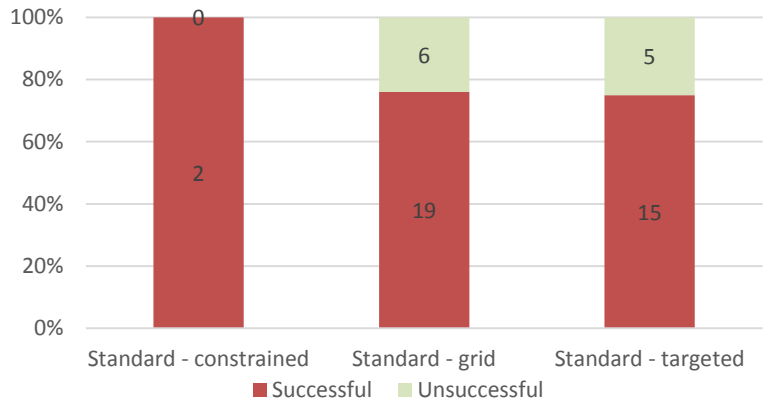

Figure 13: Effectiveness of different evaluation trench types

Sample size and effectiveness

Table 6 examines the effectiveness of further work that followed evaluations of different sample sizes, excluding those with constrained trench layouts (n=45). Those with a very small sample size (<=1%) appear from the data to have been remarkably effective; however, 'effectiveness' in this instance relates to whether what was found during the evaluation was reflected in the further work subsequently undertaken. Additionally, the areas covered by the further work are often just those areas where evaluation revealed features. Thus, even with small samples, it is highly likely that the further work will be effective. Interestingly, however, if the figures for <=1% are ignored, the remainder of the table appears to show that increasing the sample size tends to increase the level of effectiveness. There were no examples at a sample size of greater than 10%.

Although these results are tentative, given the small number of sites and the potential circularity of the argument, they do appear to reflect the conclusions of the OAU study (Hey and Lacey 2011).

Excavated area sample size	**Effective**	**Ineffective**	**Effective**	**Ineffective**
	Number		**% of further work excluding constrained trenches**	
Unknown	3	1	7%	2%
<=1%	12	3	27%	7%
>1-2%	3	2	7%	4%
>2-3%	4	1	9%	2%
>3-4%	6	3	13%	7%
>4-10%	6	1	13%	2%
Total	34	11	76%	24%

Table 6: Sample size and effectiveness of further work

Periods and effectiveness

Table 7 and Figure 14 examine the relationship between the date of archaeological remains uncovered and effectiveness of evaluations that were followed by further investigations. The table and chart include all instances of periods identified in the 47 evaluations that were followed by further work; thus, as some sites produced archaeological remains of several periods, the total number of archaeological periods represented is 100, not 47.

The conclusions are somewhat tentative, particularly in respect of the periods with very few instances recorded (Mesolithic, Neolithic, Bronze Age, Saxon). The results seem to indicate that evaluations in Worcestershire were reasonably effective at identifying archaeological remains of Iron Age, Roman, medieval and post-medieval date.

	Effective	**Ineffective**	**Total**	**Effective**	**Ineffective**	**Total**
	Number			**%**		
Mesolithic	4	0	4	100%	0%	100%
Neolithic	0	1	1	0%	100%	100%
Bronze Age	1	0	1	100%	0%	100%
Iron Age	5	2	7	71%	29%	100%
Roman	13	6	19	68%	32%	100%
Saxon	0	1	1	0%	100%	100%
Medieval	17	7	24	71%	29%	100%
Post-medieval	18	6	24	75%	25%	100%
Modern	5	5	10	50%	50%	100%
Undated	4	1	5	80%	20%	100%
None	4	0	4	100%	0%	100%
Total	71	29	100	71%	29%	100%

Table 7: Effectiveness and period: all periods on all sites with further work

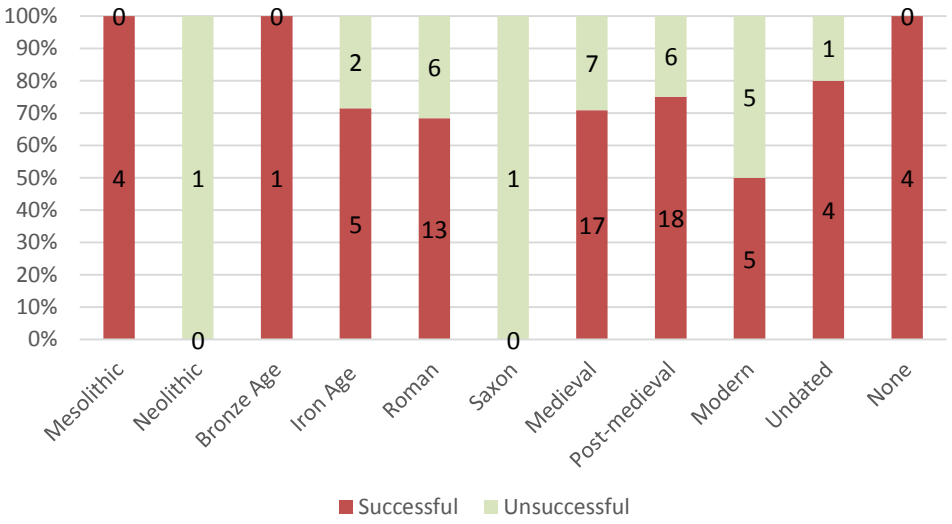

Figure 14: Effectiveness and period: all periods on all sites with further work

Landuse and effectiveness

Figure 14 compares the effectiveness of the evaluations that were followed by further work in urban areas, rural areas and on brownfield sites. Sites were classified as brownfield if they had previously held buildings, but were not within the historic centres of towns. This classification therefore included redevelopment of farmyards as well as former industrial areas of towns. The brownfield site evaluations proved to be the most effective (83%), closely followed by urban evaluations (76%), and rural, of which 57% were effective.

Other factors need to be considered as well, however. Firstly, in addition to the effect of landuse, it should be noted that the rural development sites were considerably larger, averaging 18ha, compared with brownfield average site sizes of 3ha, and urban of 0.2ha. The variation could therefore be related to development area rather than landuse, with larger sites being more challenging to evaluate. Trench samples in each case were similar: urban 2.6%, rural 2.4% and brownfield 2.6%, so this is unlikely to have affected the results. A further variable which may have influenced the level of success for brownfield evaluations is that more was known about the potential for archaeological remains before the work was carried out than in the rural areas. Landuse alone, therefore is not a clear predictor of the effectiveness of evaluations in determining the extent, nature and scale, type, period and density of archaeological deposits on a site.

Figure 15: Effectiveness of evaluations and modern landuse

In relation to how archaeological advice is formulated for brownfield development sites, these results indicate that far from being degraded (as some Planning Archaeologists and consultants assume), archaeological remains can survive on these sites and can be very effectively evaluated.

Evidence base – evaluation outcomes and further work

Periods of activity identified

Figure 16 shows the number of periods of past activity identified in Worcestershire evaluations. As might be expected, few evaluations revealed remains of more than three periods; however, 26 evaluations had four or more periods of activity. Three of the four evaluations revealing six periods of activity were in Droitwich which has been a focus of salt-making from prehistoric times, and the fourth was a rural evaluation that identified an extensive multi-period site.

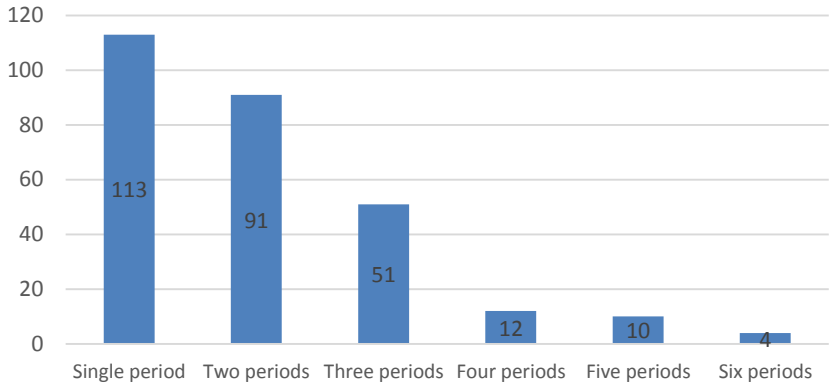

Figure 16: Number of periods identified in evaluations where at least one period was identified

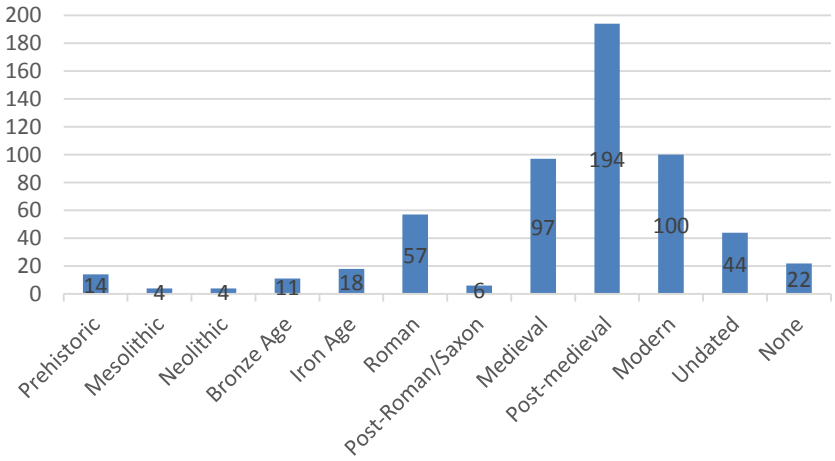

Figure 17: All periods identified during evaluation

Figure 17 shows all instances of periods identified in evaluations in Worcestershire. Post-Roman/Saxon remains were only identified on six of the 281 evaluations carried out between 1990 and 2012; 'prehistoric', Mesolithic, Neolithic and Bronze Age together were identified on 33 occasions, and Iron Age on 18. These results reflect the pattern observed in the OAU study (Hey and Lacey 2001), discussed above. Archaeological remains of these periods are likely to be

dispersed and unenclosed and are consequently particularly difficult to locate by means of archaeological evaluation (*ibid* 59-60).

A closer examination of the evaluations which identified post-Roman/Saxon activity revealed that four of the six were in Droitwich, one was in Pershore Abbey, leaving only one rural evaluation that identified unexpected Saxon remains. In Worcestershire this period is virtually aceramic, making identifying remains especially challenging, unless diagnostic features are revealed by trenching. More generally, it has been noted that it has been possible to identify Saxon remains during archaeological work at gravel quarry sites in Worcestershire when extensive areas are stripped in advance of quarrying. Whilst it is possible that settlement focused on gravel areas, this has not been proven; significant post-Roman and Saxon remains may well survive on clay soils away from the gravel river terraces in the county.

In relation to periods where artefacts can be more effective at identifying sites, fieldwalking is one evaluation technique that can make a difference, as was identified in the OAU study. Overall, 7% of the Worcestershire evaluations examined for the project incorporated fieldwalking; however, 16% of the evaluations that recorded prehistoric remains included fieldwalking. It is possible, therefore, that fieldwalking may have been a factor in the identification of some of these periods of activity, as Hey and Lacey noted in the OAU study (2001, 23).

'Undated' periods of activity were recorded on 44 occasions. Undated features represent a challenge in the context of archaeological evaluation. Without an understanding of the date of archaeological remains it is very difficult to assess significance. However, as has been identified, there are periods of past activity where datable finds are rare. As a consequence, some 'undated' remains may well be Saxon, or prehistoric. Where the features are not in themselves diagnostic, the significance of features or phases of activity identified during evaluation may well be being missed.

Evaluated potential

The archaeological potential of the sites once evaluation had been carried out was also assessed for the five Worcestershire districts. Three levels of potential were identified:

- High – the evaluation resulted in a high number of archaeological deposits which were deemed of local and regional significance.
- Medium – the evaluation resulted in a number of archaeological deposits which were of local significance.
- Low – few or no archaeological deposits were found. A site was also deemed to be of low potential if any archaeological deposits which were discovered were heavily truncated by subsequent site disturbance.

Figure 18 illustrates the post-evaluation archaeological potential for Worcestershire sites with most sites (160, 57%) falling into the category of low potential.

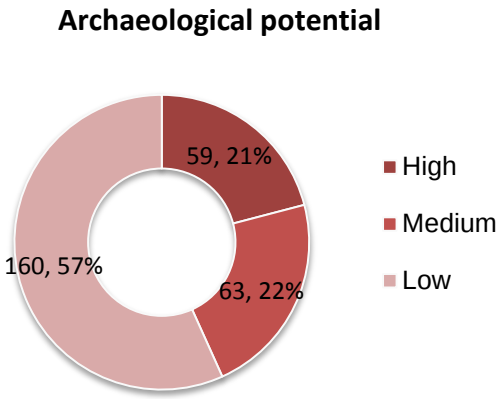

Figure 18: Archaeological potential of evaluations

Further work following evaluation

Out of 281 evaluations, 47 went onto further work representing 17% of the total. Of the 47 evaluations assessed, 38 (80%) scored 3 or more, meaning that they were successful in predicting what would be found in the development area as a whole. On this basis, evaluation in Worcestershire has been demonstrated to be an effective approach, enhancing the understanding of site potential and informing not only further work on the same site, but also contributing to the HER and ultimately to research frameworks within the county and beyond.

The main approaches used in the 47 instances of further work were watching brief only on 23 sites, 49% of all the assessed further work; excavation only on 14 sites (30%), and excavation and watching brief on 8 sites (17%). Strip, map and sample was used once in conjunction with a watching brief, and excavation with building recording once.

All but two of the 47 instances of further work took place from 1996 onwards (Figure 19), with just two before this during 1992. However, it should be noted that these figures exclude county council-funded watching briefs, which were carried out by the County Archaeological Officer and Planning Archaeologists until *c* 1996.

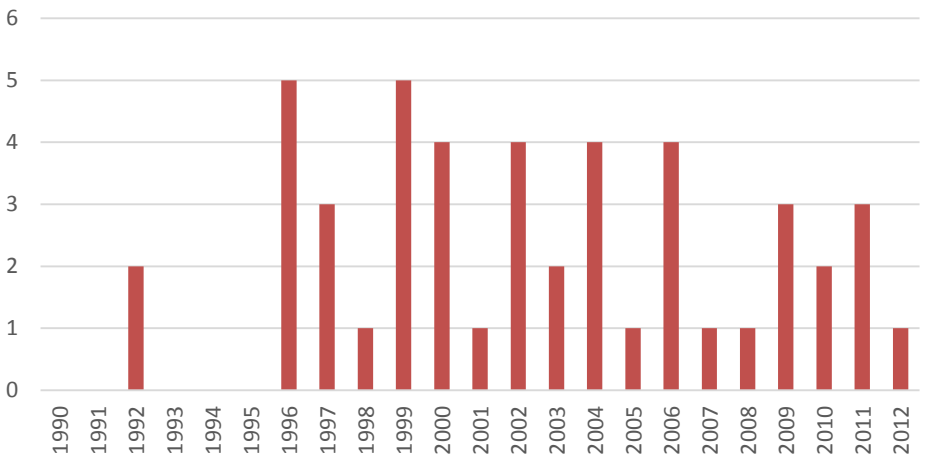

Figure 19: Number of instances of further work by year

Historic towns

There are thirteen historic towns in Worcestershire and additional analysis was carried out in these areas.

The Central Marches Historic Towns Survey

This was one of the first of a series of county-based extensive urban surveys of small towns carried out across England in the 1990s. The survey covered the counties of Herefordshire, Shropshire and Worcestershire and included thirteen historic towns in Worcestershire (Dalwood 2000, Dalwood and Bryant 2005). Prior to the survey, planning archaeological input focused on the few towns known to have Saxon origins or other significant archaeology, and focused only on limited areas within those few towns. There was insufficient understanding of the archaeology of the other urban centres to provide clear justification for requesting archaeological evaluation or conditions on planning applications. As there was no research framework for any of the towns, the results of development-led archaeological interventions could not be put into context or contribute to further understanding of any individual town or of historic urban development in Worcestershire. This has now changed, and the understanding of each town continues to be developed alongside a wider understanding encompassing the county as a whole.

The Survey identified the historic core of each town, characterised different areas of archaeological significance, and drew up constraint maps for each which allowed Planning Archaeologists to tailor archaeological planning advice in these urban areas more accurately.

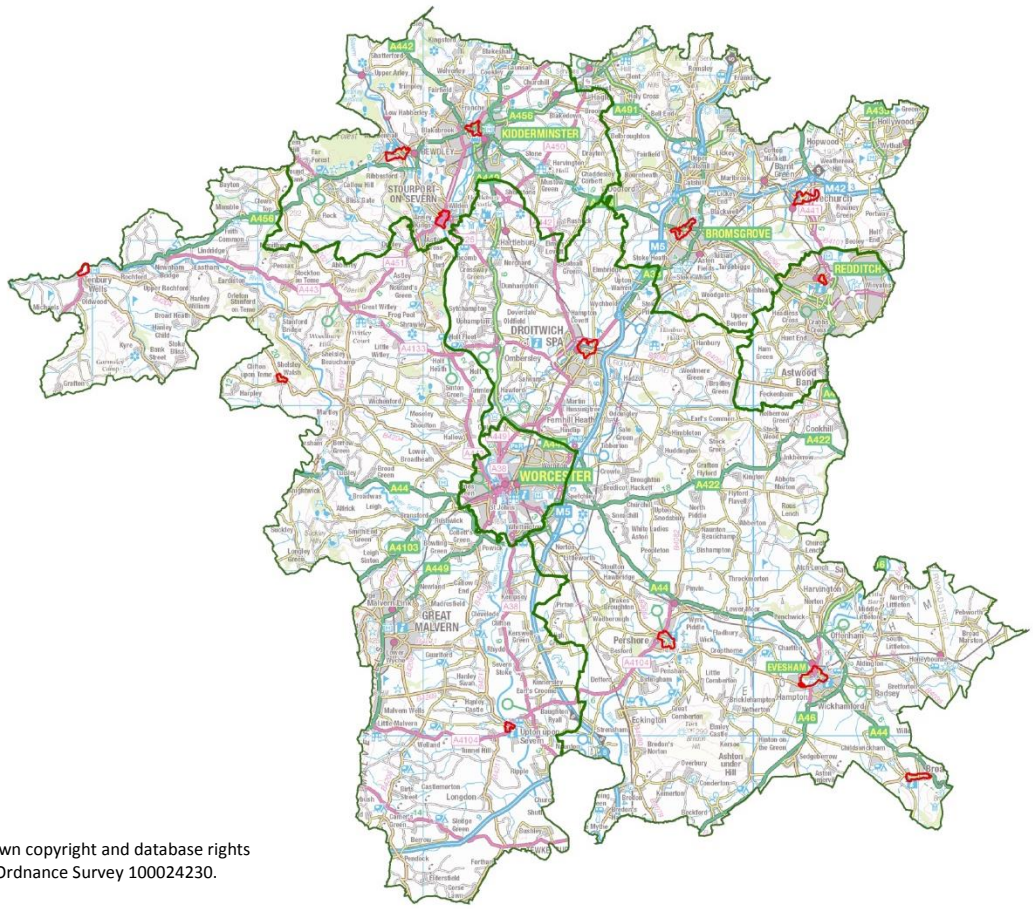

Figure 20: Location of historic towns (excluding Worcester City)

The quantity of fieldwork being requested in urban settings increased remarkably quickly as a direct consequence of the CMHTS. Dalwood and Atkin (1998) summarised the effect of the survey on responses to planning applications, contrasting the situation before survey data were available in 1993, and 1996. By 1996 the results of the project were available and applications could be located spatially within urban form components that provided a context and a local research framework for development-led archaeological interventions. This was at a time when the then SMR could only identify archaeological sites as points on paper maps. Having the area-based data available for the CMHTS towns alongside research frameworks for 'components' within each town was hugely helpful to the Planning Archaeologists working in the mid- to late 1990s. Between 1993 and 1996 the proportion of planning applications where an archaeological response was required quadrupled (Dalwood 2000, 217; Dalwood and Atkin 1998, 8).

Planning applications in historic towns

For the present project, each district council provided data on planning applications which had been submitted and approved within the historic towns during the period 1990 to 2013, and which were located within the CMHTS constraint area plus a 50m buffer zone. Using this data, the number of planning applications involving groundworks and the numbers of archaeological mitigations which took place could be compared. Not all applications which receive approval go forward to construction, but these figures provide a broad indication of the level of development in each town and provide a dataset which allow the archaeological work to be set in context.

A total of 12,052 planning applications were submitted to the districts in the thirteen historic towns during the period 1990-2013. Of these, 2229 applications could have had an impact on below-ground archaeology, excluding those that were refused permission or were withdrawn, (Table 9). Only sparse records of archaeological advice on applications survive before 2000 so it is not possible to know how often some form of archaeological mitigation was recommended for all these applications. However, it is assumed that a substantial proportion of the 2229 applications would have been commented on at the time of submission. (It should further be noted that the district council data for Pershore are incomplete due to the lack of information regarding some older applications.)

In contrast to other sections of the present report the numbers of interventions shown in include watching briefs required as a condition on planning applications, not just evaluations. The variation between the numbers of recorded archaeological interventions in the different towns can partly be explained by the differences between the towns in the late 20th and early 21st centuries in terms of extent, population, and economic basis. Although historically a town, Clifton-upon-Teme is now classed as a village, with an estimated population of just under 700. By contrast, Evesham is still regarded as a market town, and has a population of close to 23,600. The difference in areas of the historic towns can be seen on Figure 20. However, the considerable variation between the percentages of relevant planning applications that had recorded archaeological interventions visible in Table 9 and Figure 21 is interesting, and does not directly reflect the size of the historic town areas. The very low figure of 4% in Clifton reflects the low number of planning applications: even a modest increase in archaeological interventions could increase the percentage significantly. Given the long history of archaeological interest in Droitwich and the significance and level of preservation of waterlogged remains relating to the saltmaking industry, the high proportion of archaeological interventions is not surprising. However, the difference between Evesham (24%) and Pershore (11%) or Bromsgrove (7%) is interesting, given their similarities in other respects; all have a significant number of listed buildings, and in each case they flourished as medieval market

towns. In relation to the variation across the county as a whole, it is possible that differing approaches by the district planning authorities may have had some influence: in the mid-1990s there was a perceptible difference between the district planning departments in how they responded to advice recommending archaeological intervention. However, this is not the only factor, as significantly less variation between districts is reported now in 2016. It is possible that there was a difference in the level of archaeological advice between the towns, but this could not be investigated in the absence of records relating to the archaeological advice for a significant part of the study period. The project has been helpful in identifying this discrepancy, and in future care will be taken to ensure that any difference in advice between towns and areas of the county can be explained.

Historic town	**All planning applications**	**Planning applications with groundworks**	**No of recorded archaeological interventions**	**% of planning apps with groundworks with recorded archaeological interventions**
Alvechurch (B)	612	143	11	8%
Bewdley (WF)	1128	241	19	8%
Broadway (Wy)	1343	212	14	7%
Bromsgrove (B)	582	147	11	7%
Clifton (MH)	208	83	3	4%
Droitwich (Wy)	1674	244	68	28%
Evesham (Wy)	1688	271	65	24%
Kidderminster (WF)	1051	127	13	10%
Pershore (Wy)	1087	414	47	11%
Redditch (R)	1072	53	4	8%
Stourport (WF)	793	141	8	6%
Tenbury (MH)	177	48	14	29%
Upton-upon-Severn (MH)	637	105	10	10%
Total	**12052**	**2229**	**287**	**13%**

Table 8: Planning applications in historic towns, 1990-2013

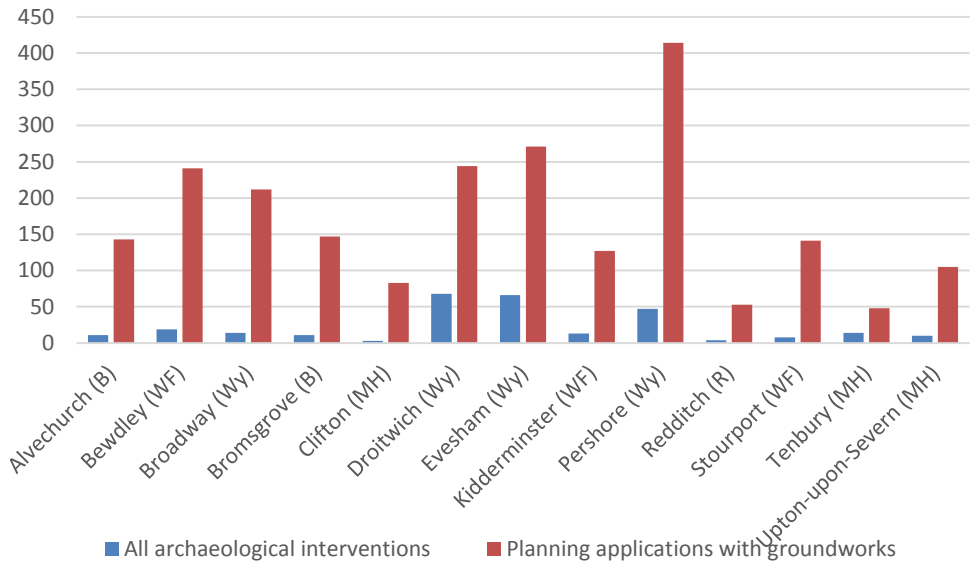

Figure 21: Planning applications in historic towns with groundworks and recorded archaeological interventions

Table 10 contrasts the numbers of all development-led archaeological interventions in historic towns in the first five years of the study period, 1990 to 1994, with the numbers carried out after the results of the CMHTS were available. Although, as has been noted above, there is considerable variation between the towns overall, the figures in this table do demonstrate a positive effect from the CMHTS in Alvechurch, Evesham, Kidderminster, Redditch, Stourport and Upton-upon-Severn.

Historic Town	**No of archaeological interventions**	**Interventions before 1995**	**Interventions before 1995 as % of all interventions in each town**
Alvechurch (B)	11	1	9%
Bewdley (WF)	19	3	16%
Broadway (Wy)	14	2	14%
Bromsgrove (B)	11	2	18%
Clifton (MH)	3	1	33%
Droitwich (Wy)	68	10	15%
Evesham (Wy)	65	4	6%
Kidderminster (WF)	13	1	8%
Pershore (Wy)	47	7	15%
Redditch (R)	4	0	0%
Stourport (WF)	8	0	0%
Tenbury (MH)	14	2	14%
Upton-upon-Severn (MH)	9	0	0%
Total	286	33	12%

Table 9: Archaeological interventions in historic towns

Table 11 and Figure 22 summarise all the archaeological interventions that have been carried out in historic towns in Worcestershire, not just the evaluations and subsequent work discussed elsewhere in this report. The watching briefs therefore include both those carried out after evaluation, and others that were recommended as conditions on planning applications.

	Evaluations		**Watching briefs**		**Excavations**		**All interventions**	
Alvechurch (B)	5	45%	6	55%	0	0%	11	100%
Bewdley (WF)	5	26%	12	63%	2	11%	19	100%
Broadway (Wy)	4	29%	8	57%	2	14%	14	100%
Bromsgrove (B)	5	45%	6	55%	0	0%	11	100%
Clifton (MH)	0	0%	3	100%	0	0%	3	100%
Droitwich (Wy)	27	40%	37	54%	4	6%	68	100%
Evesham (Wy)	27	42%	26	40%	12	18%	65	100%
Kidderminster (WF)	8	62%	5	38%	0	0%	13	100%
Pershore (Wy)	15	32%	27	57%	5	11%	47	100%
Redditch (R)	2	50%	2	50%	0	0%	4	100%
Stourport (WF)	2	25%	5	63%	1	13%	8	100%
Tenbury (MH)	2	14%	12	86%	0	0%	14	100%
Upton-upon-Severn (MH)	2	22%	7	78%	0	0%	9	100%
Total	104	36%	156	55%	26	9%	286	100%

Table 10: Interventions in historic towns, 1990-2013, numbers and percentages of all interventions in each town

In addition to the variation in numbers of projects between the towns mentioned above, Table 11 and Figure 22 show that the type of work has differed. All three interventions in Clifton-upon-Teme were watching briefs; by contrast five (38%) of the thirteen interventions in Kidderminster were watching briefs. Numbers of interventions in Droitwich and Evesham are higher than any of the other towns, but there have been fewer excavations in Droitwich. This is possibly due to the complexity and depth of deposits in the town, which mean that excavation, is generally a time-consuming and expensive option. Alternative foundation design is frequently a better solution.

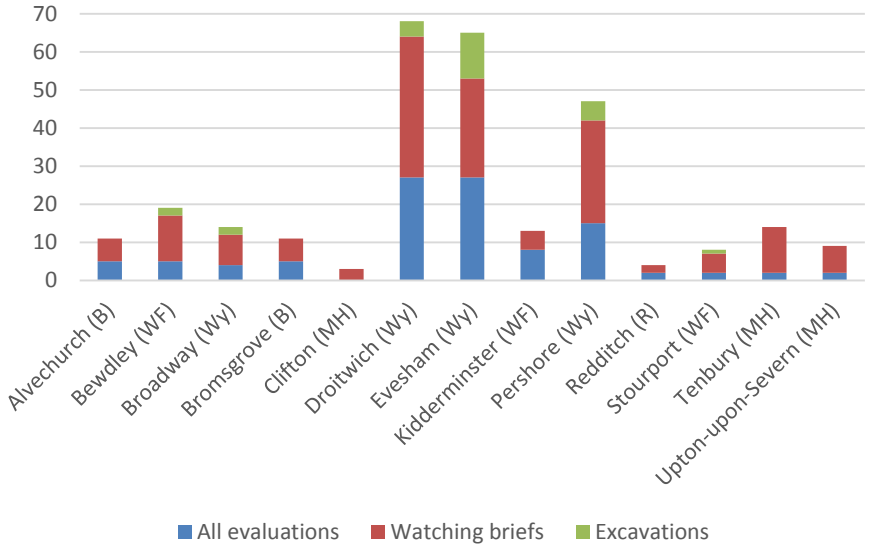

Figure 22: Numbers of watching briefs, excavations and evaluations in historic towns

A range of factors have led to the variation that can be observed between responses to planning applications in the different historic towns. As the numbers are relatively small it is not possible to analyse this usefully: the development type, scale, and location within each town, combined with the nature of archaeological deposits anticipated may quite reasonably result in different archaeological advice on a development in one town to a very similar development in another town. Nevertheless, the process of carrying out this analysis has given pause for thought. The Planning Archaeologists for the five Worcestershire districts are already taking care to ensure that any variation in advice between historic towns can be fully justified.

4.4 Analysing the evidence base – Worcester City by James Dinn

The number of evaluations carried out in the 3328 ha of the Worcester district in 1990-2014 is about half that for the rest of the county (174100 ha), giving a density of individual evaluations which is over 25 times greater, though it should be noted that the average evaluation size in Worcester is much smaller.

The format used in this project to describe evaluations in Worcester is similar to that for the rest of the county, though the methods used to collate and store the data are different.
Some specific questions for Worcester were set out in the project design, in addition to the more general questions relating to evaluation. Some of the descriptive statistics have a bearing on these questions, but they are more generally addressed (where possible) through descriptive text and discussion. As will emerge in the analysis, the degree to which some of these questions could be answered was limited.

1. Can differences be seen between methodologies used in Worcester (city centre and 19th and 20th century suburbs) and those used in the other urban centres?

2. What is the value of site monitoring and has it changed the outcomes of projects or our understanding of particular sites?

3. How has the research framework influenced the archaeological mitigation strategy and how will the results of that mitigation influence the evolution of the research framework in the future? (This question is addressed in section 5.2 below)

Policy background and overview of evaluation in Worcester

Pre-1990 evaluations

Before 1990 there were very few evaluations in Worcester. One early example was the work carried out before the 1975-76 excavation at Sidbury, where the 'evaluation' comprised work on the 'documentation of the site, a test section and two neighbouring salvage operations'. This process was followed by two 're-evaluations' (Carver 1980b, 155-160). It was more of an iterative development of excavation strategy than an evaluation as currently understood.

Evaluation began to feature as part of the development process in Worcester from the mid-1980s, with 10 sites examined between 1985 and 1989. Most of these were small, and nearly all were within areas of already relatively well-understood archaeological potential in and on the edges of the city centre, although the circumstances of the work were very varied (Appendix 3-D):

With the exception of the Warndon project and 27/27A Friar Street, all of this work was undertaken by the then Hereford and Worcester County Council archaeological service. The two projects named here were carried out by teams under the aegis of the City Museum.

1990 onwards

A conjunction of linked changes in 1990 (adoption of local, followed by national policy, and the appointment of the city's first Archaeological Officer) led to evaluation becoming embedded in the development system in Worcester, though this was as elsewhere a slow process.
It has proved convenient to break the period under discussion down into equal five-year time bands; this allows consideration of changes through time, while the time bands equate very roughly to some major developments in policy.

Figure 23 shows the numbers of individual evaluations for each year since 1990.

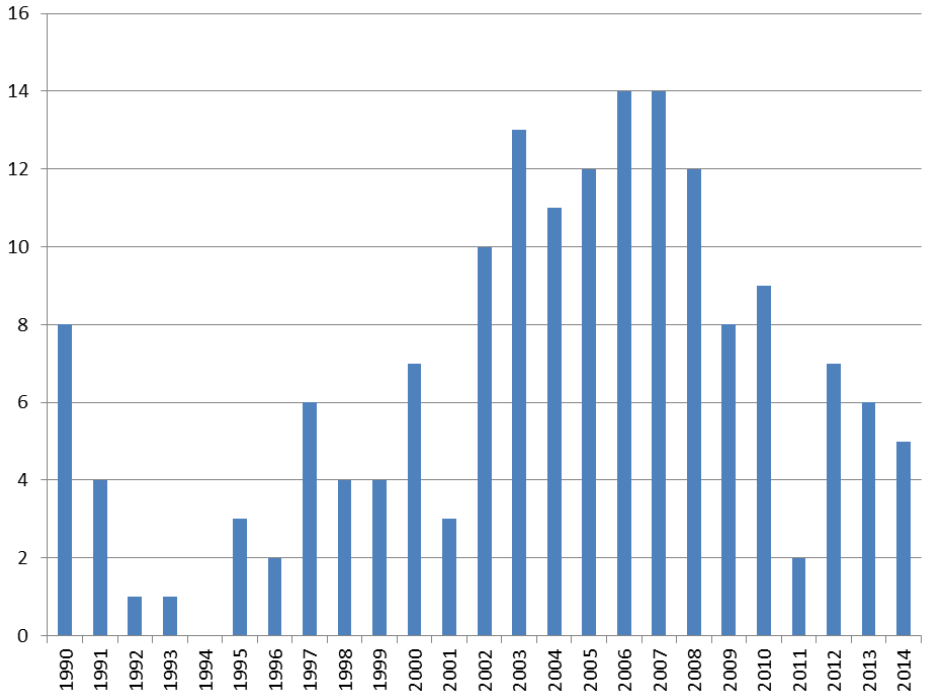

Figure 23: All evaluations by year

Time band A: 1990-94

- 14 evaluations
- Appointment of City Council's first Archaeological Officer in early 1990; Dominic Perring, left the post towards the end of 1990 and was replaced by Charles Mundy in early 1991
- Worcester City Council *Planning policy for archaeology and development* adopted 3 July 1990 (superseded by policies in the first Local Plan)
- Local Plan adopted 1994
- PPG16 published 21 November 1990
- PPG15 published 14 September 1994
- Implementation of both local and national policy was slow – although there were 10 evaluations in the first two years, the following three produced only four (and the five years 1992-96 only nine)
- Large and complex schemes – none

Time band B: 1995-99

- 19 evaluations
- Implementation of PPG16 and local policies was becoming routine
- Charles Mundy left the Archaeological Officer post in late 1996, and after a short gap in which advice was provided by the County Archaeologist, James Dinn took over at the beginning of 1997
- Steady though small numbers
- Urban Archaeological Database (sites and monuments record for city centre and surrounding areas) at very end of period
- Large and complex schemes – Friar St, City Arcades

Time band C: 2000-04

- 44 evaluations
- Increase in evaluations through the period, with large numbers every year from 2002
- Urban Archaeological Database adopted 2004
- Large and complex schemes – Magistrates Court, 14-24 The Butts, Newport Street

Time band D: 2005-09

- 60 evaluations
- Abortive Heritage Bill; work to deliver this included the articulation of concepts of heritage assets, values, significance (*Conservation Principles* 2008)
- A very busy period for evaluation, dropping off only in 2009
- *Resource assessment and research framework* 2007 (Worcester City Council 2007a)
- Urban Archaeological Database developed into historic environment record
- *Archaeological strategy for Worcester* (Worcester City Council 2007b)
- *Archaeology and the historic environment* SPD (Worcester City Council 2007c)
- *Archaeological Deposit Characterisation of Worcester City Centre* (Worcester City Council 2008)
- Financial crash 2008
- Large and complex schemes – Royal Worcester Porcelain, The Hive, University of Worcester City Campus, Sainsbury's (St John's), Kings SPACE, Lowesmoor Trading Estate

Time band E: 2010-14

- 29 evaluations (31 to end 2014 with 2 not included in analysis)
- PPS5 (23 March 2010) in force 2010-12
- National Planning Policy Framework from 27 March 2012
- South Worcestershire Development Plan in preparation
- Regional archaeological research framework published (Watt (ed.) 2011)
- sharp increase in desk-based assessments and heritage statements, from 15-22 per year in 2010-2012 to 50 in 2014)
- Large and complex schemes – no new schemes, so no new evaluation projects, though mitigation (and further evaluation) continues on several
- PPS5 gave rise to only 2 assessable cases (on one site) and NPPF to only 4 to date

Topographical and archaeological resource factors

Zones

Strictly for ease of analysis, analysis of different approaches to evaluation across different parts of the city was undertaken through the use of zones. Six zones were defined (figures 23 & 24):

A – Historic city
B – Historic suburbs
C – Historic urban fringe
D – 19th and 20th century expansion
E – Greenfield
F – Northern part of Roman town (not overlaid by medieval or early post-medieval occupation).

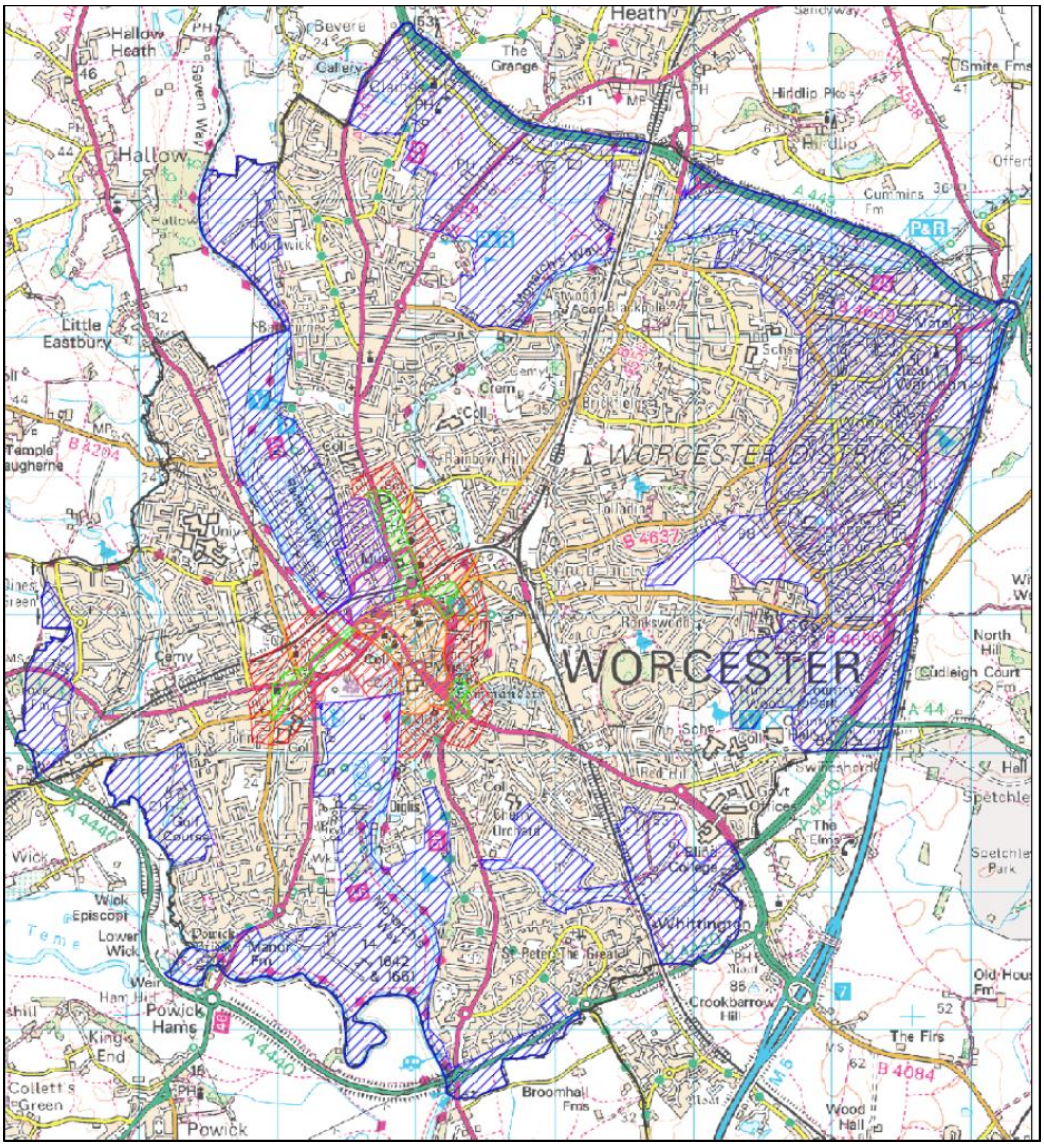

Figure 24: Zones used in analysis

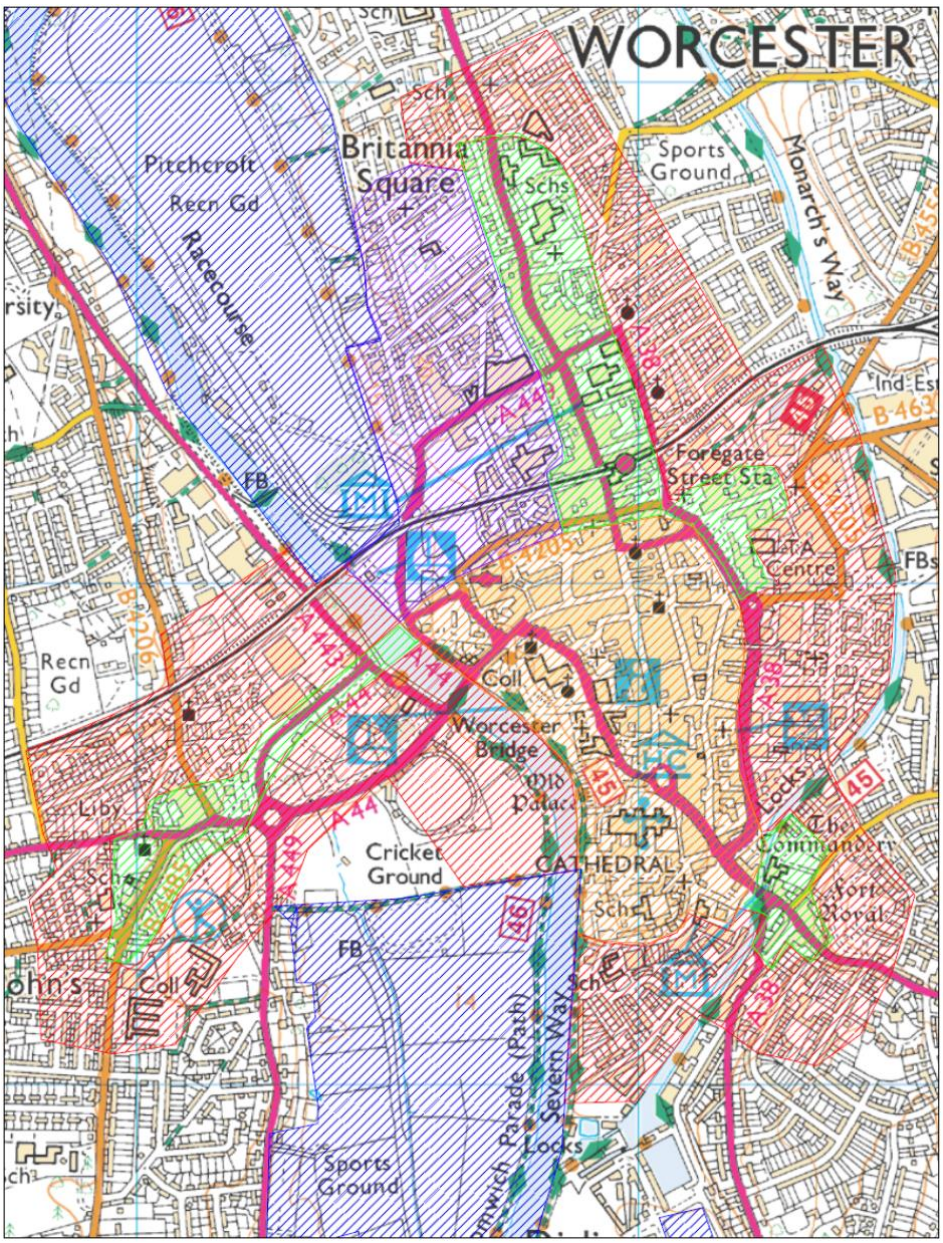

Figure 25: Zones used in analysis (city centre)

Key
A – Historic city (orange hatching)
B – Historic suburbs (green hatching)
C – Historic urban fringe (red hatching)
D – 19th and 20th century expansion (not hatched)
E – Greenfield (blue hatching)
F – Roman town (purple hatching)

These use archaeological and historically informed criteria (A-C, F) and recent development trajectory (D, E), and all have a common basis in HER data and HLC mapping. They are very different in size, with three very small zones of 'prime archaeological interest' covering the medieval and earlier city and the Roman town (zones A, B and F) comprising a total of 89 ha or less than 2.7% of the total area. Zone C is larger, but not by much (105 ha). With the expansion

of the city, the boundary between zones D and E is variable, so 1990 has been taken as the benchmark date for calculating the extents of these zones. Further detail on zones is given in Appendix 3-C.

Unsurprisingly the progress of archaeological fieldwork in the six zones has been very variable (figure 25). This can be seen as a response both to perceptions of archaeological importance and potential and also to the extent and type of development proposed or implemented in each zone.

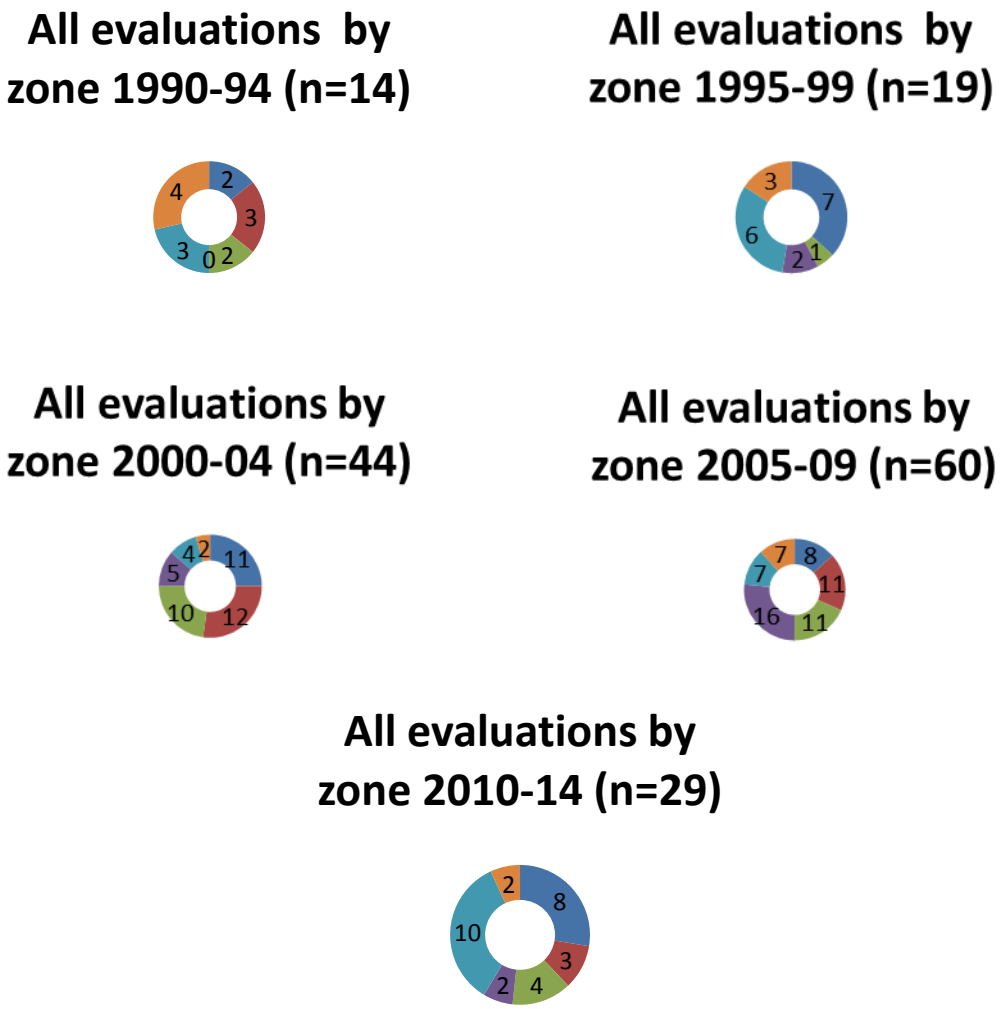

Figure 26: Evaluations by zone and time band

In the historic city (**zone A**), high archaeological potential is assumed. However, access for evaluation is often very constrained, partly because the entire zone is within conservation areas, and standing buildings awaiting demolition are often present. Conservation area consent (and now planning permission) for early demolition of buildings within conservation areas is not usually forthcoming, as at this stage of the planning process there can be no certainty of the development which would replace the buildings being delivered, and therefore there is the potential that the site could be left empty. This leads to an increased proportion of evaluations secured by condition. Additionally, development sites are often small, and deposits are deep (often between 2-4m, sometimes as much as 6m). It is very hard therefore for evaluation to address the full deposit sequence, though this has been done in places using auger or boreholes. An alternative is to use deposit sequences from neighbouring sites as a proxy.

The historic suburbs (**Zone B**) is in many ways similar to zone A, though the constraints are not as acute. Archaeological potential is assumed, but access for evaluation is often constrained; the historic suburbs are nearly all within conservation areas, and many of the developments in this zone have included the demolition of backplot or other buildings. Deposit depth is typically between 1-2m, and it is more usual for evaluation to be able to address the full sequence.

The historic urban fringe (**Zone C**) is much more variable, as would be expected given the way it is defined. Archaeological potential is expected to be variable, with some concentration on known monuments, areas of topographical potential (eg river and stream valleys), and sites adjacent to areas of known high significance. Relatively little of this zone is within conservation areas, and access for evaluation is less constrained in most cases. The full deposit sequence is usually addressed.

The archaeological signature for 19th and 20th century expansion (**zone D**) is almost the same as that for zone E, the difference being one of survival, given that the zone is largely defined by its development history (the previously-developed parts of Worcester's hinterland). There has been a concentration on known sites. Access for evaluation is usually unconstrained and it is nearly always possible to address the full deposit sequence.

The greenfield zone (**Zone E**) comprises a number of separate areas, mostly small and more closely linked to areas outside the city boundary. A concentration on known sites can also be seen here. Again, access for evaluation is usually unconstrained and it is nearly always possible to address the full deposit sequence.

The Roman town north of the historic city (**Zone F**) shares many characteristics with zone C (including its variability), but also some with zones A and B. Archaeological potential is often very high, but very dependent on survival. There are occasional areas of deep deposition, though more frequently deposit depths are around the 1m mark. Constraints on evaluation are very variable, but it has usually been possible for evaluation to address the full deposit sequence.

Trends through time are not completely clear, as the figures and percentages fluctuate, sometimes wildly; no doubt this is due, at least in part, to the . However there has been a decline in the proportion of work in the historic suburbs and the Roman town (B and F) and an increase in the 19th and 20th century suburbs (zone D). Coverage of the zones by evaluation varies enormously, from the 20% of zone F which has been addressed by evaluation, to the 1.31% of zone D (these figures are arrived at by aggregating the total extents of development sites where evaluation has taken place). Over 8% of the historic city and historic suburbs has been addressed by evaluation. Coverage at this sort of level has important implications for

archaeological understanding and the development of the research framework, discussed below.

Differences in approach to evaluation in the city centre zones A, B and F on the one hand, and C, D and E on the other, are most marked in the trenching percentages (figure 9). Sites in zones A, B and F have been subject to coverage which approximates to the 'post-Hey and Lacey industry norm' (4.40%. 4.35% and 4.24% respectively), while the percentages in the other three zones are about half of this level (2.07%, 1.93% and 2.38%).

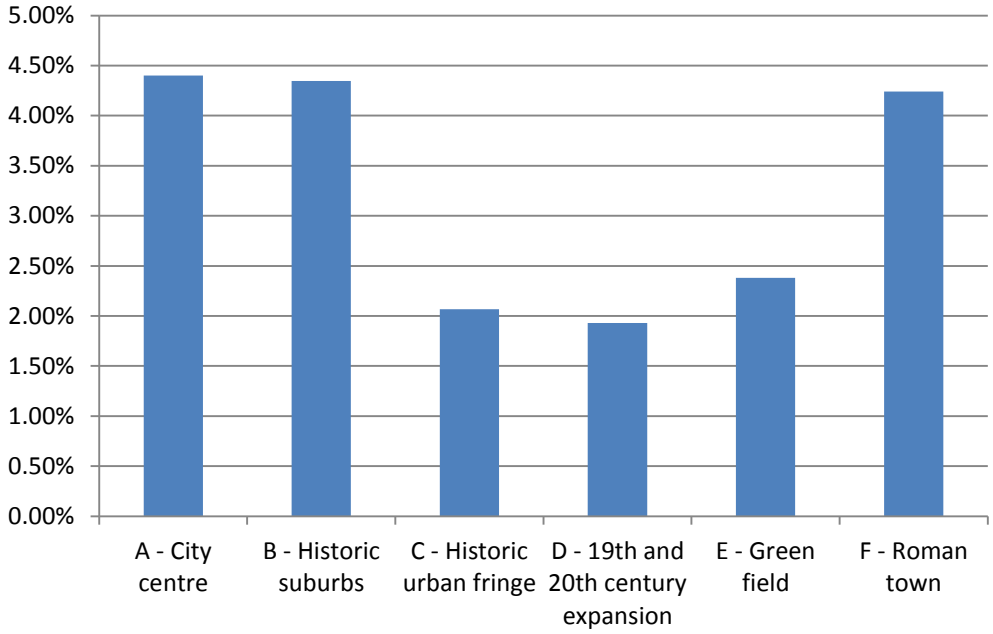

Figure 27: Evaluation trenching and percentage coverage (by zone)

Evaluation in the development process

Development drivers for evaluation

It is beyond the scope of this report to analyse the impacts of political priorities, development cycles or financial markets. However these do have fundamental impacts which can to a greater or lesser extent be seen in the distributions of numbers and types of development through time. Residential development has for the most part been the main driver, reaching 60% of all evaluations in time band D (2005-09), and 47% overall. The only others to exceed 20% in any time band have been entertainment and sports (26% in band B, 1995-99; though this was skewed by multiple events on one site), public (21% in the same period), and education (21% in band E, 2010-14).

Residential development has been most prevalent in zone D (84% of all developments in this zone), but also the most significant in all zones (equal with public at 28% in zone F). Few other development types dominated a zone, though retail in zones B and C (17% and 29%), office in zone F (22%), and employment (23%) and highways (20%) in zone E should be noted. Further analysis (not attempted here) could identify if development cycles have had a significant influence on approaches to evaluation in Worcester.

Stage in development process

Evaluations were separated into pre-application, pre-determination, and condition (implementation) phases. Overall the figures show an increase in pre-application and condition evaluations, though this is not consistent across all time bands – the 2000-04 period seems to contradict the trend (figure 27).

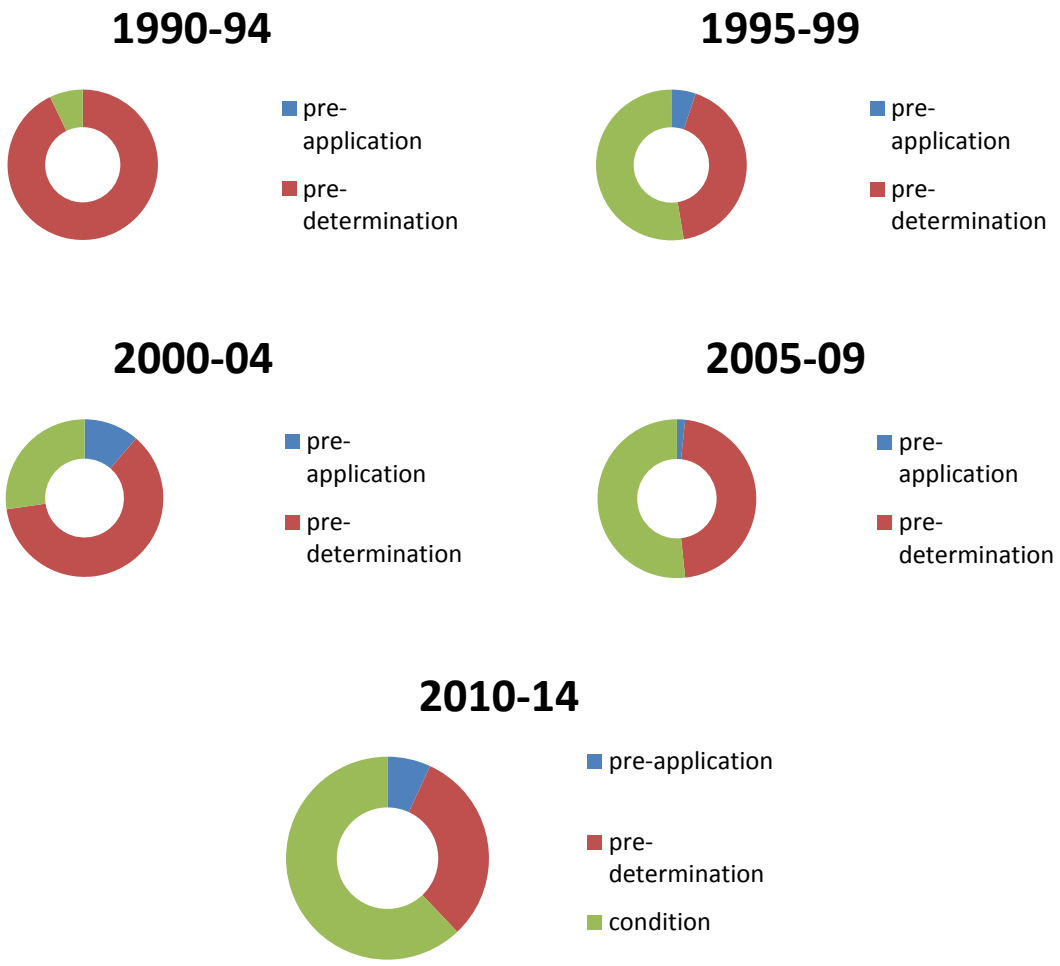

Figure 28: Evaluation by stage of planning process (by time band)

The 'effectiveness scores' for the three phases were compared (see Appendix 2). However, only one pre-application evaluation could be scored, and in any case the results did not vary significantly. An additional reservation is that several evaluation cases included investigations at two phases (in one case, all three). The slightly lower average score for pre-determination evaluations may reflect a tendency to undertake a lower-density 'first stage' evaluation at this stage, with further trenching expected to follow later.

Development stage	Average assessed score
pre-application	26.0
pre-determination	24.2
condition	27.7

Table 11: Assessed scoring by development stage

Archaeological drivers for evaluation in Worcester

It is clear that the process of scoping evaluations has not always been consistent. One way of systematising this is to look at the archaeological drivers for the evaluation, and a classification has been applied retrospectively to the evaluation cases. These have been classified for the analysis as:

- Known monument on site (known heritage asset: principal need is to establish survival, condition, and significance of remains whose existence is anticipated)

- Known monument adjacent to site (potential heritage asset: potential for the monument to have greater extent, or for there to be associated remains)

- Within area of known or predicted archaeological deposits (potential heritage asset: need to establish presence, survival, condition, and significance of remains)

- Assessment of predicted archaeological character (potential heritage asset: this is based on consideration of topographical variables, landscape character, including HLC, HER records on site or nearby, rather than on prior knowledge of the site itself)

In zone A (historic city) over half of evaluations related to a known monument on site. In the majority of cases these monuments were elements of the medieval defences. All others were within an area of known or predicted archaeological deposits, which is unsurprising, as this classification covers the whole of the city centre.

In zone B (historic suburbs) the overwhelming majority of evaluations (nearly 90%) related to an area of known or predicted archaeological deposits. Again this is unsurprising, as the whole area is covered by this classification, and there are few known monuments.

The pattern in zone C (historic urban fringe) was similar to that in the historic suburbs (zone B), suggesting that this marginal zone is seen as having much in common with the historic suburbs. Zone D (19th and 20th century suburbs) shows a completely different pattern. Here, two-thirds of evaluations were on sites where the driver was the assessment of predicted archaeological character. 20% were on known monuments.

Evaluation in zone E (Greenfield) was more targeted to known monuments (60%), either on site (33%) or adjacent (27%), while 40% related to assessment of predicted archaeological character. Zone F (Roman town) shows a very similar distribution to the historic suburbs (zone B), for largely the same reasons.

By time band, being within an area of known or predicted archaeological deposits was the most frequent driver in all bands apart from 1990-94, when known monument on site was the most frequent. The presence of a known monument on site has tended to decrease in significance as a driver through time, while assessment of predicted archaeological character has tended to increase and stood at 28% in 2010-14. This appears to reflect a change in practice, with an increased appreciation of potential as opposed to the more easily demonstrated importance of individual sites. It is also likely that it has been influenced by changes in the types and locations of developments. It would be interesting to re-examine caseloads from the 1990s where evaluation was not carried out, to see how often a different approach might be taken now.

Briefs

Time band	Evaluation briefs written	Evaluation briefs implemented	Total evaluations	Percentage governed by brief
1990-94	30	11	14	79%
1995-99	20	16	19	84%
2000-04	52	36	44	82%
2005-09	48	40	60	67%
2010-14	11	10	29	34%
Total	**161**	**113**	**166**	**68%**

Table 12: Briefs by time band

The proportion of evaluations governed by a brief provided by the archaeological adviser has fallen in the last decade from around 80% to 34% (figure 28). This is partially offset by cases where a brief has been provided by a consultant. Given that the effectiveness of evaluations seems to have increased in the same period, this is not necessarily a problem. However, it is suggested below that the effectiveness of archaeological investigation generally could be improved further by a much more engaged and collaborative process throughout, including at brief / WSI stage, to fine-tune the work to the needs of the individual site.

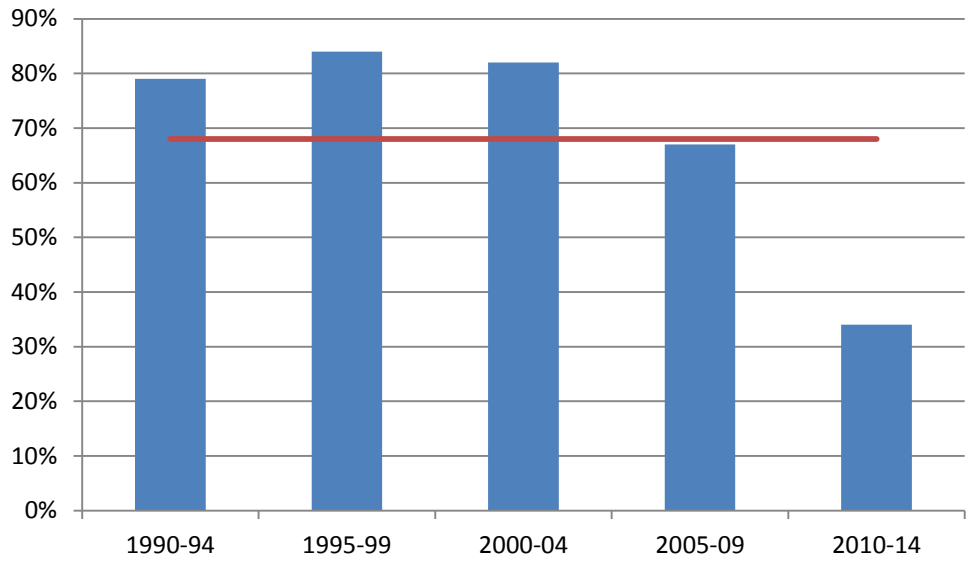

Figure 29: Briefs and evaluations (by time band)

Constraints on evaluation, especially trenching

There are of course multiple constraints on achieving 'ideal' evaluation trenching coverage, and in fact it is very rare to achieve this except on green field sites. City centre locations, existing built-up sites and brownfield areas are particularly affected by constraints. In many cases these reduce the areas available for trenching, and consequently its effectiveness. In other cases pre-application or pre-determination evaluation may be impossible to achieve, though it is usually possible for suitable coverage to be provided later in the process by condition.

Factors relating to use and ownership which constrain evaluation include current active use of the site, as well as land needed for access. The site owner or prospective developer may themselves not have free access to investigate the site, especially if there is an active tenancy.

Physical factors that constrain evaluation include the presence of standing buildings on the site; this is a particular issue within conservation areas, where planning permission is needed for demolition (as also under the former Conservation Area Consent regime). The physical presence of buildings can therefore give rise to a problem of process, where an LPA is unwilling to grant consent for a development without a field evaluation (risking losing control of the redevelopment of the site: NPPF para 136 refers), but the evaluation cannot be undertaken at the appropriate time (i.e. pre-determination). Compromises may include restricting the scope of evaluation fieldwork, or securing a staged process by condition, though both entail an element of risk, either to the preservation of remains or to the applicant, or both.

The presence of live services, or buildings adjacent to the site edge (and party wall issues), often restricts the area available for trenching.

Physical factors related to the deposits themselves include the identification of areas of past destruction, where trenching is unlikely to be useful; ground contamination, which may restrict safe working; and the depth of burial of remains of archaeological interest, which may require expensive shoring or very extensive stepped trenching to allow safe access.

Finally, in many cases parts of a development may be identified as having no potential for impact on archaeological remains. This can reduce or remove the need for evaluation of those areas. While this may reduce the overall level of understanding of the archaeological resource within the development red line (as well as reducing the actual trenching percentage), it should not reduce the effectiveness of the investigation within the remainder of the site.

A frequently cited reason for not undertaking pre-determination evaluation has been unwillingness on the part of a prospective developer to commit financial resources to evaluation where the planning outcome is uncertain for non-archaeological reasons. Close working with planning case officers has concentrated on ensuring that appropriate information is supplied with applications and that individual policy areas (such as heritage) are not disadvantaged, and this is no longer seen as a major factor.

Use of techniques

All evaluations in Worcester include a level of desk-based research. A separate desk-based assessment is often provided before evaluation, and this is a common approach both for larger sites and also in the many cases where logistical constraints make it impossible to provide a pre-determination evaluation. These desk-based assessments are often undertaken by consultants and used in discussions about the need for pre-determination evaluation. Many such desk-based assessments are very thorough, and focus clearly on research potential and the specific characteristics of the site, though there is an opposite tendency towards more generic assessments, often applying Environmental Impact Assessment methodology.

Where evaluation is undertaken without a pre-existing desk-based assessment, there is an observed tendency to minimise the level of detail given in the evaluation WSI. Where the WSI is not provided in response to a brief, this has in some cases meant that no mediated HER information was available before fieldwork started. When the desk-based research is done during the evaluation fieldwork stage, it is often much less thorough than for a stand-alone desk-based assessment, and has occasionally only been targeted at elucidating questions suggested by the fieldwork results, rather than the full spectrum of potential.

Nearly all evaluations have consisted primarily of trenching, and usually this has been the sole technique used. Use of the 'classic' grid array for trenches has been very limited (less than 5% of evaluations), with haphazard trench layouts more frequent even on greenfield sites lacking many constraints (overall average 10% of evaluations, but this has increased to over 30% of recent evaluations). In a limited number of cases it has been possible to target anticipated features (usually cropmarks or geophysical anomalies). Targeted trenching accounts for about 16% overall, though it was much more frequent in early (pre-2000) evaluations, at around 36%. By far the majority of trench evaluations, however, have been constrained by one or more factors, including nearly all evaluations within the three central zones (overall, 66%, and as high as 84% in 2000-04).

The percentage evaluation coverage has varied wildly, between fractions of 1% and over 23% (figures 30 and 31). While many of both the smallest and largest are anomalous (a large percentage might represent a single trench on a very small site) there are some very real divergences in practice. The average trench sample is 2.4%, and for the three time bands between 1995 and 2009 the average was close to this (between 2.5 and 2.9%). However the average for the small number of evaluations between 1990 and 1994 was 4.5%, and more noticeably, the average for 2010-14 was 1.6%. This last figure is skewed, however, by one large site where there has only been a first-stage evaluation (a very small sample of 0.4%). If this is taken out the average for this period is 2.38%, very close to the overall average for 1990-2014, though still well below the levels advocated by Hey and Lacey (2001).

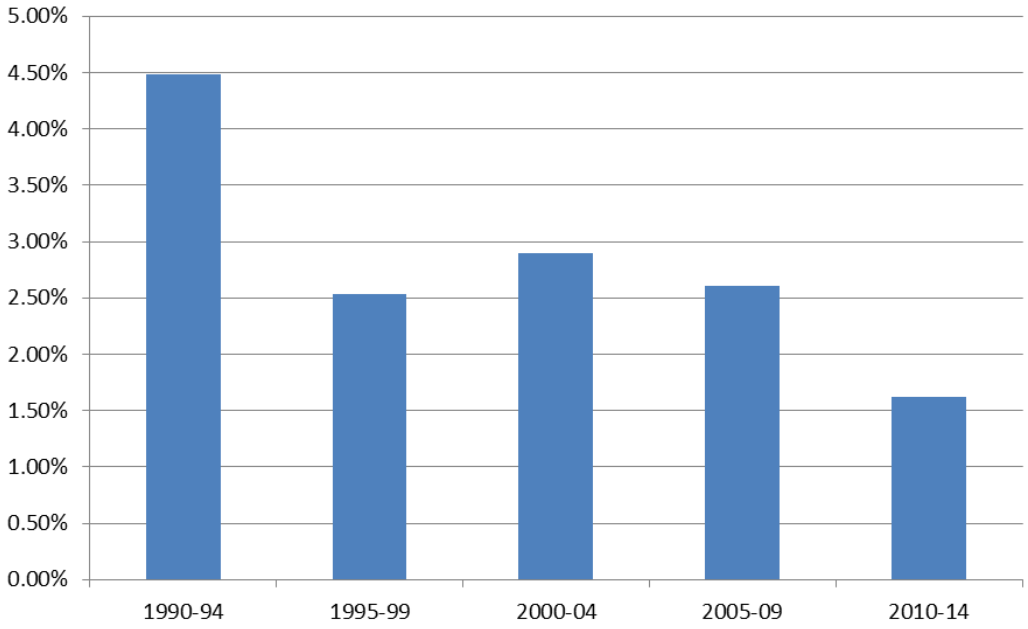

Figure 30: Evaluation trenching and percentage coverage (by time band)

In a sample of 29 evaluations from the city centre, where the issue of the full deposit sequence is most significant, some diversity of practice is apparent. In no case was the full deposit sequence fully excavated to the base of the trenches. Indeed, in nearly half the cases (13) there was no attempt to establish the full sequence (though in over half of these, where the impact was assessed as limited to the upper part of the deposit sequence, this more limited approach can be seen as correct). In 9 evaluations the deeper deposits were sampled by auger or borehole, and in just 7 by partial excavation to the base of the sequence. A clear intention can be seen to limit the extent of deeper intervention, which is of benefit both logistically and for

conservation of the archaeological resource. However this has limited understanding of the nature of, and impact on, deeper deposits.

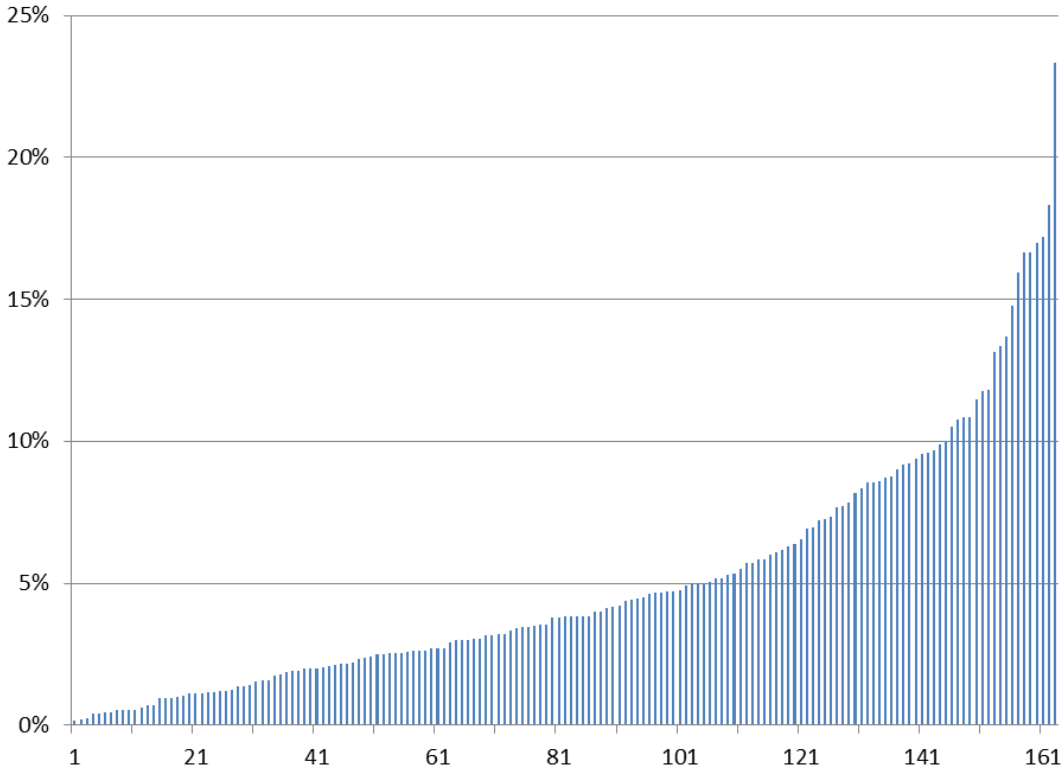

Figure 31: Evaluation trench percentages

Overall, in 32 evaluations (31 cases) other techniques apart from trenching have been used (figure 32 – use of auger holes omitted). These have comprised geophysics (magnetometry and ground-penetrating radar), other intrusive techniques (auger holes, observation of developer's site investigation), and finds retrieval techniques (fieldwalking and metal detecting). In only three of these evaluations were two additional techniques used, as well as trenching. Five evaluations did not use trenching: two of these used boreholes only (due to deep deposits) and three were based on trial pits, with no trenching. There is no clear indication that the use of other techniques has altered; although the percentage in the 1990-94 time band is much higher (36%) than the average (19%) this is based on a small sample.

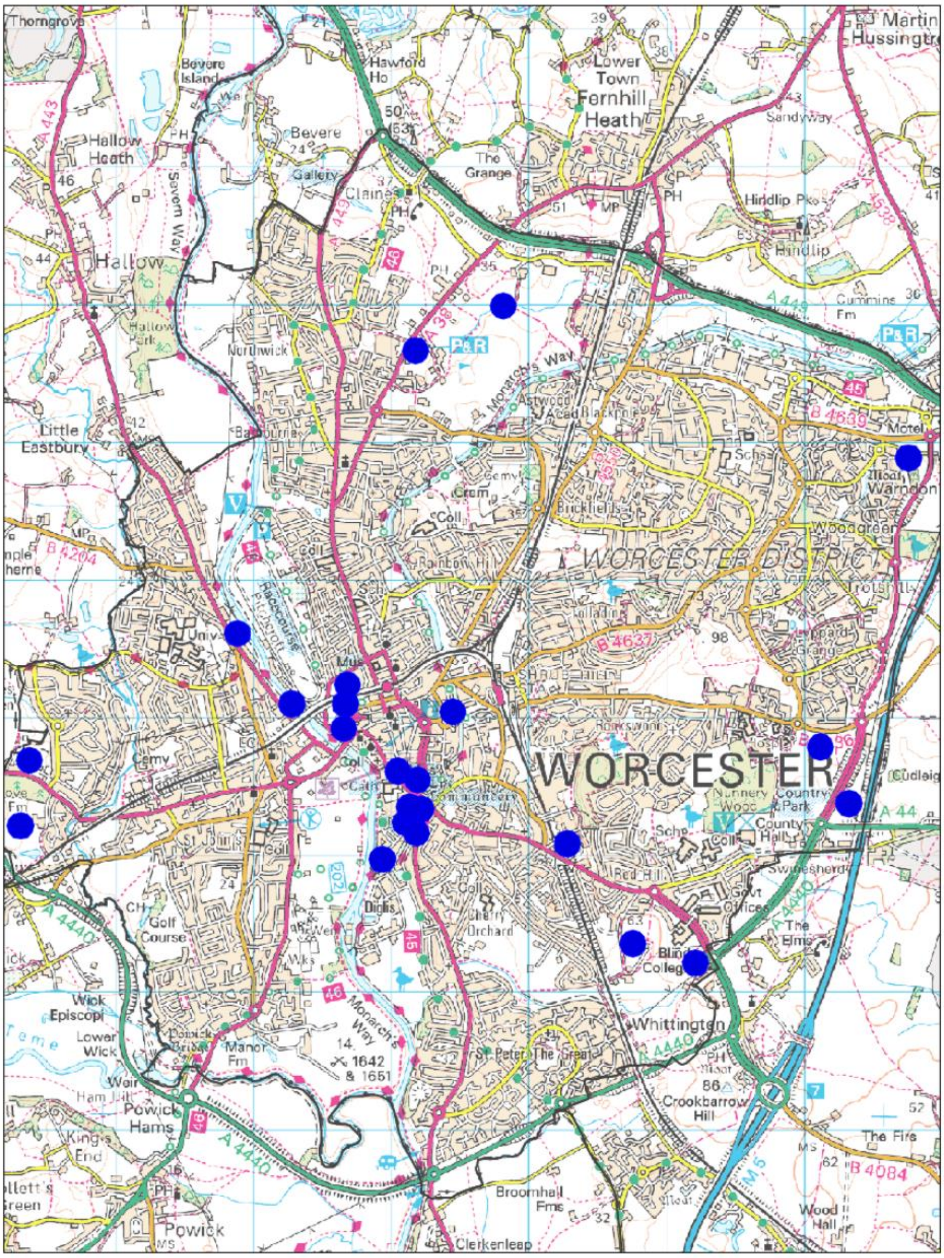

Figure 32: Use of multiple techniques in evaluation

Monitoring

In Worcester, the value of monitoring, in particular of evaluations, has not been seriously questioned. Because of the contrast with past practice in the rest of the county, it was proposed to examine this as one of the specific questions for Worcester:

> 'What is the value of site monitoring and has it changed the outcomes of projects or our understanding of particular sites?'

By default all evaluations in Worcester are monitored by City Council archaeological staff. Over 95% of recorded evaluations received at least one monitoring visit, and all of the 8 identified as not having been monitored were small in scale. This is in marked contrast to the rest of the county, where monitoring has not been so frequent. This is considered to be largely a matter of time and resources: most fieldwork in Worcester is within walking distance of the office, while

even the most distant site is only a short drive away, so a monitoring visit can usually be accomplished in an hour, sometimes less.

Monitoring has not been used so consistently in Worcester for mitigation fieldwork, and watching briefs in particular are not regularly monitored. Excavations, on the other hand, usually receive regular (often weekly) monitoring visits.

Answers to the question have to be based on case studies and judgement, as it is not susceptible to quantification.

The archaeological adviser considers that there is a significant value in having visited the site and personally seen the archaeological remains when framing mitigation requirements. This is an issue of confidence in methodologies and interpretation, and could lead to a reduction in required mitigation work, an increase, additional precautionary stipulations, or closer focusing of effort. In this respect it can be said that monitoring can be expected to lead to improvements in outcomes, through greater engagement of the archaeological adviser with the remains themselves and with the unit and staff carrying out the evaluation. However these improvements are implied and not readily measureable.

With a large number of archaeological contractors carrying out work, either the organisations as a whole or individual staff may not be familiar with local conditions, or sometimes with aspects of complex urban stratigraphy. The archaeological adviser can bring local knowledge which can contribute to the work on site, though it must be emphasised that this is not a substitute for proper briefing of the site staff by the contracting organisation concerned. On-site monitoring provides the opportunity to raise issues like this in a positive, timely and non-confrontational manner. Monitoring by reviewing reports when there has been no on-site engagement is more likely to be negative and confrontational, identifying errors rather than things which have been done well, and is of course too late for any errors in the on-site conduct of the evaluation to be addressed.

On several occasions there has been a need to increase the extent of evaluation trenching, either through the formal provisions of the brief, or more generally to allow the objectives of the evaluation to be met. This usually arises from an on-site monitoring meeting, and requires interaction between the archaeological adviser, contractor, consultant (if involved) and client. On-site monitoring of evaluation is also very important where integrated programmes of evaluation and mitigation have been secured by condition. Here the main concern is time, and rapid specification of mitigation is needed to avoid delays to the development programme. On a procedural issue, consultants usually ask for a monitoring meeting as a way of demonstrating compliance with the brief or WSI to their clients. These meetings can be very valuable in bringing together the archaeological adviser, consultant and contractor (and sometimes the client) to consider implications and make decisions on changes to the programme where needed.

Most of the above can be expected to lead to improvements in the conduct of evaluations and the quality and reliability of results, leading to benefits in the mitigation stage (for preservation and/or recording of remains) which are evident and significant if not clearly measurable. In a small number of cases monitoring can be transformative, and the two case studies which follow focus on these. Site names and the identities of those involved have been omitted from these case studies.

Monitoring case studies

City centre site

A site was proposed for a housing development encompassing part of the historic city centre as well as areas beyond. Following a desk-based assessment, evaluation consisted of trenching and a partial GPR survey. In one trench, post-medieval building foundations and medieval pits cut a layer of reddish clay and gravel which was considered by the excavators to be a natural deposit. This layer was observed by the City Council's archaeological adviser on a monitoring visit and the interpretation was challenged. Although only observed in small sondages between the post-medieval foundations, comparison of levels suggested that the layer might postdate Roman occupation levels. A similar deposit had been noted in a watching brief on an adjacent site a few months earlier and reference to the historical model for the city's development between the Roman and medieval periods produced the suggestion that the layer was redeposited and that it may have formed part of an otherwise unrecorded Anglo-Saxon rampart. This would be of major significance for the understanding of the city's development, and potentially of equivalent significance to scheduled monuments, but has not yet been tested by excavation as the site has not yet come forward for development.

Greenfield site

Evaluation of an extensive greenfield site for a housing development comprised a magnetometer survey followed by trenching. The trenching did not confirm any of the possible archaeological anomalies from the geophysics, but a thin scatter of cut features was recorded. A monitoring visit was carried out and all trenches were viewed. By agreement, the trenching coverage had been reduced from that originally specified in the brief. However, in two areas of the site the archaeological adviser felt that there was insufficient information to meet the objectives of the evaluation and frame mitigation requirements. In one of these areas a number of small, shallow and undated cut features were evident, along with two linear features. The significance of this was by no means evident; as a consequence two of the trenches were extended. Extending the trench revealed a clear pattern of postholes and a gully making up a probable building plan, along with the linear features which could be interpreted as enclosure ditches. The site was subsequently excavated and proved to comprise settlement from the late Anglo-Saxon to high medieval periods, including four structures and a series of enclosures. This is one of the first medieval rural settlement sites to have been excavated in the county and of major significance in the county context.

Evaluation and mitigation

The number of cases where the results of mitigation could be used to test the evaluation was very small, at just under 33% of the number of both evaluations and cases. This is smaller than anticipated in the project design, and a number of contributing factors can be seen.
For nearly half of all evaluations, no further work has been carried out (table 14). The following reasons were recorded:

No or very limited archaeology or archaeological potential	28
Impact judged acceptable without mitigation	18
Application refused	1
Development not yet implemented	4
Development not implemented (timed out)	26
Conditions not attached (against advice)	0
Conditions not attached (appropriate advice not given)	0
Conditions not attached (application granted on appeal)	0
Conditions not complied with	2
Total	**79**

Table 13: Reasons for no further work being carried out

In Worcester City, as this table demonstrates, archaeological advice has habitually been followed in the drafting of planning conditions, even when applications have been refused by the LPA but allowed on appeal (though planning inspectors have in some cases used different conditions or altered wording). There is a low level of refusal of permission in Worcester, with a strong emphasis on achieving improvements through negotiation, but a seemingly high level of non-implementation of approved schemes. Enforcement is an area where practice has been improved, with two cases noted where the mitigation fieldwork did not take place despite the development being implemented. The evaluations relating to the two cases cited were in 2000 and 2004, and a much more proactive approach to enforcement is now in place, though formal enforcement action has not been necessary.

In a significant number of cases (33) the mitigation recording that did take place was too limited in extent to provide for meaningful testing of the evaluation. This is very common in Worcester, especially in and around the city centre, where the aim of specifying mitigation has usually been to minimise impact and therefore to minimise the consequent need for any significant degree of recording. This has usually been achieved through foundation design in areas of deep deposits, for instance where an 'acceptable' level of deposit destruction through piling has been agreed, usually substantially less than 5% (see Historic England 2015b). In areas on the fringes of the city centre (especially in zones C and F), remains have been considered to be more vulnerable to disturbance, and it is here that the planning balance, and the public benefit of certain schemes, has led to a greater emphasis on mitigation excavation, giving rise to the cases cited in the research section below.

Worcester and the other urban centres – comparison of methodologies

The practice and results of evaluation in Worcester have also been compared with that in the other historic towns in the county. These towns are all considerably smaller, and most have also seen a much lower intensity of archaeological fieldwork of all kinds. Only Droitwich, Evesham and Pershore have datasets which can be compared in any way with Worcester.
The question posed was:

> 'Can differences be seen between methodologies used in Worcester (city centre and 19th and 20th century suburbs) and those used in the other urban centres?'

As seen above there are significant differences between the nature of archaeological remains in the defined study zones of Worcester's city centre, historic suburbs, the Roman town, and the 19th and 20th century suburbs. These have shaped both methodological considerations and the results of evaluation and other fieldwork.

Worcester's Roman town does not find ready parallels in the other three towns. Droitwich has a very significant Roman presence, but the Roman remains there are mostly specialised in nature, with a particular emphasis on deeply stratified waterlogged deposits associated with salt extraction and the consequent significance of the Roman and later settlement. Evesham and Pershore are primarily medieval small towns, and the land area and archaeological effort in both is heavily dominated by a large monastic precinct; in contrast, Worcester's monastic precincts (cathedral priory; Blackfriars; Greyfriars; Whiteladies) have seen very little evaluation, and none with significant results.

The 19th and 20th century suburbs of Worcester are much more extensive than those of the other towns, reflecting its generally greater population growth (with a limited exception in the later 20th century urban expansion of Droitwich). Recently, the Worcester suburbs have also seen more pressure for redevelopment and infill, usually for the replacement of non-residential uses with residential development. The opportunity has therefore been available for evaluation to attempt to address questions relating to the hinterlands of the Roman town and medieval city of Worcester. Of necessity this has been opportunistic. Overall, this work has shown that there is a significant potential for remains to survive in this zone, and that some of it has the potential to provide a significant understanding of Worcester's hinterland. There has not to date been any work of this nature in the other towns, though there is potential for the results of the Worcester work to inform such an approach.

Effectiveness of evaluations

Introduction

As introduced above, the size of the dataset which is usable for analysis is relatively small. Analyses which break this down into smaller units, such as changes through time, or variability across zones, need to be scrutinised very thoroughly as these units can be too small to be valid. Where mitigation recording occurs, the results of evaluation will be used to guide and target it. Because of this, there is a significant danger that the results of mitigation will tend to confirm rather than challenge the results of evaluation (with regard to the types of archaeological remains recorded). The scoring does need to be considered in this light.

Potential, significance and importance

More evaluations are now carried out post-determination and by condition, than was formerly the case, though the average scores quoted above suggest that this has not been accompanied by a significant decline in effectiveness. Figure 33 shows that the effectiveness of evaluations does seem to have increased through time, albeit slowly and not dramatically.

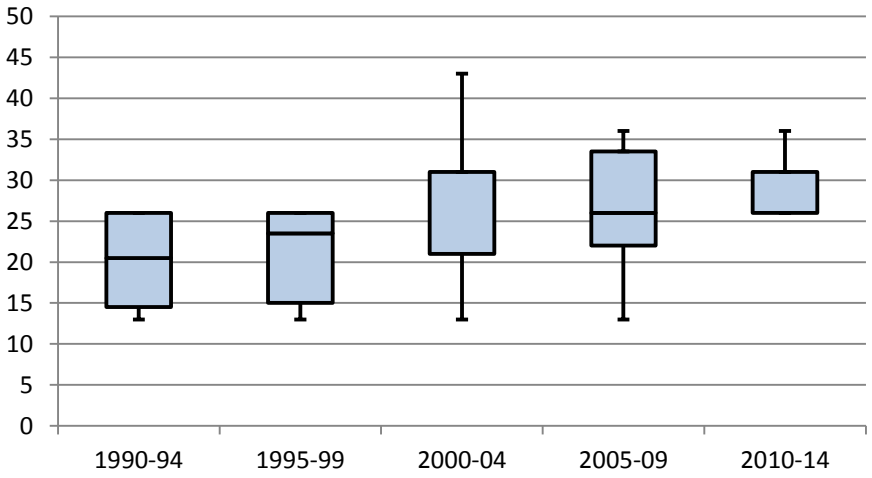

Figure 33: Scoring of evaluation effectiveness by time band

Figure 34 makes a clear case that evaluation brought positive changes in understanding of potential, with the number of sites identified as of high potential rising from 17 to 31. It should be remembered here that the dataset is selected for cases where there was assessable mitigation work, so there is a greater likelihood of potential being high. Further work was still required in a number of cases where the potential was assessed as low; this can be attributed to a low degree of confidence in the results of the evaluation.

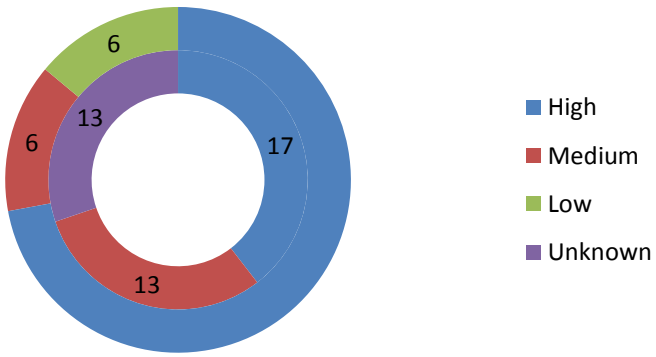

Figure 34: Assessment of potential before and after evaluation (inner ring before, outer ring after)

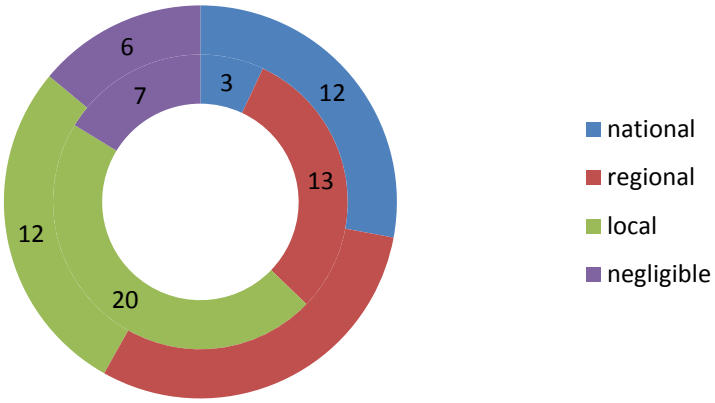

Figure 35: Assessment of significance before and after mitigation fieldwork (inner ring before, outer ring after)

Figure 35 is perhaps more telling, showing how the assessed significance of sites changed following mitigation. There was little change on sites where negligible or regional significance was attributed, while the number of sites assessed as having remains of local significance declined sharply. Only three of the cases were assessed as of national significance after evaluation, despite this level of significance being broadly equivalent to what would be required to define a 'heritage asset of equivalent significance to scheduled monuments'. This increased fourfold, to twelve, following mitigation. While the evaluations therefore provided enough evidence to require mitigation recording (bearing in mind that heritage assets of local significance will still merit consideration in the planning process), they did not provide enough evidence for an accurate assessment of national significance such as would be required to invoke NPPF para 139, at the time that that assessment could be used in that way. One caveat here is that the very act of mitigation recording, and thereby documenting the archaeological remains in detail, can in itself be the cause of a definition of national significance. This would, for instance, apply to the extensive excavated remains of the late medieval to early post-medieval textile industry at Newport Street.

Potential does not map directly to significance. Identification of high potential (figure 34) may be associated with remains of regional or even local significance. This cannot therefore be compared directly with the attribution of a particular level of significance (figure 35).

The scatter chart showing evaluation effectiveness scoring against trench percentage coverage (figure 36) suggests some surprising conclusions. The trend line based on a rolling average of scores starts to decline at about 6% coverage. Ten (nearly 25%) of the assessable cases were subject to coverage of over 6%. This is a very high level of coverage and clearly would not typically be applied to a large site; of the evaluations classified as large or very large, i.e. over 500 sq. m of trenching (figure 37), the largest trench coverage was 3.8%. Indeed most of the sites with a high percentage are extremely small. While this may accurately reflect the unpredictability of archaeological remains on individual sites, it is nevertheless concerning that evaluation of such intensity (albeit sometimes only a single trench) can give results which appear so unreliable.

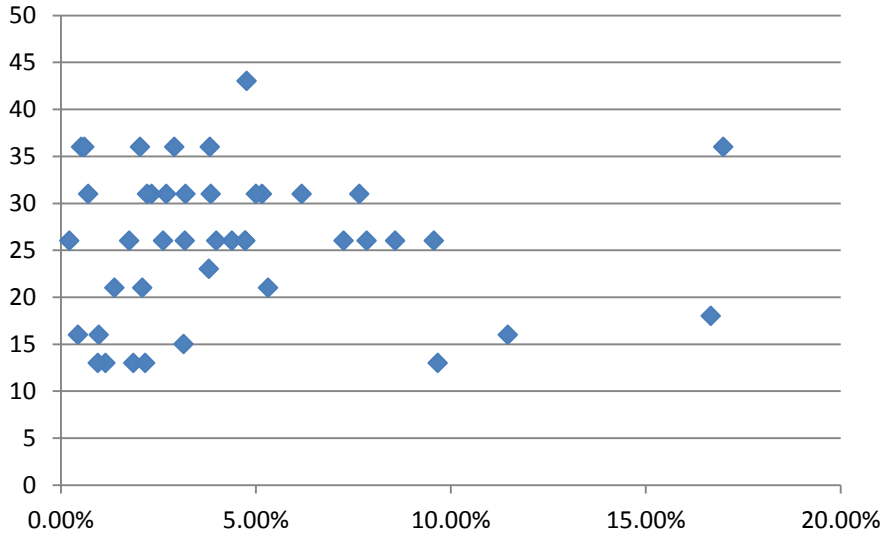

Figure 36: Percentage of evaluation trench cover and effectiveness score

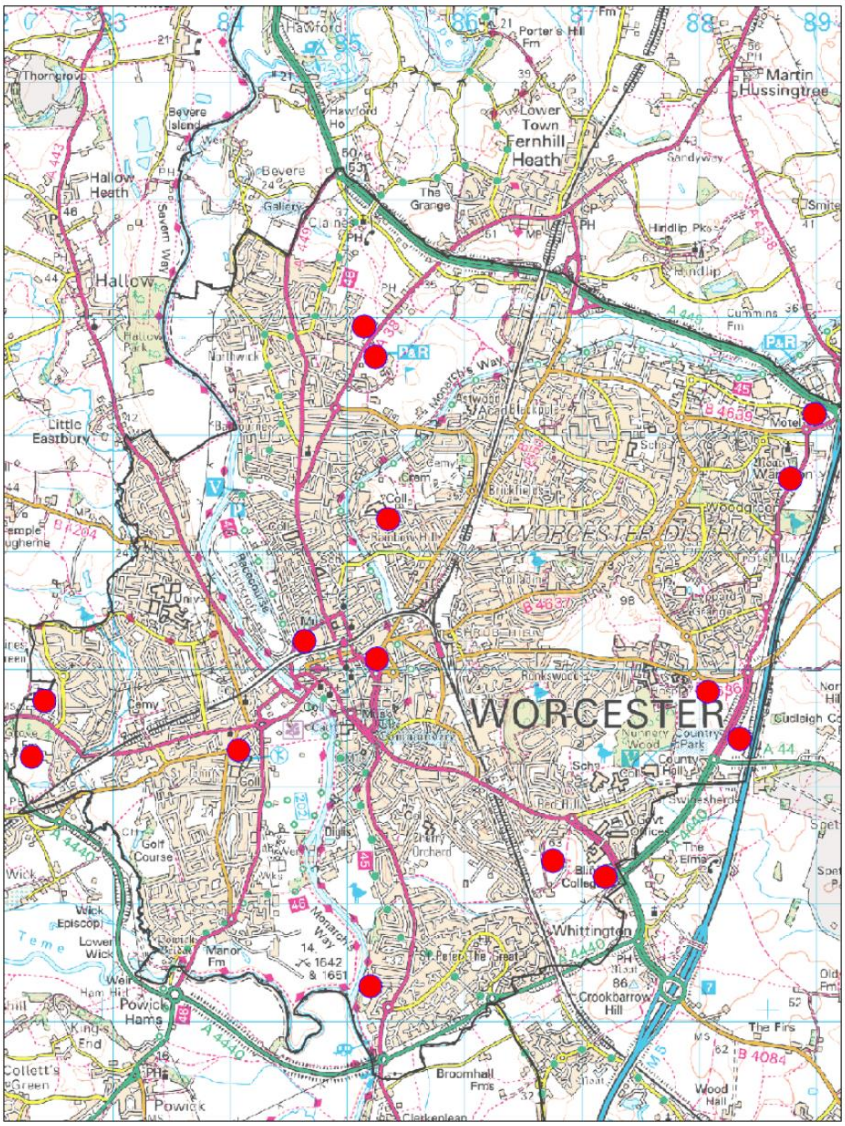

Figure 37: Large evaluations

Figure 38 shows the assessed effectiveness of evaluation by zone. There is very little distinction between the zones (max average 28.5, min average 21.9). Surprisingly the result for the northern extent of the Roman town was the lowest, though this might have been expected to be more predictable than the others.

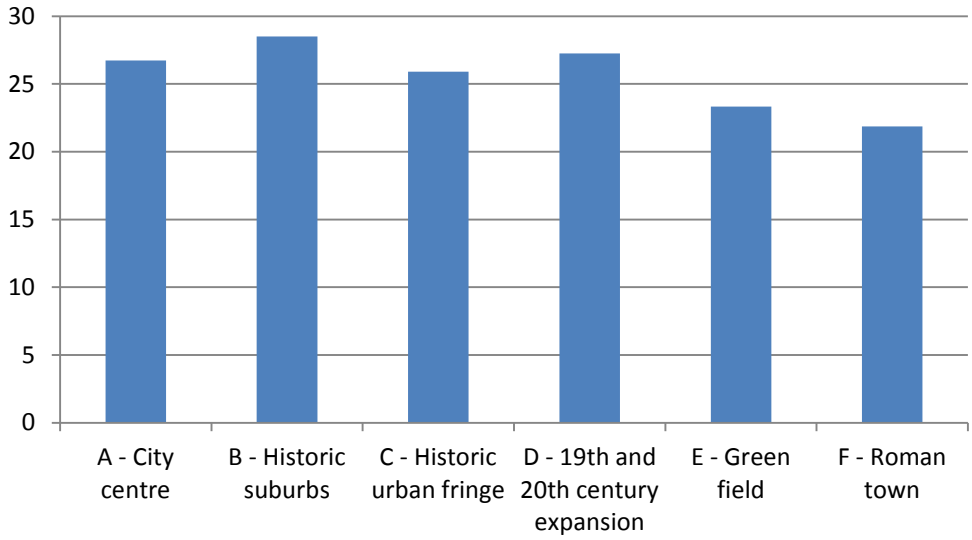

Figure 38: Evaluation effectiveness scoring by zone

5 Case studies

Case studies have been used in this project to answer specific questions (in the case of Worcester City) and to examine a number of sites where mitigation identified significantly more archaeological remains than had been indicated by evaluation (in the case of Worcestershire).

5.1 Worcestershire

The case studies for Worcestershire focus on the role of the Planning Archaeologist, and on general issues rather than specific instances. Details of three evaluation and mitigation projects follow. These have been anonymised so that the underlying themes and principles can be brought out, rather than focusing on specific problems with individual projects.

Greenfield site bounded by modern housing, 19th century pub and historic A road

Pre-application advice was followed by advice on the full planning application.

WAAS were consulted at the pre-application stage regarding a proposed residential development of *c* 50 units. Given the paucity of records for the area it was advised that a field evaluation rather than a standalone desk-based assessment (DBA) should accompany any forthcoming application:

> *There are currently no known heritage assets recorded on the County Historic Record within the proposed development area. However, the paucity of information alone points to the need for some form of archaeological assessment of the site prior to determination of any application to develop this site.*
>
> *This is emphasised in National Planning Policy Framework, paragraph 128.*

> *'In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.'*

The evaluation methodology consisted of a standard 4% sample comprising fifteen trenches laid out on a rectilinear grid array, taking account of topographic variation and obstacles.

> *A ditch and a pit/ditch terminal containing quantities of Middle Iron Age pottery were identified in Trench x. An undated posthole was also identified within the trench and may be broadly contemporary. Although these features are suggestive of settlement activity, no other contemporary features were identified during the evaluation making further interpretation impossible.*

The presence of Middle Iron Age features, although sparse and limited to a single trench, resulted in mitigation advice to excavate an area *c* 2500²m, centred on the trench containing the Middle Iron Age remains. The excavation revealed a complete Middle Iron Age multiple ditched palisade enclosure with unusual features interpreted as relating to stock management.

The Planning Archaeologist did not carry out a site visit to the evaluation. There is no reason to believe this would have altered the outcome in this case.

Water main supply route

Following the 2007 summer floods, a new 17km long water supply relief route was proposed. WAAS were consulted on the three possible options then provided advice on the final preferred route.

The route was assessed by geophysical survey followed by trial trenching, carried out by archaeological contracting organisation A, working on behalf of archaeological consultant B. In one area where Romano-British remains were known to occur the evaluation identified a number of cut features, confirming the geophysical survey results. A strip, map and sample approach along this part of the route was then advised and undertaken by archaeological contractor C advised by archaeological consultant D.

The strip map and sample investigation revealed remains of much greater significance than the evaluation had uncovered, partly because of significant under-machining of deposits by archaeological contractor A. These remains included substantial and extremely well preserved Roman stone buildings including a bath-house with walls standing to nearly 1m with painted plaster still on the walls, and a shrine or well for a spring that still held water after excavation. This site was one of the most important Roman finds in the county in 30 years. Much of the site was excavated and the pipeline was slightly diverted to avoid impacting the structural remains.

The nature and extent of archaeological remains were not established by the evaluation. Natural deposits were not tested in every trench. Some of the evaluation trenches were under-machined, and features were therefore not seen. Some of the features revealed were not adequately investigated and were misinterpreted. A trench had been excavated across the

Roman stone bath-house building but its wall had been interpreted as a medieval stone-filled drain. The report on the evaluation did not fully illustrate what had been found.

This was a politically sensitive development that was progressed with speed to guarantee water supply in case of further flooding. The changes to archaeological consultants and contractors made this application particularly difficult to manage. Although a satisfactory result ensued, the process was not straightforward. The problem arose from the initial misinterpretation of the features revealed during evaluation trenching. In relation to the effectiveness of advice, as the Planning Archaeologist did not carry out a site visit during the evaluation, there was no opportunity to assess what had been found, or to know whether a site visit could have led to earlier identification of highly significant and complex remains. On this, and other sites where poor work by contractors clearly failed to identify or interpret features correctly, a site visit from an experienced Planning Archaeologist might have made a difference.

Mill site in historic town

This was an application on a brownfield site adjacent to a small river in a historic town that is known to have significant archaeological remains of all periods and deeply stratified and well-preserved waterlogged deposits. A programme of works was secured by condition on a full planning application. The existing 18th century mill complex was appraised pre-determination, but its presence as a standing building prevented any below-ground investigation at this stage. A consultancy managed the archaeological assessment and mitigation based upon the planning advice from the advisory section of WAAS.

The advice required the recording of the existing mill structure before demolition to ground level, followed by trial trenching to determine the nature and extent of subsurface deposits, and finally mitigation excavation:

> *The proposed development will affect deposits of archaeological significance that shall require investigation and recording prior to construction. Given the nature of the site, the existing structures, some of which will require detailed recording prior to demolition, may be demolished to ground level and the site cleared to an agreed level. After which a staged programme of archaeological work will be necessary. This will entail trial trenching to establish extent, preservation and depth of surviving archaeological deposits, followed by targeted excavations.*

After the existing buildings had been recorded, they were demolished and a series of trial trenches was excavated. These identified deposits of archaeological significance, but the nature and extent of these deposits were not fully determined. Due to development pressures it was agreed to commit to excavation without analysing and writing up the evaluation. This is not an uncommon practice, especially where preservation in situ is not an option, but it can mean that insufficient attention is given to reviewing the results of an evaluation.

A project design for the excavation of an agreed area was submitted and approved. The excavation uncovered deeply stratified and exceptionally well preserved remains of a succession of mill buildings dating back to the 14th century, with associated waterlogged palaeoenvironmental deposits of the highest quality. This possibility could have been predicted based on information available in the HER, but it had been assumed that later canal construction would have removed a lot of the earlier archaeology.

The problems of dealing with significantly deeper and more complex archaeological deposits than anticipated were compounded by challenging ground conditions in winter (the river-side

site had flooded) and an unrealistic time programme. The latter stages of the excavation were rushed before any development began on site, and consequently the most significant deposits were not adequately recorded.

The excavation report drew the following conclusions:

- *By not completing the evaluation report it is felt that the potential of the site and complexity of the area was not fully established early on. This obviously had implications during the excavation which proved far more complex and extensive (both physically and temporally) than had been thought.*
- *It was also felt that, by confining the excavation into the set building programme, this limited the available time on site, as it hampered the reassessment of the excavation strategy in response to the increasingly complex stratigraphy under difficult excavation conditions.*
- *By confining the excavation area to the limits of the proposed new building footprint and, therefore, to the impacts of the new build, the interpretation of the structures became impeded. Although on many excavations this method is often employed, for watermills the buildings and structures are inherently linked and can only be fully understood in association with more extensive water management systems. By only focusing on the main mill building, this focussed archaeological attention on where truncation and disturbance was potentially at its greatest, and limited the chance to offset this by understanding better the integral and evolving water management systems over time. However, the wider area beside the watercourse has not been impacted by the new build and may, therefore, be investigated during any future development. Though it can be suggested that, in future, excavation at mill sites should deliberately include the wider area around the mill building itself, so that more associated structures (channels etc.) can be investigated in greater detail.*

From an archaeological research perspective, the excavation of a wider area as suggested by the contractor would undoubtedly have clarified the sequence identified in the mitigation excavation. However, the very considerable expense would be difficult to justify in a development-led context. Mitigation excavation of an area not affected by the development could not easily be argued to be proportionate or reasonable.

Ideally sites of this potential would always be evaluated pre-determination, but the existing buildings made this difficult. The Planning Archaeologist should have made it clear from the start that archaeological deposits had the potential to be highly complex and well preserved. The desk based assessment provided by the consultant indicated 'moderate' potential due to the possible truncation by later buildings and canal construction, but the potential should always have been identified as high, given the known depth of complex, water-logged deposits elsewhere in the town and the known existence of at least one earlier mill on the site. The Planning Archaeologist should have ensured that the developer programmed enough time to deal with the archaeology properly, rather than allowing the development programme to dictate the time spent on the archaeology. The LPA has the power to issue a stop notice, or similar, to ensure that the development does not proceed until the archaeological works are completely satisfied, but politically this is challenging to achieve. With hindsight, the developer

should have been made aware from the outset that the evaluation could not start less than 2 months before the proposed commencement of site works.

5.2 Worcester City

The question posed in the project design was:

> 'How has the research framework influenced the archaeological mitigation strategy and how will the results of that mitigation influence the evolution of the research framework in the future?'

This has been refined into a series of more detailed questions for Worcester City:

- Has the increased emphasis on the evaluation of sites based on an assessment of predicted archaeological character led to an increase in unexpected discoveries?
- How have formal mitigation strategies and other approaches been used and what has been their impact?
- To what extent have the research priorities identified before or during evaluation been addressed in mitigation?
- To what extent have new research priorities been identified during mitigation (either new to the site, or new to Worcester) and how have these been accommodated?
- What are the effects of the policy of directing mitigation recording requirements solely to impact areas, on the resulting archaeological understanding of the individual site or the wider area?
- How have issues relating to the use of multiple contractors on one site (usually consecutively rather than simultaneously) been managed?

These are explored through case studies and a wider discussion.

Development and maintenance of the research framework

In numerical terms there had been very few archaeological interventions in Worcester before 1990, although the preceding quarter century had seen some large excavations (Sidbury, Blackfriars and Deansway), as well as the smaller-scale but nevertheless influential work along City Walls Road and at Lich Street and Broad Street. All of these were development-related. The review volumes by Barker (1969) and Carver (1980a), and Baker and Holt's synthesis of the city's development (research carried out in the late 1980s and early 1990s, part-published as Baker *et al* 1992, but not fully published until 2004) combined archaeological and historical understanding, and set a research agenda which has been refined rather than overturned by the results of more recent work.

The creation of the Worcester Urban Archaeological Database (now HER) from 1998, followed by the publication of the *Archaeological resource assessment and research framework* (Worcester City Council 2007a), have allowed for greater consolidation of the results of earlier work. Most importantly, this process created a well-structured and academically robust framework for archaeological understanding at a time when the amount of fieldwork taking place was increasing to unprecedented levels. The 2007 research framework set out 155 Research Priorities to be addressed through archaeological work in the city. These vary from overarching multiperiod or cross-period themes to some priorities which are specific to individual sites.

It should be noted that the publication of the regional research framework (Watt (ed) 2011) came very late in the study period.

Resourcing has not allowed for the initially-proposed 5-year review of the research framework, though there is some provision for more informal development, as additional research priorities are added from time to time. This process has, to date, added an additional 28 research priorities to the original 155.

Assessment and review

This project has provided an opportunity for a review of the contribution of planning archaeology as measured against the research priorities set out in the RF, and approached through consideration of five site-based and two thematic case studies.

The strong emphasis on reducing or eliminating development impact on archaeological remains (as seen in the number of mitigation projects where the scale of recording was insufficient to allow the evaluation to be judged) has in itself reduced the impact on the research framework. Many of these sites are small, and the use of the research framework priorities has focused attention on defining the contribution these sites could make in the future if there is an opportunity for further work.

Broadly, the review indicates that the detailed local research framework is vital for the cost-effective and timely formulation of priorities for development-related casework. This is particularly the case for large and complex developments, where unexpected discoveries are more common. Often these developments lead to complex evaluation and mitigation over several years, sometimes with multiple archaeological contractors. In the case of the former Royal Worcester factory site four archaeological contractors have been involved over a period of 11 years (to date), in seven phases of evaluation, fifteen separate watching briefs and one excavation. At Lowesmoor Trading Estate, two archaeological contractors have been involved, with three phases of evaluation, eight phases of watching brief, and five excavations.

The potential implications of this complexity are wide-ranging. It should be stressed that the comments which follow are generic and not intended to be applied to the cases mentioned in the previous paragraph. Issues include differences in personal and organisational knowledge, understanding and engagement, recording, finds retention and sampling policies and practice, analysis methods and report formats. This may lead to a fragmentation of effort and understanding which can occasionally be fundamental and catastrophic. Finding a place for synthesis in the development process is often challenging, but it is rendered much more difficult in these complex cases. Given the input of time from the archaeological adviser and others, the impact of these issues can be reduced, but such time input is rarely available. The archaeological adviser should certainly work to ensure that fieldwork meets the agreed specification, but it is unclear whether 'tidying up' of fragmented fieldwork is a legitimate cost to the Council taxpayer.

Research case studies

In a small number of developments a combination of direct public benefit, other heritage benefits (for instance the reuse of historic buildings, or the recreation of built townscape on former surface car parks), and the needs of the developments themselves, has weighted the planning balance in favour of permitting developments with greater impact on archaeological deposits. Many of these sites are around the edges of the historic city. In this area, where remains are not deeply buried and the significant stratigraphy may itself be quite thin, the remains may be very vulnerable, and the feasibility of preserving remains *in situ* may seem low. Particular issues are that the significant remains are not deeply buried; that the remains are in themselves not deeply stratified, making them vulnerable to total destruction; and some of the sites are sloping, giving rise to engineering challenges.

Four large developments in this category – The Hive, The Butts; Royal Worcester Porcelain, Severn Street; Lowesmoor Trading Estate (St Martin's Quarter); Newport Street – have been used here in an attempt to clarify the impact of the Worcester Research Framework on the conduct of the site work, and the impact of the results of that work on the research framework.

All four developments necessitated substantial amounts of ground disturbance and related mitigation recording. While at the time of writing only Newport Street has been fully published, there is sufficient material from grey literature reports, assessment reports and draft publications to allow a detailed assessment of their impact on understanding. In all four cases a very broad spread of research objectives was defined at the outset, and this was refined and developed during the course of fieldwork and analysis.

One further site-based case study has been used: the former Government oil depot site at Bath Road, south of the city.

Two other case studies relate to topics. One is a period-based topic: the Roman town, the other subject-based: the defences (principally the medieval and Civil War defences, though the Roman and Anglo-Saxon defences have also been the subject of recent work). More detail on all case studies is given in Appendix E.

The Hive, The Butts

Apart from the medieval city wall and ditch, there was very little archaeological knowledge of the site before evaluation. Early-stage evaluation was limited in extent to small trenches excavated and backfilled in a single short day so as not to impede the site's use as a depot. Later evaluations were more extensive. Mitigation was very extensive, comprising excavation of a large part of the footprint of the new building as well as watching briefs over a wide area. The site contains significant remains of the Roman, medieval and post-medieval periods. Analysis of the results is largely complete and report writing underway. Reporting through a digital monograph and summary journal report has been agreed.

At the start of the evaluation process, the Worcester Research Framework was under development. Eight Research Priorities were included in the first brief written for the site (desk-based assessment, 2005), and a further six added after evaluation (mitigation WSI, 2008).

The Research Priority list for this site is short, but the level of contribution made by the fieldwork is very high. Fieldwork, although extensive, was tightly focused on the priorities defined for the mitigation programme; for some parts of the site this has restricted the understanding of part or all of the sequence. However, in post-excavation it was possible to identify, and partially address, some further research issues which had not been identified on site. These relate mainly to detailed analysis of artefacts and ecofacts.

Royal Worcester Porcelain, Severn Street

The site crosses zones and includes a substantial length of the city wall and ditch as well as medieval street frontages. Roman remains were also anticipated, and there was an expectation that the site's documented post-medieval history would be accompanied by significant buried remains. Overall, the site contains significant remains of the Roman, Anglo-Saxon (not fully defined), medieval and post-medieval periods.

Early evaluation was extensive, though constrained by standing buildings. Further phases of evaluation were carried out later. Mitigation to date has comprised watching briefs and some

very limited, highly targeted excavation; fieldwork is ongoing. The nature of archaeological remains across the site is very variable, while the development has been split into multiple small phases, with individual mitigation strategies developed as needed. One part of the site ('area C') was subject both to the two early phases of evaluation and two later phases as part of a mitigation programme designed to preserve a medieval church, burial ground and the city wall *in situ* as far as possible. This is thought to have been successful in its aims.

Reporting reflects the fragmented nature of the fieldwork, its limited extent and (mostly) limited results, and has comprised grey literature reports only. Four contractors have worked here since 2004; most of these have engaged fully with the archaeological potential of the site and have been able to build meaningfully on the work already carried out.

At the start of the evaluation process, the Worcester Research Framework was under development. The Research Priority list used in analysis is taken from the 2007 evaluation brief. Two points arose from discoveries made during the 2005 evaluation, but all other points in this very long list (which reflects both the extent of the site and the very wide variety of anticipated remains) were foreseen in early consideration of the site, though not formally documented at the time.

Notably the results from mitigation have so far been much less significant than those from evaluation, again reflecting the very limited extent of mitigation fieldwork so far. No new Research Priorities have been added during mitigation. However, areas of the site which have not yet been developed are expected to yield more significant results in future mitigation phases.

Lowesmoor Trading Estate (St Martin's Quarter)

The site had been subject to two previous phases of evaluation, in 1990 and 2002. One substantive phase of evaluation took place later. Mitigation comprised extensive watching briefs, most related to impacts which were not fully identified or quantified early on. There were also targeted excavations at three locations, widely separated across the site; again, the largest of these was associated with an impact which had only been identified in outline early on (a very large flood attenuation tank). The site contains significant remains of the Roman, medieval and post-medieval periods; the distribution of these is very variable, concentrated towards the west and north (in a medieval suburb) and south-east (19th century porcelain works). Grey literature reports have produced for the evaluations, but all other fieldwork has reached post-excavation assessment only. A digital monograph and summary journal report are anticipated.

The Research Priority list is taken from the mitigation brief (2009, post-evaluation) but all of the points were anticipated in the desk-based assessment brief (2006). Evaluation and all subsequent fieldwork were undertaken using the published Worcester Research Framework and most Research Priorities were available through the whole process (from 2006). The early phases of evaluation took place in the absence of any formal research framework.

Again, the Research Priority list for this site is short, but the level of contribution made by the fieldwork is very high. This is in spite of the fragmentary nature of the fieldwork, over a wide area; one of the excavations and some of the watching brief work were less successful for this reason. The contribution of fieldwork to answering Research Priorities may reflect a very high level of engagement of the archaeological adviser in the fieldwork programme – the developers did not engage a consultant. Most of the remains which featured significantly in the mitigation had been identified in evaluation, and little was unexpected or new at this stage.

Newport Street

The evaluation, based on trenching and borehole monitoring, was rated as the most successful of the 43 assessable cases. Mitigation comprised a large-scale partial excavation of the whole site (upper levels) with the deeper levels largely preserved in situ below the construction. The size of the excavation necessitated a partnership between two archaeological contractors to meet the development programme. Only very limited and localised investigation of the deeper levels took place, forming part of the mitigation package to compensate, in part, for the extensive impact of piled foundations across the site. The site contains significant remains of the Roman, medieval and post-medieval periods. A printed monograph report has been published (Davenport 2015).

Fieldwork took place during the early stages of preparation of the Worcester Research Framework. Consequently only an incomplete set of Research Priorities was available, and the research focus of the excavation was set by a site-specific set of research aims which developed during the fieldwork. During post-excavation, these were mapped to the list of 25 Research Priorities used here.

The list of Research Priorities is long and the results demonstrate a high level of contribution from the fieldwork. Several were not addressed, but these mainly relate to understanding of the natural topography of the site and earlier periods (Roman), which were only investigated to a limited extent.

Former Government oil depot, Bath Road

This is a smaller site which has nevertheless produced a significant research dividend for Worcester, while demonstrating a total mismatch between the anticipated archaeological remains before evaluation (from a desk-based assessment based on the HER), after evaluation, and after mitigation excavation.

The site was archaeologically unknown before evaluation, and is an example of a site where assessment of predicted archaeological character was important. It is close to a Roman road line, and desk-based assessment also identified potential for Civil War remains. Access for pre-determination evaluation was not possible. Consequently evaluation was secured by condition, and both a second phase of evaluation and mitigation followed rapidly. Evaluation comprised trenching of accessible areas. Mitigation comprised total excavation of most areas not affected by the very large mid-20th century tanks which occupied much of the site, as evaluation found extensive remains and it was considered unfeasible to preserve these *in situ*. The site contains significant remains of the prehistoric and Roman periods.

All of the fieldwork took place late in the development of the Worcester Research Framework.

Neither of the two Research Priorities identified at desk-based assessment stage featured in the results of fieldwork; in fact, given the extensive nature of the mitigation, both can be judged to be absent from the site. Evaluation added two further Research Priorities. Excavation added a further 15. This reflected the discovery of unexpected remains of both early and late prehistoric activity. A high level of engagement from the archaeological adviser was needed, given a requirement for rapid decision making, but there was no reasonable possibility of securing preservation *in situ* at a late stage in the development process.

The survival and state of preservation of archaeological remains on this site was significantly better than had been predicted before evaluation, although clearly compromised by large-scale intervention for the fuel tanks.

Roman Worcester (figure 39)

Worcester has long been known as an extensive Roman settlement, and since Barker's work in the 1960s it has been clearly understood that this extended well beyond the area understood to be enclosed by defences (which largely coincides with the core of the medieval town). Where the Roman remains are buried below the medieval city, they are hard to access and have only been seen to a significant extent in larger excavations, where they are often severely impacted by later activity (as, for instance, at Deansway; Dalwood and Edwards 2004). To the north of the city wall there is an area where there was effectively no occupation from the end of the Roman period until the 18th century. Here there is potential to retrieve extensive information on areas of Roman Worcester which have not been subject to the impact of medieval occupation. This is the area identified as Zone F for the purposes of the current project.

One significant aim for the understanding of the Roman town is to attempt to define the extent of occupation. This will be of benefit not just in providing a spatial framework for understanding the town and how it functioned, but also in prioritising protection of remains. Evaluation and mitigation have been very important in addressing this through the identification of both the presence and absence of Roman deposits and finds. However, even within a recognised area of settlement or industrial activity there can be areas which are completely blank. The Hive project is a good example; here, an area of intensive activity along a street was immediately adjacent to a large apparently empty area, certainly devoid of Roman remains when excavated.

More recent evaluations on sites to the north of the known Roman occupation areas, at Worcester City FC and White Ladies Close, have shown how unexpected discoveries in areas which were previously poorly understood can transform understanding.

A second significant aim is to understand the variability to be seen within the Roman town, including these apparent blank areas. Again, evaluation (at a fairly low level) and mitigation (often at a very detailed level over sizeable areas) have been very important in achieving this aim. It is clear, overall, that the most significant advances have come from large-scale mitigation. Conversely, smaller interventions (including very fine-tuned mitigation) can also make a significant impact, but generally only within a framework provided by the larger sites. Significantly, it is apparent that fieldwork carried out since the first drafting of the research framework has been more focused and successful in achieving in meeting research objectives than earlier fieldwork.

1990-2014 has seen substantial redevelopment of eight medium or large sites within the zone covering the northern part of the Roman town, making up the bulk of the 20% of this zone which has been addressed by evaluation. Taken along with other developments in this zone, especially in the 1970s and 1980s, relatively few new opportunities for large-scale intervention are anticipated. Information from individual sites over 25 years has been crucial in taking understanding of Roman Worcester to a new level, and will be cemented by the anticipated publication of several of those sites. Advances in some parts of the town may now come more from re-examination of existing archives, and comparison work across different archives, rather than from new fieldwork. In this respect, important results can be expected from the Roman Rural Settlement Project, specifically the added project focussed on small unwalled towns, for which data was supplied from the Worcester City HER in 2015.

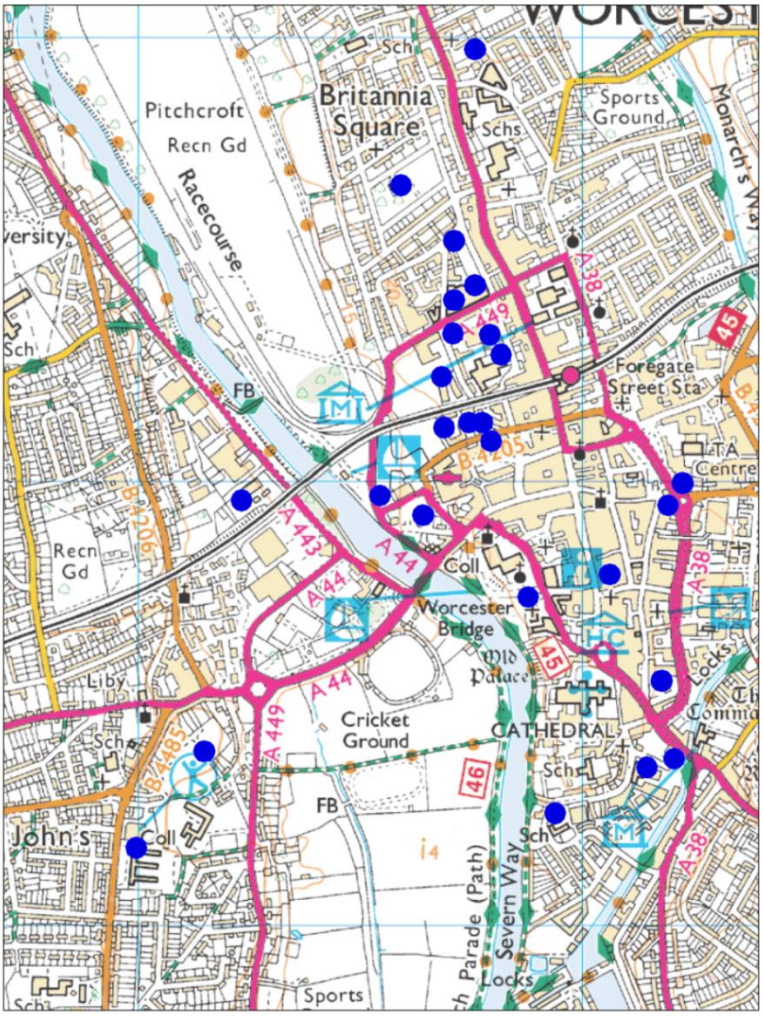

Figure 39: Evaluation and the Roman town

Defences (figure 40)

Over 15% by area of the historic city zone is occupied by features related to defences: Roman, Anglo-Saxon, medieval (including the castle) and Civil War (Dinn 2012). It is therefore to be expected that a significant proportion of evaluations in this zone would address defensive features. However the proportion which has done is unexpectedly high: 30 of the 36 evaluations in the historic city zone (83%) addressed at least one aspect of the defences. These comprised Roman (1), Anglo-Saxon (2), and medieval (28, including 1 negative and 7 relating to the castle). There were only 2 specific instances of Civil War defences as a separate consideration, though as these included the refortification of the medieval defences it is acknowledged that Civil War defences could occur anywhere where there are medieval features.

Evaluations in the medieval suburbs (zone B), the historic urban fringe (zone C) and the northern part of the Roman town (zone F) – all outside the medieval defensive zone – also addressed the Civil War defences. In zone B there were 2 positive and 2 negative instances; in zone C there were 10 negative instances; and in zone F there were 2 positive and 4 negative Civil War instances. The cumulative impact of these evaluations, and of a number of mitigation interventions, has been to give Worcester's Civil War defences a firm physical presence which had been quite absent in 1990.

Unlike other aspects of the archaeology of the historic city, work on the defences concentrates on a small number of known monuments whose existence and nature are already relatively well

understood. This lends itself to synthesis, and it was in this light that a short paper was produced to summarise the contribution of recent fieldwork to understanding of the defences (Dinn 2012). This aimed to build on the research framework to provide a more detailed understanding.

Evaluation and other fieldwork has enhanced understanding of the survival and condition of the wall and other features as well as identifying internal and external earthworks. Occasionally, inherited knowledge of the location and alignment of features has been challenged (eg at Royal Worcester Porcelain). Evaluation of the medieval and Civil War ditch at The Hive led to a mitigation programme including the first ever archaeologically excavated section across the ditch. Overall, however, in spite of the large number of interventions, the constrained scope of evaluation fieldwork has limited the impact on new understanding of the main defensive system. The use of mitigation strategies has had a strong focus on preserving remains of the medieval defences, and the extent of mitigation fieldwork has been correspondingly very limited in most cases. While there are still some opportunities in this zone, mainly for mitigation on sites which have already been evaluated, the potential for otherwise uninvestigated sites to come forward along the city walls is now quite restricted, partly because of the scheduled status of much of the defences, but more because most available sites have been developed.

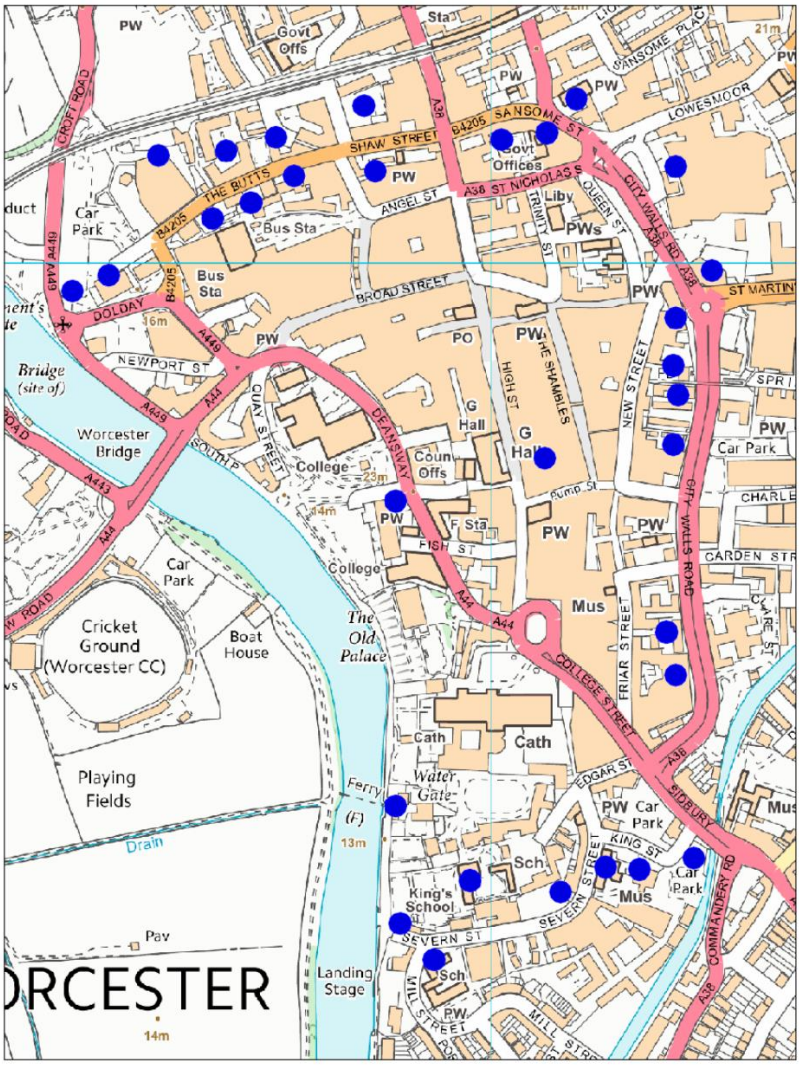

Figure 40: Evaluation and the city defences (Roman, Anglo-Saxon, medieval, post-medieval

Discussion

The Worcester Research Framework has had a profound impact on the conduct of archaeological mitigation in the city over the past decade. Mitigation strategies for individual sites have been developed to address its provisions. A feedback loop is evident, whereby the results of investigation have influenced the development of Research Priorities, both during the initial development of the research framework (2004-07) and subsequently. Framing of new research priorities, where appropriate, has been encouraged through engaged monitoring by the archaeological adviser.

The structure provided by the research framework has provided to be both robust and flexible in specifying mitigation. Perhaps the least successful application has been in cases where mitigation requirements have been too closely fine-tuned to impact areas, and archaeological investigation has been fragmented and small-scale. In these cases the results of mitigation have usually not contributed significantly to understanding.

Engaged monitoring and continuity on the part of the archaeological adviser and archaeological consultants has been important in the rare cases where multiple archaeological contractors have been involved on a single site.

Evaluation of sites based on an assessment of predicted archaeological character has certainly led to unexpected discoveries in some areas. There is insufficient evidence as yet for any widespread effects, but the two sites cited in the Roman discussion indicate the potential. Both were chosen for evaluation based on such an assessment: Worcester City FC is in the valley of the Barbourne Brook, where remains of the prehistoric and Roman periods have proved to be widespread, while White Ladies Close is near a probable Roman road. However, neither site had previously shown any specific indication that Roman remains were to be expected.

6 External consultation

Consultation with archaeological contractors and consultants who regularly undertake archaeological work in Worcestershire was undertaken as part of the project, in two stages, starting with a written questionnaire. This detailed the aims and objectives of the project and posed the following questions:

1. Are there any questions not laid out in the project design that you feel we should be exploring?
2. Are the generic briefs adequate and do they lay out what is required of you as a contractor/consultant clearly enough for you to develop a WSI?
3. Do you feel that phased programmes of work are effective? If not, why not?
4. Do you think that current evaluation strategies are effective?
5. Are there other methods of surveying etc. that could be employed to assist in identifying sites, particularly those of prehistoric date?
6. Do you have any comments on the development control process in Worcestershire as whole?

Following the written consultation, a workshop was held on 2nd March 2015 to which all interested parties were invited: archaeological consultants, archaeological contractors, Planning Archaeologists, architects and planning consultants. The questions posed at the workshop were:

1. How valuable are research frameworks (everything from regional to local and specialist)? Do you use them to inform your project specifications, on-site practice analysis or discussion? If not, why not?
2. From your experience of the curatorial process, please identify and outline examples of good practice from the inception of a project to deposition of archive. If there are some very common bad practices, please list these as well (no names needed).
3. How effective are phased programmes of work in evaluating sites? Please think about this from two perspectives: the developer (cost, reduction/increase in risk) and archaeological understanding and the management of the historic environment.
4. Anyone can find a Roman settlement on gravel. What techniques, in your opinion, are most likely to be useful in evaluating sites of structure and finds-poor periods such as most of prehistory or post-Roman, on a range of soils and geology?

An audio recording was made of the workshop discussion, and written responses from groups and on post-it notes were collated. A transcript of the recording forms part of the project archive.

The consultation response was good and several key themes were raised:

Communication

Communication is a point which was raised on a number of occasions during both parts of the consultation and revolved around the communication between consultants/contractors acting on behalf of the developer and Planning Archaeologists. One of the concerns raised was the reduction in monitoring site visits during recent years to 2015 resulting from pressures on resources and capacity. Due to funding cuts, it had been necessary to introduce a sliding scale of fees (based on size of development) which are paid by the developer and while these fees do include some monitoring visits, they are generally charged at an extra cost. It was felt that this had had an impact on how mitigation strategies are designed, particularly in relation to phased programmes of work. A point was also raised about feeling 'on the leash' as a field archaeologist when lines of communication are between the developer/archaeological consultant and the Planning Archaeologist, omitting those carrying out site work.

To combat this, it was suggested that pre-start meetings should be carried out with all parties to discuss the scope and design of the archaeological strategy. In the case of large sites, these meetings are already carried out; however, it may be possible to ensure that these are carried out on more modest developments. From a Planning Archaeologist's point of view, establishing clear lines of communication at the start of projects may go some way towards reducing the feel of disconnect between the field team on site and the Planning Archaeologist. This does need to be a shared responsibility, however, and to be considered as a topic for inclusion in WSIs and agreements with developers. In the case of large developments it may be necessary to accept that communication will go through a third party such as a consultant.

Research frameworks

In general it was felt that research frameworks are valuable tools which can help to provide context and assist in determining more site specific research questions. However, some responses seemed to suggest a reluctance to use them and referring to them is seen more as the responsibility of the Planning Archaeologist rather than the contractor or consultant. Other responses signalled that they have been used in specifications/WSIs although they are only used in on site practice if specified in the brief. A valid point was raised regarding the lack of regular updates for some research frameworks, as some were significantly out of date. In general, responses indicated a favourable view of research frameworks but perhaps some confusion over who should set the research questions and at what stage. This will be considered further in relation to the forthcoming strategy document.

Phased programmes of work

Respondents considered that phased programmes of work are effective in providing a strategy early on in the project which can inform associated processes and funding. A well-designed programme of works can provide clarity and understanding of the heritage assets on site which can inform subsequent approaches to the work. However, some noted that this can cause issues with costings as methodologies are altered over the course of a project. Other issues which may arise include later stages being carried out before the reports of previous work have been prepared, overtaking the post-excavation analysis. Other points which were raised included the importance of ensuring that programmes of work are designed on a site by site basis rather than a one size fits all approach. An example was given with reference to evaluations in the core of historic towns – should this go straight to excavation?

Phased programmes of work can be complicated and in the case of major developments, can take a number of years to complete. Many of the issues raised are valid and steps could be taken to ensure a smoother operation of these phased programmes of work where they are deemed to be necessary. This includes working with the developer to establish what such programmes of work can mean in reality, and ensuring that the fluid nature of archaeological fieldwork is understood. However, this is the responsibility of all within the sector and not just Planning Archaeologists.

Evaluation techniques

Generally speaking, the responses seemed to indicate that the current evaluation techniques are adequate although with the necessary caveats of ensuring that staff are adequately trained and qualified. The consultation also asked if any additional techniques could be applied to assist in evaluating sites of structure- and finds-poor periods such as most of prehistory and post-Roman/Saxon. A number of suggestions were received including an increased sample size as suggested by Hey and Lacey (2001) and more consideration of geomorphology. Non-intrusive methods such as metal detecting, stream walking and the possibility of sieving topsoil were also suggested. Many of these suggestions are valid and could be applied on a site by site basis as they depend on soils/geology and the current land use of a site. It is interesting to note that many of the suggestions were also echoed by the Roman Rural Settlement project, particularly regarding metal detecting.

Several responses both to the questionnaire and workshop were concerned with the perception of developers that a blank desk based assessment and/or geophysical survey negates the need for further work. There was also a concern that only positive results of geophysical surveys were targeted by trenching and blank areas signed off. Although this may have happened in Worcestershire in the past, practice has changed and there is now consistency in the advice provided by the Planning Archaeologists within the Advisory team. It is recognised that consistency of advice across the county is vital in changing the perceptions of all parties.

Quality of reports

Several points were raised both during the workshop discussion and the written consultation about the quality of desk based assessments and evaluation reports. It was felt that too many DBAs do not provide an adequate assessment of the site and just present results from a HER search. DBAs can be powerful tools in providing the background not just to the archaeological potential of a site but also to soils, geology and topography. A good DBA allows the Planning Archaeologist not just to assess the potential and wider context of the site but also to design a suitable archaeological strategy. In addition, evaluation reports were not considered to provide enough information particularly when carried out as part of a phased programme of works. This is something which was observed during the data gathering phase of this project with reports of earlier evaluations from the 1990s appearing to provide more context (in relation to both background and research frameworks) and interpretation than more recent reports. The Roman Rural Settlement Project has also observed this although no solution was offered. It may become necessary for Planning Archaeologists to be more rigorous when assessing reports, particularly DBAs.

Watching briefs

Some of the consultation responses related to watching briefs and questioned whether they represent an adequate mitigation strategy. To quote one response

> *'…I have done a number of watching briefs that have identified significant remains and that should have become more than just a watching brief. I am sick of busting a gut to get the best result out of a bad situation'.*

There is clearly some concern over the specification of watching briefs and the perception by developers that they are a 'good thing'. There are many instances in which a watching brief represents the most reasonable and proportionate response as specified under NPPF. However, this has been recognised as an issue that needs careful consideration, both in relation to the Worcestershire strategy and on a case by case basis by Planning Archaeologists.

Conclusion

The points discussed above represent the common threads from the questionnaire responses and the workshop. It has not been possible to discuss all the points raised but the responses to the written consultation and workshop questions can be found in Appendix 4 and the project archive includes a transcript of the workshop discussion. Issues raised by the consultation made a significant contribution to the project as a whole.

7 Discussion

A number of issues have been highlighted throughout the project and aspects of these are discussed below in themes as appropriate and more general observations.

7.1 The use of Research Frameworks

Archaeological projects undertaken through the planning process are tailored to the anticipated impacts of individual developments. Nevertheless, such work should be undertaken in the context of local and national research frameworks. A noticeable trend over time across the 338 county evaluation reports was an increasing lack of context, and/or reference to research frameworks. This was particularly apparent when reading through all the reports from 1990 forwards over a couple of weeks. The early reports gave quite a lot of space to discussing the context of a site and how it fitted into the wider picture. A certain level of synthetic analysis was usually attempted in advance of any mitigation to set the further work in context and justify the methodology for mitigation recording. More recent investigations tend to simply present the results and leave interpretation, context and mitigation decision making to others. This trend has been borne out on a national scale in the results of the Roman Rural Settlement Project.

The question of whose responsibility it is to set and consider research questions was raised in the consultation (see Chapter 7 and Appendix 4). Responses from contractors ranged from feeling that this is the exclusive domain of the Planning Archaeologist and the HER team, through to a belief that this purely the responsibility of the contractor, as they are the ones dealing with the archaeology. Within these extremes, there was a general consensus that it should be a collaborative approach, with bespoke briefs laying out research questions, which are then refined and added to, as the work progresses. The onus should be on both the Planning Archaeologist and the contractor (and consultant if present), not one or the other. More synthetic evaluation of the archaeology before the further work stage is not just beneficial for the Planning Archaeologist to determine the best mitigation strategy, but also to the contractor focussed on costing this work:

'Simple quantifications of pottery and other finds are often all that is provided and these do not help determine levels of specialist input required since context and research potential is either not, or is inadequately, considered. Thus most evaluation reports provide sufficient information to determine the planning question of whether the site has the potential to 'advance understanding of the significance of any heritage assets to be lost' and thus inform the appropriate basic level of response (refusal, mitigation by design, excavation, strip, map and sample or WB, etc.) but where they fall short is in providing the contractors with information to confidently determine (and cost) the approaches and resources which might most effectively deliver that advance in understanding.' (Quote from the consultation)

One key point raised in this report is how research frameworks affect development-led work within Worcester and Worcestershire. Worcestershire outside Worcester City does not have a detailed county-wide research framework. The West Midlands Research Framework includes Worcestershire, and there are many thematic and period based frameworks that cover aspects of work in the county, but these are often too generic. Worcester City has had a detailed research framework since 2007 and this has made a difference. Case studies presented above in the Worcester section support the value of local and well-defined research agendas. Case studies covering the rest of the county focused on those sites where significantly more, or more complex, archaeology was uncovered by mitigation fieldwork following evaluation.

A range of formal and informal research frameworks have been and continue to be developed that inform development-led archaeological investigation in Worcestershire. Some synthetic papers that formed an early outline framework for Worcester City were compiled well before the advent of developer-funded archaeological intervention. However, for the county as a whole there were no archaeological syntheses or frameworks to draw upon before the early to mid-1990s. Even now some periods and site types are better supported than others, and some of the existing research frameworks now need updating in the light of recent work.

7.2 Critical appraisal in response to changes in practice

There has long been a recognition that methodologies and techniques for archaeological investigation, including evaluation, need critical appraisal if the right balance is to be struck between cost (justification), timing (timeliness in the planning process), effectiveness (in understanding the resource and informing change), and impact (on the surviving resource). A three-volume study was published by English Heritage in 1995, reviewing work since the early 1980s (English Heritage 1995; Darvill et al 1995; Champion et al 1995). The first of these volumes focused on work carried out between 1982 and 1991, and assessed the impact of PPG16 on archaeological work carried out in England. Even at that time concern was being raised about the percentage of proposed development areas that was typically being sampled by evaluation trenches: 'There is good evidence from the survey that curators are successfully keeping field evaluation costs low but also that in doing so they are frequently adopting the use of a 2% sample fraction without critical consideration of its appropriateness in particular circumstances.' (EH 1995, 16).

In 2000 Oxford Archaeological Unit undertook an analysis of evaluation techniques used in the planning process to determine how effective these were in identifying the nature, date and extent of archaeological deposits subsequently uncovered in further mitigation (Hey and Lacey 2001). The study looked at twelve extensive sites that had been evaluated by a variety of means before topsoil and overburden were completely stripped, allowing for archaeological recording

of all features revealed. These sites were then used to assess the effectiveness of simulated trench plans to determine how successful different patterns or area sample percentages might be in locating the archaeological remains present. This analysis is acknowledged to have had a positive impact on how archaeologists evaluate and mitigate for damage to archaeological remains through the planning process. However, whilst aspects of this study have been accepted, the full impact of its conclusions has rarely been taken on board when requiring or specifying archaeological evaluation.

The outcome of this project, the *Evaluation of Archaeological Decision-making Processes and Sampling Strategies* (Hey and Lacey 2001) is frequently taken to be that a 4% sample of a development area is effective for archaeological evaluation trenching. However, this is a gross generalisation of a considerably more careful and nuanced set of conclusions relating to a range of different evaluation techniques and many variables, including the period of archaeological remains concerned, the nature of those remains, the type of soil and geology, and the depth of overlying deposits. In relation to the area sample percentage, the conclusion was that a 5% sample usually achieved a moderate to good result, although not always; a 10% sample was considered to *guarantee* a moderate to good result. For Roman and medieval remains, 5% was found to be effective, and higher percentages did not improve results. For remains of other periods, particularly Neolithic, Bronze Age, increasing the sample to 10% resulted in a significant increase in information. Archaeological remains of post-Roman and Saxon date were most difficult to locate, and increasing sample percentages above 5% did not improve the likelihood of good results. This variability was interpreted as resulting from the types of features encountered: linear features, funerary or monumental features, and nucleated settlement remains were easier to find. Dispersed remains with irregular layouts were much more difficult to locate. The study considered the full range of evaluation techniques: desk-based assessment, geophysical survey, fieldwalking, metal detector survey, test pitting, evaluation trenching (usually by machine), and considered the strip, map and sample approach which may follow on from evaluation. Fieldwalking was found to be particularly effective for Neolithic and Bronze Age remains, and could identify 'sites that had been entirely disarticulated by the plough' (Hey and Lacey 2001, 59). Geophysical survey was much better at 'locating sites with more substantial features and enhanced soils, such as Roman and some Iron age settlement sites, and medieval landscape features such as boundary ditches' (*ibid*, 27). Early prehistoric funerary monuments could be located, but settlement remains were more difficult to find. Whilst test pits and boreholes were not generally seen as being very effective, 'sieving pits at the end of [machined evaluation trenches] can be a very valuable exercise for evaluating post-depositional disturbance and dating build-up' (*ibid*, 29).

Amongst the conclusions, the following still seems very pertinent, even fifteen years on:

> *An awareness of the kinds of archaeological remains that can be missed by all evaluation techniques will enable the adoption of a more effective mitigation strategy, but there will remain a problem of predicting the unusual.*
>
> *There may be solutions to this dilemma, however. The most expensive and time-consuming excavations are those for which evaluation is comparatively successful. Conscientious evaluation should locate most Roman, Iron Age and medieval remains, even at moderate percentages. The kind of archaeology that will not be located by these means is also that which can be examined often comparatively quickly and without great expense. Contingencies of time and money built into a development programme would enable most of these to be investigated adequately as they were revealed during stripping. The problems of evaluating such sites should be acknowledged openly; it is not*

> *possible to find everything in evaluation. There is good reason to be more daring about suggesting large-scale stripping having first assessed the risk of expensive archaeology in a cost-effective fashion.* (Hey and Lacey 2001, 62).

The OAU Hey and Lacey study is particularly valuable to the present project in its assessment of techniques, most of which have not changed significantly in the fifteen years that have passed since its publication.

Other studies have looked in more detail at the decision-making processes involved in archaeological development management, including a 2008 PhD thesis *Archaeological evaluation, land use and development: An application of Decision Analysis to current practices within the local government development control processes in England* by Ruth Waller, published in 2011 (Waller 2011). This applies Decision Analysis (the discipline comprising the philosophy, theory, methodology, and professional practice necessary to address important decisions in a formal manner) to the process of archaeological development control as practiced in the early to mid-2000s. As Waller's study focuses on the decision-making process, it is less immediately relevant to the present project, which focuses more on techniques, site types, and the range of deposits identified. However, Waller did analyse a large sample of evaluations, and concluded that a sample size of at least 6% would be required to identify two thirds of the archaeological periods present on a site, and to identify all periods on a site the sample size would need to be between 21% and 30%:

> *This shows that if the Decision-maker at DMP 12b wishes to be sure that Trenching can identify all of the periods present on a site, an increase of Sample size to between 21% and 30% of the total area of the site will be required. The extension of the Trendline shows that for an Intervention to identify 66% of the periods present will require an increase to at least a 6% sample of the development site.*
> (Waller 2008, 201)

The Roman Rural Settlement project was a national synthesis project which aimed to bring together the excavated evidence of Roman Britain. This included data from grey literature reports from development-led excavations from 1990 onwards and was carried out by Cotswold Archaeology in partnership with the Universities of York and Reading. The project was funded by Historic England and the Leverhulme Trust, and the main part of the work was carried out between 2012 and 2015.

As part of the project, two one-day conferences were held to disseminate preliminary results from the project and discuss some of the questions arising from the project around excavation and post-excavation techniques. Much of the discussion has enormous value for the sector in terms of re-evaluating archaeological fieldwork techniques and improving archaeological planning advice. Key points which were raised during the second conference held in September 2016 are discussed here.

The project recognised the value of the data gathered through development-led archaeology and its contribution towards the national synthesis of Romano-British archaeology. However, to continue this, it is essential that every intervention should, in some way, contribute towards this wider national picture for any given archaeological period, not just Roman. Careful consideration needs to be given to asking the right question(s) at the outset of a project and to ensuring that the proposed methods fit the aims. There also needs to be a realistic and pragmatic approach to what can be achieved proportionate to both the question(s) and NPPF. This is essentially about well-reasoned and effective design of archaeological projects which

involves all stakeholders such as the developer, Planning Archaeologist and the archaeological contractor. This ideal was promoted in a recent CIfA training workshop on CIfA's standards and guidance for briefs, specifications and WSIs held in September 2016. A rather controversial point was raised that evaluations are not successful; however, this was not backed up by evidence. There is clearly a case for a future project which aims to assess the value of different methodologies applied during evaluation phases on a region by region basis.

Further discussion revolved around the question of whether development-led archaeology has become mechanised in its approach. The question was asked as to whether standardisation is good or bad with some arguing the dangers of standardisation as it can stifle innovation. It is more difficult to apply a variety of methodologies within a mechanised process which can impact on the amount of data which can be gained from a particular site. However, the legislative framework of the planning system means that a certain degree of standardisation is necessary. This is also applicable to post-excavation analysis although this comes with its own set of issues much of which revolves around achieving the best outcome between different shareholders on a limited budget.

Leading on from this, various methodologies were discussed which do not seem to take place during development led archaeology, or at least, only in certain cases. Fieldwalking was raised as something which no longer seems to be carried out yet has validity in its application. However, as a technique it is not always possible to apply in many areas due to the nature of soils and the changing of ploughing regimes and techniques. There is also of course, the thorny issue of cost. Metal detecting, volumetric recording and top soil sieving were also raised as valid techniques which can be used in increase the amount of data gathered. While it is not possible to use volumetric recording across a large site, there may be value in conducting it in smaller quantities to allow a snapshot. However, it may be possible to use metal detecting and small scale top soil sieving in many cases.

Another major issue which was raised during the conference involved the reduction in the quality of grey literature reports. A lack of contextualisation and interpretation in many reports was noticed which does have an impact on the value of the final data. Specialist reports are often not fully integrated into reports creating a fracture in the final interpretation. Neil Holbrook of Cotswold Archaeology also pointed out that this fracture exists within a wider context, namely that of his own archaeological company. He referred to a disconnection between project managers, field archaeologists and specialists. These intangible barriers are, in all likelihood, echoed in other archaeological organisations. Suggestions were made as to how this could be improved, much of which revolved around the need to improve communications between specialists and field teams but also Planning Archaeologists. It was also suggested that specialists should be included at the start of projects in order to facilitate an early dialogue with regards to post-excavation strategies. Of course, linked to this is training with many calling for training of field teams in soil formation processes and sampling techniques.

The outcomes of the Roman Rural Settlement project in terms of its critical analysis of methodologies, has an impact for the whole sector. CIfA identified a strong case for reform of the current standards and guidance for evaluation and watching brief reports. The Roman Rural Settlement project has presented a national lens through which this project can be viewed with many of the suggestions already being considered in Worcestershire.

7.3 Observations

- The framework in which Planning Archaeologists work has changed considerably since 1990 in many ways: understanding within the profession has developed, legislative frameworks have changed, government guidance has been revised, evidence bases have improved, and there have been technological advancements. There is now a far more nuanced approach compared to 1990. A wider variety of archaeological techniques are available and 25 years of experience and case-law has refined strategies for evaluation and mitigation.

  The ability to predict the archaeological character of an area, based on topography, geology, soils and historic landscape character, has improved immensely with the increased data available and the increased use of GIS and spatial mapping. The increase in knowledge and understanding allows for much more rapid appraisal of planning applications and a clearer idea of potential. It is difficult to compare decision-making now with that of over 20 years ago. Linked to this is the difficulty in determining whether the change in wording regarding the goal of development-led work from PPG16 through to NPPF has had a practical impact. The original justification supplied by the Planning Archaeologist isn't available for early evaluations so comparisons are unable to be drawn. However, this is an interesting debate to open as the definition of 'advancing understanding' as specified in NPPF is not necessarily clear. A national conversation with this definition at its heart could perhaps lead to more innovative ways of justifying archaeological work at a time when development-led archaeology is under pressure both in terms of resources and changing planning legislation.

- In evaluation, the use of other field techniques apart from trenching, or trenching following geophysical survey, is still the exception rather than the rule. There is a need to consider sites more holistically. In relation to periods where artefacts can be more effective at identifying sites, fieldwalking is one evaluation technique that can make a difference, as was identified in the OAU study. Overall, 7% of the Worcestershire evaluations examined for the project incorporated fieldwalking; however, 16% of the evaluations that recorded prehistoric remains included fieldwalking. It is possible, therefore, that fieldwalking may have been a factor in the identification of some of these periods of activity, as Hey and Lacey noted in the OAU study (2001, 23).

- The issue of sample size is still one that does not have clear answers. The results of the project show that sample size has steadily increased over the last 25 years, from around 2% in the early days to broadly 4% now, excluding the City. Within the City there is far greater variability; the mean average for 2012-2014 is 5.6%, and overall from 1990 to 2014, it is 5%, but this belies a more complex picture, with many sites being heavily constrained by existing structures.

  The Worcestershire case studies provide examples where the mitigation found more complex archaeology that was predicted in the evaluation. Whether or not a larger sample size would have produced more accurate results in some cases is still unclear. Further simulation studies on well-recorded fully-excavated sites are needed, as carried out by OAU (Hey and Lacey 2001, 34-51), particularly for ‘hard-to-find’ site types and periods. Nevertheless, the results of this project align with the OAU study and indicate that for all site types and periods 4% should be a minimum, with any trenching contingency added to this.

- Although not studied in detail during this project, the subject of desk-based assessments is something which has been discussed throughout. There is a need for more attention to be given to the quality and content, including level of detail, of desk-based assessments. This needs to be proportionate, but a clearer understanding of the interplay between existing knowledge and potential is urgently needed. Too many desk-based assessments simply re-write HER records. While the goal of this project has not been to comment on the quality of the archaeological work that has been carried out, it is clear that many desk-based assessments have become formulaic and result in a tick boxing exercise rather than a true and accurate depiction of the potential of any given site. With funding cuts to local government, many areas in the country have seen a reduction in provision of archaeological planning advice. With so many desk-based assessments not seen as being up to par, how can we be certain that they are supplying local authority case officers, who are not archaeological specialists, with the correct information needed to determine if the historic environment will be impacted by proposed development? It is time for a national conversation to debate the efficacy of such assessments and what role, if any, they play in the future of development-led archaeology in the UK.

- The project set out to 'create a robust evidence base' (see Project Design) which would allow an overview of curatorial responses to the historic environment that took proper account of the different types of deposits and the different techniques most appropriate to them (see Aims and objectives above). Inspired by the work carried out in 2000 by Oxford Archaeological Unit (Hey and Lacey 2001) it was hoped that the numbers of evaluations that had been carried out in Worcestershire since 1990 would provide that robust evidence base, which could then be interrogated and analysed using spreadsheet, database and GIS software. However, although the overall number of evaluations undertaken during the study period totalled 522 (338 in the five Worcestershire districts plus 184 in Worcester City), fewer – 447 – were susceptible to analysis (281 plus 166 in Worcester City). The more critical factor was that far fewer of these evaluations had been followed by further work that could be used to assess the effectiveness of the evaluation results (47 for the five Worcestershire districts, plus 43 in Worcester City). These relatively small numbers were spread across a wide geographical area, with varying geologies and soils had been undertaken over more than two decades, in response to a wide variety of different development proposals, and had revealed archaeological remains of very varied types and periods. It was not possible therefore to compare and contrast different variables, as there were too few examples of each. The data gathered during the project can be regarded as being of value, and it is recommended in Chapter 9 that this data should be collected in the future, perhaps as part of the HER event record. It has not been possible to statistically test the data due to the number of variables contained within the dataset as well as the small numbers. It is considered that a dataset gathered across a region with 'controlled' variables such as geology, sample size and trench type may enable this statistical test.

  In summary, the data did not represent the 'robust evidence base' that had been hoped for. Nevertheless, the project scope has allowed a wide-ranging review of work carried out since 1990, which has allowed some useful conclusions to be drawn.

  Another issue relating to methodology is that where further work did take place, it is likely that this mitigation found exactly what was anticipated, as in most cases the work consisted of watching brief or targeted excavation, rather than extensive excavation or widespread strip, map and sample. When larger areas are opened up, as the OAU study identified, unexpected results can be identified and apparently blank areas can be seen to contain archaeological remains (Hey and Lacey 2001). In Worcestershire there were only a few

cases where this was possible, mainly on extensive gravel quarry sites stripped of topsoil and overburden under archaeological supervision.

- Inevitably, in a project of this nature, which takes the arguably courageous path of critically examining the planning archaeological work carried out over a long period, specific instances have been identified where things went wrong. The aim of this project was not to apportion blame to any individual, group, or organisation, but rather, to use this as an opportunity to learn from those cases which had not gone as well as they might. A distinction was made between specific problems relating to individual cases, and general approaches that could be improved. The aim was to learn from this reflexive criticism. Some practices have already been altered as a result; for example, on-site monitoring of projects, particularly evaluations, in Worcestershire has been increased, despite the pressure of work that makes this challenging to achieve in a large county.

  The project as originally proposed was to have begun in April 2014, and was due to be completed in the summer of 2015. For a variety of reasons this timetable needed to be extended, and the work is being completed in the autumn/winter of 2016. The unexpectedly long timescale has had some benefits. Worcestershire County Council staff restructuring has required changes in working practices and planning archaeology is now shared between several post holders. Different approaches have been adopted; approaches used elsewhere in the country have been proposed for consideration, and there have been opportunities to discuss and develop some of the ideas mooted by the project in different ways than had originally been anticipated.

8 Conclusions and recommendations

The project highlighted key areas where approaches need to be modified in Worcestershire. A more refined and nuanced approach to evaluation is required, with reliance on a greater range of techniques; alongside the need for evaluation reports to attempt a greater level of understanding with regards to significance and potential before mitigation is planned.

The conclusions and recommendations have been drawn from the datasets both in Worcestershire and Worcester City. It is inevitable that there will be overlaps with between the two areas as well as more broadly. Where it has been possible, specific recommendations relating to either the County or the City have been drawn out but these should not be considered to be exclusive to either area. The geographical nature of the County means that invariably there are more recommendations to be made but these could also be applied to the City where these are appropriate.

General conclusions

Conclusion 1

There is a need for better understanding by all archaeologists within the sector of the frameworks within which they and all the other players work. These include professional and ethical, business and financial, regulatory and research frameworks.

Recommendations

Regular meetings e.g. 6 monthly, should be held with contracting organisations/individuals, consultants and heritage advisors within the county to discuss matters arising from

archaeological work within both the city and the county. These discussions should be broadened to include issues such as, but not limited to, digital archiving, the question of physical archive deposition and the online pottery reference collection. It is suggested that regional meetings of this nature could be facilitated by West Midland ALGAO which would enable these issues to consider across county boundaries and allow common ground to be established. The format of these meetings could be applied to other ALGAO regional groups.

With the advent of trainee positions in many contracting organisations, it is suggested that specific CPD sessions are held to outline the different roles within British archaeology, how they interact and how they contribute to the broader picture of heritage within the UK. Such CPD sessions have been held in Worcestershire for the staff of WAAS which have been very successful. While the format of these sessions has been informal, it is suggested that resources could be created for use within other organisations and to support CIfA within the framework of the NVQ.

Conclusion 2

Guidelines and standards documents are very valuable, even essential, but it would be unnecessary duplication for every Planning Archaeologist to produce their own. Rather there should be common national guidelines documents (see for instance those produced for Greater London and the East of England: Greater London Planning Advisory Service 2015, Gurney 2003), along with a clear understanding that additional local standards will be established to suit specific circumstances. *Guidelines for archaeological work in Worcester* (based closely on Greater London Planning Advisory Service 2015) has recently been endorsed by Worcester City Council's Planning Committee.

Recommendation

It is suggested that National ALGAO in association with Historic England and CIfA could work together to establish the provision of these national guidelines. Regional meetings facilitated by ALGAO could be used to discuss whether common ground could be established to determine aspects such as the requirement for digital archiving across counties. The outcome of these meetings could be used to provide the basis for more national guidelines while recognising the diversity across regions.

The provision of a common standard document would enable Planning Archaeologists to monitor projects more effectively against a standard brief rather than a non-standard WSI. A more intellectually engaged and cooperative approach to WSI formulation is needed. The workshops held by CIfA on archaeological briefs and WSIs is a step towards this but it is suggested that a more proactive approach is taken on behalf of both contracting organisations and Planning Archaeologists to challenge briefs and WSIs in turn.

Conclusion 3

The issue of how good evaluation is at answering the two key significance questions (presence of heritage assets of equivalent significance to scheduled monuments, and assessment of the level of significance against the level of 'less than substantial harm') reliably remains a concern. Evaluation is focused on sites identified, for various reasons, as having potential, but the experience in Worcester City and Worcestershire is that it rarely does more than provide a visible demonstration of that potential (i.e. significance is not addressed). It has usually been the case that it is only during mitigation fieldwork that this potential is translated into an understanding of actual significance.

Linked to this is the process of identifying what are heritage assets of equivalent significance to scheduled monuments. This process needs to be clarified. It must be robust enough to resist legal challenge, and identify both who is empowered to make these judgements, and the resource requirements of doing this effectively. The secondary process of assessing the level of significance against the level of 'less than substantial harm' also needs clarification.

Recommendation

The heritage sector should consider producing guidance on how evaluation should be specified in order to meet the requirements of NPPF, addressing the three aspects of significance in Good Practice Advice 2 (paras 8-10). Research frameworks on a local, regional and national level could be reconfigured to support this process. It is suggested that this is a topic taken by the Historic England and CIfA during the current discussions being held both in CPD sessions and online discussions.

Conclusion 4

The project has highlighted that reporting on evaluations needs to be clearer in its acknowledgement of the limitations of the work, in particular those resulting from methods, sample size and constraints.

Recommendation

A set of key information should be recorded for each evaluation and included in the report which could be based on the dataset collected for the project by Worcester City (Appendix 3-B). Factual data on the scope of the evaluation and its results should be tabulated by the organisation undertaking the evaluation and scoring added by the archaeological advisor. This will enable future evaluation performance to be assessed without the need for extensive data collection. This information could be recorded in HERs with an additional tab being made available under the Events record in HBSMR for example.

Conclusion 5

Geophysical survey is an effective and useful tool when used appropriately, but too often an absence of geophysical evidence has been interpreted as an absence of archaeological remains (by contractors, consultants and Planning Archaeologists). On sites where trenching has followed on from geophysical survey, it has been demonstrated repeatedly that geophysics is not always effective, for all periods and on all soils/geology, but particularly for aceramic periods and over mudstone/sandstone geology. There is also an issue with some consultants whereby geophysical survey is commissioned to support the planning application but the technique used is not always the most appropriate one but rather what is most cost-effective to the client at that particular time.

Recommendation

In the majority of cases, Planning Archaeologists are not specialists in geophysical survey and while it is possible in state in briefs that the technique must be reflect the conditions i.e. geology/soils. However, we would recommend that a more overarching view is taken and that training is provided for Planning Archaeologists in the basics of geophysical survey. This would enable a more considered approach to be taken to geophysical survey together with an enhancement in the confidence of the Planning Archaeologist to justify correct techniques.

This training should not be confined to just geophysical survey but could be broadened out to encompass geoarchaeology and other training needs where they are identified. With ever deepening cuts to archaeological services, it is recommended that these training events could take place regionally and facilitated by a national organisation such as ALGAO or CIfA with the specific goal to upskill Planning Archaeologists and other members of the profession where it is needed. Training such as this could form part of a suite of knowledge experience shared

between local authorities in order to meet training needs within the confines of limited resources.

Conclusion 6

Throughout the project, it was noted that earlier reports are more likely to include reference to wider research questions and frameworks which enabled the site to be placed in context. A certain level of synthetic analysis was usually attempted in advance of any mitigation to set the further work in context and justify the methodology for mitigation recording. More recent investigations tend to simply present the results and leave interpretation, context and mitigation decision making to others.

Recommendation

Placing an individual site within a wider regional context is essential in order to fully understand the significance of that site. Discussion in the consultation workshop held as part of this project showed that while research frameworks are considered to be important, there is an element of disagreement between the different parties with some believing the setting of research questions and wider context to be the remit of the planning archaeologist while others believe that only commercial archaeologists have the experience and knowledge to do this. We would suggest that it is the responsibility of all parties to ensure that adequate research questions are set at the outset and that the results of the investigation, whether negative or positive, are interpreted within the context of research frameworks. This could be achieved by more rigorous interaction at brief and WSI level between planning archaeologists and contractors.

Worcestershire

The Worcestershire Standards and Guidance for archaeological work in the County provides a good framework for implementing the recommendations listed below. The Standards and Guidance will be updated to reflect these recommendations and will be taken forward when most appropriate due to the individual nature of each archaeological site.

Conclusion 1

The project has identified a recurring issue of HER searches and/or background research/desk based assessment being carried out after the conclusion of fieldwork, both in the City and across the whole county of Worcestershire. This means that the significance of features identified or finds recovered cannot be fully understood in the context of both the local and regional research frameworks.

Recommendation

The WS&G will require HER searches to be carried out and sufficient assessment of the archaeological context of a site to be made *before* fieldwork is undertaken in order to allow the nature of deposits to be determined. WSIs will not be approved without an event number from the HER. Event numbers for projects are given out with searches. This will ensure that the HER data has been sent to the contractor/consultant before work commences.

Conclusion 2

The project addressed the benefits of site visits and monitoring of fieldwork by Planning Archaeologists, and the work carried out in Worcester City demonstrated the advantages of this. The consultation process revealed that archaeological contractors and consultants also appreciate the effectiveness of on-site monitoring.

Recommendation

The Planning Archaeologist will carry out on-site monitoring as standard for evaluations and excavations. This requirement will be highlighted in the WS&G and also recorded in the HER under the consultations module.

Conclusion 3

The consultation sought opinions on whether standardised Briefs for archaeological work, available for download, are viable. The potential advantages included saving time, and streamlining the processes of setting up development-led archaeological projects. However, experience over the course of the project, and the results of the consultation process indicate that this would not be as time-saving as anticipated, and could present a significant level of risk. Although the specific circumstances of a site would be addressed in a letter to the Local Planning Authority relating to the planning application, should this letter not be made available to the archaeological contracting organisations tendering for the work, the aims of the project are likely to be missed. This could result in costly and complicated delays, and damage to archaeological deposits.

Recommendations

The format of supplying standard briefs with accompanying detailed letters will cease. Briefs will be adapted from template documents to suit each individual site and development proposals as appropriate.

Conclusion 4

Examination of reports on 281 evaluations has clarified the limitations of geophysical survey in Worcestershire. Although this can be a useful technique in some circumstances, it is not considered to be a reliable means of locating archaeological features in all cases.

Recommendation

The Planning Archaeologist will require evaluation trenching to be used to test areas where geophysical survey results appear blank. This requirement will be included in the WS&G.

Conclusion 5

The project has identified that one of the challenges in carrying out development-led archaeological investigation in Worcestershire is that archaeological remains from some periods are completely or almost completely aceramic. During the post-Roman and early to mid-Saxon period there was almost no pottery use in this part of the country, and the Iron Age had relatively low levels of pottery use. Where evaluation reveals archaeological features that contain no pottery or other datable artefacts, and where these features are not in themselves diagnostic it is necessary to investigate them further.

Recommendation

The updated WS&G will allow for further investigation or mitigation where undated features are identified during evaluation.

Conclusion 6

The use of metal detecting in archaeological evaluation has rarely been used in Worcestershire. However, this is a technique that can be very effective as an additional means of archaeological evaluation, particularly in rural areas.

Recommendation

The updated WS&G will allow for the use of archaeological metal detecting surveys where appropriate.

Conclusion 7

It has long been recognised that some archaeological features can be difficult to see in newly-cleaned or recently excavated trenches. These features start to appear after the ground has been allowed to weather over a few days. As archaeological evaluations are carried out so rapidly now, compared with in the early 1990s, local planning authorities in some counties (eg Kent) require evaluation trenches to be left open for a minimum of 48 hours, then observed by a suitably experienced archaeologist.

Recommendation

The updated WS&G will require evaluation trenches to be left open for a minimum period where it is felt beneficial, and all features revealed to be investigated appropriately.

Conclusion 8

Whilst changing agricultural practices mean that arable land may often be less suitable for fieldwalking than in the past, this remains a valuable technique.

Recommendation

The updated WS&G will emphasise the use of fieldwalking where landuse and ground conditions permit.

Conclusion 9

Residual or disturbed artefacts in topsoil can be the only evidence for archaeological deposits that have been ploughed away, or can provide evidence for the dates of occupation within built up areas. Subjecting a sample of topsoil to sieving and more intensive examination would help to identify any of these residual artefacts. While it could be argued that the level of information offered by such unstratified objects is limited, it can, as evidenced by 'Turning the Plough' provide valuable evidence for the presence of human activity.

Recommendation

The updated WS&G will require, where appropriate, that a sample of topsoil from each evaluation trench will be sieved and that all artefacts recovered from this will be identified in accordance with CIfA standards and guidance. This sample will normally consist of the last 1m length of the trench.

Conclusion 10

The review of evaluations identified cases in which natural deposits proved to be redeposited, sealing earlier archaeological deposits beneath. In order to ensure that evaluation trenching has reliably reached undisturbed natural deposits, these must be investigated, either by machine or hand excavation, as appropriate.

Recommendation

The updated WS&G will require natural deposits to be tested by excavation of a sondage to ensure that they are undisturbed, not redeposited.

Conclusion 11

The review has highlighted the limitations of archaeological watching brief conditions on planning applications. A watching brief can sometimes be the best and most appropriate response. However, in other circumstances, such as an extensive housing development, a more proportionate and reasonable requirement of a developer may often be excavation of a defined area, or strip, map and sample recording.

Recommendation

The updated WS&G will recommend consideration of a range of different mitigation options if archaeological deposits are identified during evaluation.

Worcester City

Conclusion 1

The Worcester Research Priority listing in briefs is a valuable starting point in building research into fieldwork designs, but needs fuller engagement from all parties (consultant and contractor as well as planning adviser) to be more effective.

Recommendation

One approach to achieving this may involve a more structured proposal and response to research, to be included in the brief / WSI process. This may also feed into a more inclusive approach to updating the Research Framework.

Conclusion 2

In evaluation, the use of other field techniques apart from trenching is still the exception rather than the rule in Worcester, though it must be acknowledged that this can often reflect the needs of individual evaluation projects. There is a need to consider the needs of the site more holistically.

Recommendation

On constrained sites in particular there is a need for all parties to engage with any problems of understanding at the WSI stage and develop a strategy to address them. In some cases, trenching might not be needed, but this approach would need to be justified.

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