CARLISLE URBAN ARCHAEOLOGICAL DATABASE

Project Design

Oxford Archaeology North

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Carlisle City Council

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1. INTRODUCTION

1.1 BACKGROUND AND NATIONAL CONTEXT

1.1.1 ***National Policy:*** Department of the Environment (DoE) planning guidance (*PPG16,* 1990) identifies the presence of archaeological deposits as a material consideration in the determination of a planning application and it expects planning authorities to adopt a curatorial role. PPG 15 (DoE 1994) recognises the archaeological potential of standing buildings and allows local authorities to give consideration to this aspect.

1.1.2 National policy on urban archaeological resources was set out in *Managing the urban archaeological resource* (English Heritage 1992), which proposed that management be achieved under an Urban Archaeological Strategy, to be developed in three broad stages:

- *Stage 1 (UAD)* **Urban Archaeological Database**
  Creation of a database of archaeological information to support informed planning advice;

- *Stage 2 (UAA)* **Urban Archaeological Assessment**
  Preparation of a written assessment which synthesises current archaeological knowledge and understanding of, in this case, Carlisle, in terms of local, regional and national archaeological importance;

- *Stage 3 (UAS)* **Urban Archaeological Strategy**
  Preparation of a strategy for managing the archaeological resource and updating the database.

1.1.3 ***Regional Research Framework:*** the project will link into the Regional Research Framework that is presently being compiled for the region, and is funded by English Heritage. The draft Resource Assessment has been compiled (Liverpool National Museums 2005), which has demonstrated that Carlisle is of considerable archaeological importance for the region for all periods. Similarly, the Draft Research Agenda has highlighted the importance of Carlisle and the need for collation of the material from the city (*ibid*).

1.1.4 ***The Need for an Urban Archaeological Strategy, Carlisle:*** since the transfer of Carlisle Archaeological Unit from Carlisle City Council in August 1999 (*Section 2.2.2* below), advice on archaeological matters has been provided to the City Council by Cumbria County Council's Historic Environment Service (CCCHES), which also maintain the County Historic Environment Record (HER). Whilst the working relationship between the city and its advisors has always been good, it is clear that there is a need for more detailed archaeological data for the city. A detailed Urban Archaeological Database (UAD) has therefore been proposed for the historic heart of the city, which utilises a GIS system for ease of search and analysis. The UAD will support the provision of forward planning and development control advice by CCCHES to Carlisle City Council and will, in effect, represent an extension of the HER. The UAD will be nested within the HER database so that accessing the HER for Carlisle will draw upon the results of the UAD. As such it will provide an essential tool for early consultation between planners, developers and archaeologists, and will form a comprehensive, but upgradable, factual basis

for the definition of management policies. It is intended that the strategy will provide for the design of policies for the future management of the archaeological resource, which would include policies on conservation, protection, presentation, and future research.

1.1.5 The present project design is submitted by Oxford Archaeology North (OA North) for the design of the structure, preparation and management of a UAD intended to collate a selection of available data relating to the City of Carlisle relevant to the management of its archaeological resource. The UAD will facilitate the production of an Urban Archaeological Assessment (UAA), and ultimately an Urban Archaeological Strategy (UAS), for Carlisle, which will provide for the management of the archaeological resource within the bounds of the city, and will maximise the value of conservation and preservation in the urban context. This will provide a simple set of maps indicating archaeological potential and hazard areas, for use by planning officers. The UAS will be produced by Cumbria County Council in conjunction with Carlisle City Council (*Section 3.2* below).

1.1.6 The UAD will involve the detailed analysis of, and research into, the development of Carlisle from its inception through to the mid-eighteenth century. It will thereby provide the basis for strategic planning and allow for the conservation, presentation and future development of Carlisle's historic resource. It is proposed, though not as part of the present project, that an EUS-style assessment be implemented for Carlisle as a whole, which will examine, at a rudimentary level, the archaeological resource for post-1750 Carlisle (*Section 5.1.4*). This would include the entirety of modern Carlisle, both within and beyond the study area defined for the UAD. Together, both studies will provide the basis for integrated heritage policies across the whole of the urban area. Again this database will be nested within the HER database and will be accessed through the HER user interface, along with any other databases such as the HLC.

1.1.7 Carlisle's Roman and medieval history places it in the first rank of historic northern towns, surpassed in significance only by York and Chester. English Heritage has acknowledged the great archaeological importance of Carlisle as one of the dominant settlements in the north of England, in its willingness to consider funding the creation of a UAD for the city.

1.2 BACKGROUND TO THE ESTABLISHMENT OF AN URBAN ARCHAEOLOGICAL DATABASE FOR CARLISLE

1.2.1 *Background to the curation of Carlisle's archaeology:* Carlisle Archaeological Unit (CAU) was established in 1977 as part of Carlisle City Council's Department of Leisure and Community Development. Advice on archaeological matters was provided to the City Council's Planning Department and other Council officers by the Principal Archaeologist, and the unit also undertook excavations and other fieldwork in the City and District of Carlisle in advance of redevelopment.

1.2.2 During the period 1977-1999 CAU carried out several large-scale excavations in the centre of Carlisle, together with a far greater number of smaller interventions. With the rise of competitive tendering during the early 1990s, however, the role of the Principal Archaeologist, as both the City Council's archaeological advisor and the head of a contracting organisation competing for work within the city, was

increasingly regarded as unsatisfactory. In August 1999 the unit transferred from Carlisle City Council to Bradford University and continued to carry out contracting work as Carlisle Archaeology Ltd (CAL). From that time to the present, the Historic Environment Service of Cumbria County Council has provided archaeological advice to Carlisle City Council and has been responsible for the archaeological aspects of development control and planning within the City and District.

1.2.3   Between 1977 and 1999 CAU did not submit records of archaeological work undertaken by the unit to the County SMR, preferring instead to maintain their own basic log of interventions and standing building surveys. Following the transfer of CAU to Bradford University, however, this situation came to an end and records of work carried out by all archaeological contractors in Carlisle are today routinely entered onto the County HER.

1.2.4   The CAU site and standing building logs were hand-written on pro-forma sheets and two copies of this log were located during the English Heritage-funded Carlisle Archives Project. The data from these logs was used as the basis for the events record of the Archives Project (OA North 2003) and was presented to the County for entry into the HER at the completion of Stage 1 of that project (an example of the data set is presented in *Appendix 8*). The logs themselves are currently stored at OA North for use in later stages of the Archives Project.

1.3   PILOT STUDY

1.3.1   In 1994 CAU was invited by English Heritage to submit a proposal for a UAD for the City of Carlisle. One of the key elements of the project design produced by CAU was a proposal for a pilot study. The aim of the study was to assess the quality and range of data available and provide a basis for estimating time and costs for the full UAD (McCarthy and Padley 1995, 1). The project design set out proposals for the scope of the UAD, both in terms of the study area and the range of data to be assessed, together with data standards, database structure, and mapping provision. For the purposes of the pilot study four archaeological excavations within the city centre were selected for assessment, two of which were undertaken by CAU in the late 1970s and early 1980s and two pre-dating the formation of the unit in 1977. The scope of the pilot study, proposed methodologies, and resourcing requirements were also set out in the document.

1.3.2   On the basis of a revised project design submitted in November 1995, CAU was commissioned by English Heritage to undertake the pilot study. The work was undertaken between March and June 1996, but a report on the results of the study was not produced until September 1998 (McCarthy 1998).

1.3.3   The ultimate aim of the pilot study was to identify the resource requirements for compiling the UAD in order to provide accurate costings and a timetable for submission to English Heritage. The study addressed four main issues:

- an assessment of the quantity and quality of the sources to be drawn on for the compilation of the UAD, with a view also of assessing their accessibility and relevance/value;

- the design of a workable database for the capture, manipulation and presentation of the data. The pilot study provided a manageable amount of

data, that could be used to test the system and thereby identify any potential problems at an early stage;

- the collection and entering of data for the sample study area, in order to provide an assessment of a sample of the data available for the city;

- using the experience gained during the pilot study to refine methods for the compilation of the main UAD.

1.3.4   In the eight years that have elapsed since the pilot study was completed advances in both computer technology and current thinking about the compilation of UADs have rendered most of the recommendations of the pilot study redundant. Important recent developments in the availability of relevant data, such as the production of an events database for Stage 1 of the Carlisle Archives Project (OA North 2003), also need to be taken into account. For these reasons the pilot study has not been used as the basis for the production of the present project design.

1.3.5   Following the production of the pilot study report no further work was undertaken and the full Carlisle UAD was never commissioned. In August 1999 CAU became Carlisle Archaeology Ltd (CAL), Bradford University, and continued to undertake archaeological work in Carlisle and the surrounding area. The company ceased trading in August 2001.

1.4   THE CARLISLE ARCHIVES PROJECT

1.4.1   Following the demise of CAL it became clear that basic archaeological information for the majority of projects undertaken by CAU/CAL between 1977 and 2001 was not in the public domain, nor was there a coherent overview of the unit's work or the archive that it generated. In order to address these issues English Heritage prepared an *Outline Brief and Specification for the Carlisle Archives Project* in 2001 (Kerr and Perrin 2001). This report proposed a three-stage work programme, beginning in Stage 1 with the compilation of a database providing a definitive and consistent list of all archaeological events undertaken by the Carlisle unit, together with a digital map of the events. In Stage 2 a current listing of the full archive holdings was to be made, whilst in Stage 3 it was envisaged that any remedial work required prior to deposition of the archives would be undertaken.

1.4.2   On the basis of a project design submitted in September 2002 (OA North 2002a) OA North was commissioned by Carlisle City Council in January 2003 to undertake Stage 1 of the project. The work resulted in the compilation of an Access database containing details of 585 archaeological events (including 310 field events such as excavations, evaluations and watching briefs) undertaken by CAU/CAL. A report detailing the results of Stage 1 and incorporating an updated project design for Stage 2 was subsequently produced (OA North 2003).

1.4.3   OA North is currently (April 2005) completing Stage 2 of the Archives Project, the key elements of which can be summarised as follows:

- production of a detailed inventory of the contents of individual archives, including those currently stored in Shaddon Mill that relate to projects pre-dating the formation of CAU in 1977;

- assessment of the current condition and location of each archival element;

- production of a list of missing or incomplete archival elements;

- recording and mapping of trench locations for all field events within the City and District of Carlisle;

- estimation of the amount of remedial work required for each archive prior to deposition;

- production of recommendations for Stage 3 of the project.

All the data generated by this work has been entered onto the Stage 1 database, which was adapted and expanded to take large quantities of additional information (*Appendix 8*).

1.4.4 The data generated by the Archives Project clearly represent a key resource for the Carlisle UAD. In addition to holding large quantities of detailed information about individual projects and archives, the project database provides a definitive list of all the archaeological work undertaken by CAU/CAL, and also the work of other organisations in the city prior to 1977. Since the company was responsible for most of the fieldwork undertaken in the City and District of Carlisle from 1977 to 2001, the database can be regarded as a substantially complete catalogue of recognition events for this period. Furthermore, as a result of the recent Stage 2 work, digitised trench location plans are now available for most of these events. All these data, together with accompanying metadata, are available for use in the Carlisle UAD. A short example record from the Archives Project is included in *Appendix 8*, although only the basic event data has been included, without the accompanying bibliographic and archival information held within the Archives Project.

1.4.5 Whilst the Archives Project has undoubtedly generated much data that are directly transferable to the UAD, the database contains only brief descriptions of the results of each fieldwork event. It is therefore not, of itself, sufficiently detailed to be used for the identification of Monuments or Archaeological Elements, or for deposit modelling. It can however be used as a guide to the character, range and date of archaeological deposits recorded on each site, and should enable data for each of the recognition events undertaken by CAU/CAL to be entered to the UAD more rapidly than would otherwise have been the case. For obvious reasons the database does not contain information pertaining to archaeological work carried out since 1977 by organisations other than CAU/CAL, although these data are available in the County HER.

1.5 THE RIVER EDEN PROJECT

1.5.1 In February 2004 OA North was commissioned by Cumbria County Council to undertake a programme of research and digital mapping to determine the extent to which the course of the River Eden at Carlisle has changed from prehistoric times to the present day (OA North 2004). The project looked at all relevant documentary, cartographical, geotechnical and archaeological evidence for the position of the river in the prehistoric, Roman, medieval and post-medieval periods. Early maps were georeferenced by matching the position of a number of features with their modern counterparts on digital vector mapping, and geotechnical and archaeological evidence was plotted onto the map as point data.

1.5.2   The results of the River Eden project, which include GIS mapping of the projected course of the river at various periods, will potentially form an important resource for the Carlisle UAD. This identified archaeological events associated with the river, and data gathered during this project may potentially be useful in enhancing monument and event records. The mapping of the changing course of the river through time will provide important information for use in the deposit modelling phase (*see Section 5.4.29*). It will be possible to transport much of the data electronically to the UAD at an early stage in the project.

1.6   CARLISLE URBAN ARCHAEOLOGICAL DATABASE

1.6.1   The presentation of this project design incorporates discussions between English Heritage, Carlisle City Council and Cumbria County Council, in line with English Heritage's policy statement *Managing the Urban Archaeological Resource* (English Heritage 1992). The project design is prepared in accordance with English Heritage's guidelines for the *Management of Archaeological Projects* (MAP 2) (English Heritage 1991), with the document issued in September 1993*, 'Urban Archaeological Databases: Extended Brief for Project Designs*' (English Heritage 1993), and a brief issued by Cumbria County Council in 2004 (CCC 2004) (*Appendix 6*).

2. CARLISLE: HISTORICAL BACKGROUND

2.1   INTRODUCTION

2.1.1   For centuries prior to the local government reorganisation of 1974 the City of
Carlisle served as the county town of Cumberland. For the past 30 years the city has
been the principal town, and indeed the only city, in the County of Cumbria, which
was created through the amalgamation of the historic counties of Cumberland,
Westmorland, Lancashire North of the Sands, and part of Yorkshire. Today Carlisle
retains an important role in the administration of the region and, as the largest urban
centre for many miles, plays a significant part in the social and economic life of the
area. At various stages in its history the city has been of considerable regional
importance. Its location immediately adjacent to the northern frontier of Roman
Britain and its subsequent proximity to a long-disputed and often ambivalent
national border has frequently afforded it a strategic and historic significance far
greater than its present size would suggest. Indeed, its value was such that it can be
listed alongside York, Chester and Newcastle as one of the dominant centres of the
North in both the Roman and medieval periods.

2.1.2   In broad terms the historic centre of Carlisle corresponds to the area enclosed by the
medieval city walls, at the north end of which lies the imposing medieval castle.
Beyond this area it is clear that significant suburban development also occurred in
the Roman, medieval and post-medieval periods alongside Rickergate and
Botchergate, the principal roads leading north and south from the core area of
settlement. There was also a medieval and post-medieval suburb at Caldewgate on
the west, although the extent of Roman activity in this area is unknown. The
modern suburb of Stanwix, which lies directly across the River Eden approximately
half a mile north of the city centre, was the site of the largest fort on Hadrian's Wall
and existed as a small village in its own right during the medieval and earlier post-
medieval periods.

2.1.3   *Geology:* the solid geology of the Carlisle area comprises soft, reddish Permo-
Triassic sandstones of the St Bees formation, together with the less extensive
Kirklinton sandstones, St Bees Shales, and Stanwix Shales. At Carlisle itself the St
Bees sandstone is overlain by reddish till or boulder clay (Keeley in prep).

2.2   PREHISTORY

2.2.1   With the exception of a few Mesolithic flints recovered from several excavations in
the city centre, the earliest human activity in central Carlisle is represented by
ploughmarks found during excavations at Blackfriars Street (McCarthy 1990, 13-4),
Annetwell Street (Charlesworth 1979; Caruana in prep), the Millennium site (OA
North 2002b, 15-16), Rickergate (OA North 2002c, 17-18), and the northern Lanes
(Zant in prep a). At the latter site a metalled trackway, probably contemporary with
the ploughing, was also recorded, whilst at Rickergate shallow, irregular gullies
sharing a common alignment with the ploughmarks were interpreted as the remains
of possible field boundaries. Considerable numbers of largely residual prehistoric
flints have also been recovered from these and other excavations within the city
centre. The ploughing is interpreted as the remains of an extensive system of arable

fields associated with an as yet unlocated prehistoric settlement. Although this activity is not closely dated, the residual flint assemblage suggests a late Neolithic or early Bronze Age date.

2.2.2 Very little evidence for pre-Roman Iron Age activity has been found in the centre of Carlisle, although a roundhouse was excavated at Old Grapes Lane in the southern Lanes. This structure was found to be stratigraphically later than the ploughmarks, and immediately preceded the earliest Roman layers, being therefore probably of late Iron Age date (McCarthy 2000, 17). At Rickergate evidence for an ancient channel of the River Eden was found on the northern part of the site. A calibrated radiocarbon date of 120 Cal BC – Cal AD 80 (2015±40; BP OxA-7155) was obtained from a sample of organic material recovered from this feature (OA North 2002c, 17). The relative abundance of dung beetles in a second sample from the channel suggested the proximity of grazing land during this period (*op cit*, 187).

2.2.3 Beyond the modern city centre prehistoric occupation has been recorded at a number of low hilltop sites. On the eastern side of the city excavations at Durranhill revealed evidence for a probable Neolithic / early Bronze Age unenclosed settlement and two phases of palisaded enclosure that may have been of pre-Roman Iron Age date (McCarthy *et al* 1998, 4-5). Less than a kilometre to the north-west, a site at Botcherby was occupied by a probable Bronze Age roundhouse and other associated features (*op cit*, 5), whilst a short distance to the south an early Bronze Age cremation cemetery was found during construction of the Garlands hospital in 1861 (Hodgson 1956, 6-12). In 1996 a burnt mound was excavated on the lower slopes of the Garlands hill, only a few hundred metres north of the cemetery (LUAU 1996; Neighbour 1997).

2.2.4 Evidence for prehistoric settlement in the western part of Carlisle is more limited. However, the discovery of a group of five roundhouses on yet another hilltop site at the Cumberland Infirmary (Flynn and McCarthy 1993) suggests that many of the low hills in and around the modern city may have been occupied at one time or another in later prehistory. Although a few Bronze Age flint artefacts were recovered from the Infirmary site, the date of the settlement is not entirely clear and a late Iron Age or even early Romano-British date has been postulated.

2.2.5 At Stanwix, north of the River Eden, several phases of excavation at Cumbria College of Art and Design and the adjacent Beech Grove/Tarraby Lane/Knowefield area have recovered evidence, in the form of ploughmarks and buried soil horizons, for early arable cultivation over an extensive area (McCarthy 1999, 166; OA North 2005). Some structural remains, including gullies, cobbled spreads and other small features, were also present but their significance remains unclear. These activities pre-dated the construction of Hadrian's Wall in the AD 120s and the establishment of the stone Wall fort at Stanwix, which is conventionally dated to the AD 160s, but are otherwise not closely dated. However, the paucity of flint artefacts from the area might indicate an Iron Age rather than a Neolithic/Bronze Age date and this hypothesis is supported by a single calibrated radiocarbon date of 763-410 Cal BC (2465±50 BP; Bidwell 1999, 162) from a stratigraphically contemporary feature at Knowefield.

2.3 ROMAN PERIOD

2.3.1 From Roman times Carlisle (*Luguvalium*) has been a site of strategic importance (McCarthy 2002, 21), since it controls the north/south land route between England and Scotland on the western side of the Pennine range. The city also lies in close proximity to the western end of the Tyne-Solway gap, which forms one of the principal trans-Pennine routes, and close to the head of the Solway Firth, on a river that may once have been navigable for light craft. At the beginning of the Roman period Carlisle lay within the territory of the *Carvetii*, a people who appear to have formed part of the large Brigantian tribal confederation that occupied much of what is now northern England (Higham and Jones 1985).

2.3.2 Despite a long tradition of antiquarian interest in Roman Carlisle it has only been in recent years that additional information has become available regarding the origins, nature and extent of Roman settlement in the city. The presence of an early Roman fort had been suggested as long ago as the early twentieth century on the basis of ceramic evidence (Bushe-Fox 1913) but its existence and location remained unproven until the commencement of a major programme of excavation at Annetwell Street in 1973-1990 (Caruana in prep). This work was followed in 1998-2001 by a second major phase of excavation within the fort, which was undertaken as part of Carlisle City Council's Millennium project (Zant in prep b).

2.3.3 The excavations located the south and west ramparts and south gate of the primary turf-and-timber fort, together with the junction of two major roads (perhaps the east/west *via principalis* and the north/south *via praetoria*). Several internal buildings and other features, including barracks, workshops and what may have been the corner of the commanding officer's house (*praetorium*), were also found. The fort appears to have been roughly square in plan and measured approximately 2.85ha (*c*7 acres) over the ramparts. Exceptional preservation of organic materials was a feature of the earlier Roman levels. A defended annexe was located immediately south of the fort (McCarthy 1991; Caruana 1992), although it is not clear if this was a primary feature or was added later.

2.3.4 A programme of dendrochronological dating has established that the first fort was constructed in the winter of AD 72-3 during the governorship of Petillius Cerialis, a date confirmed by the occurrence of a significant group of pre-Flavian and early Flavian coins from the site (Shotter 2000, 10-41; 2001, 21-4). The interior of the fort was extensively refurbished in the autumn/winter of AD 83-4, perhaps for the arrival of a new garrison, and further refurbishment work is attested internally and on the defences in AD 93-4.

2.3.5 The nature of the original garrison is not clear; an early level at Annetwell Street produced a lead baggage sealing, probably of a cohort of Lingones. However, the fort was too large to have been built for this unit alone, so it is possible that parts of two regiments were brigaded together at this time. The refurbishment of AD 83-4 is likely to have been associated with the arrival of the *ala Gallorum Sebosiana*, a 500-strong cavalry regiment whose probable presence is attested on writing tablets from the site (Tomlin 1998). Some elements of the artefactual assemblages hint at the possible presence of legionary troops in the primary fort, although the evidence remains inconclusive. Another writing tablet from the annexe ditch records the presence of two legionaries of *Legio XX Valeria Victrix* in November AD 83, but it

is not known if these soldiers formed part of the fort garrison or were in Carlisle on other business.

2.3.6 The first fort was deliberately demolished around AD 103-5, after which the site was wholly or largely abandoned for a short time. However, deeply stratified deposits relating to at least two subsequent phases of fort overlay the earliest remains, indicating that the site had been occupied as a military base for most of the Roman period. The second fort, which was also built entirely of earth and timber, was occupied from *c*AD 105-140. A possible change seems to have occurred in the Hadrianic period, when at least some barracks were replaced by industrial-type buildings, including a smithy, and external cobbled surfaces. This may point to a shift in the function of the fort following the construction of Hadrian's Wall on the north bank of the River Eden in the AD 120s (Zant in prep b). The identity of the fort garrison during the first half of the second century is unknown, although it has been suggested on the basis of epigraphic evidence that the *ala Asturum* and the *ala Petriana* may have been in Carlisle during this period (Caruana in prep; Daniels 1978, 239-40).

2.3.7 The Hadrian's Wall fort at Stanwix (*Petriana*) was situated less than half a mile north of Carlisle but remains one of the least known of all the Wall forts. The existence of a primary fort on the site seems certain, although little direct evidence has yet been found (Caruana 2000, 74-5). The stone fort, which, at 3.96ha (9.78 acres), was the largest on the Wall, is conventionally dated to the AD 160s. This fort was the base of the 1000-strong *ala Petriana*, the senior auxiliary regiment not only of the Wall garrison but also of the entire army in Britain.

2.3.8 In Carlisle itself, the demolition and abandonment of the second fort around AD 140 was probably a consequence of the Antonine reoccupation of southern Scotland, when the northern frontier was advanced to the Forth-Clyde isthmus and Hadrian's Wall, together with many forts in its hinterland, went out of use (Breeze 1982). In the half century that followed, the fort site may have been occupied only intermittently. The character of this activity has proved difficult to determine, but it seems probable that the site was not occupied by a conventional fort during this period (Zant in prep b). Intensive occupation appears to have begun again in the early third century, when a rebuilding in stone occurred. Most of the excavated evidence suggests that this Severan installation was a fort of conventional type, but this is not entirely certain. What is clear is that occupation within the fort continued uninterrupted to the end of the Roman period, which on coin evidence extended into the beginning of the fifth century at least.

2.3.9 A building stone of *Legio VI Victrix* in the south-east corner of the stone headquarters building (*principia*) demonstrates that the fort was built by men of the York legion (Zant in prep b). It is possible that a detachment from this legion formed the primary garrison, although there is also good epigraphic evidence for the presence of legionaries from *Legio II Augusta* and *Legio XX Valeria Victrix* at Carlisle in the first half of the third century. The nature of the fort garrison in the later Roman period is not known.

2.3.10 South of the fort, excavations in 1977-9 at Blackfriars Street demonstrated that extramural timber buildings adjacent to the main road leading south were in use within a few years of the arrival of the Roman army (McCarthy 1990). More recently a probable Roman ditch has been identified nearby at West Walls

(Compton and Giecco 2004). The narrow first century building plots at Blackfriars Street, running back from the street frontage, remained in use to the end of the Roman period, although the buildings themselves were frequently rebuilt. During the course of the Roman period the settlement grew into a sizeable town covering much of the area later occupied by the medieval walled city. From the Hadrianic period the former annexe was absorbed into the civilian settlement, which spread over a large area to the south and east of the fort. A milestone recently discovered near Penrith proves that the settlement had become the tribal capital of the Carvetii (*civitas Carvetiorum*) by AD 223, and it is possible that *civitas* status was conferred on the town by Septimius Severus some years earlier (Shotter 2004, 1). As with the fort, the first stone buildings appear in the town during this period, including a possible forum or *mansio* in the Abbey Street area (Caruana 1996) and a possible bathhouse beneath the present Market Hall (Frere 1991, 235). There is good evidence from a number of sites that intensive occupation within the town continued into the late fourth - early fifth centuries at least.

2.3.11 At the northern Lanes, where an extensive programme of excavations was undertaken in the late 1970s and 1980s, an early ditched enclosure (possibly a marching camp) was overlain in the second century by a sequence of extremely large timber buildings of a military and/or 'official' nature (McCarthy 2002, 75-7). One of these structures has been interpreted as a possible *mansio* (Black 1995, 23-4 and fig 16a). Later, a second large timber building, perhaps also a *mansio* (*op cit*), was built further to the east. During the second half of the second century narrow building plots containing timber structures, pits and cobbled yards were laid out at right angles to a major north/south Roman road beneath modern Scotch Street, suggesting that the area had been incorporated into the expanding civilian settlement by this date. In one of these plots an early third century rectangular stone-footed building developed during the fourth century into a winged-corridor house with a heated room. Intensive occupation continued into the second half of the fourth century at least (Zant in prep a).

2.3.12 On the southern part of the Lanes site the sequence of Roman activity was quite different to that recorded further north. Here, from as early as the late first century AD, comparatively small timber buildings of apparently agricultural and domestic function were erected. Some of these structures were associated with metalled yards and were situated within quite large plots defined by hedges or fences (McCarthy 2000). This occupation seems to have continued into the second half of the second century, after which activity may have declined. Second century Roman civilian occupation has been investigated at Fisher Street, where two pottery kilns were recorded (Cameron 2002, 18-9). Later deposits were truncated. Nearby, at 42-48 Scotch Street, three major phases of Roman occupation were noted stretching from the first through to the fourth century. The nature of the development proposals here meant that only those deposits dating from the mid second century onwards were investigated in detail. It is possible that some of the structures noted relate to the possible *mansio* noted in the northern Lanes (*Section 2.3.13*). After an hiatus in the late second century intensive activity recommenced on the site in the third century with the erection of a small, apparently low status, timber building. A similar building replaced it in the early to mid fourth century (Giecco 2004, 61-6).

2.3.13 At certain times during the Roman period quite extensive suburbs extended along the main roads leading north and south from the town. To the north, occupation

adjacent to a presumed Roman road beneath modern Rickergate, leading north to the river crossing, was preceded by a major episode of landfilling over an old river channel (*Section 2.1.5* above) (OA North 2002c, 18-19). Several phases of timber strip-buildings and associated external deposits dating from the late second to fourth centuries were recorded on the eastern side of the road. What evidence there is suggests that the Roman bridge over the Eden was situated close to the site of the present bridge (Caruana and Coulston 1987, 50).

2.3.14 The principal cemeteries appear to have been situated on the south side of the town, adjacent to the main north-south road represented by modern Botchergate (Patten 1974). Burials, both cremations and inhumations, have been found on sites a considerable distance from the main settlement, including St Nicholas Yard (Howard-Davis and Leah 1999, 91-95; 109-111). Recent excavations on the eastern side of this road, approximately 700m south of the fort, revealed a number of cremation burials of late first century date (Giecco *et al* 2001, 17-18; OA North 2002d, 11). The burials were overlain during the first half of the second century by regularly-sized building plots running back from the Botchergate frontage. Some of the timber buildings within these plots were clearly used for industrial purposes, whilst others appear to have had a domestic function. Later, probably during the third century, occupation declined and the area was once more used for burial, with both cremation and inhumation being practised at this time. On the west side of Botchergate there is evidence for timber buildings datable to the second to fourth centuries AD (Cracknell and Martin 2004).

2.3.15 On the eastern side of Botchergate, excavations at Collier Lane revealed a small number of second century cremations and a substantial north/south aligned earthwork that had once supported a timber superstructure (Zant 2000). The significance of this feature is unclear, but it has been suggested that it may represent the base of an aqueduct. From the late second century to the second half of the fourth century the excavated area between the earthwork and the Roman road beneath Botchergate appears to have been used as a rubbish dump. There is some evidence to suggest that the deposition of rubbish in this area may have been regulated.

2.4   EARLY MEDIEVAL PERIOD

2.4.1 The nature of settlement at Carlisle in the earlier post-Roman period is difficult to determine. In view of its long history as a Roman administrative centre and its position at the hub of a system of roads, the town is unlikely to have been completely abandoned, and would probably reflect some degree of continuity, as a settlement or administrative centre. During the sixth century Carlisle is traditionally placed within the British kingdom of Rheged (Kirby 1962, 79 quoting Hywel ab Owen (d 1170)), although archaeological and historical evidence for the town at this time are almost entirely lacking. That the settlement contracted considerably at the end of the Roman period is indicated by the presence, on most excavated sites in the city centre, of a thick accumulation of dark soils above the latest Roman levels. The fact that these soils are normally directly overlain by deposits of twelfth century and later date suggests that many areas remained unoccupied until the beginning of the Norman period.

2.4.2   Structural remains of possible fifth / sixth century date have however been recorded within the area of the Roman town at Blackfriars Street, Scotch Street and at the cathedral (McCarthy 2002, 138-9; Giecco 2004). Other than specific objects, the evidence for early medieval activity consists primarily of features that stratigraphically date to somewhere between the end of the fourth century and the twelfth century. Likewise, some of the very latest structural activity within the forts at Carlisle and Stanwix could conceivably belong to this period (McCarthy 2002, 134-6). In all cases, however, dating of these deposits relies on stretched chronologies rather than direct evidence, although excavations at the cathedral in 1988 produced a brooch of a fifth to seventh century type from the post-Roman dark soils (McCarthy 1993, 33).

2.4.3   The history of the putative kingdom of Rheged is obscure but the Carlisle area was traditionally thought to have been part of it, and in the first part of the seventh century the kingdom was absorbed into the expanding Anglian kingdom of Northumbria; from this period onwards occasional historical references to Carlisle survive. By the late seventh century the settlement formed the centre of a royal estate 15 miles in circumference, which the Northumbrian king Ecgfrith gave to St Cuthbert, bishop of Lindisfarne, in 685 (Summerson 1993, 10). Cuthbert, in turn, used the grant to establish and endow a nunnery in the town. That this establishment was situated in the area now occupied by the cathedral and St Cuthbert's church is suggested by this church's dedication and unusual alignment, and by discoveries of eighth-century cross fragments in this area during the nineteenth century. It is even possible that a substantial post-Roman timber building, excavated at the cathedral site, was associated with this monastery (McCarthy 1993, 34).

2.4.4   During Cuthbert's visit to Carlisle in 685 he was shown the town walls (possibly the fort defences, since there is as yet no evidence that the town itself was walled) and a working Roman fountain by Waga the reeve (*praepositus*) and other citizens (Webb 1998). The use of the old Roman title *praepositus* and the civic pride evident in Cuthbert's guided tour suggest a surviving connection with Carlisle's Roman past at this time.

2.4.5   By the late ninth century control of Carlisle and its region passed from Northumbria, whose power was waning, to the British kingdom of Strathclyde or Cumbria, which itself owed allegiance by this time to the king of the Scots (Summerson 1993, 1). Scandinavian influences during the tenth century are attested by the recovery of a small number of diagnostic artefacts from several city centre sites, including metalwork from a tenth-century cemetery at the cathedral (*Section 2.4.7* below). In the mid-eleventh century the region came briefly under English control but was recovered by Malcolm Canmore in the 1060s (*op cit*, 14-15), after which it remained in Scottish hands until the arrival of the Norman king William II in 1092.

2.4.6   During the twelfth century the chronicler John of Worcester claimed that by the late eleventh century Carlisle had been deserted for 200 years following its destruction by the Danes (Summerson 1993, 11). The nunnery founded by St Cuthbert may indeed have been sacked in the late ninth century, perhaps shortly after 876 (McCarthy 1993, 37), but John's assertion is not supported by the archaeological evidence, which proves that occupation persisted throughout the early medieval period. Excavations at a number of sites in the modern city centre have produced a

sparse but fairly widespread distribution of ninth-eleventh century coins, artefacts, and (to a lesser extent) archaeological features. The evidence includes three dendrochronological dates, one of the seventh century from a timber-lined pit at Blackfriars Street (McCarthy 1990, 72-3) and two of the late eighth-early ninth centuries from timber pits at Castle Street and the southern Lanes (McCarthy 1991, 48-50; 2000, 48). An isolated inhumation burial from the Castle Street site also produced a radiocarbon date of 640-1000 (McCarthy 1991, 49). The Lanes pit produced a Trewhiddle-style strap-end mould of the ninth century AD.

2.4.7   A principal focus of occupation during this period lay in the vicinity of the cathedral, where excavations in 1988 revealed evidence for a tenth century cemetery (Gaimster *et al* 1989, 174). The distribution of ninth century Northumbrian stycas, of which over 50 have been recovered, also shows a marked concentration on the western part of the city centre, particularly around the cathedral. It seems likely that this activity was associated with a church that may have occupied the site of the present cathedral. There are also hints that the church of St Alban, on Scotch Street, which is first recorded in 1201, may have been pre-Norman in origin (McCarthy 2000, 48) and there may have been other pre-Norman buildings along Scotch Street (Giecco 2004, 69-70.

2.5   LATER MEDIEVAL PERIOD

2.5.1   *The Anglo-Saxon Chronicle* records that in the year 1092 William II led an army north to Carlisle (Earle and Plummer 1892). The king drove out a certain Dolfin, who may have been the son of Gospatric, a former earl of Northumbria. Since Gospatric had fled to Scotland around 1074 and was given lands by the Scottish king, Dolfin's presence in Cumberland has been taken to show that the region was part of the kingdom of the Scots prior to 1092 (Summerson 1993, 47). William constructed a castle and brought settlers from the south to inhabit the re-established town. No trace of the early castle has been found and its location is unknown, but it was almost certainly built of earth and timber and was probably of the motte and bailey type. It is conceivable that it occupied the site of the present stone keep, and may have utilised what remained of the north-east angle of the Roman fort defences (McCarthy *et al* 1990, 11, 28).

2.5.2   The Norman hold on Cumberland was consolidated by William's brother Henry I, who visited Carlisle in 1122 (Earle and Plummer 1892). At this time the position of the Anglo-Scottish border was still a matter for dispute between the two nations, as illustrated by a contemporary Scottish description of Carlisle as lying 'between England and Scotland' (Kennedy 1973, 96). During his stay Henry took measures to strengthen Carlisle's position within his kingdom, providing money for the construction of 'walls and towers' around the town and for the foundation of the Augustinian priory of St Mary's (Summerson 1993). The priory subsequently became a cathedral with the creation of the see of Carlisle in 1133 (Perriam 1987, 127). It was probably also during Henry's reign that construction work began on the stone castle, whilst the hospital of St Nicholas on the south side of the city may have been another of his foundations. The discovery of a rich vein of silver at Alston in 1130 was followed by the establishment of a mint at Carlisle around the time of Henry's death in 1135, which is likely to have provided a stimulus to the development of the city as a commercial centre. The mint closed in 1208 when the

silver was exhausted but re-opened briefly to facilitate Henry III's recoinage of 1247-8 (Summerson 1993).

2.5.3   As a consequence of the unsettled conditions that prevailed in England following Henry's death large parts of the northern English counties, including Carlisle, came under Scottish control (Kapelle 1979). The Scots king, David I, heightened the city walls and built or completed the castle's stone keep. However, the city reverted to English rule in 1157 and probably received its royal charter from Henry II in the following year (Summerson 1993).

2.5.4   During the comparatively stable period from the mid-twelfth to late thirteenth centuries the story of Carlisle is one of sustained, if not spectacular, growth, both in terms of population density and prosperity, although for the English kings its primary function remained that of the border fortress. In 1231 the city, which had previously been administered by the king's reeve, attained self-governing status and burgesses were able to elect a mayor from their own ranks. By this time the greater part of the modern street system within the city centre had been established. The arrival of groups of Franciscan and Dominican friars in 1233 demonstrates that the city was sufficiently large and prosperous by this time to support such communities. However, the fact that both friaries were located within the city walls (the Dominicans having relocated from a site outside the south gate in 1238) shows that plenty of space still remained within the defences (*ibid*).

2.5.5   By the later twelfth century suburbs had developed outside all three of the city gates, on Botchergate to the south, Rickergate to the north, and Caldewgate to the west. Also on the western bank of the Caldew was the *vicus Flandrensis*, or Flemish quarter (Jones 1976, 83), which is thought to have lain in the vicinity of modern Shaddongate. Records suggest that during the twelfth to thirteenth centuries a church dedicated to the Holy Trinity was located in the Caldewgate suburb. The discovery of approximately 40 burials during the laying of a sewer beneath Bridge Street in 1959 may point to the location of a cemetery associated with this church (Perriam 1979, 51-3). In addition to the hospital of St Nicholas to the south of the city, a second hospital, that of St Sepulchre, existed 'in the suburbs of Carlisle' in the thirteenth and early fourteenth centuries, although the precise whereabouts of this establishment are not known (Wiseman 1987, 85).

2.5.6   A number of documentary sources from the late thirteenth to early fifteenth centuries refer to the existence of several water mills along the course of the Caldew (Summerson 1993, 333-4). Records of 1382 and 1427, referring to a stream or water-course, may provide the earliest evidence for the existence of a mill-race that is referred to in post-medieval records and is shown on eighteenth / nineteenth century maps of the city (Jones 1985, 187-9). This stream, which is named as the Corporation Dam on Hutchinson's map of 1794, flowed from east to west roughly on the line of the modern railway, between the Caldew on the south and the bluff occupied by the city's western defences to the north. What may have been part of the stream channel was excavated in 1997 on James Street, a short distance upstream from the walled city (Drury 1998).

2.5.7   By contrast with the preceding 150 years, the last decade of the thirteenth century heralded the beginning of a disastrous period of unrest for Carlisle and the wider region. Destruction of much of the city by fire in 1292 was followed four years later by the onset of the Anglo-Scottish wars, during which the city was attacked and

besieged on a number of occasions. By 1316 disruption to trade and commercial activity caused by the wars and by further serious fires had reduced the revenues of the city to less than half of what they had been in 1292. The unprotected suburbs are likely to have suffered particularly severely; in Caldewgate, the Bishop of Carlisle's revenues from rents fell from 10 shillings in 1253-4 to only two shillings in 1329, and other documents point to a similar decline during the fourteenth century (Perriam 1979, 53-54). Recent archaeological evidence, however, has shown that the area was actively being used by metalworking enterprises in the later fourteenth century, with archaeomagnetic dates from kilns demonstrating that they post-date the early fourteenth century Scottish sieges (F Giecco pers comm). A fragile peace negotiated in the 1320s had broken down a decade later, leading to several centuries of warfare, raiding and skirmishing in the border region. The city was impoverished for much of this period and there are frequent documentary references to the citizens being relieved of their obligations for the payment of taxes and subsidies due to the 'depression of the state of the people'. The impact of the arrival of the Black Death in 1349 is uncertain, but the city's population may have been reduced by a third or more and further outbreaks of plague are recorded in 1361, 1380 and 1391. Another major fire in 1391 is said to have destroyed approximately three-quarters of the city (Summerson 1993).

2.5.8 Throughout this period the stone castle and the city defences, which were originally constructed during the twelfth century, were continuously in need of repair, as documentary references attest. Concerns were frequently expressed about their decayed and ruinous state, which appears to have resulted more often than not from long periods of neglect rather than warfare. The castle was (and indeed remains) a royal possession and responsibility for its upkeep rested with the king, who was also responsible for maintaining the city gates and the curtain wall (Summerson 1993, 123). In the case of the city defences, however, the task of upkeep was entrusted to the citizens themselves through periodic murage grants provided by the king, and it seems they may also have been responsible for maintaining the ditches (*op cit*, 269).

2.5.9 Carlisle may never have been very densely occupied in medieval times and large areas within the walled area probably remained open in all periods. References to waste places and gardens increase in frequency from the later fourteenth century, however, and the population may have continued to decline during the fifteenth century. The cathedral, which had been severely damaged in the fire of 1292, was still not fully repaired at the beginning of the fifteenth century, although a major programme of building works around 1410-20 saw the completion of the tower and spire and the construction of the north transept. Intermittent warfare continued for much of the century and the city was besieged in 1461, during the Wars of the Roses, although in general these wars were less catastrophic than those of the previous century (Summerson 1993). However, extremely unsettled conditions continued to prevail across the entire border region until the Union of the Crowns in the early seventeenth century. Consequently, the city appears to have remained under populated and relatively impoverished well into the post-medieval period.

2.5.10 With the exception of the castle, the cathedral and its associated buildings, and the remains of the western city walls, only two structures of medieval date survive today in the centre of Carlisle. These are the Guildhall in the market place (now a museum and restaurant), which was constructed in the mid-fourteenth century but

was extended and modified later, and the priory's tithe barn on West Walls (now a community hall). The latter was constructed during the second half of the fifteenth century, during the time of prior Thomas Gondibour (Davey 1972, 74-75).

2.5.11 Extensive archaeological investigation of medieval deposits has been undertaken at several city centre sites. Excavations within the demolished section of the cathedral nave uncovered burials and other features relating to the medieval structure (Gaimster *et al* 1989, 174). Work at Blackfriars Street exposed part of the cemetery of the Dominican Friary, together with the poorly preserved remains of part of the friary church and ancillary buildings (McCarthy 1990). At the south end of Scotch Street parts of St Alban's Church and burial ground were discovered in 1989 (Gaimster *et al* 1989, 174) and in the Botchergate suburb part of the hospital of St Nicholas has also been excavated (Howard-Davis and Leah 1999).

2.5.12 At the castle an extensive fabric survey and documentary history was undertaken in the 1980s (McCarthy *et al* 1990), but very little excavation has been carried out within the castle complex. The most extensive investigation occurred during the Millennium excavations of 1998-2001, when the remains of twelfth / thirteenth century timber buildings and external surfaces located within the castle's outer ward (today occupied by Castle Green) were exposed (Zant in prep b). These deposits were sealed by a thick layer of soil that may relate to gardens and orchards that are mentioned in documents of the 1380s and appear on a map of 1560. Also during the Millennium project a section was dug across the massive ditch that had separated the outer ward from the city to the south. This feature was of probable twelfth century date and appears to have been recut during the thirteenth century. It is conceivable that documentary references to ditch construction in 1173 and the building of a bridge (presumably spanning a ditch) between the castle and the town in 1197 (Jones 1976, 94) refer to this feature. By the late fourteenth century the ditch was no longer maintained as a defensive feature and buildings and fences encroached into it from tenements fronting medieval Annetwell Street. This encroachment may have been broadly contemporary with the commencement of intensive development immediately south of the ditch (Jones 1999, 130-131).

2.5.13 Only a limited amount of excavation has been undertaken on the medieval city defences themselves. In 1973 short sections of the curtain wall were exposed in three small trenches on the line of West Tower Street (Charlesworth 1974, 211-12) and the wall foundation and its construction trench were exposed on Castle Green during the Millennium project (Zant in prep b). At the southern end of the walled area archaeological investigations in 1979 adjacent to The Courts revealed part of the curtain wall and what may have been a ramp giving access into the south gate (McCarthy 1980). However, the most substantive piece of work took place in 1998-9, when excavations at Rickergate on the northern defences exposed the defensive ditch fronting the curtain wall (Zant *et al* in prep). Two principal phases were recorded, with a primary ditch of probable twelfth / thirteenth century date being replaced in the fourteenth century by a second ditch that probably remained partially open into the eighteenth century. A poorly preserved section of the curtain wall foundation was also revealed.

2.5.14 Within the city itself, excavations at the Lanes exposed parts of several medieval tenements east of Scotch Street. Development of this part of the city probably commenced in the late twelfth or early thirteenth century, although the cobbled

lanes from which the area derives its name were not laid out until the early fourteenth century (Zant in prep a). There is some evidence to suggest that the upstanding remains of a Roman stone-built townhouse influenced the layout of the medieval property boundaries on the northern part of this area. Although the Scotch Street frontage lay outside the excavated area a complex sequence of timber buildings, yards and other external deposits was recorded. Most of the tenements were continuously occupied from the late twelfth to early thirteenth centuries to at least the fifteenth / sixteenth centuries. Similar remains have recently been recorded on the western side of Scotch Street, immediately opposite the Lanes site (F Giecco pers comm).

2.5.15 Little archaeological work has been undertaken within the medieval suburbs of Carlisle. Where excavations have been undertaken, for example at Rickergate on the north (OA North 2002c) and Botchergate to the south (Giecco *et al* 2001; Zant 2000; OA North 2002d), most medieval remains were found to have been destroyed by late post-medieval cellars and other building works. However, sufficient evidence survived to demonstrate that medieval occupation on the south side of the city extended along Botchergate at least as far as modern Tait Street and Crown Street. Truncated medieval features, recorded on the eastern side of Rickergate in 1998 (OA North 2002c, 28), probably represented the remains of one or more timber buildings fronting a street extending northwards from the Scotch Gate to a crossing of the River Eden. The precise location of the river crossing is not known due to later changes in the course of the river, although a massive masonry feature, discovered during construction of the Civic Centre in the 1960s, may have been the southern abutment of the medieval bridge (M McCarthy pers comm).

2.6   POST-MEDIEVAL PERIOD

2.6.1 One of the most significant historical events to occur during this period was the Dissolution of the monasteries by Henry VIII in the 1530s. In Carlisle this led to the disappearance of both friaries and the re-foundation of St Mary's Priory as a cathedral with dean and chapter. Some of the buildings of the Dominican Friary were initially retained for meetings between the English and Scottish march wardens, but most structures, including the church, were demolished, as were all the buildings of the Franciscan Friary (Summerson 1993). Many of the materials stripped from these sites were used in building works and repairs at the castle and on the city defences. What remained of the hospital of St Nicholas, which seems to have suffered a severe decline in its fortunes during the fifteenth century, had already been made over to the priory in 1477, from whence it passed to the Dean and Chapter of the cathedral in 1541 (Wiseman 1996, 63-4).

2.6.2 During the later sixteenth and seventeenth centuries Carlisle began the slow process of recovery from the period of warfare and plague that had prevailed during the later Middle Ages. From 1560 a state of peace existed between England and Scotland, although the Border region remained extremely unsettled throughout the sixteenth and early seventeenth centuries and this is likely to have had a detrimental effect on trade and commercial activity (indeed if the *Border Papers* are anything to go by it became more unsettled in the last decades of the sixteenth century (McDonald Fraser 1971)). The city's slowly increasing population, which a 1534

muster-roll suggests may have stood at approximately 1700, suffered a further setback with another visitation of plague in 1597-8 (Hughes 1971).

2.6.3 By the 1530s extensive works on Carlisle's defences were once again urgently required. This time, however, repairs to the city walls themselves were regarded as uneconomic and resources were instead targeted on a major refurbishment of the castle and the construction of the Citadel on the site of the medieval south gate. The idea was not to defend the entire city from Scottish attack, as had been the case previously, but to make occupation untenable through the creation of strong-points at the northern and southern ends of the defences. However, by the 1550s the scheme appears to have been abandoned and large sums were again spent on repairing the city walls, using stone from the demolished friary buildings. In spite of these works, records from the 1560s tell of collapses at various points and the earliest surviving plan of Carlisle, which was produced around 1560 and first published in 1815 (Lysons 1815, 56), clearly shows missing sections of walling. That the defensive ditches were also suffering from a lack of maintenance is suggested by documentary references to the growing of vegetables within these features and the ploughing-up of banks and ditches on the eastern side of the city (Summerson 1993).

2.6.4 Changes to the topography of the city were not always due to the works of Man, however. In 1571 a 'disastrous flood' caused the River Eden to divide into two main channels (Hogg 1952, 137); the original, southernmost, channel lay well to the south of the river's present course, which today follows the approximate line of the more recent northern channel. This new channel, which became known as the Priest Beck, was spanned by a timber bridge built between 1597 and 1601. Both this bridge and the medieval bridge over the original channel were replaced by stone structures soon after 1601 (*ibid*).

2.6.5 Within a few years of the accession of James VI of Scotland to the English throne (as James I) in 1603, the era of Border raiding came to an end and both Carlisle and the wider region enjoyed a period of peace and comparative prosperity. However, during the Civil Wars the threat of trouble returned once more and in 1644 the royalist stronghold of Carlisle was besieged by the Scots. The city was ringed with siege works, about which very little is known beyond the approximate location of some of the principal batteries. The city surrendered in June 1645 but changed hands once more three years later and was surrendered again, this time to Cromwell in person. During the Scottish occupation most of the cathedral's nave, part of which had long been used by the citizens as their parish church, was demolished, together with a number of other former priory buildings (Perriam 1987).

2.6.6 The century following the end of the Civil Wars was a time of peaceful, if slow, development for Carlisle. Even as late as the beginning of the eighteenth century many of the buildings within the city were constructed of timber, but from the late seventeenth-early eighteenth centuries the use of stone in both public and private buildings became increasingly common. One of the first to be built was the Old Town Hall, which was constructed in 1669 and was later extended. Little is known about the private residences of this period as few have survived, a notable exception being the house of Isaac Tullie on Abbey Street, which was built in 1689 and today forms part of Tullie House Museum and Art Gallery (McCarthy 1993, 109).

2.6.7   During the first half of the eighteenth century the city walls were so ruinous that the citizens themselves demolished certain stretches that had become unsafe. In 1745, the parlous state of the defences was brought into sharp focus during the Jacobite uprising, when it was found that parts of the eastern curtain wall had been demolished and that the castle defences were much decayed. After a short siege the Jacobite army took possession of the city in November 1745, but surrendered it the following month following bombardment by the Duke of Cumberland (*op cit*, 83-4). In the aftermath of the uprising a plan of the city defences was produced by the Board of Ordnance (1747) and various schemes were proposed for their strengthening, although very little was actually done.

2.6.8   In the second half of the eighteenth century Carlisle was a small and somewhat sleepy county town of perhaps 4-5000 people. Most of the population continued to live within the medieval city defences, where ample space was still available, although the Rickergate, Botchergate and Caldewgate suburbs continued to develop during this period. By the time of the 1801 census, however, the population had risen to approximately 10,000 and the city walls were beginning to be viewed as a hindrance to expansion and re-development and the free movement of traffic in and out of the city. Extensive demolition of the curtain wall along what became West and East Tower Streets on the north and Lowther Street on the east occurred during the early nineteenth century and was largely complete by 1815 (Perriam 1976, 184-98). However, the greater part of the West Walls was spared and these survive to this day, since the steep scarp on which they were built precluded expansion of the city in that direction. The medieval Scotch (north) Gate was demolished in February 1815 and its remains were thrown into a raised causeway associated with the new Eden Bridge, which was under construction at the time (MacDonald 1971, 256). During construction of the bridge the south channel of the river was permanently blocked. At much the same time masonry from other parts of the demolished city walls was being used in the construction of the Courts on the site of the medieval Citadel. This work involved rebuilding and refurbishment of the Citadel's eastern bastion and the construction of a northwards extension comprising a hall and ancillary offices. The western bastion was levelled completely and a new tower was constructed further west (Hughes 1970, 209).

2.6.9   Census records indicate that Carlisle's population continued to rise sharply during the first half of the nineteenth century (McCarthy 1993, 84), reaching 35,000 by 1841. However, cartographic sources, including Hutchinson's map of 1794, Wood's plan of 1821 and Asquith's map produced for the Board of Health in 1853 (Asquith 1853), show remarkably little evidence for significant expansion of the built-up area during this period. Indeed, even as late as 1850 Carlisle covered an area not much bigger than that of the medieval city, although the population was of course many times larger than it had been several hundred years earlier. That this led to chronic overcrowding in some parts of the city, including the Lanes area and the Rickergate suburb (which are shown as densely built-up areas on the Board of Health map), is clear from a report of 1850 produced by the Carlisle Sanitary Association, which records families living 20 to a room 'adjacent to the filthiest privies and dunghills' (McCarthy 1993, 90).

2.6.10 By the time the first edition Ordnance Survey map of Carlisle was produced in 1865 the city had begun to expand significantly beyond its medieval boundaries and this growth continued apace during the second half of the nineteenth century and into

the twentieth century. Between 1881 and 1903 some 3700 new houses were built. Most were constructed outside the historic city centre, greatly increasing the size of all the suburbs and extending the built-up area well to the east of Lowther Street (which had itself been laid out on the line of the medieval eastern defences). In the city centre too, what remained of the old open spaces to the rear of the street frontages were increasingly infilled with housing and workshops. North of the river the construction of new housing and business premises began the process of transforming Stanwix from a small village into a city suburb.

2.6.11 One potentially significant impact on the development of Carlisle was the construction of the Carlisle Navigation Canal to link Carlisle to the sea at the Solway Firth. It was constructed between 1821 and 1823 and ran between Carlisle and Fisher's Cross, near Bowness on Solway, which was thereafter called Port Carlisle (Ramshay 1997). While the canal provided much needed communications for Carlisle and allowed for some industrial expansion of the town; it was not the catalyst for a rapid expansion of the town (*ibid*). It was rapidly overtaken by the development of the railway network and in 1853 the canal was closed so that its route could be used for a railway extension between Carlisle and Silloth Bay (*op cit*, 135).

2.6.12 Although no single factor can explain the rapid growth of Carlisle in the mid nineteenth century, the arrival of the railway in 1836 and the subsequent development of the rail network in the region are likely to have been significant factors affecting the city's development. The Newcastle to Carlisle railway was fully opened in 1838 and by 1845 the Carlisle to Maryport line was providing a rail link to the Irish Sea coast (McCarthy 1993, 86). Initially the Newcastle-Carlisle railway was served by a station on London Road; the Carlisle-Maryport railway opened a station in Crown Street in 1844 and by 1854 a third station existed to serve the Port-Carlisle railway. Rationalisation began in 1850 with the opening of the present Citadel Station.

2.6.13 During the nineteenth century Carlisle became the leading industrial and commercial centre in the county, although it never achieved the prominence of the big industrial centres of Lancashire and Yorkshire. As early as the 1720s a mill for the manufacture of broad cloth was built on the mill-race adjacent to the river Caldew (Jones 1985, 186-191) and from the second half of the eighteenth century textile manufacture became increasingly important in the city. Shaddon Mill on Shaddongate, with its 320-foot chimney, was built in 1836 and survives as one of the city's most striking monuments to this period. Clockmaking, brickmaking, ironworking, manufacture of tin-plate, and the production of biscuits also developed into significant industries during the nineteenth century and remained so well into the twentieth century (McCarthy 1993, 87-88).

2.6.14 In spite of the many extensive archaeological excavations that have been carried out in central Carlisle over the past 30 years, virtually no work on archaeological remains of post-medieval date has been undertaken. A major programme of building survey and recording was, however, formulated for a large number of post-medieval structures in the Lanes area prior to demolition and redevelopment. Most of these buildings were of nineteenth century date, although elements of eighteenth century (and in at least one case probable late seventeenth century) structures were also recorded. At the Carnaud Metal Box site on James Street, the channel of a

post-medieval mill leat was excavated and evidence for nineteenth century occupation was recovered (Drury 1998). Excavation at the medieval hospital of St Nicholas to the south of the city centre also recorded evidence for the development of the site in the post-medieval period (Howard-Davis and Leah 1999, 97-8), whilst several post-medieval burials within the cathedral cemetery were investigated during the course of the 1988 excavations (Keevill 1989).

3. AIMS AND OBJECTIVES OF THE URBAN ARCHAEOLOGICAL STRATEGY

3.1 GENERAL PRINCIPLE

3.1.1 The detailed management of the urban archaeological resource requires a staged approach (English Heritage 1992; 1993):

- Pilot study: to allow precise details of timetable and cost to be established (undertaken by CAU but largely superseded by the Carlisle Archives Project);

- Creation of UAD (data collection and manipulation using GIS);

- Creation of Urban Archaeological Assessment (UAA), resulting in publication;

- Production of Urban Archaeological Strategy (UAS) (planning tool);

- Enhancement/maintenance of UAD; use as planning tool/amenity/educational tool.

3.1.2 The UAD will be a sophisticated and sensitive planning tool and will be a new element of the HER held by Cumbria County Council. It will optimise the management of the archaeological resource within the bounds of the city through the creation of an Urban Archaeological Strategy. To this end, it will be GIS-based, a principle that has already been established in other similar projects. It is vital that, from its inception, the project be resourced accordingly.

3.1.3 The present project design defines only the second stage of the Urban Archaeological Strategy: the creation of the UAD, although it has been compiled with the subsequent stages in mind. The staged approach is regarded as vital to ensure a well-targeted and cost-effective product.

3.2 THE AIMS OF THE OVERALL PROJECT

3.2.1 The primary aim of the overall project is, and must remain, the development of an Urban Archaeological Strategy, a valid and reasoned document for the future management of the archaeological resource, including in effect an improved 'early-warning system' in terms of development control. This will be a significant contribution to the planning process, highlighting the most archaeologically important parts of the city. The creation of such an Urban Archaeological Strategy would follow on from the compilation of a UAD, from which an Urban Archaeological Assessment can be made. The continued maintenance of such a city-wide database is vital to the future review and updating of the Urban Archaeological Strategy.

3.2.2 The overall Urban Archaeological Strategy will be based upon a fundamental underlying research agenda, designed and implemented from the outset of the project. The agenda will be designed to investigate the evolution of this major English city. It will make it possible to review the settlement as a single archaeological and historical entity, not only as the sum of its parts, and to

demonstrate how interaction between the separate elements has influenced the development of the modern city. Furthermore, by interface with the county-wide HER it will highlight the context of the city within its wider environs.

3.2.3   The Urban Archaeological Assessment should strive towards presenting the evolution of Carlisle's historic core and, to a degree, its interaction with its social and economic hinterland through communication links, industrial supplies, markets, agriculture and so on, using multiple lines of evidence brought together through the presentation and synthesis of data to produce 'time slice' views of the present city at critical moments in its development.

3.2.4   It is important that such a project should not simply service the needs of town planners and archaeologists, although these are fundamental to its rationale, but that the results should be accessible and comprehensible to the inhabitants of Carlisle today, who are, indeed, part of the history of tomorrow. The feasibility of on-line presentation of some datasets should be considered as part of the archaeological assessment, as the UAD would be an important potential amenity asset. It may involve the establishment of a hypertext document serviced by the database (constant update) available at terminals in the City Library, Tullie House Museum and Art Gallery, and the City Council offices, and could be made more widely available by providing an interactive graphic and textual summary of the UAD on CDs, which could then be made available to schools. Such presentations should be designed with a view both to teaching and interactive data-gathering and should be of great benefit as a source of material for local history and education, involving the inhabitants of the city and region in an unobtrusive but valuable fashion, for instance drawing on the life experience of industrial workers, and the responsible reporting of new finds and other material within the defined area. This would serve as a valuable response to a common public grumble that archaeological developments are not adequately reported to the general populace.

3.3   OBJECTIVES OF THE OVERALL PROJECT

3.3.1   To achieve the aims defined above, there is a need to create and verify a definitive UAD of known archaeological material within the study area, in the form of event and monument records, as defined by other UADs (Darvill and Gerard 1994) and in *Section 5.3*. Supplementary source material describing events and monuments will also be recorded.

3.3.2   The creation of this UAD will require the rapid appraisal and assessment of the survival of known archaeological deposits and upstanding remains to provide information on the thickness, volume, character, date and interpretation, if applicable, as well as information as to the recording of that information to date. From this, an archaeological and historical framework for the city should be developed, utilising the predictive modelling capabilities of the system, in the form of an Urban Archaeological Assessment.

3.3.3   Finally, policies for the future management of the archaeological resource should be formulated, to produce a proactive response to the needs of the resource, including policies on conservation, preservation, protection, presentation and display, future research, and also contingency options, to build on those already in place. This will

take the form of an Urban Archaeological Strategy and will be compiled by Cumbria County Council in conjunction Carlisle City Council.

3.4 URBAN ARCHAEOLOGICAL DATABASE

3.4.1 The UAD will be a functioning GIS providing the opportunity to interact between textual and graphic 'event' and 'monument' records. Table 1 below provides a brief outline of the components that will form the final product, which are described in more detail in *Section 5*.

Database Tables	Corresponding GIS Overlays
Recognition Events	Event Points
	Event Polygons
Monuments	Monument Points
	Monument Polygons
Bibliographic sources	n/a (hotlink functionality will provide link to these)
Image Sources	n/a (hotlink functionality will provide link to these)
Deposits	Deposit Model
	Modern Vector Mapping
Documentary Events filtered from main Events Table	Documentary Information Extent Polygons
	Historic Raster Mapping

Table 1: Brief outline of the components of the UAD database and GIS

3.4.2 One of the principal aims of the UAD is to establish not only known archaeological deposits but also to identify the potential for survival of such deposits, which can be achieved by establishing negative evidence as well as positive, in order to highlight areas of potential. This would be achieved by the following stages:

- historic maps, including eighteenth and nineteenth century maps (such as Smith's map of 1746, Hodgkinson and Donald's of 1783, Hutchinson's of 1794, Cole and Roper's of 1801 and Wood's of 1821), along with the Ordnance Survey 1: 500 maps from 1865, will be graphically superimposed upon modern vector OS mapping within the GIS system to enable a direct comparison of the development of Carlisle;

- a basic deposit model will be established, on the basis of documented archaeological interventions and boreholes, which will be presented in conjunction with known areas of truncation demonstrated by a cellar survey (see *Section 5.4.30* for methodology);

- a rapid survey of cellar lights will be undertaken and those buildings with cellars will be highlighted on the GIS to inform the deposit model.

3.4.3 A comparison of all these attributes will provide an indication of archaeological sensitivity. With the GIS-based UAD, the process can be undertaken mechanically to compute a comparison of all the defined attributes, and thereby provide a graphical depiction of levels of archaeological potential for the whole of the study area. To the best of our knowledge this process of highlighting areas of archaeological potential has not been undertaken within the context of a UAD, but there are examples of it being used successfully in other areas of archaeology (see Ebert and Singer (2004) for an example).

3.4.4   ***Assessment and Urban Strategy:*** it is anticipated that, following the compilation of the UAD, a synthetic review of the archaeological resource of the city will be undertaken (the Urban Archaeological Assessment), which will, amongst other things, highlight gaps and inadequacies in the range of information available to the database. Following this, an Urban Archaeological Strategy will be designed and enacted by Carlisle City Council, with advice from Cumbria County Council, to aid in the management of the archaeological resource within the historic core of the city. It is anticipated that the implementation of these three procedures will highlight the requirement for further archaeological initiatives in line with the primary research agenda. This could possibly involve a programme of research excavation designed to address significant interpretative problems highlighted by the completion of the database compilation and the Urban Archaeological Assessment.

4. STATEMENT OF POTENTIAL

4.1   INTRODUCTION

4.1.1   The aim of this section is to assess the quantity and quality of the sources to be drawn on for the compilation of the Carlisle UAD, and to determine their accessibility and potential value to the project. This assessment will facilitate the production of accurate costings and a timetable for submission to English Heritage.

4.1.2   An assessment was made, by means of desk-top searches and contacts with relevant organisations, of material relating to the past development and current archaeological status of Carlisle. Materials of potential interest included archaeological reports and archives, articles in the local press, primary and secondary sources, paintings and drawings, photographs, maps and plans. The archives consulted, their contents, and relative importance for the main study are summarised in *Appendix 1* below.

4.1.3   Particular importance was attached to historic maps and plans, because they can provide archaeological information in a format compatible with a GIS database. The history of individual structures or plots, of changing street plans, and industrial concerns can be traced through maps, and this evidence tested by archaeological means when the opportunity arises.

4.2   THE RESOURCE

4.2.1   The search identified a diverse but important archaeological resource relating to the proposed UAD study area, which is defined within *Appendix 1* and is summarised below.

4.2.2   ***Published CAU/CAL excavation reports***: to date only eight archaeological interventions undertaken by CAU/CAL within the proposed study area have been adequately published (see *Section 4.2.8* and Table 3 below). In addition, the monograph report on the results of the south Lanes excavations has also been published (McCarthy 2000), although the accompanying specialist reports are not available. Given that some of these events, particularly those undertaken at Blackfriars Street and the southern Lanes, were large, multi-period urban excavations, the numbers of Monuments recorded are likely to be relatively high. Indeed, it is estimated that interrogation of these published sources may generate approximately 100 Monument records.

4.2.3   ***CAU/CAL archaeological archives:*** in view of the lack of published sources, the principal source of stratigraphic data for the UAD will be the archive of CAU/CAL, most of which is currently stored in Shaddon Mill, Carlisle. In total, 407 archaeological events of all types were undertaken by the unit within the study area, between 1977 and 2001, which are summarised in Table 2 below. Basic details for all these events are available on a database compiled as part of the Carlisle Archives Project, and a database providing detailed listings of the contents of each archive is currently being compiled by OA North (OA North forthcoming). Information concerning the interventions made by a range of organisations since 2001 (approximately 20 by 1st January 2005) will be derived from the Cumbria County Council HER. Rapid assessment of the event records on the Archives Project

database suggests that these recognition events may generate approximately 335 monument records.

4.2.4 It is estimated that the events listed in Table 2 relate to approximately 110 parent projects, as defined during the course of Stage 1 of the Carlisle Archives Project (OA North 2003, 16).

Event type	Count of Events	Monuments probably before the UAD cut-off date
Excavation	57	56
Evaluation	12	9
Watching brief	72	49
Standing buildings	260	30
Desk-based assessment	4	4
Other	2	2
Total	**407**	**150**

Table 2: Archaeological events undertaken by CAU/CAL within the proposed UAD study area

4.2.5 The great majority (perhaps as many as 200) of the standing building recording events listed in Table 2 relate to buildings in the Lanes area that certainly or probably post-date the proposed cut-off date of 1750 (*Section 5.1.3*). It is, however, proposed to create an event record for each, although only those pre-dating the cut-off date (estimated at approximately 30) will generate monument records. The cost implication for this is defined in Section 8.

4.2.6 Table 3 below provides a broad overview of the number of CAU/CAL field events (excavations, evaluations and watching briefs) that produced remains of a particular period. It should be noted that some types of activity, particularly those dating to the prehistoric and early medieval periods, leave relatively little trace in the archaeological record and are often more difficult to detect than remains of Roman and medieval date. Consequently, these periods are frequently under-represented in the archaeological record, particularly where archaeological work predominantly takes the form of small-scale interventions, such as evaluations and watching briefs.

Period	No of Events*
Prehistoric	20
Roman	100
Early medieval	5
Later medieval	95
Post-medieval	45

*Note: a single event may have produced evidence for more than one period of activity. Therefore, when added together, the figures in Table 3 are not consistent with the number of field events undertaken by CAU/CAL as shown in Table 2

Table 3: Number of CAU/CAL events producing evidence for activity of a specific period (excluding standing building recording events)

4.2.7 The work undertaken during Stage 1 of the Carlisle Archives Project provided an indication of the publication status of all the events in the CAU/CAL archive (OA

North 2003, 21, table 9; 34, table 18). Reporting of the great majority of events was found to be patchy and uneven; some had a client report, others were partly published or were referred to in minor published sources, whilst many had no report whatsoever, published or unpublished. Overall, less than 3% of events had been adequately published, whilst approximately 26% had minor published references of some sort (mostly in the round-up sections of *Britannia* and *Medieval Archaeology*). A further 10% had a client report only, leaving 61% of events with no report at all. Of these, however, the majority (45% of the total) comprised standing building recording events of low archaeological potential.

4.2.8 A detailed breakdown of the publication status of the 407 events within the proposed UAD study area is provided in Tables 4, 5 and 6 below. It is known that only eight events have been fully or adequately published, and the proportions of events with minor published references, client reports, or no reports appears to be broadly similar to those of the archive as a whole. In most cases, therefore, deposit modelling data and detailed information pertaining to the Monuments and Archaeological Elements recorded in each intervention will have to be extracted from the primary site archives or from client reports and other grey literature.

Publication status	Count	% of total
Fully published:	8	1.97
Not fully published:		
With minor published reference	70	17.20
With client report only	30	7.37
Standing building events with no report	257	63.14
Other events with no report	42	10.32
Total	**407**	**100**

Table 4: Summary of reporting status of CAU/CAL events within the UAD study area

4.2.9 The eight fully or adequately published events within the study area are listed in Table 5 below. These events represent, in numerical terms, less than 2% of the total amount of work undertaken by CAU/CAL in the area from 1977 to 2001. However, they include a number of substantial projects published in monograph form, including deeply stratified urban excavations at Blackfriars Street and Castle Street and a detailed fabric survey and documentary history of the castle.

Site code	Site name	Publication
ABB B	Abbey St (Tullie House lift shaft)	*Britannia* paper 1991
BLA A-H	Blackfriars St	Monograph 1990
CAS H	Carlisle Castle (fabric survey and documentary	Monograph 1993

	history)	
CAT L	Carlisle Cathedral	CWAAS article 1991
CST B	32-40 Castle St	Monograph 2000
CTS	The Courts	CWAAS article 1980
DST A	7 Devonshire St	CWAAS article 1998
LLA A-B	Long Lane	CWAAS article 1991

Table 5: Events considered fully or adequately published (eight events)

4.2.10 Additionally, a total of 270 events can be said to have publication work either in progress or partly complete. Of these, some 251 (93%) form part of the Lanes project. The south Lanes monograph was published in 2000 (McCarthy 2000) but the accompanying specialist fascicules have not yet appeared and their current status is unknown. The north Lanes, which comprises 115 events, is unpublished, although much post-excavation analysis has been undertaken and a draft monograph text is partly complete (Zant in prep a). The exact status of the accompanying specialist reports is, however, unknown.

4.2.11 Several other major projects of considerable archaeological importance are currently in various stages of preparation but, for various reasons, little progress has been made in recent years. Of particular significance are the reports on the extremely important excavations undertaken in 1973-84 and 1989-90 within the Roman fort at Annetwell Street (ANN A, ANN D-G and ANN H) and the excavations at the Cathedral Treasury in 1988 (CAT G-H), where important evidence for a pre-Norman cemetery was found.

4.2.12 Work on analysis and publication of the results of the Millennium excavations (MIL 1-5) and the archaeological investigations at the Rickergate (Lanes extension) site (RIC A-F), both major projects of considerable archaeological significance, has recently been commissioned and is now underway (Zant in prep b; Zant *et al* in prep). Additionally, it is understood that a number of small sites may be published as short papers or notes in forthcoming volumes of the *Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society*, although the status of these reports remains unclear (OA North 2003, 35-36). In addition, post-excavation programmes are being undertaken by CFA Archaeology Ltd on results from 7-9 Fisher Street and North Pennines Archaeology on 42-48 Scotch Street (R Newman pers comm).

4.2.13 Of the remaining 129 CAU/CAL events within the study area, it is estimated that 70 are of low archaeological potential and are therefore unlikely to warrant further work. This leaves 59 events that are, or may be, worthy of publication, but where little or no publication work has been undertaken. In most cases the low priority events comprise watching briefs or other minor interventions where nothing of archaeological significance was encountered, although they include a few events where records are very poor or non-existent and the precise character and significance of what was found cannot now be determined. Many of the standing building recording events that fall into this category consist of only one or two photographs and no other records.

Report status and type	Total
Fully published:	8
Not fully published:	
i) further work required/in progress:	270
ii) further work required/not in progress:	59
iii) no further work required:	70
Total	**407**

Table 6: Summary of publication status of CAU/CAL events within UAD study area

4.2.14 ***Other archaeological archives:*** eight interventions have been undertaken by OA North within the proposed study area and a small number of events (perhaps approximately ten) were carried out by other organisations during the period of the Carlisle unit's existence from 1977 to 2001. Additionally, complete or near-complete archives for four projects pre-dating the formation of the Carlisle unit in 1977, which will also be of value to the UAD, are currently stored in Shaddon Mill with the CAU/CAL archives. The precise number of what might be termed 'professional' field events (as opposed to early antiquarian discoveries and observations) pre-dating the Carlisle unit's formation in 1977 is unclear, but is unlikely to exceed 20. It is estimated that these *c*42 non-CAU/CAL recognition events may generate approximately 22 monument records. Reports on at least some of these early excavations have been published in the *Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society*, whilst notes relating to others may be contained within the archive of the late Robert Hogg's papers held by Tullie House Museum and Art Gallery (see *Appendix 1*). The National Monuments Record (NMR) is also likely to hold data of relevance to the UAD. It is estimated that this resource may produce approximately 45 event records, which in turn may generate *c*25 monument records.

4.2.15 ***Database Records (Cumbria County Council HER):*** the HER holds approximately 20 reports on interventions undertaken in Carlisle by various archaeological organisations in the period 2001-2005 (since the demise of CAL). It is estimated that these recognition events may generate approximately ten monument records. The number of Listed Buildings in Carlisle is estimated at around 335, but the spatial and chronological boundaries proposed for the UAD mean that many will be excluded from the proposed study. The number of Listings directly related to the UAD is estimated at no more than 217. Each listed building description will constitute an event and each of these buildings, within the spatial or chronological threshold, will constitute one or more monuments. Seven scheduled monuments have been designated within the study area. There are approximately 273 HER entries for the city as a whole, and 126 within the study area, of which the great majority duplicate the data from the Archives project. Those that are exclusive to the HER are for the most part find spots. It is not clear at present to what extent these find spot records relate to isolated finds in the Tullie House Museum and Art Gallery collections, although its seems highly likely that there will be at least some degree of duplication in the two sets of data. Perhaps as few as 20 new monument records will be generated by these recognition events. Taking into account all potential sources of information, it is therefore estimated that a total of approximately 363 event records and 247 monument records will be generated by the HER.

4.2.16 *Photographs:* Carlisle City Library holds a collection of over 10,000 photographs of Carlisle and the wider region, most of which are of late nineteenth- and twentieth-century date. Some do however show buildings and other features within the proposed study area that pre-date *c*1750 and are therefore of relevance to the UAD. In addition Carlisle Cathedral Library has a collection of historic photographs of the cathedral and of other pre-1750 buildings in the Close. Although a detailed examination of all these photographs has not been possible, both the Local Studies Librarian and the Cathedral's Canon Librarian have been consulted in order to determine how many of the images may be of relevance to the UAD. On the basis of these discussions it is estimated that up to 300 photographs from the City Library collection and approximately 70 from the Cathedral Library are likely to be of value to the project, since they depict city centre buildings (some surviving, others demolished) that pre-date the UAD cut-off. This estimate includes a small number of the most informative old photographs of the castle and the cathedral that are to be found in these collections. Many other photographs of these monuments that are also held in the collections will not be used, in order to avoid unnecessary duplication. Likewise, an archive of glass plates and slides held by Tullie House Museum and Art Gallery will not be consulted, since we are advised that copies of all these images are available in the City Library collections. No photographs post-dating *c*1900 will be selected for use in the UAD. Overall it is estimated that the 300 event records selected from the City Library collections may generate approximately 150 monument records, with a further 20 monuments coming from the 70 photographs in the Cathedral Library collection.

4.2.17 *Other illustrations:* Tullie House Museum and Art Gallery holds an important collection of eighteenth- and nineteenth-century paintings and drawings of Carlisle, which will be of considerable value in establishing the character and form of specific areas of the city. It is estimated that the gallery holds 132 eighteenth / nineteenth-century illustrations that may be of value to the UAD (23 of eighteenth-century date and 109 from the nineteenth century), with the great majority dating from the 1830s to 1880s. These event record images may generate approximately 50 new monument records. In addition, a few non-photographic illustrations are also present in the collections of Carlisle City Library and Carlisle Cathedral Library. The total number of items of value to the UAD is not known, but is unlikely to exceed around 30 in total, generating perhaps around 30 new monument records. Finally, at least six illustrations of eighteenth / nineteenth-century date that may be of relevance to the UAD are held by other museums and galleries outside Carlisle (see *Appendix 1*). These recognition events may generate a further six monument records. In total it is estimated that there are up to *c*168 non photographic illustrations that may be pertinent to the UAD.

4.2.18 *Documentary sources:* the likely sources of documentary references that may be of value to the UAD are set out in *Appendix 1*. Summerson's history (1993) can be regarded as the principal source for published and unpublished primary and secondary documentary references for medieval Carlisle and renders any detailed investigation of these sources unnecessary for the purposes of the UAD. Although many of Summerson's sources cannot be related to a specific property or monument within the medieval city, a rapid assessment suggests that his work may contain in the region of 200 references that do refer specifically to an identifiable monument (for example the castle, the cathedral, or an element of the city defences), and which

will therefore be of value to the UAD. The documentary references will be selected as events only if they provide valid information on a site or building which can be reliably located on the GIS. It is estimated that these event references will relate to approximately 100 monuments within the medieval city. The majority of post-medieval documentary sources are located in the County Record Office in Carlisle. The precise number of references of interest to the present study is unknown, but is likely to be at least double that available for the medieval period (*c* 400). As with the medieval period, only references that shed light on specific, identifiable buildings or other monuments within the study area will be selected for inclusion in the UAD. It is estimated that this source may generate approximately 150 new event records.

4.2.19 *Cartographic sources:* perhaps the most valuable documents in terms of illustrating change and its physical expression in Carlisle are historic maps. The principal maps and plans dating from the mid-sixteenth century to the nineteenth century that will be consulted as part of the UAD are listed below (Table 7). A rapid assessment of these plans suggests they may between them depict approximately 100 monuments of relevance to the UAD. Most of these monuments will, however, be duplicated by historic references in Summerson's history (1993), leaving perhaps only 20 new monument records. With the exception of the Ordnance Survey First Edition maps, these will be purchased from the Cumbria Record Office either as scans or the originals will be borrowed so that they can be scanned. Carlisle City Council has agreed to provide the Ordnance Survey mapping for the duration of the project, on the understanding that the copies (digital and paper) are returned on completion.

Map Title	Cartographer	Date	Photograph or copy	Georeferenced within GIS
Ancient Plan of the City of Carlisle	Anon (publ 1815)	*c* 1560	n/a	No
Cumberland and the ancient citie Carlile (sic) Described with many memorable antiquities therein found observed	J Speed	1610	n/a	No
Plan of the City of Carlisle and the batteries erected by the Duke of Cumberland	G Smith	1746	high-res scan	Yes
Plan and section of the City and castle of Carlile (sic)	Board of Ordnance	1747	Photocopy	Yes
Survey of Cumberland (with plan of Carlisle inset)	J Hodgkinson and T Donald	1770-1	Photocopy	Yes
Plan of the City of Carlisle and places adjacent	W Hutchinson	1794	Professional digital photograph	Yes
Carlisle town plan	G Cole and J Roper	1801	high-res scan	Yes
Plan of the City of Carlisle from actual survey	J Wood	1821	Photocopy, high-res scan	Yes

Ordnance Survey First Edition Revised 1:2500 data (Landmark)		1881	Digital	Yes
Ordnance Survey First Edition 1:500 Mapping		1865/ 1881	Digital	Yes

Table 7: Historic maps for use and or/consultation within the UAD

4.2.20 **Boreholes:** Carlisle City Council's Building Control Department has held an archive of site investigation reports for all developments undertaken in the City and District since 1974. Some of these reports contain geotechnical data derived from borehole surveys or other ground investigations that may be of value to the UAD. Unfortunately, many of these records were destroyed in the floods of January 2005, so the number of surviving records relevant to the study is not known. For the purposes of this project it has been estimated at around 30. Due to the methods used by Carlisle City Council to store borehole data (*Section 5.4.21* below), it will be necessary to target specific developments that are considered to have the greatest potential, rather than conducting a search of all the Council's records. As there will be a high coincidence between boreholes taken for development purposes and archaeological investigations, much of the borehole information may be superseded by the more relevant archaeological data. The nature of the data generated by borehole investigations means that these records should generate no additional monument records.

4.2.21 **Museum collections:** Tullie House Museum and Art Gallery contains a large collection of artefacts, both isolated finds and collections of objects recovered in the course of archaeological interventions. All isolated finds (ie those that were not recovered as part of a larger archaeological intervention or other project) of archaeological significance that can be plotted with a reasonable degree of precision will be incorporated into the UAD. However, this will not include material of limited archaeological potential, such as stray finds of common Roman potsherds from within the core of the Roman settlement, as these will not be a diagnostic indicator of activity. Outside the core area, though, diagnostic find spots can prove to be valuable indicators of historical activity, and each will generate a single event record. It is estimated that this source of information may produce approximately 40 such records. Monument records are unlikely to be generated by find spot data.

4.2.22 **Oral sources:** investigation of oral sources will concentrate on local historians and archaeologists who have knowledge of excavations and research undertaken within the city. The Cumberland and Westmorland Antiquarian and Archaeological Society will also be contacted. A list of initial contacts is identified in *Appendix 7*, although as they have yet to be approached there is the possibility that some of them will not be willing to contribute to the study. It seems probable that only a small number of new records will be generated from this source, perhaps no more than five monument records and a maximum of 15 event records.

4.2.23 **River Eden Project:** in 2004 OA North undertook a project to determine the extent to which the course of the River Eden at Carlisle has changed from prehistoric times to the present day (*Section 1.5* above). The project looked at all relevant documentary, cartographic, geotechnical and archaeological evidence for the position of the river in the prehistoric, Roman, medieval and post-medieval periods.

Evidence pertaining to the date and position of bridges over the river was also gathered. The results of the project form a potentially useful resource for the Carlisle UAD in that they represent a synthesis of all the available evidence for the position of the river and its bridges in ancient times. The work is unlikely to generate many new recognition events or monuments, however, since it merely duplicates records in other sources, such as published and unpublished documents, excavation archives and old maps. Having said that, the data may be of use for enhancing existing monument and event records, whilst the GIS mapping of the course of the river will potentially provide important information for deposit modelling. It will be possible to transport much of the data electronically to the UAD at an early stage in the project.

4.2.24 *National Sources:* it is possible, perhaps even likely, that information relating to archaeological events and/or monuments within the Carlisle UAD study area exists in the archives or collections of national bodies such as the British Museum, Society of Antiquaries of London, the Bodleian Library, and the university libraries at Newcastle and Durham. Furthermore, the Public Record Office may hold information relating to archaeological finds made during the construction of the railway. An assessment of the potential of such sources should have been undertaken as part of the original pilot study prepared by CAU, but this was not the case, and such a search lay outside the scope of the present project design. It is not therefore clear precisely how many event or monument records these sources might generate. Using the Lancaster UAD as a guide, however, it is possible to estimate that approximately 100 event records and 30 monument records may be produced for the Carlisle UAD.

4.2.25 *Resource summary:* presented below in tabular form (Table 8) is an estimate of the numbers of recognition event and monument records that will be generated by each source. A breakdown of the estimated number of Monument records by chronological period is also presented in Table 9 below. In both cases the figures are inevitably imprecise because it was only possible to examine a sample of the documents from each source and because it is not known to what extent sources repeat each other. In the absence of an adequate pilot study it has proved extremely difficult to determine the scale of the problem with regard to the duplication of monument records (where several event records from different sources actually refer to a single monument). It does, however, seem clear that the total number of records from all sources, if taken at face value (Table 8 below), can be regarded as a considerable overestimate, since a significant degree of duplication is likely to have occurred. This is particularly probable with regard to those sources such as photographs and post-medieval documentary references that were not addressed at all as part of the pilot study and which could not be adequately assessed during the compilation of this project design. Taking all this into account, therefore, an attempt has been made to estimate the likely extent of duplication, particularly with regard to the number of post-medieval monument records, and to adjust the total accordingly. In addition to the total number of monument records from all sources, therefore, Table 8 also includes an adjusted estimate of the actual number of monuments, which acknowledges the potential scale of the duplication.

Source	No of event records	No of monument records
CAU/CAL archaeological archives:		
Field events (evaluation, excavation and watching briefs)	141	*c* 300
Desk-based assessments	4	-
Standing building recording events	260	*c* 30
Other	2	*c* 5
Sub-total:	*c* **407**	*c* **335**
Other archaeological archives:		
OA North archives	*c* 8	8
Other Unit Project Reports/Archives, 1977-2001	*c* 10	4
Other interventions, pre-1977	24	*c* 10
Sub-total:	*c* **42**	*c* **22**
Published CAU/CAL excavation reports	**9**	*c* **100**
NMR	***c45***	***c25***
Cumbria County Council HER:		
Client Reports 2002-2005	20	10
HER entries	126	*c* 20
Sub-total:	**146**	**30**
Listed Buildings	**217**	**217**
Carlisle City Library:		
Photographs	*c* 300	*c* 150
Other illustrations	*c* 20	*c* 20
Other sources	*c* 30	*c* 10
Sub-total:	*c* **350**	*c* **180**
Carlisle Cathedral Library:		
Photographs	*c* 70	*c* 20
Other illustrations	*c* 10	*c* 10
Secondary sources	*c* 50	*c* 20
Sub-total:	*c* **130**	*c* **50**
Tullie House Museum and Art Gallery:		
Paintings and other illustrations	132	*c* 50
Log of newspaper cuttings	*c* 40	*c* 15
Robert Hogg's papers	*c* 8	*c* 20
Ordnance Survey record cards	*c* 20	*c* 10
Artefactual collections	*c* 40	-
Sub-total:	*c* **240**	*c* **95**
Illustrations held by other institutions	**6**	**6**
Cumbria County Council Record Office, Carlisle:		
Post-medieval documentary sources	*c* 400	*c* 150
Maps (most data duplicated in Summerson's history)	*c* 10	*c* 20
Other	*c* 40	*c* 50
Sub-total:	*c* **450**	*c* **220**
National Sources	*c* **100**	*c* **30**

Source	No of event records	No of monument records
Summerson's medieval history	*c* 200	*c* 100
Carlisle City Council Planning Department borehole records	*c* 30	-
Oral Sources	15	5
River Eden Project	1	-
Total (unadjusted, from all sources)	*c* 2379	*c* 1415
Total adjusted for likely duplication between sources	-	*c* 1100

Table 8: Summary of the estimated number of recognition event and monument records generated by each principal source

Chronological period	Estimated monument records*
Pre-Roman	*c* 10
Roman	*c* 350
Early medieval	*c* 40
Later medieval	*c* 250
Post-medieval	*c* 450
Total	*c* 1100

* Note: the estimated number of monument records is based on the adjusted total in Table 8 above, which takes into account the likely duplication of records from different sources

Table 9: Estimate of number of monument records by chronological period

5. METHOD STATEMENT

5.1 SCOPE OF WORK

5.1.1 *The Participants:* Carlisle City Council is taking responsibility for the creation of the UAD in conjunction with Cumbria County Council's Historic Environment Service (CCCHES) and Tullie House Museum and Art Gallery. Carlisle City Council will commission OA North to design and compile the UAD with funding provided by English Heritage. Project Management for Carlisle City Council will be through Peter Messenger, Senior Conservation Officer, and Richard Newman, County Archaeologist for Cumbria County Council and archaeological advisor to Carlisle City Council. A steering group will be established which will include representatives of Carlisle City Council, Cumbria County Council, English Heritage, Tullie House Museum and Art Gallery, and OA North. The involvement in the project of the Tullie House Museum and Art Gallery will be primarily through the steering group, although they hold considerable data pertinent to the study and will have a key role in any proposals for a wider dissemination of the UAD.

5.1.2 The design and development of the GIS system, which will present the data graphically, will be undertaken by OA GIS specialists in conjunction with Jo Mackintosh, the HER Officer for Cumbria County Council. Jo Mackintosh will be closely involved at the outset of the project when the database and GIS will be designed, and also at the end of the project, when the data will be converted into the format required for incorporation into the Cumbria HER. The long-term maintenance of the UAD will be undertaken by CCCHES, on behalf of Carlisle City Council, as the UAD will form a sub-element of the County HER. There will therefore be no need to develop a bespoke user interface as that functionality will come from the HER; however, some development will be required for the purposes of data entry, analysis and manipulation during the project itself.

5.1.3 *The Period under Consideration:* there is a need to define a chronological cut-off for the study; as the primary evidence for the extent, form and character of the city is derived from cartographic sources it would be logical to correlate the cut-off with the publication of one of the city maps, so that a definitive snapshot of the city can be provided for that date. It is therefore proposed that the study period should end in 1750, when the essentially medieval layout of the town still survived and before the major expansion of the city in the mid-nineteenth century. This has the considerable advantage that it coincides approximately with the production of Smith's map in 1746, which defines the extent and character of the city at the point of cut-off. Later developments within the historic core, such as the development of the canal in 1821, would be covered by the proposed EUS for Carlisle (*see Section 5.1.5*).

5.1.4 *The Area under Investigation:* the expansion of Carlisle beyond its historic core is a relatively recent event. The earliest maps in effect show the extent of the medieval city, which in broad terms also appears to correspond to the extent of the Roman settlement. Even as late as the mid-nineteenth century cartographic evidence demonstrates that settlement beyond the historic core was very limited. To provide an effective database it is proposed that the study area be broadly based upon

Smith's map of 1746, which depicts the walled city, and the suburbs of Botchergate, Rickergate and Caldewgate. Townships such as Stanwix, Denton Holme, Etterby, Upperby and Harraby, which are clearly part of the modern city but independent of the historic core, should, for present purposes, be excluded from the study area (Fig 1). An L-shaped study area has been defined so as to incorporate the full extent of Carlisle in 1746, but also to include some later suburbs. Other, later suburbs are excluded as all are post-1750 developments within the study area. This, however, leaves a gap in the record, as Carlisle was excluded from the Cumbria EUS and the area is also excluded from the Cumbria Historic Landscape Characterisation.

5.1.5   To avoid such a discrepancy, and to contextualise the Carlisle UAD within the history of Carlisle, it is proposed that an EUS-style survey and urban characterisation of the outer areas of the city be undertaken. The historic core would also be subject to such a survey, to incorporate post-1750 data. This information should be nested, along with the Carlisle UAD data, within the Cumbria HER, and it would be gathered as part of the UAD project; however, it is proposed that funding for this element should be drawn from the City and County Councils. At the completion of these projects, it is envisaged that the HLC, UAD and EUS will form mutually complementing nested layers within the HER.

5.1.6   *Research agenda:* a useful tool for assessing the categories of data will be a simple draft research agenda, which will identify major issues and questions about the archaeology of Carlisle. The primary areas of concern identified to date are as follows:

- what was the extent and character of prehistoric activity, and can it be dated?

- can the environment and topography of the site in the pre-Roman and early Roman periods be determined?

- how did the Roman fort at Carlisle develop, and to what extent was its development affected by changes in Roman frontier policy?

- what evidence is there for Roman military activity elsewhere in Carlisle, beyond the defences of the known fort?

- what was the extent and character of the Roman town of *Luguvalium*, including the suburbs and cemeteries, and how did it develop?

- is the granting of *civitas* status to Carlisle in the early third century reflected in the archaeological data?

- how did the fort at Carlisle articulate with the civil settlement, particularly in terms of their respective origins, development and decay?

- how did the Roman fort and town of Carlisle develop into a post-Roman settlement during the fifth-seventh centuries?

- can the extent and character of settlement at Carlisle from the seventh-eleventh centuries be defined?

- what was the character and extent of Carlisle in the twelfth and thirteenth centuries, including the suburbs, and how did it develop?

- to what extent was the layout of the medieval city determined by the existence of roads, buildings and other features surviving from earlier periods?

- how did the religious houses of medieval Carlisle develop?

- is the impact of the wars and plagues of the fourteenth and fifteenth centuries evident in the archaeological record?

- how did the Reformation and subsequent policies with respect to the border region impact upon the appearance and development of the city during the sixteenth century?

- how did Carlisle develop during the seventeenth and eighteenth centuries?

- to what extent was the industrial development of Carlisle impeded by its poor communications prior to the construction of the canal in 1821.

5.1.7   Any finalised agenda used in carrying out this exercise will take full account of the soon to be published Regional Research Framework for the North West, in which Carlisle is featured prominently. It will take account also of the developing Research Framework for Hadrian's Wall.

5.2   GIS STRUCTURE

5.2.1   GIS-based approaches to UADs have proved invaluable, but in the past have been expensive to set up and compile. However, OA North would be able to build upon the work already started in the Carlisle Archives Project and circumvent some of the initial set-up costs. Furthermore, it is anticipated that training costs would be low as OA North already has considerable experience with the GIS used by Carlisle City Council and the database packages used by both Carlisle City Council and Cumbria County Council.

5.2.2   It is intended that the GIS data generated by the UAD will augment the existing data in the present HER, enabling a far more detailed analysis of Carlisle's archaeological resource, for planners, archaeologists, historians and other interested parties. By tying together the event-based approach of the HER with the monument-based approach of the UAD, and using the power and versatility of modern GIS software, it will be possible to analyse the archaeological resource of the city using geostatistical methods and deposit modelling techniques. One example of how this resource might be used would be the correlation of the distribution of known monuments or finds with topographical characteristics, and using this information to define areas of suitability or 'hot spots', where hitherto unknown monuments or finds may occur. This may then be used to inform future planning decisions and lead to better preservation and management of the archaeological resource.

5.2.3   *GIS structure:* Carlisle City Council use the commercially available ArcMap 9 GIS package. This is an extremely powerful package including many features for the display and analysis of wide-ranging types of data in a geographical way. Cumbria County Council use the GGP package, which is a proprietary system designed mainly for use by Local Authorities; however, there is a possibility that they will soon upgrade to either ArcMap or Mapinfo. Given that it is neither possible nor appropriate for OA North to predict the future development of the GIS systems used by the various stakeholders, it has been agreed that ArcMap shape files will be

the format used for data transfer, although it is also possible for MapInfo format files to be provided. Shape Files are a recognised medium for GIS data transfer, and ensure that all attribute data, properties and database links will be transferred correctly. All current GIS packages, including GGP, will import Shape Files, or include methods of converting them into a usable format.

5.2.4   The design structure of the database and GIS will be based heavily on those constructed for the Oxford UAD (OA 2001), and the Carlisle Archives Project (OA North 2003). For examples of entries from both the Carlisle Archives Project and the Oxford UAD see *Appendices 8* and *9* respectively. Some work will, however, be necessary to include refinements based upon the most up to date MIDAS data standards (English Heritage 2003), particularly in the case of the GIS Mapping (English Heritage 2004). These are at present available only as an appendix to the third reprint of the first edition of MIDAS, but if the second edition should be released during the project then that will be the standard used for both the database and mapping structures. It is also anticipated that there will be minor developments in the design as the project progresses and as a result of further liaison with other UADs.

5.2.5   The City Council use a Unique Property Reference number to identify each individual building within the city. The Council has agreed to provide this information in the form of a database and GIS overlay. This number will be incorporated within the UAD database as a new locational field, and will provide full compatibility and advanced functionality for the Council on completion of the project.

5.2.5   *Graphic Data:* the base map for the GIS will be Ordnance Survey NTF vector and contour mapping provided under licence by Cumbria County Council; other data will be represented as layers to be draped over this base data. Historic maps will be scanned at high-resolution and georeferenced, or tied to the modern topography, within the GIS, allowing this important resource to be displayed accurately but with no loss of detail. Earlier, less accurate, maps will be consulted but may not be georeferenced due to the false impression of accuracy that this would create. The ten maps that will initially be used for the project are shown in Table 7 above, but this should not be considered an exhaustive list.

5.2.6   *Graphic Monument Data:* monument data will be displayed in the GIS as polygons representing maximum extent where known, or with a distinct hexagon-shape otherwise. These polygons will be digitised within ArcMap, and each will have an attached unique identifier that acts as the linking field for the database, enabling the detailed information within the database to be displayed in the GIS and used in geospatial analysis. The centroid of each polygon will also be used to generate a second monument shape file of point data from which grid references and other spot information can be generated for use within the database.

5.2.7   In addition, a further identifier for each monument will be used as a hyperlink to any pictorial or documentary data gathered during the project. This will allow the supplementary data to be displayed directly from within the GIS.

5.2.8   *Graphic Recognition Event Data:* a similar technique will be used to display recognition event data, where sufficiently accurately located. The Carlisle Archives Project GIS has produced both point and polygon data for all events conducted by

CAL and its predecessor CAU, and these can be imported directly into the GIS for the UAD. In addition, recognition events conducted by other units within the study area will be treated in the same way.

5.2.9   Recognition event data that are not sufficiently accurately located will be displayed in the GIS as a distinct symbol, also with an unique identifier attached to link to the database.

5.3   DATABASE STRUCTURE

5.3.1   *General structure and principles***:** it is proposed that the database structure developed by Oxford Archaeology for use in the Oxford UAD will be utilised (OA 2001). However, some refinement will be necessary to take into account the latest developments in UAD Design and MIDAS data standards (English Heritage 2003; 2004). This structure has been rigorously tested and refined, and is flexible enough to ensure compatibility with all organisations who might require access to the data. In order of priority, other databases would include:

- County HER structure;

- English Heritage National Archaeological Record structure;

- other UADs.

5.3.2   The database will be developed using Access 97, as this is the package used by Oxford Archaeology North. However, on completion of the project it will be upgraded to Access 2000 and other later versions as required for full compatibility with all stakeholders.

5.3.3   In practice, ensuring compatibility with a wide range of organisations will involve careful structuring of the data to ensure that it follows proper relational standards; in other words there should be no unnecessary duplication of data, or combining of data into a single record or field where it would be better split into two. While this would appear to add extra complexity to the data structure it is a proven technique and has many benefits in terms of analysis and compatibility.

5.3.4   Standard terminology will be used where appropriate, both for field names and in entering the data. MIDAS terms will be used where possible, and appropriate word lists and thesauri will be consulted to ensure compatibility in data entry. It is proposed that the NMR Monuments Thesaurus (RCHME 1998) be used, along with the FISH word lists (Forum in Information Studies in Heritage (www.mda.org.uk/fish)). To ensure consistency and to minimise mistakes in data entry, dropdown lists of terms will be used where appropriate.

5.3.5   The key datasets consist of the following tables outlined in Table 10: *Recognition Events, Monuments,* and *Deposits* (to record geological and archaeological horizons from which deposit models can be generated). Subsidiary tables include *Bibliographical Sources* (as a means of avoiding unnecessary repetition of details) and *Indices of digital files, drawings, and images*. The data structure is fully normalised (*ie* double entry of information in more than one field is avoided). The basic unit of recording will be the recognition event for field data and monument for interpretative information.

Table	Description of data
Events	Will record archaeological observations of all kinds, including, but not exclusively, archaeological interventions and non-intrusive surveys, any artefactual stray finds, listed building descriptions, pictorial records, and documentary sources which refer to a specific structure or locale. They will exclude observations of post-1750 features or structures.
Monuments	Will record archaeological interpretations of event data, primarily extant and non-extant structures, and parts thereof, which have their foundation prior to the 1750 cut-off.
Deposits	Will record interpreted archaeological horizons for the purpose of generating deposit models.
Bibliographic Sources	Will record documentary references to both events and monuments.

Table 10: Description of different tables within the UAD database

5.3.6 The choice of fields within this framework has been influenced by examples of data structures provided by compilers working elsewhere in England. A review of several existing studies revealed a wide variation of approach in the grouping of the obligatory and optional fields of the *Data Standard* (RCHME and English Heritage 1993; English Heritage 2003). This is not necessarily surprising in view of the priority given to local resource-type and local planning requirements in the *Extended Brief* (English Heritage 1993, para 4). There is, however, wide agreement on the soundness of the core concepts and the core field-lists in those two documents. In practice, since their publication, differences between UAD structures seem to have been only in matters of emphasis and detail, reflecting local circumstances.

5.3.7 ***Recognition Event data:*** the recognition event table, as described in Table 10, will record *observed data* from archaeological observations of all kinds. The core of recognition event information will be derived from the sources, which include maps, drawings, photographs and documentary sources, and reports or notes of field observations and investigations, summarising the key details of their results. Significant amounts of detailed field records or finds catalogues etc will *not* be included. Such material will remain in the archives, the existence of which will be recorded.

5.3.8 It is anticipated that the work on the Carlisle Archives Project will form a significant subset of the recognition event database, providing a basic record of each event conducted by CAU/CAL. As both databases will be MIDAS compatible, it will be straightforward to import the relevant data from the Carlisle Archives Project database into the UAD, avoiding the need to repeat the work done in the earlier project.

5.3.9 In the course of work undertaken on the Oxford UAD, it became clear that the separation of data between recognition event and monument databases is not necessarily a clear-cut choice. In the light of the work undertaken at Oxford it is proposed that the recognition event database be used as the prime repository for much of the individual detail of sites. Selected pertinent detail, such as the presence of pits, walls, activity of different periods etc, will be entered into the *Archaeological Elements* section of the recognition event form, with further discussion being added to the *Site Description* (free-text) field. It is not intended that this be a full transcription of the original source, but instead will provide a

readily comprehensible summary of the source, and will refer back to the primary source for further information if required. Similarly, the monument records will provide a summary description of the structure compiled from the component event records. Bibliographical details of all published sources and unpublished client reports will be entered in a separate *Bibliographical Sources* table within the UAD database. Much of this will be imported directly from the Carlisle Archives Project database. Basic cross-references to the *Bibliographical Sources* table, such as bibliographical number and page numbers, will be entered in the recognition event table. It is envisaged that the *Bibliographical Sources* table will in itself develop into a core resource for future research into the archaeology of Carlisle. *Appendix 3* shows all the proposed fields for the recognition events database and is based on the list of 'Data Fields for UAD Site Record' in *Urban Archaeology Databases - Data Standard and Compiler's Manual* (RCHME and English Heritage1993; RCHME 1998).

5.3.10 *Monument Data:* the *Monuments Table*, as described in Table 10, will primarily record archaeological interpretations of recognition event data, *ie* synthetic data, although some locational data, such as grid references, National Monuments Record Reference numbers, and English Heritage Reference numbers, will be included within both recognition event and monument databases (see *Appendices 3 and 4*). While the 'recognition event' data provide the basis of the UAD, the ultimate functions of the database outlined above are essentially interpretative; they relate to archaeological and historical understanding and extrapolation from existing data and interpretations to inform conservation and planning decisions or to support new research and education.

5.3.11 The database needs to be able to cover a hierarchy of different levels of archaeological entity: for example, the *Monuments Table* needs to cover both monument groups (for example, Carlisle Roman fort) and individual monuments (for example, the fort's headquarters building). The detailed hierarchy needs to be open-ended and flexible, while being as simple as proves practicable. As discussed above (*Section 5.3.8*), the choice of where to separate data between recognition event and monument databases is in practice debatable, and can have serious cost implications. The proposal for the Carlisle UAD is therefore to put as much individual site detail as possible into the recognition events database, and to concentrate the monuments database work on the identification of larger, individually coherent monument groups.

5.3.12 The process of defining monuments and monument groups will, to some extent, be qualitative, and as such cannot be set out precisely at this stage. It is anticipated, however, that if a building changes substantially in form and function over time it will be assigned a separate monument number for each phase in its existence, but that cosmetic or design changes will be ignored.

5.4 TASK BREAKDOWN

5.4.1 *Introduction:* the tasks necessary to compile the Carlisle UAD are defined below. They are numbered within square brackets and are cross-referenced with the task list (*Section 8*, below) and the Gantt chart (*Appendix 5*).

5.4.2   ***Project liaison [1]:*** a steering group will be established at the outset of the project to oversee the compilation of the UAD. This will comprise representatives from English Heritage, Carlisle City Council, Cumbria County Council's Archaeology Service, and Tullie House Museum and Art Gallery. Its aim will be to facilitate, monitor and guide the overall programme. It will meet at the outset and at three monthly intervals during the course of the project.

5.4.3   ***Design of GIS and database [2]:*** the flexibility of interface customisation offered by the GIS and database packages (ArcMap and Access) has been demonstrated during the course of other projects undertaken by OA North, including the pilot study for the proposed Lancaster UAD (OA North 2002e). ArcMap allows complete control over the creation of menus, buttons, tools and forms. These features will be developed to allow the GIS to be tailored to the needs of a UAD. The GIS will be developed primarily from that used by OA for the Oxford UAD, but will require some updating to take into account the advances in data standards, and new software developments in the five years since the Oxford UAD was developed. To ensure full compatibility with CCCHER, the HER Officer, Jo MacKintosh, will be involved in developing the system in conjunction with GIS staff from Oxford Archaeology North.

5.4.4   ***GIS training [3]:*** OA North has developed considerable expertise in the use of GIS packages and databases, having worked on the recent English Heritage-funded Carlisle Archives Stage 2 (OA North forthcoming a) and Upland Peats projects (OA North forthcoming b). However, this experience will be enhanced by training from GIS specialists in the Oxford office of OA. This will follow on from the design of the GIS and database and will entail targeted training in the use of the ArcMap GIS system specifically to fit the needs of the UAD. This will be carried out by key personnel of OA who were involved in the production of the Oxford UAD.

5.4.5   ***Data gathering [4]:*** the first stage of the process is to obtain all relevant information for assimilation within the UAD. The data captured will be of a form and character defined below (*Section 5.4.13*). The sources that will be investigated are as follows:

- CAU/CAL archaeological archives (Task 4a);

- OA North archive (Task 4b);

- Other archaeological unit archives: CFA, Headland, NPAT (1977-2001) (Task 4c);

- Pre-1977 Interventions (Task 4d);

- Published CAU/CAL excavations (Task 4e);

- National Monuments Record (NMR) (Task 4f);

- Cumbria County Council Historic Environment Record (Task 4g);

- Cumbria County Council Listed Buildings Record (Task 4h);

- Carlisle City Library (Task 4i);

- Carlisle Cathedral Library (Task 4j);

- Tullie House Museum and Art Gallery, Carlisle (Task 4k);

- Other Institutions (Illustrations) (Task 4l);

- Cumbria County Record Office, Carlisle (Task 4m);

- National Sources (Task 4n).

- Summerson's Medieval History (Task 4o);

- Carlisle City Council Planning Dept, Civic Centre, Carlisle (Task 4p);

- Oral Sources (see *Appendix 7*) (Task 4q);

- River Eden Project (Task 4r);

5.4.6   As a result of the work undertaken during Stage 1 of the Carlisle Archives Project (OA North 2003), the number of recognition events generated by archaeological works undertaken by CAU/CAL within the proposed study area is already known. The amount of fieldwork undertaken both prior to the formation of the CAU and after the unit ceased trading can also be estimated (see *Section 4.2.2* and Table 2 above and *Appendix 1*). Numbers of event records are as defined in Table 8.

5.4.7   The number of monument records that will be generated has been estimated and is presented in tabular form above (Table 8). The number is inevitably imprecise, because only a sample of the documentation was examined and it does not account for the amount of repetition of monuments between the respective sources.

5.4.8   ***Data Processing [5]:*** it is proposed that a flexible approach to the input of the data be employed. Where there are high transport and accommodation costs then the quickest way of capturing the data will be employed; this is typically the taking of photocopies and using a digital camera. The data would then be input in the office (Task 10), so reducing travel and accommodation costs. Where there are no financial restrictions to the spending of a greater amount of time at the data source (eg the Record Office), or there are restrictions to copying the data, then the data would be input directly into a laptop computer at the point of source. By using such a flexible approach the inputting costs will be minimised.

5.4.9   Where the data was copied during Task 4, rather than directly input, the data will need some processing before it can be input into the database. It will therefore undergo an editing process, to ensure quality and consistency, and to save time during inputting. This may involve converting word documents into tables that can be easily imported into the database, ensuring that the correct terms are used to describe events and monuments, and arranging data into an accessible filing and naming system for easy retrieval.

5.4.10 ***Acquisition and input of historic maps [6 and 7]:*** the maps that will be examined and incorporated are defined in Table 7. Of these, the anonymous map of *c*1560 and John Speed's map of 1610 will be used mainly for reference purposes as they may not be accurate enough to be georeferenced in the GIS. High resolution scans will be taken of copies of Smith's 1746 map, the Board of Ordnance map of 1747, Cole and Roper's 1801 map, and Wood's 1821 map. However, Smith's map of 1746 and the Board of Ordnance map of 1747, may only be of limited use since, for the most part, they show schematic blocks of built-up land rather than individual structures or properties. Hutchinson's map of 1794 is not available for copying, so a high-resolution digital photograph will be taken by a professional photographer. The numbers of maps records are as defined in Table 8.

5.4.11 The later maps show the city in rather more detail than the earlier mapping. The OS 1:500 mapping (1865/1881) will provide an accurate base record of the structures, albeit some time after the cut-off date, and will be used in conjunction with the pre-1750 maps to define the extent of early structures that have survived through to the late nineteenth century.

5.4.12 *Liaison with CCCHES [8]:* in order to maximise the utility of the final GIS, a close liaison will be needed between the organisations and staff that will use it (principally CCCHES). This will allow refinement of the interface style, and visualisation techniques. This liaison should take place at key stages throughout the development of the GIS.

5.4.13 *Rubber-sheeting of historic maps [9]:* the scans of the historic maps will be rubber-sheeted and georeferenced in ArcMap. They will be rubber-sheeted by identifying reference points extant today and linking them to their modern-day equivalents on the Ordnance Survey 1:1250 map. Corners of buildings and boundary junctions have proved the most reliable reference points. ArcMap allows experimentation with a number of different transformation methods to achieve an optimal fit with minimal distortion. It may be necessary to georeference the historic maps in smaller blocks to achieve an acceptable fit, as has been done with the Oxford UAD. These will then be used to identify individual monuments, which will be digitised on-screen and linked to the database. The two earlier maps (see Table 7) will be used in conjunction with the later maps, but will not be georeferenced within the GIS.

5.4.14 *Event Record Creation [10]:* the edited event data [Task 5] will be entered into the Access database in a format compatible with the GIS. There are ten classes of data that will be input from the varied sources as defined below (*Sections 5.4.13-24*). It is not intended that large amounts of textual data be copied wholesale into the database, rather that a short free-text summary be included in the relevant recognition event table, along with a link to the bibliographic reference in the Source Table. Once all the event database information has been imported the data will be incorporated with the digital map base in the GIS (*See Table 8 and Section 8*). Individual recognition events and broad documentary event outlines will be digitised on screen as ArcMap shapefiles, as detailed above (*Section 5.2.6*). Unique identifiers will be used to link the spatial features to the attribute information contained in the Access database. The trench locations for the CAU / CAL data have already been digitised as part of the Carlisle Archives Project.

5.4.15 *CAU / CAL Archives [10a]:* the principal source for intervention data is the archive of CAU/CAL [Task 10a], the bulk of which is stored in Shaddon Mill, Carlisle. This data has been summarised as part of the compilation of the Archives Project and the summary data will be digitally transferred into the UAD and will be enhanced from the primary archive material held at Shadddon Mill. The numbers of event records are as defined in Table 8.

5.4.16 *OA North Archives [10b] and Other Unit Reports / Archives (1977-2005) [10c]:* eight interventions were undertaken by OA North [Task 10b], and a few interventions were carried out in the city by other archaeological units during the period 1977-2001 [Task 10c]. Several organisations (CFA, Headland and NPAT) have undertaken fieldwork in Carlisle since CAL ceased trading in August 2005; this

data is held by the Cumbria HER and will be input as part of Task 10g. The numbers of event records are as defined in Table 8.

5.4.17 *Pre-1977 Interventions [10d]:* the deposit records from four major projects and a number of lesser interventions that pre-date the formation of CAU in 1977 (held in Shaddon Mill) will be input into the UAD. Other work pre-dating the formation of CAU in 1977 is published in the *Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society* and other national journals. A key source for this period is Dorothy Charlesworth's important paper on Roman Carlisle (Charlesworth 1978), which provides a summary of current knowledge and a gazetteer (with references) of archaeological work (mostly within the historic walled city and excluding Stanwix) up to *c*1978. The numbers of event records are as defined in Table 8.

5.4.18 *Published CAU / CAL Excavations [10e]:* the nine published CAU/ CAL excavations (*Section 4.2.9*; Table 8) will be input into the UAD. Summaries of these excavations are held within the Archives Project GIS, and will be transferred into the UAD. Additional detail will be abstracted directly from the published reports, copies of which are held in the OA North offices.

5.4.19 *NMR [10f] and Cumbria HER [10g]:* the NMR [Task 10f] holds a number of records for the city, but these will, for the most part, be duplicated by the Cumbria HER. Prior to the commencement of the Carlisle Archives Project, the Cumbria HER contained relatively few archaeological event records for Carlisle, for reasons that have already been described (*Section 2.2.3* above). Fortunately, an accurate listing of all archaeological events carried out by CAU/CAL between 1977 and 2001 is now available as a result of Stage 1 of the Carlisle Archives Project (OA North 2003) [Task 10g]. Additionally, records of archaeological interventions undertaken by organisations other than CAU/CAL (*Section 5.4.15*), and of casual finds within the city, are available on the HER; however, event records will not be created for stray finds of Roman pottery from the core area of the town and fort. The County Council has also commissioned a project to identify and catalogue the industrial archaeological resource for Carlisle which will be completed in the near future. This will be more relevant to the EUS rather than the UAD, as the majority of the monuments uncovered by this programme will post-date the UAD 1750 cut-off date. The numbers of event records are as defined in Table 8.

5.4.20 *Listed Building data [10h]:* the HER has digital records of the Listed Building Records [Task 10h] for the city which can be transferred directly into the Listed Buildings table within the UAD Access database. The event record will define the episode of listing, which may have resulted in the listing of multiple buildings, and will be linked to the Listing Buildings table which will incorporate the descriptions for the individual listed buildings. Following discussions with the Carlisle City Council Conservation Officer it has been agreed that a further copy of the listed building record should be available to the UAD, which is a duplicate of that held within the City Council GIS. There has been some concern that the maintenance of two copies of the listed building record will result in some differences developing between the records of this statutory data. However, in all instances the listed building description will be incorporated into the descriptive field for the record but will not be altered or amended in any way. Hence, although copies of the data will be maintained within two digital sources, these will remain identical and it is

anticipated that there will be no conflict between their separate usage. The numbers of event records are as defined in Table 8.

5.4.21 Although the primary Listed Building descriptions will not be altered, monument records will be compiled for those buildings that fall within the UAD date-range, and a separate monument description will be produced for these buildings or parts of the buildings. If they are multi-phase buildings they will be assigned separate monument records for each broad phase of use. The monument record(s) for the building will then be cross-referenced back to both the single listed building record and the event that listed it.

5.4.22 *Photographic Records held by Carlisle City Library [10i], Carlisle Cathedral Library [10j] and Other Institutions [10l]:* early photographic records will be accessed as these will potentially provide important information about features, structures and buildings within the city that were constructed prior to 1750. The main source for photographic images will be the Local Studies section of Carlisle City Library [Task 10i], which has a considerable photographic collection (*Appendix 1*). There is also a number of photographs held in the County Record Office in Carlisle and Carlisle Cathedral Library [Task 10j] which may also be of value to the study. Although the Tullie House Museum and Art Gallery holds a collection of photographic plates and slides, we are advised that copies of all these images are also held in the Library's collections, where they are far more accessible; there will not, therefore, be a requirement to access the Tullie House Museum and Art Gallery photographic collection. The numbers of event records are as defined in Table 8.

5.4.23 Although the photographs themselves obviously post-date the proposed cut-off date of 1750 for the UAD study, they provide recognition events for a number of monuments that were constructed prior to this date. The earlier the photographs the greater will be their potential for defining the original form of the monuments depicted. As such, only photographs pre-dating 1900 will be used in the UAD. An event record will be compiled for each photograph, which will then contribute details to the monument records. Duplicate images, even from different sources, will be omitted, which should dramatically reduce the number of photographs entered into the system.

5.4.24 *Records held by Tullie House Museum and Art Gallery [10k]:* the Tullie House Museum and Art Gallery holds an important collection of eighteenth- and nineteenth-century paintings and drawings of Carlisle, which will be of considerable value in establishing the character and form of specific areas of the city (see *Appendix 1*). A few other illustrations of potential significance are also held in the collections of other museums and galleries in the region. As with the photographs, each painting or other illustration will generate an event record.

5.4.25 Tullie House Museum and Art Gallery also holds a large number of documents and databases that will be of value to the Carlisle UAD. These sources are described in *Appendix 1*. The museum also contains a large collection of artefacts that have been recovered as a result of either chance discoveries or in the course of archaeological interventions. A published catalogue of all the inscribed and sculpted Roman stones in the museum's collections is available (Wright and Phillips 1975). Any stray finds that can be accurately located within the study area, and pre-date 1750, will be classed as recognition events; however, event records will not be created for stray finds of Roman pottery from the core area of the town and fort as these will not

significantly inform the development of the town and fort. The numbers of event records are as defined in Table 8.

5.4.26 ***Documentary data from Cumbria County Council Record Office [10m], National Sources [10n] and Summerson (1993) [10o]:*** the principal source for published and unpublished primary and secondary documentary references is Summerson's Medieval Carlisle (1993) [10o]. This will serve as the starting point for searches from the Cumbria County Council Record Office [10m], and National Sources (*Section 4.2.24*) [10n]. The data that will be incorporated into the UAD will concentrate on any source of historical data that relates specifically to identifiable and locatable sites; to an extent this will exclude much of the historical documentation for the city, as much of the data relate to individuals and events rather than locales. Where the documentary data provides locational information they invariably relate to whole streets rather than to a specific property, and consequently there is considerable imprecision as to the precise location of any documented monument. A separate GIS overlay will be established for the documentary information, upon which will be defined a broad polygon extending around whole streets or similar areas, and these will be referenced to all the event records pertaining to such broad extents. The numbers of event records are as defined in Table 8.

5.4.27 ***Boreholes and planning constraints (Carlisle City Council Planning Dept) [10p]:*** Carlisle City Council's Building Control Department holds copies of all site investigation reports for developments undertaken in the City and District since 1974. However, these are not readily available but are stored with the building control documentation for the development to which they belong. Furthermore, an unknown number was destroyed in the floods of January 2005. The strategy for collection and processing of the borehole data will be adjusted subject to an assessment of the survival of these records. Initially all borehole records in the study area will be assessed, and if there is good survival then the abstraction and incorporation of the records into the UAD will target areas where there are likely to be *lacunae* in the deposit model.

5.4.28 ***Oral sources [10q]:*** the data from the interrogation of the oral sources (See *Appendix 7*) will be input into the UAD.

5.4.29 ***River Eden project [10r]:*** the outline of the changing lines of the River Eden will be incorporated into the GIS from the digital archive of the River Eden project, and will therefore be a simple digital data transfer.

5.4.30 ***Monument Record Creation (input and mapping) (11):*** Monument records will be created, based on the event record data (*Sections 5.4.13-29* above), and will be input into the Access database and digitised into the GIS. As with the event database it is not intended that large amounts of textual data be copied wholesale, but rather that a short free-text summary be included in the relevant table, along with a link to the bibliographic reference in the Source Table. Once all the information has been imported to the database the data will be incorporated with the digital map base in the GIS. Individual monuments will be digitised on screen as ArcMap shapefiles, as detailed above (*Section 5.2.6*). Unique identifiers will be used to link the spatial features to the attribute information contained in the Access database. Although the trench locations for the CAU / CAL data have already been digitised as part of the Carlisle Archives Project, there will be a need to digitise the monuments identified by these interventions.

5.4.31 The monument data will be input and mapped according to period as follows:

- Prehistoric Monuments [Task 11a]

- Roman Monuments [Task 11b]

- Early Medieval Monuments [Task 11c]

- Later Medieval Monument [Task 11d]

- Post-Medieval Monuments (prior to 1750 cut off date) [Task 11e]

5.4.32 ***Cellar survey [12]:*** a rapid cellar survey will be undertaken to indicate areas where archaeological deposits may have been truncated or destroyed. It is proposed that this be undertaken by a rapid visual survey of cellar lights within the study area, rather than by any more detailed technique. This information will be used to inform the deposit model.

5.4.33 ***Input of graphic images [13]:*** in Task 10 [Tasks 10i, j and l] the descriptions and locations of the photographs and illustrations will be input into the GIS. In this task [Task 13] the photographs and images will be scanned and the digital images will be linked to the Monument Record Table. These scanned images will be related to distinct spatial locations within the study area and will be hot-linked to relevant points on the GIS base map (*Section 5.2.5*), allowing the retrieval of a photograph or drawing through a simple mouse click on the map. Each image will be assigned an individual image source record, which will be linked to the relevant monument or event record. It is estimated that approximately 300 photographs held by Carlisle City Library (from a total collection of over 10,000 images) and *c*70 from the Carlisle Cathedral Library archives may be of value to the UAD (Table 8); additionally, approximately 140 paintings, drawings and other illustrations will also be scanned (Table 8). All the images selected will pre-date 1900 and will depict buildings or other monuments of pre-1750 date within the study area. In the case of some vanished earlier post-medieval (seventeenth/eighteenth century) structures, these images may represent the only surviving evidence for their character and appearance. Where multiple images of a single monument exist, only one or two will be selected, in order to avoid duplication. The number of photographs that will need to be scanned, and incorporated into the UAD can not be reliably determined at this stage, but an assessment of the photographic collections will be made at the data capture stage (Section 5.4.5) and following discussions with English Heritage and CCCHES the numbers requiring scanning will be defined.

5.4.34 ***Deposit model [14 and 15]:*** it is proposed that a deposit model be constructed as far as is feasible using the erratically distributed borehole and excavation data held within the deposit and borehole tables. Borehole data will also be compared with the present-day land surface. The most critical part of the deposit model creation process is correlating the different sources of stratigraphy that have been recorded within the study area. It has not been possible to examine any of the borehole data, but it is likely that only a basic level of data will be available for assimilation into the UAD. On the other hand, there is a wealth of data relating to the depth and character of archaeological stratigraphy within the study area, most of which is to be found within the CAU/CAL archive in Shaddon Mill. Whilst it will probably not be possible to reconstruct individual stratigraphical episodes throughout the study area, it should be possible to construct basic modelled surfaces for some key

stratigraphical horizons, including the natural ground surface, the top of Roman levels, and the present ground surface. It is not always possible to construct deposit models of anything other than the natural and modern ground surfaces, but, in the case of Carlisle, in some areas there is a corpus of very good quality excavation data, which should allow the construction of a more detailed model. These measurements will also provide an indication of the gross thickness of stratification over the study area as a whole.

5.4.35 The assimilation of the borehole and excavation data will generate three-dimensional coordinates for the main interface of made ground/natural subsoil, and the present surface. These datasets will be mathematically converted into a digital terrain model (DTM), using ArcMap 3D Analyst Extension, and can be output as a digital mesh over the study area or as a contour plot. It will also be possible to create sections across the city showing the interfaces in relation to the present day ground surface. Areas that have a particular *lacuna* of borehole or excavation events will be highlighted in the model, in order to prevent any inaccuracies in the interpretation of the modelled surface.

5.4.36 *System Documentation [16]:* as part of the transfer process OA North will provide full documentation on the use of the database and GIS. In accordance with the *Archaeological Data Services Guide to Good Practice for GIS* (Gillings *et al* 1998) this will include full documentation on the derivation and accuracy of the different aspects of the UAD. A user guide to the use of the database will be provided, which will include how to find particular records, how to query the database, and how to generate printed reports from it. Finally instructions will be provided on importing the GIS data into common formats for use in other GIS software packages.

5.4.37 *Transfer of UAD [17]:* on completion of the UAD, the system will be transferred to Cumbria County Council's Heritage Environment Section and to Carlisle City Council. As the CCCHER officer will have been involved from the start of the project in the design and use of the system, full compatibility will have been ensured, which will allow for a straightforward transfer of the data into the HER. Throughout the project there will have been close liaison with the other respective organisations, but they may require training in the use of the system. A format for exchange with the NMR will be negotiated with English Heritage.

6. RESOURCES AND TIMETABLE

6.1 PROJECT TEAM

6.1.1 The project will be subject to considerable advice and coordination from members of an advisory team, who will provide considerable input 'in kind', particularly from those members of Cumbria County Council and Carlisle City Council.

Advisory Panel

Team Leader	Peter Messenger	Senior Conservation Officer	Carlisle City Council
Project Co-ordinator and external academic reviewer	Richard Newman	County Archaeologist	Cumbria County Council
HER liaison	Jo MacKintosh	HER Officer	Cumbria County Council
Carlisle City Council GIS liaison	Rob Stapleton	GIS Manager	Carlisle City Council
Cumbria County Council GIS liaison	Jon Robinson	Information Systems Officer	Cumbria County Council
Team member	Hilary Wade	Director	Tullie House Museum and Art Gallery
Team member	Tim Padley	Keeper of Archaeology	Tullie House Museum and Art Gallery

Project Personnel - OA

Data Capture and Processing	Project Officer John Zant	Project Officer Jo Cook
Project Coordination and GIS Support	Geomatics Manager Tom Evans	Project Manager Ianto Wain
GIS Design	Project Officer Matt Bradley	Project Officer Jo Cook
Digitising	Project Assistant	
Project Management	Project Manager Jamie Quartermaine	
Academic Overview	Line Manager Rachel Newman	

6.1.2 ***Liaison:*** the success of the project depends on close liaison between the various bodies concerned. It is therefore proposed that, in addition to informal liaison as necessary, there should be regular meetings of a team, comprising representatives of OA North and others on the advisory panel (*Section 6.1.1*), together with a representative of English Heritage, who will assess progress against agreed project indicators, monitor quality, and plan the next stages of work. Consequently, the Meetings will be held at three monthly intervals and will be coordinated by Cumbria County Council on behalf of Carlisle City Council. The project management team will be chaired by Peter Messenger, Senior Conservation Officer for Carlisle City Council. In addition, there will be more frequent *ad hoc* project management meetings to discuss the progress of the project

6.2   COMPUTER EQUIPMENT

6.2.1 The GIS database will be developed by in-house GIS specialists on the basis of that developed for the Oxford UAD by OA, and will be undertaken in part on computer equipment already in place. However, a second machine of suitable specifications (*Appendix 2*), will be required to implement the UAD. As OA possesses an A1 scanner, and OA North has an A3 scanner, it is considered that by judicious use of this resource, there will not be a requirement to enhance this facility for the proposed programme.

6.3   IN-KIND CONTRIBUTION

6.3.1 Carlisle City Council will provide Ordnance Survey vector base mapping, in digital form, along with digital versions of the Ordnance Survey First Edition 1:500 scale mapping and digital contour data, and will be in either Landline or Mastermap formats. Furthermore, they will provide a GIS overlay of their own Unique Property Reference numbering system, which allows the unique identification of every building within the city. Cumbria County Council Heritage Environment Services (CCCHES) will provide HER and Listed Building data. This has an enormously favourable impact on the resources sought from English Heritage.

6.3.2 The construction of the UAD will require a second licence for ArcMap 9.2, coupled with Microsoft Access 97. OA North possesses licences for Access 97, but will need to purchase a license for ArcMap 9.2 for the Lancaster office; the cost for this is £1300. Carlisle County Council are already using ArcMap 9.2 software, and are operating Access 97.

6.3.3 CCCHES will provide the services of Jo Mackintosh, the Cumbria HER Officer, at the outset of the project during the design of the GIS/Database, in the course of the project for up to six weeks, and at the end of the project when the data are transferred over to the HER. This is an extremely generous contribution, that will not only allow considerable savings on the project, but will significantly enhance the interaction between the UAD and the HER.

6.3.4 ***Archives Project:*** a significant amount of the primary data has been processed as part of the Carlisle Archives Project and this has resulted in a significant saving in the overall project costs, which is in the region of £11,900.00. As a result the cost of processing the archives project data to meet UAD standards is considerably less

than that from other sources: it is estimated that it will cost £10 per monument to process data generated by the Archives Project, as opposed to an average of £27 per monument to process data from other sources.

6.4 TIMETABLE AND RESOURCES

6.4.1 The OA North staff resources for the project are defined in *Section 8* and the corresponding timetable is presented as a Gantt chart within *Appendix 5*. The principal task numbers are shown within square brackets ([ ]) against each task and correspond accordingly to tasks defined on the Gantt chart and within the project costings.

6.5 OTHER MATTERS

6.5.1 *Health and Safety:* full regard will, of course, be given to all constraints during the project, as well as to all Health and Safety considerations. All site procedures are undertaken in accordance with the guidance set out in the *Health and Safety Manual* compiled by the Standing Conference of Archaeological Unit Managers (1991, rev 1993). Risk assessments will also be undertaken as a matter of course, and these will anticipate the potential hazards arising from the project. Copies of OA North's health and safety policy are lodged with English Heritage.

6.5.2 *Insurance:* the insurance in respect of claims for personal injury to or the death of any person under a contract of service with OA North and arising in the course of such person's employment shall comply with the employers' liability (Compulsory Insurance) Act 1969 and any statutory orders made thereunder. For all other claims to cover the liability of OA North in respect of personal injury or damage to property by negligence of OA North or any of its employees, there applies insurance cover of £10m for any one occurrence or series of occurrences arising out of one event.

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8. PROJECT COSTS AND TASK LIST

8.1   INTRODUCTION

8.1.1   In this section is presented the global costs for the compilation of the Carlisle UAD the project and overleaf is a costed task list for the project.

8.2   TRAVEL AND ACCOMMODATION

8.2.1   Much of the data capture will be undertaken at Shaddon Mill, Carlisle and from other sources in Carlisle. It will be necessary to provide transport to and around Carlisle and to provide for accommodation during the periods of data capture. The costs for this are defined within the costing sheet overleaf.

8.3   ADDITIONAL CONTRIBUTIONS

8.3.1   The table overleaf presents a breakdown of the actual costs that will be required to compile the UAD for Carlisle. In addition to this there are contributions in kind and direct financial contributions from Carlisle City Council and Cumbria County Council, and these are presented below with respect to the total costs for implementing the project. In addition to the direct grant provided by Cumbria County Council, they have also offered the services of the HER officer, Jo MacKintosh, for a period of six weeks. Two of these weeks will be involved in the design of the database and GIS, and also the conversion of the final UAD output into that of the HER. In addition, she will spend four weeks inputting and processing the data into the project GIS. This will have the effect of making a valuable saving of OA North staff time which is expressed as a costed contribution in kind below.

Costs of compiling UAD (OA North Costs) (See Over)	77963.69
Cumbria County Council Direct Contribution	-5000.00
Carlisle City Council Direct Contribution	-5000.00
Cumbria CC - Jo MacKintosh Contribution in Kind	-2295.00
Costs of project less contributions	**£ 65668.5**

8.4   STAFF TASKS

8.4.1   The number of days allowed for the completion of each task and the amount of time allocated to each member of the UAD project team are set out in the accompanying task list (overleaf). The bulk of the data gathering and data input work will be undertaken by two or more OA North Project/Research Assistants under the supervision of John Zant and Jo Cook, OA North Project Officers. Since John has

unrivalled knowledge of the work carried out by CAU/CAL from 1977 to 2001, and of the CAU/CAL archive itself, he will have significant input into data gathering for the 177 CAU/CAL events that are estimated to be of relevance to the UAD. His knowledge of the CAU/CAL data, and of the archaeology of Carlisle generally, will also be of fundamental importance for the preparation of a deposit model for the city. In her capacity as GIS Project Officer Jo Cook will be responsible for all GIS applications within the project, including design and construction of both the GIS and the project database. Jo will undertake some of the more complex tasks required for GIS input and processing (including event and monument digitisation) and will also contribute to the deposit modelling element of the project. The remaining GIS input work will be carried out by a Project/Research Assistant under Jo's supervision. The Carlisle UAD project will be managed by Jamie Quartermaine.

8.5 STAFF CHARGE OUT RATES

Initials	Role	Day Rate before Overheads
RMN	Director	249
JQ	Project Manager	191
JZ	Project Officer	130
JC	GIS Project Officer	130
PS	Project Supervisor	97
Draught	Illustrator	97
RA1	Research Assistant	85
RA2	Research Assistant	85

8.6 NOTES

1. Salaries and wages inclusive of NI and Superannuation
2. Costs incorporate all work necessary to compile the UAD
3. Costs are at 2005/2006 prices and there is an allowance for 2.5% inflation for 2006/2007
4. Overheads are charged at 25% of the staff costs

APPENDIX 1
APPRAISAL OF SOURCE ARCHIVES

A1.1 **CARLISLE ARCHAEOLOGICAL UNIT/CARLISLE ARCHAEOLOGY LTD (CAU/CAL) ARCHIVE**

A1.1.1 The principal source of recognition event and stratigraphic data for the Carlisle UAD will undoubtedly be the archive of CAU/CAL, which was responsible for the vast majority of archaeological field interventions undertaken in Carlisle between 1977 and 2001. The bulk of this archive is currently stored in Shaddon Mill, Carlisle, under the care of Tullie House Museum and Art Gallery, and is currently the subject of a detailed assessment by OA North as part of Stage 2 of the Carlisle Archives Project (OA North in prep). As a result of Stage 1 of the project, it is known that 141 fieldwork events, 260 standing building recording events, four desk-based assessments and two other non-intrusive events were undertaken by CAU/CAL within the proposed UAD study area between 1977 and 2001. Of these it is estimated that approximately 177 may be of value to the UAD. A database providing a detailed listing of the contents and condition of the archives for each of these events is currently being compiled by OA North as part of the assessment. The Stage 2 work has established that project archives relating to four major sites within the UAD study area are at the present time located away from Shaddon Mill. Two are currently stored at OA North's premises in Lancaster and two are in the Library of Carlisle Cathedral (see *A1.2*).

A1.1.2 It is estimated that the great majority (perhaps as many as 200) of the standing building recording events in the CAU/CAL archive relate to buildings in the Lanes area that certainly or probably post-date the proposed cut-off date of 1750. Of the remainder, it is possible that approximately 30 may be of relevance to the UAD. The material at Shaddon Mill also includes complete or near-complete archives for four projects pre-dating the formation of the Carlisle unit in 1977, which will also be of value to the UAD.

A1.2 **CARLISLE CATHEDRAL LIBRARY**

A1.2.1 The Library of Carlisle Cathedral holds an important collection of nineteenth-and early twentieth-century photographs and other early illustrations of the cathedral and its environs (including the numerous pre-nineteenth century buildings in the Close). The total number of photographs is not known, but a rough estimate suggests there may be approximately 70 images of pre-1750 buildings in the Close and significantly more of the cathedral itself. The Library also contains an important collection of secondary sources relating to the cathedral, some of which contain illustrations pre-dating the era of photography. All primary sources relating to the cathedral were transferred some years ago to the Cumbria Record Office (Carlisle) (see *A1.5*). The primary documentary archives, together with many of the more portable artefacts, relating to two phases of excavation undertaken at the cathedral during the 1980s are also currently stored in the Library.

A1.3   CARLISLE CITY COUNCIL PLANNING DEPARTMENT, CIVIC CENTRE, CARLISLE

A1.3.1   The City Council holds little information on the historic town, and will be consulted mainly for details of recent or current developments. Of particular significance to the UAD will be the Council's archive of site investigation reports for all developments undertaken in the City and District since 1974. Some of these reports, which are held by the Council's Building Control Department, contain geotechnical data derived from borehole surveys or other ground investigations undertaken in advance of building works. A proportion of this data is likely to be of considerable value for the establishment of a deposit model for the city. For reasons of cost-efficiency it will probably be necessary to target a number of developments that are considered to have the greatest potential, rather than extracting data from every record held by the Council. The Civic Centre was severely affected by floods in February 2005, which resulted in the loss of considerable numbers of documents, including borehole data. The extent of how much survives will need to be evaluated as part of the study.

A1.4   CARLISLE CITY LIBRARY

A1.4.1   The library has a good and well-catalogued collection of published and unpublished sources relating to Carlisle, including local history journals, pamphlets, trade directories and other documents. Potentially of greatest significance for the UAD, however, is the library's extensive collection of nineteenth- and early twentieth-century photographs of Carlisle, which includes depictions of a number of pre-1750 buildings that no longer survive. The collection also includes several hundred early images of the city's principal buildings such as the cathedral, the castle and the old Town Hall, and undoubtedly represents the principal source of photographic images of relevance to the UAD.

A1.4.2   At a very rough estimate, the Library may hold in the region of 300 images of existing or vanished buildings of pre-1750 date (including street scenes) within the study area. This figure does not include nineteenth/early twentieth-century photographs of the cathedral, the castle or the old Town Hall, which may together account for several hundred additional images. The Library also holds copies of some illustrations of the city in other media.

A1.5   CUMBRIA COUNTY RECORD OFFICE, CARLISLE

A1.5.1   In addition to local journals, antiquarian publications, and copies of local newspapers dating back to the late eighteenth/early nineteenth centuries, the County Record Office in Carlisle holds primary documentation including medieval sources dating back to the twelfth century. These documents include wills, property deeds and early manuscripts relating to the cathedral. Church registers and nonconformist registers are available and a wide variety of papers deposited by local companies and families are also stored here, although it is thought that few of these will be relevant for the UAD, with its cut-off date of 1750.

A1.5.2   The Record Office is the principal source for cartographic depictions of the city from the mid-eighteenth century onwards and also holds collections of

photographs and other illustrative material, some of which will be of relevance to the UAD.

A1.6 CUMBRIA HISTORIC ENVIRONMENT RECORD (HER), CUMBRIA COUNTY COUNCIL, KENDAL

A1.6.1 The HER contains brief descriptions for approximately 126 archaeological events (including everything from controlled excavations to chance finds) within the historic city, with brief references to sources of information for each entry. As described above (*Section 2.2.3*), this sketchy representation resulted from an historical situation whereby records for most of the archaeological work undertaken by the Carlisle Archaeological Unit (CAU) from 1977 to 1999 were never entered to the County HER. This situation is currently being remedied by the Carlisle Archives Project. The HER does, however, contain records of all archaeological interventions in the city undertaken by organisations other than CAU, and of casual finds of archaeological significance. The HER also holds data on Listed Buildings and Scheduled Monuments within the city and there is also a map showing the location of all Listed Buildings (approximately 335 within the modern city).

A1.6.2 All HER entries are held in an Access 2002 database, linked to a GIS in GGP format. Listed buildings are held in a separate Access 2002 database, linked to a layer in the GIS.

A1.6.3 There are copies of published archaeological journals, and off-prints held at the HER, most of which are also available in the OA North archive or elsewhere. Likewise, maps held at the HER generally duplicate those available at the County Record Office in Carlisle. There is also a major collection of grey literature for Carlisle held by the HER.

A1.7 OXFORD ARCHAEOLOGY NORTH (OA NORTH) RECORDS AND ARCHIVES

A1.7.1 Client reports and other documentation relating to all fieldwork events undertaken in Carlisle by OA North (formerly the Lancaster University Archaeological Unit) are stored at OA North's premises in the Storey Institute, Lancaster. OA North also holds a complete run of the *Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society* from the nineteenth century to the present day, together with copies of all recent publications relating to the archaeology of the city. The bulk of the documentary archives relating to the Carlisle Millennium and Rickergate excavations are also currently stored at OA North's premises, where they are undergoing post-excavation analysis.

A1.8 TULLIE HOUSE MUSEUM AND ART GALLERY

A1.8.1 Tullie House Museum and Art Gallery is the foremost museum and gallery in the region and has historically been the repository for archaeological finds of all periods from northern Cumbria and the Border region. Both the Museum and Art Gallery hold important documents, databases, and collections of material that can be regarded as principal sources of data for the UAD.

A1.8.2 The museum contains a large collection of artefacts recovered as a result of chance discoveries or in the course of archaeological interventions. A basic MODES database of the museum's archaeological collections exists, although we are advised that it is neither complete nor entirely consistent. Accession registers list all materials, including archaeological artefacts found within the city, which have been accessioned by the museum since 1892. It is understood that some of this information is not currently on the County HER. A published catalogue of the inscribed and sculpted Roman stones in the museum's collections is available (Wright and Phillips 1975).

A1.8.3 The art gallery holds an important collection of eighteenth- and nineteenth-century paintings and drawings of Carlisle, which will be of considerable value in establishing the character and form of specific areas of the city. It is estimated that the gallery holds 132 eighteenth / nineteenth-century illustrations that may be of value to the UAD, with the great majority dating from the 1830s to 1880s. Of these, 30 are general views of the city, which may be of only limited use to the UAD, whilst a further 47 depict the castle (25 images) and the cathedral (22 images, not including illustrations of other buildings in the cathedral close).

A1.8.4 The museum also holds the following:

- a collection of old photographic plates and slides. We are however advised that copies of all these images are held in the Library's collections, where they are far more accessible;

- the diaries and notebooks of the late Robert Hogg, Keeper of Archaeology and Geology from 1949 to 1966 and Curator of the museum from 1966 to 1975, who carried out a number of excavations and observations in the city;

- a log, compiled by Tom Patten, of antiquarian references to archaeological discoveries in local newspapers such as the *Carlisle Patriot* and the *Carlisle Journal*, covering the period 1776-1937;

- copies of all the Ordnance Survey record cards for Cumbria.

A1.9   NATIONAL MONUMENTS RECORD, SWINDON

A1.9.1 The records for Carlisle held by the National Monuments Record are for the most part duplicated by the HER.

A1.10   OTHER SOURCES

A1.10.1 *Medieval Carlisle, Henry Summerson*: Summerson's magisterial history of Carlisle and the Border region from the late eleventh to the mid-sixteenth century (1993) provides a comprehensive list of published and unpublished primary and secondary documentary sources for the medieval city. This makes any detailed investigation of these sources (which would be potentially extremely difficult and time consuming) unnecessary for the purposes of the UAD. Unfortunately, the majority of the historical sources are not site specific and cannot be related to a specific property or monument within the medieval city, which limits their value for the UAD. In some cases, however, and particularly in the case of major medieval structures such as the castle and the cathedral, Summerson's sources

provide potentially important information about the date and character of building works or modifications to these structures that are still visible in the surviving fabric.

A1.10.2 *Other illustrations*: three drawings by John Ruskin, produced in Carlisle in 1837 and currently in the collections of the Ruskin Foundation at the Ruskin Library, Lancaster University, may be of relevance to the UAD. Three eighteenth century views of Carlisle by John Gilpin, Joseph Farrington and Joseph Turner are held by the Wordsworth Trust, Carlisle Record Office, and The New Art Gallery, Walsall, respectively. Two nineteenth-century views of the city by Turner and William Westall are to be found in the collections of Carlisle Library and the Abbot Hall Art Gallery, Kendal. The original copy of the earliest known map of Carlisle, produced around 1560, is in the British Library, but as published copies are freely available there seems little value in viewing the original as part of the UAD project.

A1.10.3 In addition, there are several published illustrations, which include Buck Brothers prints, a wide variety of other topographical prints, newspaper illustrations from the nineteenth century, and various published and internet collections of 'old photographs'.

APPENDIX 2
HARDWARE REQUIREMENTS FOR THE GIS SYSTEM

OA North will need to purchase a high-specification graphics computer for developing the GIS and database to supplement equipment already in place. The specification for this computer is set out below:

High-end Graphics Computer Specifications:

Pentium 4 2 Ghz processor

120 Gb hard disk

1 Gb RAM

256 Mb graphics card

21" Monitor

Windows 2000 operating System

ArcMap 9 GIS Software

Microsoft Access 97

APPENDIX 3
RECOGNITION EVENT DATABASE STRUCTURE

The table below sets out the proposed structure of the recognition event section of the database. It is based on the fields in the *Compiler's Manual* list (RCHM(E) and English Heritage 1993), but certain fields have been omitted or altered in accordance with the latest UAD standards and to ensure compatibility with MIDAS. Field names in *Compiler's Manual* list (if different) are indicated by square brackets. Both the HER and the UAD will follow the current MIDAS format and will therefore ensure compatibility between them.

(M/R/O = Mandatory / Recommended / Optional)

Field Name	M/R/O	Data Type
Recognition Event Table		
Recognition Event ID	M	Autoincrementing Index
County Code	M	Controlled (all Cumbria)
Administrative local authority code	M	Controlled (all Carlisle)
Civil parish full name	R	Controlled (all Carlisle)
Site Name	R	
Carlisle City Council unique Property Reference No	R	Controlled
Recognition Event Type	M	Controlled List
Event Start Date	R	
Event End Date	R	
Event Date Precision	R	Controlled List
Fieldworker Name	R	
Fieldworker Role	O	Controlled List
Associated Organisation	R	Controlled List
Site Description	O	Memo
NGR [National grid reference 100km square]	R	Controlled (all NY)
Easting (National grid reference)	R	Six figure British National Grid easting
Northing (National grid reference)	R	Six figure British National Grid northing
National grid reference qualifier	R	Controlled List
National grid reference precision	R	Controlled List
National Monuments Record reference no	O	
National Archaeological Record reference no	R	
Site Discrimination	O	
Area Status	O	
Status Qualifier	O	
Status Identifier	O	
Data Entered by [Compiler]	M	
Date of Initial Data Entry [Compilation Date]	M	Automatically Entered
Data updates (initials, dates)	O	
HER Table		
Event Number	M	Cross-reference to Recognition Events Table
HER number	R	Cross-reference to unique HER number
Archaeological Element Table		
Event Number	M	Cross-reference to Recognition Events Table
Archaeology Element: Number	R	
Archaeology Element: Keyword [Term]	R	
Archaeology Element: Quantity	R	
Archaeology Element: Period	R	Controlled List

Field Name	M/R/O	Data Type
Deposit Horizon Table		
Event Number	M	Cross-reference to Recognition Events Table
Deposit Horizon Keyword	O	Controlled List
Easting [Location National Grid Reference]	R	
Northing [Location National Grid Reference]	R	
X/Y precision	R	Controlled List
Z co-ordinate	R	
Z Precision	R	Controlled List
Deposit Character	R	
Comment	O	Memo
Principal deposits: Periods	O	Controlled List
Unstratified Finds: Periods	O	Controlled List
Archive Table		
Event Number	M	Cross-reference to Recognition Events Table
Archive: Deposited	O	
Archive: Ref Number(s)	O	
Archive: Type(s)	O	
Finds Table		
Event Number	M	Cross-reference to Recognition Events Table
Finds: Deposited	O	
Finds: Ref Number(s)	O	
Event Source Table		
Event Number	M	Cross-reference to Recognition Events Table
UAD BIB number	M	Cross-reference to Sources Table
Pages		
Notes		
Sources Table		
UAD BIB number [source number]	M	Autoincrementing Index
Bibliographic type	M	
Bibliographic document title	O	
Page nos [Bibliographic inclusive page number]	R	
Editor(s)	O	
Author(s) [Bibliographic document originator(s)]	R	
Author(s)' role [Bibliographic document originator(s)' role]	R	
Year [Bibliographic document date of publication or issue]	R	
Bibliographic document publisher or issuer	O	
Bibliographic document place of publication	O	
Bibliographic document edition	O	
In: Editor(s)	O	
In: Author(s)	O	
In: Year	O	
In: UAD BIB number [source number]	O	
Bibliographic document ISBN	O	
Description/comment [Bibliographic document description]	O	
Record Office Reference	O	

Field Name	M/R/O	Data Type
Bibliographic series or monograph: Title	O	
Bibliographic document ISSN	O	
Place of deposition	O	
Archival source location	O	
Archival source accession number	O	

APPENDIX 4
MONUMENT DATABASE STRUCTURE

The table below sets out the proposed structure of the monument section of the database. It is based on the fields in the *Compiler's Manual* list (RCHM(E) and English Heritage 1993), but certain fields have been omitted or altered in accordance with the latest UAD standards and to ensure compatibility with MIDAS. Field names in *Compiler's Manual* list (if different) are indicated by square brackets. Both the HER and the UAD will follow the current MIDAS format and will therefore ensure compatibility between them.

(M/R/O = Mandatory / Recommended / Optional fields in *Compiler's Manual*)

Field	M/R/O	Data Type
Event Monument Table		
Event Number	M	Cross-reference to recognition event Table
Monument Number	M	
Comment	O	Memo
Monument Table		
Monument Number	M	Autoincrementing Index
Monument name	R	
Monument Type Keyword	M	Controlled List
Monument: Certainty	O	Controlled List
Quantity	M	
Description	R	Memo
Monument Characterisation	O	
Monument Discrimination	O	
Management Appraisal	O	
County Code	M	Controlled (all Cumbria)
Administrative local authority code	M	Controlled (all Carlisle)
Civil parish full name	R	Controlled (all Carlisle)
NGR (National grid reference 100km square)	R	Controlled (all NY)
Easting (National grid reference)	R	Six figure British National Grid easting
Northing (National grid reference)	R	Six figure British National Grid northing
National grid reference qualifier	R	Controlled List
National grid reference precision	O	Controlled List
National Monuments Record reference no	O	
OS 1:10,000 quarter sheet	O	Controlled List
National Archaeological Record reference no	R	
National Buildings Record building no	O	
National Buildings Record phase no	O	
National Buildings Record site no	R	
English Heritage county no	R	Controlled (all Cumbria)
English Heritage county suffix	R	
English Heritage part letter	O	
Scheduled monument national no	R	
Scheduled monument constraint area suffix	O	
Scheduled monument archaeological item number	O	
Data Entered by: [Compiler]	M	
Date of Initial Data Entry [Compilation date]	M	Automatically entered
Data updates (initials, dates)	O	added

Field	M/R/O	Data Type
Monument Date Table		
Date Minimum	O	
Date Minimum: Precision	R	Controlled List
Date Maximum	O	
Date Maximum: Precision	R	Controlled List
Display Period	M	
Period: Precision	O	Controlled List
Scientific date	O	
Listed Building Table		
Listed Buildings Number	R	
Monument Number	M	Cross-reference to Monuments Table
Listed building road/street	O	
Listed building side of street	O	
Listed building street number	O	
Listed building number qualifier	O	

APPENDIX 5
GANTT CHART

Detailed overleaf is a gantt chart showing the proposed project schedule. The overall timetable is predicated on the existing OA North commitments to Carlisle City Council, which include the Millennium Project and the Carlisle Archives Project.
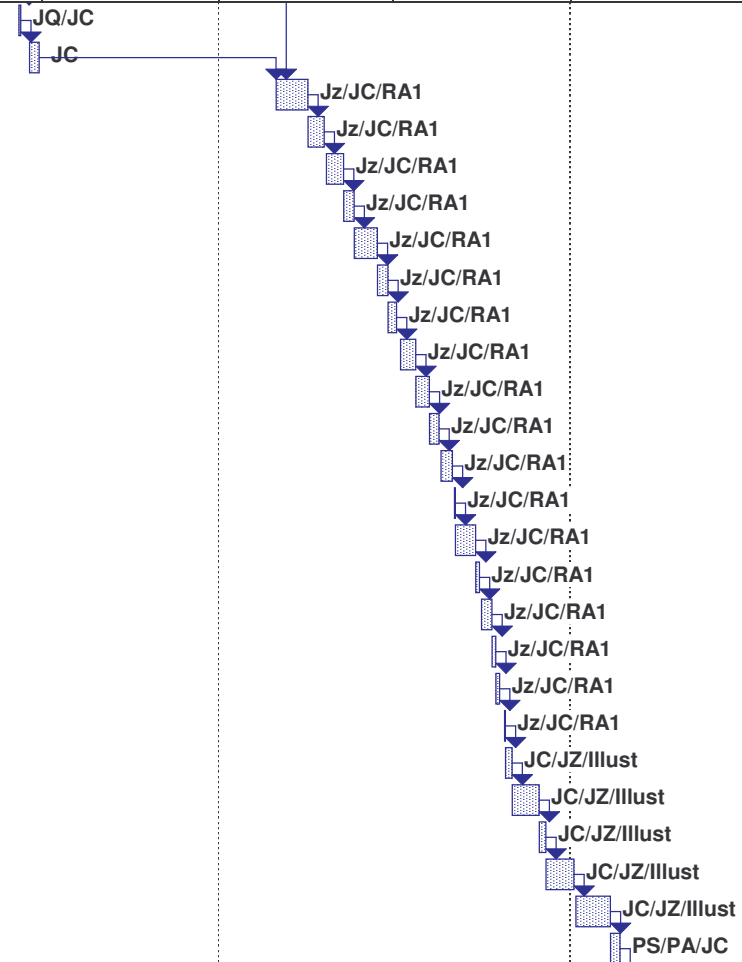
Carlisle Urban Archaeological Database

ID	ℹ	Task Name	Duration	Start	2006 H1	H2	2007 H1	H2	2008 H1
1	▦	Project preparation	5 days	Mon 03/04/06	JQ				
2	▦	[1] Liaison with CCC/CCC/EH and OA	5 days	Thu 13/04/06	JQ/JZ/JC				
3		[2a] GIS / Database Design Specifications	10 days	Thu 13/04/06	JC				
4		[2b] Refinement of GIS System	10 days	Thu 27/04/06	JC				
5		[3] GIS Training in use of system	5 days	Mon 15/05/06	JC/JZ				
6		[4a] Data Gathering: CAU/CAL Archives	12 days	Mon 22/05/06	JZ/PS/PA				
7		[4b] Data Gathering: OA North Archives	6 days	Wed 07/06/06	JZ/JC/PA				
8		[4c] Data Gathering: Other Unit Reports	7 days	Thu 22/06/06	JZ/JC/PA				
9		[4d] Data Gathering: Pre 1977 interventions	11 days	Mon 03/07/06	JZ/JC/PA				
10		[4e] Data Gathering: Published CAU / CAL Excavations	12 days	Fri 21/07/06	JZ/JC/PA				
11		[4f] Data Gathering: NMR	3 days	Tue 08/08/06		JZ/JC/PA			
12		[4g] Data Gathering: Cumbria HER	8 days	Tue 15/08/06		JZ/JC/PA			
13		[4h] Data Gathering: Listed Buildings	8 days	Fri 25/08/06		JC/PA			
14		[4i] Data Gathering: Carlisle City Library	13 days	Wed 06/09/06		JC/PA			
15		[4j] Data Gathering: Carlisle Cathedral Library	11 days	Mon 25/09/06		JZ/JC/PA			
16		[4K] Data Gathering: Tullie House Museum and Art Gallery	17 days	Thu 12/10/06		JZ/JC/PA			
17		[4l] Data Gathering: Other Institutions	5 days	Thu 09/11/06		JZ/JC/PA			
18		[4m] Data Gathering: Cumbria County Record Office	17 days	Fri 17/11/06		JZ/JC/PA			
19		[4n] Data Gathering: National Sources	13 days	Mon 18/12/06			JZ/JC/PA		
20		[4o] Data Gathering: Summersons Medieval History	8 days	Tue 16/01/07			JZ/JC/PA		
21		[4p] Carlisle CC Planning Dept	8 days	Tue 30/01/07			JZ/JC/PA		
22		[4q] Data Gathering: Oral Sources	8 days	Wed 14/02/07			JZ/JC/PA		
23		[4r] Data Gathering: River Eden Project	4 days	Mon 26/02/07			JZ/JC/PA		
24	▦	[5] Data Processing	5 days	Fri 02/03/07			JC		
25		[6] Acquisition of Historic Maps	1 day	Mon 22/05/06	JC				
26		[7] Scanning of Historic Maps	12 days	Tue 23/05/06	JC/PA				

	Task	▦	Rolled Up Task	▦	Project Summary ▬▬▬
	Split	··········	Rolled Up Split	··········	External Milestone ◆
Carlisle Urban Archaeological Databa Resource Gantt Chart	Progress	▬▬▬	Rolled Up Milestone ◇		External Milestone ◆
	Milestone	◆	Rolled Up Progress	▬▬▬	Deadline ⇩
	Summary	◤▬▬◢	External Tasks	▭	

Page 1

ID	ⓘ	Task Name	Duration	Start	2006 H1	H2	2007 H1	H2	2008 H1
27		[8] Liaison with CCCAS	2 days	Thu 08/06/06	JQ/JC				
28		[9] Rubber Sheeting of Historic Maps	8 days	Mon 19/06/06	JC				
29		[10a] Database Entry/ Mapping: CAU/CAL Archives	21 days	Fri 02/03/07			Jz/JC/RA1		
30		[10b] Database Entry/ Mapping: OA North Archives	11 days	Wed 04/04/07			Jz/JC/RA1		
31		[10c] Database Entry/ Mapping: Other Unit Reports	14 days	Mon 23/04/07			Jz/JC/RA1		
32		[10d] Database Entry/ Mapping: Pre 1977 interventions	7 days	Fri 11/05/07			Jz/JC/RA1		
33		[10e] Database Entry/ Mapping: Published Excavations	14 days	Tue 22/05/07			Jz/JC/RA1		
34		[10f] Database Entry/ Mapping: NMR	7 days	Fri 15/06/07			Jz/JC/RA1		
35		[10g] Database Entry/ Mapping: Cumbria HER	7 days	Tue 26/06/07			Jz/JC/RA1		
36		[10h] Database Entry/ Mapping: Listed Buildings	12 days	Mon 09/07/07			Jz/JC/RA1		
37		[10i] Database Entry/ Mapping: Carlisle City Library	10 days	Wed 25/07/07			Jz/JC/RA1		
38		[10j] Database Entry/ Mapping: Carlisle Cathedral Library	6 days	Wed 08/08/07			Jz/JC/RA1		
39		[10k] Database Entry/ Mapping: Tullie House Museum	10 days	Mon 20/08/07			Jz/JC/RA1		
40		[10l] Database Entry/ Mapping: Other Institutions	1 day	Mon 03/09/07			Jz/JC/RA1		
41		[10m] Database Entry/ Mapping: CCC Record Office	12 days	Tue 04/09/07			Jz/JC/RA1		
42		[10n] Database Entry/ Mapping: National Sources	4 days	Tue 25/09/07			Jz/JC/RA1		
43		[10o] Database Entry/ Mapping: Summerson Medieval History	9 days	Mon 01/10/07			Jz/JC/RA1		
44		[10p] Database Entry/ Mapping: CCC Planning Dep	2 days	Fri 12/10/07			Jz/JC/RA1		
45		[10q] Database Entry/ Mapping: Oral Sources	4 days	Tue 16/10/07			Jz/JC/RA1		
46		[10r] Database Entry/ Mapping: River Eden Project	1 day	Thu 25/10/07			Jz/JC/RA1		
47		[11a] Monument Database/Mapping: Prehistoric	5 days	Fri 26/10/07				JC/JZ/Illust	
48		[11b] Monument Database/Mapping: Roman	20 days	Fri 02/11/07				JC/JZ/Illust	
49		[11c] Monument Database/Mapping: Early Medieval	5 days	Fri 30/11/07				JC/JZ/Illust	
50		[11d] Monument Database/Mapping: Later Medieval	14 days	Fri 07/12/07				JC/JZ/Illust	
51		[11e] Monument Database/Mapping: Post Medieval	26 days	Mon 07/01/08					JC/JZ/Illust
52		[12] Cellar Survey	8 days	Tue 12/02/08					PS/PA/JC

Carlisle Urban Archaeological Databa Resource Gantt Chart	Task	▒▒▒▒	Rolled Up Task	▒▒▒▒	Project Summary	▬▬▬
	Split	....	Rolled Up Split	....	External Milestone	◆
	Progress	▬▬▬	Rolled Up Milestone	◇	External Milestone	◆
	Milestone	◆	Rolled Up Progress	▬▬▬	Deadline	⇩
	Summary	▼▬▬▼	External Tasks	▬▬▬		

		Carlisle Urban Archaeological Database								
					2006		2007		2008	
ID	ⓘ	Task Name	Duration	Start	H1	H2	H1	H2	H1	
53		[13] Input of Graphic Images	19 days	Fri 22/02/08					JC/PA	
54		[14] Preparation of Deposit Model Data	15 days	Thu 20/03/08					JZ/JC	
55		[15] Deposit Model Design	8 days	Thu 10/04/08					JC	
56		[16] System Documentation	5 days	Tue 22/04/08					JC	
57		[17] Transfer of UAD to LCAS	4 days	Tue 29/04/08					JC	

Carlisle Urban Archaeological Databa
Resource Gantt Chart

Task		Rolled Up Task		Project Summary	
Split		Rolled Up Split		External Milestone	◆
Progress		Rolled Up Milestone	◇	External Milestone	◆
Milestone	◆	Rolled Up Progress		Deadline	⇩
Summary		External Tasks			

APPENDIX 6
PROJECT BRIEF

APPENDIX 7
CONTRIBUTORS TO THE ORAL SURVEY

Mike McCarthy	Bradford University
Dennis Perriam	
Frank Giecco	North Pennines Heritage Trust
Chris Jones	North Pennines Heritage Trust
Tim Neighbour	CFA
Gerry Martin	
Philip Cracknell	Historic Building Survey and Archaeological Illustration
Ian Caruana	
Paul Flynn	Cumbria Institute of the Arts
Graham Keevil	Keevil Heritage Consultancy
	Cumberland and Westmorland Antiquarian and Archaeological Society

APPENDIX 8
SAMPLE RECORDS FROM ARCHIVES DATABASE

The following is taken from the database used for the Carlisle Archives Project (OA North 2003)

Note that further information is available on each event, such as publication and archive data, but this is not shown here due to space considerations.

Site Code	ANN_H				
Event Name	Annetwell Street, BBC Radio Cumbria				
Director	Ian Caruana				
Event Start	01/10/1990	**Event Finish**	01/02/1991	**Event Date Precision** between	
Event Type	excavation				
Event Reason	Construction of BBC Radio Cumbria building.				

Event Summary The excavation uncovered the south ends of two or more phases of timber buildings within the 1st timber (Flavian) fort. Some of these buildings were very probably barracks similar to those excavated to the east in 1981-4 (ANN A). Associated external deposits were also revealed. Part of a timber building, possibly a workshop, and associated external deposits within the second timber fort of the 1st half of the 2nd century were found. Most later Roman & post-Roman levels had been removed by modern levelling, although a few traces of buildings & other features of the later stone fort(s) were present.

Planning Ref	89/0117	**LandUse**	OT3
Land Owner	Carlisle City Council		
Land OwnerAddress	Civic Centre, Rickergate, Carlisle CA3 8QG		
Funding	BBC, Broadcasting House, London W1A 1AA		
Other Funding			
Contractor			

HERNo	6415	**SAMNum**	00547
RSM Num		**NMRNum**	1030466
Listed BuildingNu	no	**LocalAuthCode**	
Address1	BBC Radio Cumbria		
Address2	21-23 Annetwell Street		
Parish	Carlisle		
District	Carlisle		
Town	Carlisle		
County	Cumbria		

NGREast	339716	**NGRNorth**	556070	**NGRPrecision**	10
Prot Status	SM				
AIP Num	E.16.0041				
Site Code	INF_B				
Event Name	Cumberland Infirmary				
Director	Paul Flynn				
Event Start	01/09/1992	**EventFinish**	10/02/1993	**EventDatePrecision** throughout	

Event Type	excavation

Event Reason   In advance of proposed construction of new hospital buildings.

Event Summary   The excavation uncovered the remains of five roundhouses of at least two structural phases. These features were undated & could be of Bronze or Iron Age date; they do not appear to have been within an enclosure, however. The site appears to have been occuped by a 'native' settlement during the Roman period. The remains of this activcity comprised cobbled surfaces, remains of timber buildings, & so on. The occupation was multi-phase, commencing with a palisaded enclosure with associated buildings & deposits, followed by an interrupted ditched enclosure, again associated with timber buildings, cobbled surfaces & other deposits. The Roman levels were sealed by a thick medieval plough soil. At least two phases of ploughing were recorded, at least one of which comprised ridge and furrow. This was sealed by modern topsoil, perhaps relating to the use of the site as a nursery.

Planning Ref	92/0509	**LandUse**	GH5

Land Owner   Northern Regional Health Authority

Land OwnerAddres   Benfield Rd, Newcastle upon Tyne NE6 4PY

Funding   Northern Regional Health Authority

Other Funding

Contractor

HERNo	15239/25653	**SAMNum**	
RSM Num		**NMRNum**	1030522
Listed BuildingNu	671-1/5/218	**LocalAuthCode**	

Address1   The Cumberland Infirmary

Address2   Newtown Road

Parish   Carlisle

District   Carlisle

Town   Carlisle

County   Cumbria

NGR East	338582	**NGRNorth**	556158	**NGRPrecision**	10

Prot Status

AIP Num   E.16.0004

APPENDIX 9
SAMPLE RECORDS FROM THE OXFORD UAD

The following screenshots show some of the information from the Oxford UAD, as an example of how the Carlisle UAD might look. The tabbed pages in the form give access to further information about each event or monument.
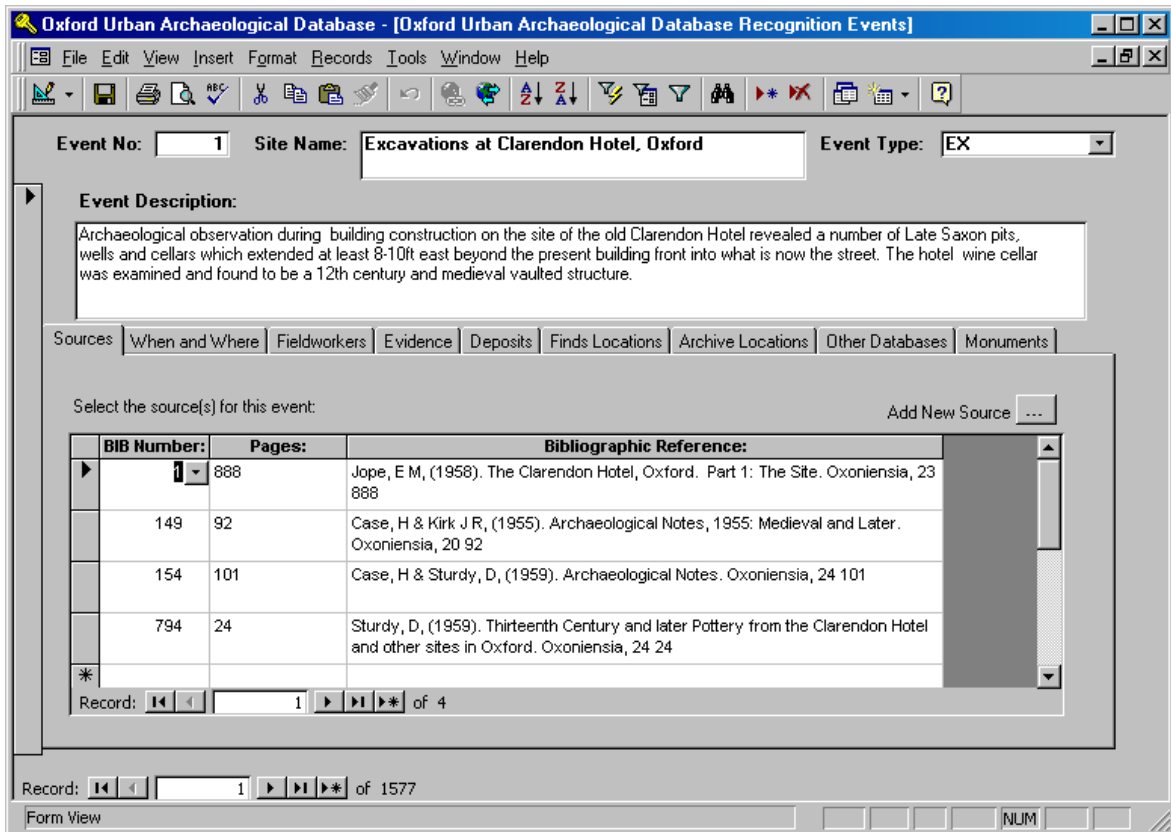
The Oxford recognition event table, showing examples of bibliographic sources pertaining to that event

Part of the Archaeological Elements Table for this event
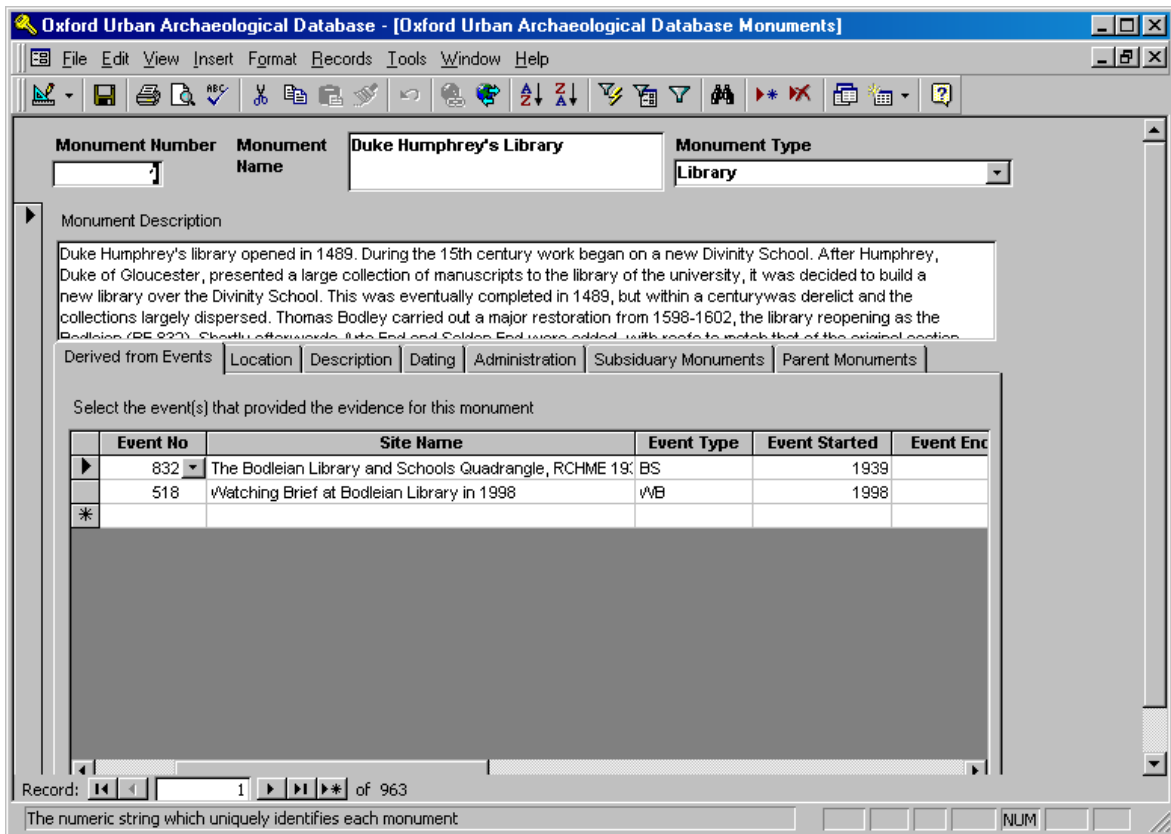
The event monument table, showing some of the recognition events pertaining to this monument
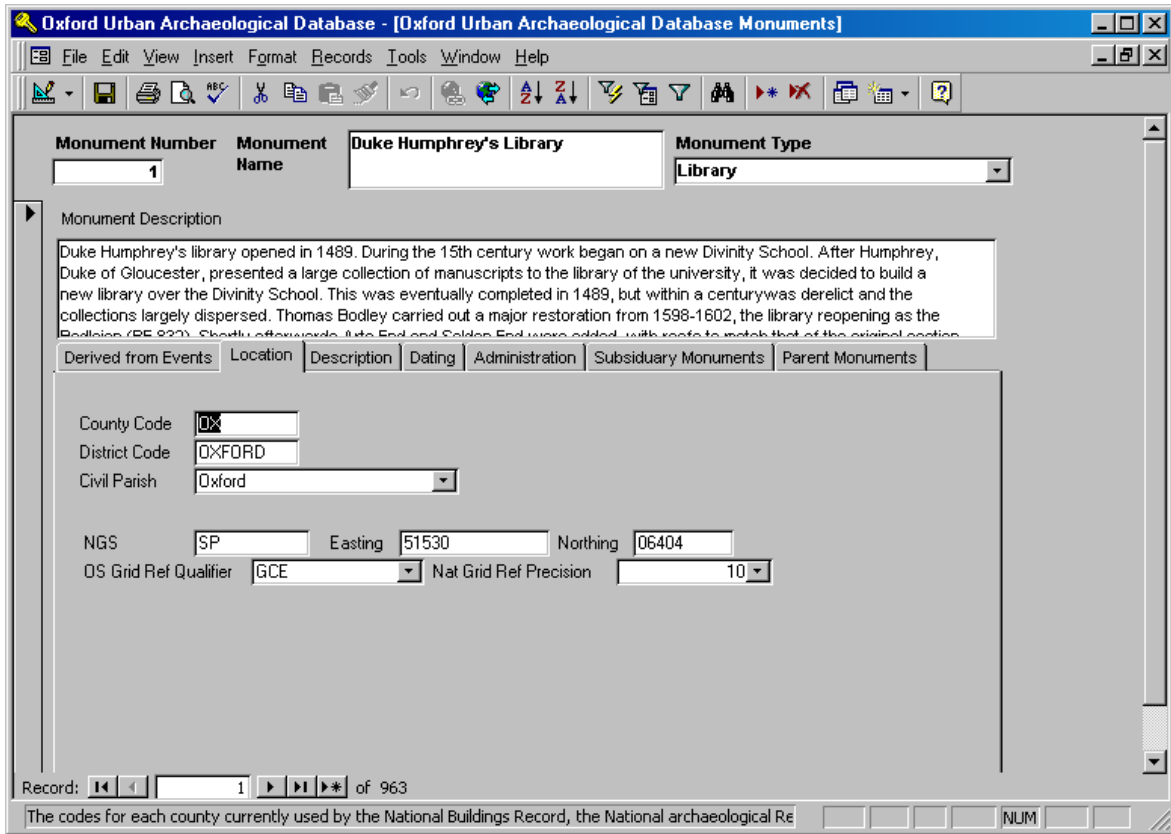
The location information for this monument.