CARLISLE NORTHERN DEVELOPMENT, ROUTE, CUMBRIA

Parcel 27 North
Phase 4 FAW
Project Design 032 (001)

October 2009

NGR: NY 337594 557137

Cumbria County Council | Connect roads | Birse Civils | oa north

1 BACKGROUND

1.1 INTRODUCTION

1.1.1 Cumbria County Council (CCC) propose to construct a new road around the western edge of Carlisle referred to as the Carlisle Northern Development Route (CNDR); the route extends around the western and northern side of Carlisle from Greymoorhill North bridge in the north to Newby West in the south.

1.1.2 This document is the project design for anticipated programme of Further Archaeological Works (FAW) required in Parcel 27 North as requested by Cumbria County Council's Historic Environment Service (CCCHES). The work comprises the excavation and recording of preserved archaeological remains surviving at approximately 1m below the surface of present ground level within a palaeochannel and associated features on the adjacent channel banks, followed by further reduction and characterisation of the channel. Parcel 27 North (NY 337594 557137) is located to the north of Hadrian's Wall and the River Eden and to the south of Holme Lane and is identified on Drawing No 42605/05/49/Am4.

1.2 GEOLOGY AND TOPOGRAPHY

1.2.1 The topography through which the road scheme passes, particularly to the south of the River Eden, consists of relatively uniform undulating terrain, predominantly in use as pasture and arable fields, which are bounded by tall and thick hedge-rows. The river bisects the route of the road; to the north of the river, the route crosses the Eden flood plain and river terraces, immediately west of Stainton, before rising steeply towards Kingsmoor House.

1.2.2 The underlying drift geology consists of Stanwix shales overlain by drift deposits of boulder clay and alluvium adjacent to the River Eden. The soils are attributed to the Wick Association, coarse well-drained brown earths, which extend westwards to Burgh-by-Sands and Kirkbampton.

1.3 CIRCUMSTANCES OF PROJECT

1.3.1 The proposed road runs in a west-south-westerly direction from Junction 44 of the M6 motorway, following the course of existing roads and passing close to Kingstown before turning south prior to crossing the main West Coast rail line. The line of the road, which from this point will comprise new build, continues south and then south-west, crossing the River Eden to the west of Stainton. On the south bank of the river the route intersects the line of Hadrian's Wall and an associated earthwork to the south, known as the Vallum, close to Knockupworth Cottage (NY 3710 5680), at the point where the Vallum is crossed by the now dismantled Carlisle and Silloth railway, which had itself been built on the line of the former Carlisle to Port Carlisle Canal (known as the Carlisle Navigation Canal). After crossing the C2042 Brough Road, the route then turns south near Cornhill, following a minor road for some of the distance to Bunkershill, where it turns south-east to join the existing A595.

1.3.2 Cumbria County Council propose to let the construction of the road as a PFI

Design and Build-type contract. As there are significant archaeological remains along the proposed route, including the World Heritage Site of Hadrian's Wall, which is statutorily protected as a Scheduled Ancient Monument (SAM; Scheduled Ancient Monument no 26110), a brief has been prepared by Cumbria County Council's Historic Environment Service (CCCHES), acting in concert with English Heritage, setting out the archaeological requirements for the main contractor in advance and during construction works associated with building the road - the brief is contained within Annex 14 Part 2B of Schedule 4 of the Invitation to Negotiate (ITN) documentation associated with the scheme.

1.4 ARCHAEOLOGICAL BACKGROUND

1.4.1 A full Environmental Statement in support of the development was published in 2000. This clarified the significance of the sites along the development route. The Environmental Statement identified Parcel 27 North as being potentially of archaeological interest and having the potential to contain sites of archaeological significance.

1.4.2 The archaeological and historical background to the development including a survey of previous archaeological work is summarised as part of the *Outline Archaeological Strategy* (OA North 2007) and scheme-wide research questions and objectives are outlined in *Project Design 001*.

1.4.3 An evaluation of Parcel 27 was undertaken by CFA Archaeology Ltd (2005). The CFA evaluation trenches retrieved eight worked lithics from the topsoil in Parcel 27 North and, in one trench, a preserved root from an oak tree. The evaluation interpreted some of the naturally deposited sediments occurring within this part of the site as being evidence for a palaeochannel transecting it. Generally, the geology was shown to comprise deposits of alluvial sediment.

1.4.4 In October 2008 OA North completed a Strip and Record exercise at Parcel 27 North (*Design 010*). The results of the Strip and Record are reported in a separate *Interim Report*, but are summarised in the following. A scatter of worked lithic material dating to the Mesolithic period was identified occurring throughout a layer of alluvial sediment adjacent to the palaeochannel at the north-east end of the site (Fig 022). Two test pits (1 and 4) were excavated through the alluvium and an assemblage of lithic material was retrieved from surface collection across the deposit and from both test pits. In the southernmost test pit (1), a grey sediment (probably a feature fill) was identified that also contained lithic material associated with charcoal fragments. Sealed below this grey sediment were other alluvial/fluvial deposits containing no finds but preserved organic material. Preserved organic material was also retrieved from a third test pit (5) excavated in the side of the palaeochannel; no finds occurred in association with this.

1.4.5 In January 2009 Oxford Archaeology undertook a programme of Further Archaeological Works (FAW) at Parcel 27 North (*Design 26*). These were evaluative in nature designed to better characterise the subsurface deposits and derive a more informed understanding concerning the nature of the remains

revealed by the Strip and Record exercise. A hand-excavated trench was excavated through the flint bearing deposits in the north-eastern part of the site. The arisings from this were retained by the square metre and stored in individually labelled bags and buckets. The trench revealed a hollow filled with flint-bearing alluvium, sealed by 0.30m thick deposits of interleaving alluvium and colluvium, the latter deriving from an area to the north and east, which also contained flint – albeit in apparently lower frequencies.

1.4.6 Machine-excavated trenches were extended along the northern and southern edges of the site, between the north-eastern edge of the palaeochannel and the terrace approximately 70m to the south-west (Fig 22). These trenches, excavated to maximum depth of 3.2m below the stripped surface, revealed evidence for three palaeochannels (Fig 27). The channels contained organic deposits that had accumulated in low energy conditions and included charcoal, insect and plant remains; some of the retrieved wood may have been worked. On an eyot (island) between the channels, on a buried land surface approximately 1m below the stripped surface of the site, was a hurdle structure associated with deposits of charcoal, burnt and fire-cracked stone and worked flint, amongst which was a scraper of possible Late Neolithic/Early Bronze Age date. Along the north-eastern edge of the palaeochannel, in the southernmost trench, was a seemingly extensive deposit of burnt stone and charcoal sealed below the uppermost deposits of alluvium in the channel. Nearby to the burnt stone deposit, was a circular area of burnt stone, *c* 1m in diameter, which had weathered-out at the level of the stripped surface of the site and was considered to be the base of a hearth.

1.4.7 Following the trenching, a design (*Design 30*) was produced defining the next phase of mitigation of the detected archaeology. With regard to the archaeological remains in the palaeochannel, this phase of work was concerned only with determining the extent of the Uppermost Buried Landsurface (UBL) within the channel and characterising the nature of the archaeological survival at this level and on the adjacent banks. This characterisation was intended to permit the formulation of a strategy for the anticipated excavation of the UBL.

In accordance with *Design 30*, machine stripping of the palaeochannel and the surrounding over-bank alluvial sediments revealed the area of organic survival at the level of the UBL to be extensive – approximately 12m by 40m (Fig 28). The UBL was excavated in accordance with *Design 31*. During the course of these excavations it was discovered that the UBL comprised a number of successive organic deposits, sealing earlier deposits of alluvium, which in turn sealed an even earlier organic deposit – the lowermost buried landsurface (LBL). All the deposits of the UBL were investigated and removed by hand-excavation. The earliest organic deposit in the UBL sequence significantly, contained four polished stone axes; a smashed but well-represented Grooved Ware vessel; a leaf-shaped and an oblique arrowhead; two wooden 'tridents', and many chipped or unworked stones. The objects seemed to have been deposited in the watercourse in association with several large oak tree trunks and pieces of worked wood, and appeared to be contemporary with a crude

wooden platform on its north-east side. These finds, alongside the flint scraper found during the trenching (*Section 1.4.6*), suggest a Middle to Late Neolithic date for this phase of activity.

1.4.8 In the organic deposits higher up the sequence, were numerous pieces of wood that were, for the most part, unworked, perhaps indicating that the channel became more heavily wooded as it silted. At the uppermost part of the sequence, was a further organic deposit in which wood was less frequent. Within this deposit were flecks of charcoal and burnt stones that derived from four burnt mounds (fire-cracked stones mixed with carbonised material), several hearths, and pits filled with burnt mound material, possibly troughs (Fig 28). These were all sealed below deposits of over-bank alluvium. One of these burnt mounds had been detected in the exploratory trenching as a deposit of burnt stone (*Section 1.4.6*). Stratigraphically, the burnt mounds and associated features seemed to be later than the Neolithic platform in the palaeochannel and may date to the Bronze Age.

1.5 OXFORD ARCHAEOLOGY

1.5.1 Oxford Archaeology has over 30 years of experience in professional archaeology, and provides a professional and cost effective service. It is the largest employer of archaeologists in the country with more than 200 members of staff and can deploy considerable resources with extensive experience to deal with any archaeological obligations arising from the development. Our offices in Lancaster, Cambridge and Oxford, trading as Oxford Archaeology North (OA North), Oxford Archaeology East (OA East) and Oxford Archaeology (OA) respectively, enable us to provide a truly nationwide service. Watching briefs, evaluations and excavations have taken place within the planning process, to fulfil the requirements of clients and planning authorities, to very rigorous timetables. OA is an Institute of Field Archaeologists Registered Organisation (No 17), is bound by the IFA's Code of Conduct and applies the IFA's quality standards.

1.5.2 Between our offices our company has unrivalled experience of working on prehistoric, medieval and post-medieval sites, and is recognised as one of the leading archaeological units in the country.

2 AIMS AND OBJECTIVES

2.1 GENERAL

2.1.1 The proposed fourth phase of FAW may possibly constitute the final phase in this multiphase programme of works. The principal aims will be to clean, characterise, excavate and the deposits of the Lowermost Buried Landsurface (LBL) and any features or finds at the level of the LBL within the palaeochannel, in order to mitigate the impact of the development. Following the excavation of the LBL it is expected that no further excavations will be required at a greater depth within the palaeochannel.

3 METHOD STATEMENT

3.1 GENERAL

3.1.1 The following work programme is based on information available at this time and is submitted in line with the aims and objectives summarised above.

3.1.2 Oxford Archaeology fully endorses the Institute of Field Archaeologists':

- *Code of Conduct* (revised edition September 2002);
- *Standard and Guidance for Archaeological Field Excavation* (1994);
- *Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology* (revised edition September 2000).

3.1.3 The management of the project will be in accordance with the methods and practice described in *Management of Archaeological Projects*, second edition (English Heritage, 1991).

3.1.4 The programme of FAW can be broken down into the following elements, which will discussed in detail below:

- Removal of spoil and mechanical reduction of the area surrounding the palaeochannel to enable safe access and egress;
- Excavation of the LBL within five 4m segments placed through the palaeochannel;
- Excavation of the remainder of the LBL, as far as is safe and practicable;
- Cataloguing and storage of the finds and samples unearthed during these excavations;
- Initial validation, cross-referencing and compilation of the fieldwork archive.

3.2 MECHANICAL REDUCTION OF THE AREA SURROUNDING THE PALAEOCHANNEL.

Prior to any hand-excavation taking place within the channel, the area surrounding the channel will be mechanically reduced and re-formed to facilitate convenient and safe access and egress into and out of the channel (Fig 30). Any spoil storage heaps in the area surrounding the channel will be relocated by mechanical excavator and dumper truck, to areas at remove from the excavation. The area to the east of the channel, between it and the grid squares will be re-profiled so as to create a more gentle slope leading down to the channel. The area to the west of the channel will be similarly re-profiled, with the arisings being used to create a bund between the channel and the adjacent sump. The section at the southern edge of the site will be battered

back. Steps and Youngman's boards will be set out in prescribed routes leading in and out of the channel in at least two places on either side of the channel.

3.3 EXCAVATION OF THE LBL WITHIN THE PALAEOCHANNEL

3.3.1 During the execution of *Designs 30* and *31*, the majority of the LBL was exposed as adark organic deposit covering and area of approximately 40m by 40m. In places, this deposit is still sealed below deposits of later alluvium. The alluvium will be mechanically removed to expose the LBL below it. In two places the LBL has been explored within small hand-excavations, as a result of these soundings and the trenching previously undertaken within the site (*Section 1.4.6*), it is expected that the LBL will be no more than 0.5m thick.

3.3.2 The aim of this phase of work will be to excavate, sample and remove all of the deposits comprising the LBL; to characterise, excavate, sample, and record any archaeological features within or below the LBL; and to retrieve any archaeological finds discovered.

3.3.3 The LBL occurs below the permanent watertable and groundwater constantly seeps into the channel. It will be necessary to ensure that there is adequate de-watering to ensure that the excavation remains as dry as possible and work is unimpeded. This may require the provision of further pumps or other plant/infrastructure. It is presently planned that water will be pumped from the channel into the adjacent sump (Fig 30) and thence to a settlement tank on the other side of the beck to the south-west of the site.

3.3.4 In order to manage de-watering and facilitate movement within the channel, the LBL will be excavated in five 4m wide interventions, each separated by 3m wide walkways on which Youngmans boards will be placed (Fig 30). It is not expected that these walkways will exceed 0.6m in height, but, should this be the case, then beanbags will be placed along the walkways to cushion any falls from them. Once these interventions have been completed, as long as it is safe and practicable, the remainder of the LBL will be investigated.

3.3.5 The deposits of the LBL contain quantities of waterlogged wood, this will be exposed and cleaned as the deposit is excavated. At the earliest opportunity, a wood specialist or specialists will visit the site to advise on the nature of the deposits encountered. They will advise on the recording, collection and the initial treatment and storage of the wood. Their advise will continue to be sort throughout the excavation and further visits may take place. Any elements that are considered to be entirely natural in origin will be removed. As the wood is removed, a representative sample will be collected for species identification. This sample might include both intact pieces of small wood and segments through pieces of large wood. All samples will be individually numbered using a wood number sequence, photographed, surveyed and clearly marked on the plan. The samples will be stored in sealed containers that preserve their integrity. The sampling strategy will be determined through consultation with OA North's environmentalists, EH and CCCHES and will make allowance for collecting samples for dendrochronology and other methods of scientific

dating. Bulk samples of the surrounding deposit will also be retrieved in accordance with the methodology described in *Section 3.9*.

3.3.6 OA North's staff will seek to identify and record any worked wood present. This wood and any potentially worked wood will be wrapped, labelled and stored in a dark damp environment until a wood specialist can assess the significance of the wood and study it in detail for signs of any alteration the excavators may have missed. Any significant or altered pieces of wood will be recorded according to the advice of the wood specialist. If the wood is deemed not to have been altered, and is not significant in any other way, then it will be discarded.

3.3.7 Once all the natural wood has been removed, the area will be re-cleaned; at this time it may prove desirable to take further photographs and draw additional plans – especially if any structural elements are now better defined. Excavation will continue to reveal the full depth and extent of any structural elements present. These will be recorded by photograph, plan and possibly by elevation. Individual context numbers will be issued to discrete structural elements and each element of these will also be individually numbered using the wood number sequence. All altered pieces of wood will be recorded on timber record sheets as they are lifted, photographed immediately, labelled, wrapped and stored in a stable environment until they can be examined by a specialist. Unaltered pieces of wood that comprise parts of structures will also be recorded and might also be sampled for species identification; special attention should be taken to ensure that both altered and unaltered elements of structures are systematically sampled to ensure that practices of woodland management and material selection are correctly understood.

3.3.8 It is possible that, as excavation proceeds, successive phases of structural wood will be encountered. If this should happen the structures will be excavated stratigraphically with each phase of structure being, cleaned, photographed, planned, recorded, sampled and lifted. The excavation strategy will be reviewed as it proceeds and it might become desirable to extend interventions, if this should be the case then monolith samples will be taken prior to the removal of the baulk, and a running section will be recorded.

3.3.9 Palaeoenvironmental and scientific dating samples will be retrieved as required in accordance with *Sections 3.101 & 3.11*. It is possible that, in addition to bulk and monolith samples, other types of sampling may be undertaken at this time. This will be decided in consultation with OA North's in-house specialists, English Heritage and the CCCHES.

3.3.10 Any finds encountered during the excavation will be three dimensionally recorded and, if necessary, photographed and/or planned *in situ*. At least 100 litres of deposit from each intervention will be wet sieved for finds retrieval Finds will be treated in accordance with the methodology outlined in *Section 3.8*. It is possible that a conservator's services will be required on site; OA North will employ a specialist conservator should this prove to be the case. Any human remains encountered will be treated as described in *Section 3.11*..

3.3.11 Excavation of the LBL will be deemed to have been completed once the organic deposits, including any wood, have been entirely excavated down to the level of the sterile alluvial sands deposits beneath. The upper levels of this surface will be surveyed. Due to time constraints, it may prove necessary to employ a machine to excavate some of the LBL deposits, but this will be a last resort.

3.4 CATALOGUING AND STORAGE OF THE FINDS AND SAMPLES

3.5.1 Any finds or palaeoenvironmental samples retrieved during the excavations will be made stable on site and stored appropriately. Given the expectation that wooden artefacts will be recovered, this will include storage tanks or the equivalent that can preserve such artefacts in a damp and dark environment. It is possible that OA North might require the services of a conservator on site to help lift and treat remains; a wood specialist's services will almost certainly be required. All wooden artefacts should be recorded soon after recovery to avoid distortion affecting recorded results.

3.5.2 All finds and samples will be assigned an individual identification number, with which they will be labelled. Finds and samples will be entered in a database and stored in appropriate containers for removal off site. It is anticipated that further treatment and cataloguing of finds will be required in the future and palaeoenvironmental samples will require future processing.

3.5.3 In some cases finds-samples may be collected for wet sieving – it is anticipated that this can take place on site using the 'Dutch Method' sieving facility that has been established on site. If this becomes impracticable then sieving will necessarily take place off site at another location and the samples will be retained and stored until this should become practicable.

3.5 INITIAL CONSOLIDATION OF THE FIELDWORK ARCHIVE

3.6.1 Post-excavation investigations are not covered by this design; instead these will be subject to a separate programme of works on the completion of fieldwork (*Section 3.14*). However, in order to ensure quality assurance, the fieldwork archive should start to be compiled as fieldwork progresses. Records will be checked and validated; archival cross-referencing will take place; information will be entered into site databases; and aggregate site plans will be compiled. The aim will be to ensure that the archive has been validated, consolidated and made stable by the end of fieldwork or a short time thereafter.

3.6.2 In order to achieve this, a support team will be required to assist and help co-ordinate the fieldwork teams. The support team will, for the most part, be based on-site, although they will liase with and, on occasion, be aided by OA's Lancaster/Oxford/Cambridge based office staff. Members of the support team may have multiple roles and the following is not intended to be a comprehensive list, but the support team shall include: Project Officers; surveyors; CAD operators; database operatives; sieving operatives; finds and palaeoenvironmental co-

ordinators; and a grid co-ordinator overseeing the systematic removal of flint-bearing deposits.

3.6.3 It will greatly enhance efficiency if the support team were to be located adjacent to or at a short remove from the site. In addition to the facilities already mentioned, they will require office space in which to work and a generated power supply to run computers and peripherals.

3.9 EXCAVATION RECORDING METHODOLOGY

3.7.1 A detailed record will be made of the stratigraphic sequence of the site, in accordance with IFA and English Heritage guidelines (*Section 3.1*). All on-site recording will be undertaken in accordance with the requirements of the OA Field Manual.

3.7.2 Context recording will operate a continuous unique numbering system. Written descriptions will be recorded on pro-forma sheets comprising factual data and interpretative elements. A unique alpha-numeric project code will appear on all records. A Harris matrix will be compiled during the course of the excavation.

3.7.3 All features and deposits will be recorded in plan and section, as appropriate. Planning will use a mixture of hand draughtsmanship and digital technology (see below); plans will drawn at an appropriate scale, usually 1:50 or 1:20, but some complex areas or features may benefit from planning by hand at larger scales (up to 1:10) as appropriate. Any such plans will be surveyed to the site grid and digitised to provide an overall CAD plan that can be imported to a Geographical Information System (GIS) for interpretation. A register of plans will be kept.

3.7.4 Long sections of trenches showing layers will be drawn at 1:50 or 1:20. Sections of features or short lengths of trenches will be drawn at 1:20 or 1:10. All sections will be tied in to Ordnance Datum and a register of sections will be kept.

3.7.5 A full black and white and colour (35mm transparency) photographic record, illustrating in both detail and general context the principal features and finds discovered will be maintained. The photographic record will also include working shots to illustrate more generally the nature of the archaeological work. Digital photographs will also supplement this record. Photographs will be recorded on OA Photographic Record Sheets.

3.10 ARTEFACT SAMPLING STRATEGIES

3.8.1 All finds visible during the fieldwork programme will be collected, processed and stored in accordance with current best practice as set out in the relevant guidelines issued by the IFA, English Heritage, UKIC and others (IFA nd; English Heritage 1991; UKIC 1983; 1990; Watkinson and Neal 1998). A register of small finds will be maintained.

3.8.2 Artefact assemblages will be recovered to assist in dating stratigraphic

sequences and for obtaining assemblages for comparison with other sites. All artefacts will be retained from excavated contexts unless they are of recent origin. In these cases sufficient material will be retained to date and establish the function of the feature from which they came. Unstratified recent material will not be retained. Certain classes of building material or post-medieval pottery may sometimes be discarded after recording if an appropriate sample is retained. However, any such decisions will not be taken until after the post-excavation assessment is completed.

3.8.3 OA employs artefact specialists with considerable expertise in the investigation, excavation and management of sites of all periods and types, who are readily available for consultation. In cases where in-house expertise is not available, external specialist advice will be sought, as appropriate.

3.8.4 A suitably qualified specialist will scan the finds assemblage to assess the date range, with particular reference to the pottery and flint. All retained bulk finds will be washed and, with the exception of animal bones and flint, marked in a manner that is indelible and irremovable by abrasion. Bulk finds will be appropriately bagged and boxed and box lists of material will be compiled. Small finds will be recorded individually (Individually Registered Finds, or IRFs), and appropriately packaged.

3.8.5 Deposition and disposal of artefacts will be agreed with the legal owner and the recipient museum prior to the commencement of the works. All retained artefacts will be cleaned and packaged in accordance with the requirements of the recipient museum.

3.8.6 In the event of the recovery of any intrinsically valuable artefacts, the terms of the Treasure Act 1996 will be followed with regard to any finds that might fall within its purview. Any such finds will be removed to a safe place and reported to the local coroner as required by the procedures as laid down in the *Code of practice* (DCMS 2002). Where removal of intrinsically valuable objects cannot be effected on the same working day as the discovery, suitable security measures will be taken to protect the finds from theft. It should be noted that *there is a presumption that objects of treasure found during the course of archaeological excavations will be kept with the rest of the archaeological archive*.

3.8.7 In certain circumstances where unusual or extremely fragile and delicate objects are found, their recovery may be undertaken by appropriate specialists. Provision will be made for on-site conservation measures to be undertaken by specialists, as required. The objects will be exposed, lifted, cleaned, conserved, marked, bagged and boxed in accordance with the guidelines set out by the United Kingdom Institute of Conservation (UKIC 1983; 1990), and in *First aid for finds* (Watkinson and Neal 1998). They will be stored in a secure, controlled environment, and storage conditions will be subject to regular monitoring. OA maintains close relationships with Ancient Monuments Laboratory staff at the University of Durham and, in addition, employs in-house artefact specialists, with considerable expertise in the investigation, excavation, and finds management of sites of all periods and

types, who are readily available for consultation. Finds storage during fieldwork and any site archive preparation will follow professional guidelines. Emergency access to conservation facilities is maintained by OA North with the Department of Archaeology, University of Durham.

3.8.8 Where required, preliminary conservation and stabilisation of objects will be undertaken as soon as practicable during, or upon completion of, the fieldwork Particularly vulnerable materials requiring conservation will be transported to appropriate facilities without delay.

3.9 PALAEOENVIRONMENTAL SAMPLING STRATEGIES

3.9.1 It is envisaged that it will be possible to retrieve bulk samples from securely stratified archaeological deposits within Parcel 27 North. Adequate provision for environmental sampling will therefore be included in the programme of work. Samples will be taken in accordance with current best practice, using the methodologies outlined by English Heritage (English Heritage 2002). A register of environmental samples will be maintained.

3.9.2 OA employs palaeoenvironmental specialists with considerable expertise in the investigation, excavation and management of sites of all periods and types, who are readily available for consultation. The advice of OA's environmental department will be sought for the recovery of the following sample types: bulk samples (charred plant remains, cremation burials, waterlogged remains, bones and artefacts); series samples (waterlogged plant remains, snails); monolith samples (palynology, soil micromorphology); or for other forms of analysis eg diatoms etc, pedology, metalworking and chemicals. English Heritage's Regional Science Advisor will also be consulted where appropriate.

3.9.3 A suitably qualified specialist will assess the environmental potential of the site through the examination of suitable deposits, enabling the formulation of an approved overall sampling strategy, to be agreed with the English Heritage Regional Science Advisor. Some or all of the following analyses may form part of the excavation, as appropriate:

- soil pollen analysis and the retrieval of charred plant macrofossils and land molluscs from former dry-land palaeosols and cut features;
- the retrieval of plant macrofossils, insect, molluscs and pollen from waterlogged deposits;
- advice will be sought from the English Heritage Regional Science Advisor, and OA faunal specialists on the potential of the site for producing bones of fish and small mammals. If there is potential, a sieving programme will be undertaken. Faunal remains, collected by hand and sieved, are to be assessed and analysed, if appropriate;
- advice will be sought from OA's geo-archaeology department on whether a soil micromorphological study or other analytical techniques will enhance understanding of site formation processes on the site. If so,

analysis will be undertaken.

3.9.4 The environmental sampling strategies employed will vary according to the perceived importance of the strata under investigation. For bulk samples, a minimum of 10 litres, but up to 40 litres if possible, will be taken for flotation for charred plant remains. Bulk samples will be taken from any waterlogged or mineralised deposits in order to recover any preserved macroscopic plant remains or insect remains. Columns for pollen analysis will be taken if appropriate, and mollusc samples will be collected if present. Other bulk samples for small animal bones, metallurgical debris (micro-slags and so on), and other small artefacts will be taken if suitable contexts are identified. All samples will be treated in a proper manner and to standards agreed in advance with the approved recipient museum.

3.9.5 Any waterlogged organic materials will be dealt with in accordance with the relevant English Heritage guidelines (English Heritage 1995; 1996).

3.9 SCIENTIFIC DATING STRATEGIES

3.10.1 It is anticipated that the site may yield material suitable for either high precision dating or AMS dating. Material will be collected specifically for this purpose and suitable stratigraphic sequences will be targeted, together with material in primary positions that is associated with other datable material, such as flint or pottery. OA has procedures for sampling and processing samples for radiocarbon dating and has established relationships with reputable dating laboratories. Other absolute dating methods may include thermoluminescence dating of pottery and daub, archaeomagnetic dating of hearths, and dendrochronology. Samples will be taken as appropriate.

3.10 HUMAN REMAINS

3.11.1 If human remains are found during the archaeological works the client, CCCHES, English Heritage and the coroner will be informed immediately. Human remains will always be treated with respect. If removal is essential, it will only take place under appropriate Home Office and environmental health regulations. A Home Office licence will be obtained before human remains are disturbed. All burials requiring excavation will be adequately recorded prior to careful removal for further scientific study. Where human remains are encountered, the post-excavation assessment will contain a statement concerning the future retention of the assemblage, including options for reburial.

3.11 HEALTH AND SAFETY

3.12.1 OA North provides a Health and Safety Statement for all projects and maintains a Safety Policy. All site procedures are in accordance with the guidance set out in the Health and Safety Manual compiled by the Standing Conference of Archaeological Unit Managers (3rd Edition, 1997). OA North will liaise with the Birse Civils, who will be the principal contractor under CDM regulations, to ensure all current and relevant health and safety

regulations are met. Excavation of the trenches will not take place until a Permit to Work has been issued by Birse Civils.

3.12.2 A risk assessment will be completed in advance of any on-site works. OA North staff and their contractors will be equipped with the appropriate PPE; Birse Civils have agreed to provide welfare facilities on-site and will conduct all necessary inductions.

3.12.3 OA North has professional indemnity to a value of £2,000,000, employer's liability cover to a value of £10,000,000 and public liability to a value of £15,000,000. Written details of insurance cover can be provided if required.

3.12 OTHER MATTERS

3.13.1 Access to the site will be arranged *via* Birse Civils. This should include vehicular access and parking. On-site welfare facilities should be adequate and fit for purpose for the staff deployed. Birse Civils, as principal contractor, will provide and be responsible for all plant and on-site logistics and infrastructure, including all aspects of water management. It will certainly be the case that Youngman's boards or similar will be required in some quantities to help protect the archaeological surfaces and it is possible that some kind of scaffold or elevated gantry may be required if complex and fragile waterlogged organic remains are encountered in the palaeochannels.

3.13.2 It should be noted that in addition to welfare facilities, office space will be required for paperwork and IT. OA's past experience on complex sites has shown that in order to ensure quality assurance and to make efficiency savings, it is preferable if the site archive is validated whilst fieldwork is ongoing and that this ideally should occur in close proximity to the archaeological site.

3.13 POST-EXCAVATION AND REPORT PRODUCTION

3.14.1 ***Post-excavation:*** following completion of the fieldwork relating to the construction of the CNDR, a scheme-wide post-excavation assessment will be produced including the results of the excavations covered by this design. The site archive will be completed in accordance with English Heritage's guideline document *MAP 2*, Appendix 3. The assessment will be deposited with the County Historic Environment Record and English Heritage in due course.

3.14.2 ***Archive:*** the results from the programme of Phase 3 FAW will form part of the project archive, produced to professional standards, in accordance with current English Heritage guidelines (*MAP 2*), the *Guidelines for the Preparation of Excavation Archives for Long Term Storage* (UKIC 1990) and *Archaeological Archives: A Guide to Best Practice in Creation, Compilation, Transfer and Curation* (Brown 2007). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. The IFA's Code of Conduct makes it clear that the deposition of a properly ordered and indexed project archive in an appropriate repository is an essential and integral element of all archaeological projects.

4 STAFFING PROPOSALS

4.1 The project will be under the overall charge of **Fraser Brown BA** (OA North Senior Project Manager) to whom all correspondence should be addressed.

4.2 The removal of the LBL and the excavation of any associated features is expected to take at least eight weeks employing at approximately 20 archaeologists on-site and will be directed by an OA North Project Officer supported by at least two OA North Project Supervisors. A team of up to ten additional archaeologists will be required to support the excavation staff, and will be engaged with sieving, finds retrieval, initial finds and sample recording, CAD, IT, survey and archive checking and consolidation (support staff will be jointly shared with the team excavating the Mesolithic flint scatter (*Design 30*)). It is presently not possible to quantify how long the support team may be required, but it will be at least as long as fieldwork was ongoing and very probably longer. All these resource allocations are currently estimates and could vary depending on the nature, extent and quantity of the archaeology encountered.

4.3 The palaeoenvironmental methodology will be agreed with OA North's Environmental Manager **Elizabeth Huckerby**.

5 MONITORING

5.1 OA North will ensure that any significant results are brought to the attention of, Birse Civils, CCCHES and English Heritage as soon as is practically possible.

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