

Trump International Golf Links, Scotland

**GOLF COURSE & RESORT DEVELOPMENT, MENIE
ESTATE, ABERDEENSHIRE, SCOTLAND
A Written Scheme of Archaeological Investigation**

Client: Ironside Farrar

Date: June 2009

1 Introduction

This document is submitted for approval by Aberdeenshire Council as Planning Authority, on behalf of Ironside Farrar, as a written scheme of archaeological investigation in connection with the proposed golf course and resort development at Menie Estate, Aberdeenshire.

The site is an area of known archaeological potential, and in order to inform a programme of archaeological mitigation, a desk-based assessment of the proposed development area has been carried out as a part of an Environmental Impact Assessment (AOC Archaeology Group 2007). The assessment identified a number of prehistoric sites of possible Mesolithic, Neolithic and Bronze Age date. Several medieval sites were identified including possible medieval cultivation remains, churches and manors. A number of post-medieval residential and agricultural structures were also identified within the development area. The assessment also identified several heritage remains from the two World Wars including anti tank blocks and pillboxes.

This document includes an Outline Research Design which establishes the basis for a systematic programme of purposeful investigation which can be built on and refined throughout the execution of subsequent project stages.

2 Background

Location

The development area is situated some 8 km to the north of Aberdeen at Menie estate (NGR NJ 98 20) immediately to the north of Balmedie. The area is roughly D-shaped facing the North Sea to the east. The development area covers 452 hectares and extends just less than 4.3 km m along the coast and over 2 km inland to the west.

Geology, Topography and Land-use

The development area is located on the Buchan platform which is a peneplain that tilts to the east and stretches from Aberdeen to the Moray Firth. The bedrock comprises Highland Schists and is generally overlain by glacial drift derived from a variety of bedrocks including the Highland Schists and Old Red Sandstone.

The proposed development area is sited on soils from a number of associations: the majority of the site is on soils of the Links Association, consisting of weakly developed thin soils derived from wind blown sands, with soils of the Tippetty/Carden Association in the south, brown forest soils developed from lacustrine deposits, with soils of the Tarves Association derived from igneous drift deposits, developing to brown forest soils. The Tippetty/Caden soils tend to poorly drained and this association coincides with some of the wetter areas of the development area.

The dune system lies next to the current beach and tidal sand. The dunes are moundy and unstable, and are partially fixed by vegetation, principally marram grass. The links appears to consist of a relict dune system, and may be unstable and prone to wind deflation if vegetation cover is disrupted. Buried A horizons have been noted in the stabilised dune area (Glentworth and Muir 1963), and these buried land surfaces may contain archaeological remains.

The topography of the area comprises a gently rolling terrain that slopes from 55 m at the west down to the beaches to the east. The area is dissected by the Menie Burn draining eastwards with

the east end of the Sandend Burn defining the northern limit of the area and Blairton Burn located at the southern end of the area.

The land use within the development area comprises cultivated fields, pasture and plantations. Part of the area has also been managed for game breeding and shooting.

3 Research potential

Anticipated survival of evidence

Previous work in the surrounding area has identified different archaeological environments within which different sampling strategies will need to operate:

- Artefacts (most likely worked flint) within the dune system deposited upon intact old ground surfaces.
- Conflated scatters of artefacts (most likely worked flint) within the dune system not associated with a contemporary ground surface.
- Artefacts in the cultivated soils inland from the dune system
- Features cut into the subsoil partly truncated by cultivation
- Features and *in situ* artefacts associated with old ground surfaces buried by or stratified within alluvium or colluvium

Period and type of evidence

Mesolithic and Neolithic periods.

There is evidence both from both within and immediately outside the development area of use of the area in the early prehistoric period:

- Three Mesolithic flint working sites have been recorded at Menie Links containing a wide range of artefacts. The sites have been dated to the Mesolithic period through the presence of microliths and other diagnostic artefacts. The sites appear to be the cores of a general scatter of struck flint material spread over a wider area as demonstrated by the discovery of several smaller flint scatters during a walkover survey in 2006.
- Worked flint including two anvil stones have been recovered from Blairton Links at the south end of the development area. Some of these were recovered from a pebble beach associated with an old ground surface.
- Excavations at Sands of Forvie some 4 km to the north of the development area revealed the survival of superimposed land surfaces, whose layers revealed hearth structures and other characteristic mesolithic artefacts. The artefacts were concentrated on the raised beach.
- Excavations have also been carried out at Millden Links some 2 km to the south of the development area that exposed cut features containing struck flint and charcoal and a substantial assemblage of prehistoric flint.

Some of these assemblages have been dated to the Mesolithic period; however it is possible that some of the struck flint assemblages date to the later Neolithic or possibly early Bronze Age periods. A possible cairn located in the dunes at Menie Links is more likely to date to these later periods.

Although no Neolithic structures have been recorded within the development area, there are two sites to the south of the area that may date to this period. The remains of a recumbent stone circle known as Temple Stones is situated some 3 km to the south-west of the area and further north lays the Hare Cairn which measures 30 m in diameter and is 3.6 m high. These two monuments are the last surviving example of several tumuli, stone circles and other prehistoric monuments that once were recorded within Belhelvie Parish.

The existing archaeological evidence indicates that this area has been occupied during most of the Early Prehistoric period, and although most of the early sites appears to be closely linked to the beach area, later sites have been recorded further inland. There is evidence that the landscape has been more densely populated in the past and that the present lack of known sites is the result of agricultural improvements over the last couple of centuries and that unknown sites may be discovered.

Later Prehistory

There are no known monuments from within the development area that dates to this period. However, at the Sands of Forvie some 4 km to the north of the development area, a settlement dating to the later prehistory comprising 31 huts have been recorded. Other evidence of activity in the area during the later prehistory includes two Late Bronze Age gold ribbon torcs found near Cothill just to the north of the of the area. It is possible that two Iron Age bronze pennanular armlets found somewhere at Drumside Links before 1853 might stem from within the extreme south parts of the development area.

Medieval

Menie Estate is referred to in documents dating to the beginning of the 14th century. There are today no known surviving structures dating to the medieval period within the development area, although aerial photographs indicate an area of possible medieval broad rig-and-furrow cultivation in the north-west part of the area. The NMRS refers to a possible site of a Manor House within the area although there are no visible remains of the manor above ground. However, it is possible that remains of foundations from a medieval manor and other buildings linked to the estate still survive below ground in the vicinity of or below the present Menie House.

The remains of Belhelvie Old Parish Church are situated just outside the south-west corner of the development area. It was confirmed to the bishop of Aberdeen in 1157, but the existing remains date to the 17th century. Evidence of medieval churches has also been recorded at Forevan and Forvie some 2 km and 5 km to the north of the development area.

Post-Medieval

The first edition OS map depicts a number of buildings within the development area most of which have since been demolished. The current Menie house is one of the oldest surviving buildings within the area. The house was built in 1835 and incorporates an earlier 1780s building. The Mill of Menie is depicted on pre-OS maps from the first half of the 19th century. There are no obvious surviving remains of the mill today although fragments may be incorporated in a modern residential building.

Modern

There are a number of pillboxes and other defensive structures dating from WWI and WWII located within the development area. The majority of these are located within the dune systems along the shore to the east.

Summary of anticipated significance/ potential

The current distribution of sites in the area seems to indicate that there is a concentration of early prehistoric sites in the area mainly located within the dune system to the east. There is relatively little indication of activity during the later pre-history from the Bronze Age onwards. However there is evidence that the landscape has been more densely populated in the past.

Menie is one of a number of estates situated along the coast to the north of Aberdeen. Documentary evidence shows that the estate existed in the 14th century. There are three parish churches in the vicinity of the estate that have their origin in the medieval period. It is likely that the medieval churches and estates originate from late prehistoric settlements. Chance finds of Bronze Age torcs and Iron Age pennanular armlets demonstrates human activity in the area during the later prehistoric period.

Research aims

Research Issues

Specific issues raised by the archaeology will form the subject of more detailed consideration once characterisation has taken place, if the potential of the site is confirmed. However, questions already identified include:

- *Is there a change in settlement pattern reflecting the transition from the Mesolithic to the Neolithic period?*
- *Does the lack of later prehistoric monuments reflect the level of human activity in the area through this period?*
- *What factors led to the formation of the medieval settlement pattern that in the main still exists today?*

Periods represented

- *Are all the periods identified by the desk-base assesment represented within the area?*

- *Is there good potential for analysing patterns of change through stratigraphic, spatial or artefactual analysis?*

It is anticipated that this potential will be mainly through artefact and spatial analysis, but that some important stratigraphic relationships will be key fixed points for such interpretation.

Character of archaeological remains

- *Do the remains include small shallow features like post-holes and gullies?*

It is expected that such features will survive. It is anticipated that the later prehistoric and post-medieval periods will be represented mainly by ditches and gullies, postholes and pits cut into subsoil. Other periods may only be represented by topsoil artifacts, though it is anticipated that small earlier prehistoric pits may survive.

- *Are there any burials?*

It is anticipated that cremations and possibly inhumations associated with prehistoric funerary monuments could be present.

- *Is there potential to identify buildings and other structures?*

It is expected that such potential could exist, and sequences of buildings could occur but evidence may be quite tenuous.

- *Can different activity areas be identified through differences in the types of features and or through artifact distributions?*

Given the apparent lack of archaeological features and finds assemblages for the late prehistoric periods it is doubtful whether sufficient archaeological evidence will be present to support this type of analysis.

Complexity of deposits

- *What is the spatial extent, density and stratigraphic complexity of subsoil features?*

It is not expected that there will be any areas that will have complex patterns of intercutting features. Spatial patterning may be quite good.

- *Are there natural or semi-natural colluvial and alluvial deposits on the site and are they interstratified with man-made features etc?*

These are most likely to occur along the streams valleys to the north and south end of the area. The shifting sands with in the current and old dune systems are constantly moving

Taphonomy

- *Do small features like post holes and shallow gullies survive evenly across the site?*

Survival may vary across the site, being least good on convex slopes and best where there is any colluvium or alluvium.

- *Is there significant evidence of redeposition of artifacts in later features?*

There is likely to be evidence of some redeposition in the areas of densest, multi-period activity. This is most likely to occur in the area around Menie house assuming that the focus of the settlement has been at the same location for centuries.

Range and preservation of finds

- *What range of artifacts is present and in what quantity?*

It is anticipated that for the early prehistoric periods a relatively large quantity of artefacts, especially struck flints will be recoverable. This is much less certain for the later prehistoric and medieval period.

Range and preservation of palaeo-environmental deposits

- *What range of palaeo-environmental evidence is present and in what quantity?*

It is anticipated that there will be moderate to good survival of carbonised plant remains. The preservation of bones may vary over the area, although burnt bones are likely to be preserved. It is not likely that waterlogged material will be present on the site.

4 Methodology

Stages of investigation

Three broad stages are proposed, each of which will inform the next through constant re-assessment of the progress towards achieving the project's research aims.

- *An Evaluation* of the location and density of archaeological sites within the development area.
- *A Characterisation* of the archaeology of the sites will be based mainly on stripping open areas and establishing through a preliminary systematic sample the overall character of the archaeology in terms of broad structures, dating, sequences, land-use etc.
- *The Detailed Investigation* of the archaeology can be based on using the results of the first two stages to develop a more detailed level of sampling which has the potential to produce detailed evidence of how people lived and used the landscape.

These three main methods are designed to establish a narrative of the inhabited landscape which fully realises the potential of the archaeological deposits to be investigated within the agreed constraints of the development programme, and in a manner which is both cost-effective and does not generate redundant information.

Although the opportunity for preservation *in situ* may be limited, Headland Archaeology will, together with other contractors, explore innovative construction solutions. It may then be possible to consider preservation *in situ* as an option, following the evaluation phases of the archaeological works.

Evaluation

The initial stage of the project will aim to evaluate the presence or absence, preservation, quality and date of archaeological features within the area. This can be achieved through a combination of several different methods.

Walkover survey

This survey involves a systematic walkover of the area and the recording of known as well as new sites found during the survey. The sites will be photographed, then planned and located at appropriate scale and accuracy.

Field walking

Field walking is normally dependent of the ground surface not being covered by any vegetation and is therefore most commonly used on recently ploughed fields or on sandy beaches and dune systems. It involves a systematic walkover the area with the retrieval of artefacts visible on the surface and the recording of their location normally within the resolution of pre-determined grid cells. To ensure a systematic coverage of the area temporary linear transects, similar to surface collection procedures, will be marked out using canes within the site limits. The purpose of this exercise is to identify the location of archaeological sites as revealed by the concentration of artefacts on the ground surface.

Metal detector survey

Field walking is often combined with a metal detector survey. The metal detectors are superior to the human eye when it comes to locating metal objects, especially as the detector is able to locate finds below the ground surface. The finds from a metal detector survey will be located within the same grid as for the field walking.

Geophysical survey

Geophysical survey involves measuring anomalies in the soil conductivity (Resistivity survey) or small variations in the magnetic field (Magnetometry survey). These variations are often caused by the presence of stony archaeological features or in the form of ditches and pits cut into the subsoil not visible on the surface. Although the two methods can produce good results on their own, the two methods partly complement each other and the best results are archived when looking at the combined results of both methods.

Trial trenching

This is the method used on almost all archaeological evaluations. It involves the machine excavation of a series of trenches typically 2 m wide by 50 m long. The trenches are excavated down to subsoil or the level of a significant archaeological horizon. Where there is no other indication of archaeological sites, the trenches are evenly distributed over the evaluation area at densities representing from 2% up to a 10% sample. Archaeological features exposed within the trenches are then sampled to establish the character of the archaeology.

Normally the layout of trial trenches is influenced by the results other evaluation methods by targeting possible sites identified through geophysical surveys and field walking.

Test pitting

Test pitting is in some ways similar to trial trenching, but is carried out by hand. This enables a more systematic recovery of finds within and a more detailed investigation of the overburden compared with machine removal. It normally covers much smaller areas and is often used to define the extent of unstratified artefact scatters.

Characterisation

Areas of archaeological features identified during the initial evaluation phase will be further investigated through the stripping of larger areas to clarify the limits and nature of activity. The strip and map will provide a plan of the extent and layout of features and through the excavation of sections across selected features it will be possible to roughly phase the features.

If appropriate, this stage may be represented by intensive use of other evaluation techniques such as test-pitting to recover artefacts from ploughsoils.

Detailed Excavation

The aim of detailed excavation is to add to the recovery of evidence from the strip and map with detailed information if possible. It will be necessary to produce a detailed chronological sequence of human activity on the site which will form the basis of post-excavation analysis of the results.

5 Reporting

The results of each stage of the investigations will be presented in a report illustrated with relevant, maps, plans, photographs etc that fully conforms to the local authority archaeologist's reporting requirements. The reports will detail the work carried out, and contain a synthesis of the results and the impact of the development on the site. An archive relating to the investigations will be prepared in the format of a Data Structure Reports (as defined by Historic Scotland). It will include relevant drawn plans and sections of excavated features, an assessment of any artefacts recovered and an interpretation of the date and function of the excavated structures. An assessment of any further post excavation work that is required to complete the process will be made.

Four copies of this report will be forwarded to the local authority archaeology service. Summary reports will be prepared for publication in *Discovery and Excavation in Scotland* and a project archive prepared and submitted to NMRS at the end of the preproject.

All finds will be reported in line with required Treasure Trove procedure.

The archive provided to the local authority archaeology service will comprise a digital copy of the full report with plans and DES entry on CD - in PDF and doc formats. The inclusion of photographs, plans and illustrations will fall within the current guidelines for archival standards set by the Archaeology Data Service and RCAHMS. A full copy of all digital photographs and digital data will be produced and presented on CD in archive stable format.

The position of all archaeological trenches, excavation areas, survey areas etc. will be additionally supplied, on CD disk, as a geo-referenced DXF file.

Should the results of any excavation merit full analysis and publication then this will be addressed after the end of the last fieldwork phase.

6 Liaison

The local authority archaeology service will be informed in advance of the schedule of the site investigations to allow for monitoring of the works, if desired. All significant discoveries will be reported immediately to the client and the local authority archaeology service.

On presentation of evaluation results to the local authority archaeology service, a further programme of archaeological work may be required as a part of the mitigation strategy. The nature of any additional archaeological field or post-excavation work will be determined in consultation with the client and the local authority archaeology service and fully funded by the client.

7 Project Team

The evaluation will be managed for Headland Archaeology Ltd by Mark Roberts.

8 Insurance

Headland Archaeology Ltd has the following insurance cover which can be presented on request.

- Public Liability £10m
- Employers Liability £10m
- Professional Indemnity £5m

9 Health & Safety

All of Headland Archaeology Ltd's work is carried out in accordance with current H&S legislation. A risk assessment will be prepared prior to the commencement of fieldwork. Hard hats, high visibility jackets and safety boots will be worn by staff at all times.

Appendix

Detailed methodologies

Introduction

The following section set out the detailed methods generally applicable to the different types of archaeological investigative mitigation required for the project as a whole. This will be carried out within the general framework provided by ideas of Characterisation and Detailed Investigation sampling outlined above. Where unforeseeable archaeology arises, depending on its character and scale, modifications to these standards may need to be made to achieve a satisfactory record, and to achieve the archaeological research aims without jeopardising the scheme programme. Any further works will be the subject of additional method statements, which will include refined objectives and where necessary technical statements, which will be developed in the light of the evaluation results.

Recording Procedures

In order to facilitate the production of an overall project archive of consistent standard, the following recording procedures will be applied as far as possible to all the excavations due to be undertaken.

Each specific area, site or group of sites identified as sub-projects will be assigned a unique alphanumeric site code, to be agreed with the recipient museums, which will be used to identify all records, finds and samples relating to that piece of work.

All on-site recording will be undertaken in accordance with the requirements of the Headland Field Manual, unified, modified and developed as necessary to take account of innovations being developed for this project, to take account of its greater emphasis on on-site interpretation and added sophistication in the management of digital data.

A continuous unique numbering system will be operated. Written descriptions will be recorded on proforma sheets comprising factual data and interpretative elements. The latter element will be enhanced to maximise on-site understanding of the archaeology, particularly regarding deposition processes. All written descriptive and interpretative data will be entered into the project database which will include automatic validation of terms and generation of cross-referencing to digital drawings and finds data.

Where stratified deposits are encountered a Harris Matrix will be compiled during the course of the excavation if appropriate.

Machine excavation methods for trial trenching and area excavations

Three hundred and sixty tracked mechanical excavators of appropriate size will be used, unless specifically agreed otherwise in advance, for the stripping of all topsoil. The excavator(s) will be fitted with a toothless ditching bucket of an appropriate size to the respective machine. The machine(s) will operate by removing the overburden, usually in spits of 0.1 - 0.2 m thick; in an area directed by the Headland machine supervisor. When the required depth has been reached the machine will move backwards and repeat the same operation. Machine excavation will be

undertaken in a manner which will ensure that subsequent hand-cleaning is kept to a minimum. The machine will not track across the stripped surface unless prior agreement is reached with the Acting Project Manager.

The removal of homogenous layers of little significance will, where possible, be undertaken at the same time as the overburden stripping operation to ensure that no plant has to travel over stripped surfaces.

Health and Safety Responsibilities

The mechanical excavator will be hired together with a qualified operator. The operator will be responsible for the safe maintenance of the machine.

The operator must immobilise the mechanical excavator and take all practicable measures to secure the machine if it is to be left unattended. The operators of the mechanical excavator will be responsible to the on-site Field Director for the safe use and storage of any reserves of petrol or diesel brought onto the site.

The on-site Acting Project Manager or the person she/he delegates to supervise the machine excavator (the Machine Supervisor) will satisfy her/himself that the operator possesses an adequate level of skill. If the operator cannot control the machine in a reasonably smooth and careful manner, a replacement operator should be requested.

Members of the project team present on site while a mechanical excavator is working must keep well clear of the excavator. They must not work within the swinging radius of the bucket arm except as defined in the Method Statement. They must wear hard hats and high-visibility vests at all times. Members of the project team who need to approach the area where the mechanical excavator is working will approach from the front (meaning the excavating side of the machine) so as to be visible to the driver. They should make their presence known to the Machine Supervisor and should not signal to the machine operator. When the mechanical excavator is working, members of the project team may only enter into, and work in, the part of the trench behind the machine supervisor i.e. the machine supervisor must be between themselves and the machine.

The mechanical excavator will not work so close to the edge of any trench as to endanger the stability of the excavation sides.

The specific responsibilities of the Machine Supervisor will be to:

The machine operator as to what is required, indicate where work is to begin, and walk over this area with the machine operator.

Make sure that the area around the machine is clear of personnel and of any obstructions before indicating to the machine operator to start work.

Take up a position in front of the machine where she/he is clearly visible to the operator, and out of the swinging radius of the machine.

Communicate with the machine operator by hand signals as follows:

- *clear downward pointing action* = **start work** (usually accompanied by an indication of the depth of soil to be removed, eg 1 finger = approx. 1 inch).
- *both hands held up with palms towards driver* = **stop** (the operator should lift the bucket out of the trench and rest it on the spoil heap).
- *one hand moved away from the body with palm pointing downwards* = **clear loose spoil from excavated area but no further excavation.**

The machine supervisor must make absolutely sure that the operator understands these signals, and must not enter the swinging radius of the machine until the machine bucket has been rested outside the trench, and when she/he is certain that the machine has ceased to work.

The machine supervisor will also be responsible for finding the level at which archaeology (if any) exists, and for instructing the machine operator accordingly. She/he will do this by cleaning small areas of the surface and trench sides as left by the machine.

Spoil Handling

During the excavation of narrow trenches and test pits, the machine will lift the spoil out of the trench and place it on either side, so that the edge of spoil heap nearest to the trench edge is always at least 0.5 m back from the trench edge. Before moving back to a fresh length of trench the machine will also scrape away any fallen spoil from the clear strip between spoil heap and trench edge.

During area excavation, the machine will load the spoil onto dump trucks which will approach the machine across the unstripped area of the site. Where necessary for health and safety reasons, access routes for spoil disposal will be marked off with high visibility plastic tape suspended on metal road pins. The spoil will be stored away from the stripped area of the site.

If for some reason it is not desirable to use dumper trucks, the spoil will be removed by double handling.

Site Survey

Site grid

The site grid will be directly tied into the National Grid using DGPS or mapped reference points. This is the same grid that is used by the project design team which will allow an easy transfer and merger of data through CAD. All heights will be measured in metres above Ordnance Datum (Newlyn).

Survey methods

The position and extent of all intrusive investigation areas will be surveyed in mainly using a Total Station linked to a field computer. The computer will be running the Theo-Lt software that acts as an interface between the Total Station and AutoCAD. This setup allows real time recording of features directly into a georeferenced CAD drawing and makes the latest site plans instantly available for interrogation and mitigation purposes. Each context will be on a separate unique CAD layer to facilitate quick location of features within the site.

In the dune area where the topography limits the visibility from survey stations a DGPS will be used to survey in extents of sites. The GPS has a similar setup as with the Total Station with a graphics display computer showing the surveyed positions in real time in relation to a background map.

The DGPS will also be used to set out base stations next to excavation areas to be used by Total station survey.

Location of trenches and excavation areas will be set out on the ground from trench plans using DGPS and/or the setting out function of a Total Station.

To make sure all features are recorded a digital pre-excavation plan will be made of all features as soon as possible after they have been identified. This will enable the re-location of features even if they become almost invisible due to change in weather conditions.

Metal Detector Survey

If the density of finds from the metal detector survey is low, each find will have their 3-dimensional co-ordinates and unique reference recorded by the Total Station or DGPS rather than attributing each find to a fixed grid cell.

To assist with the systematic and comprehensive coverage of each area temporary linear transects, similar to surface collection procedures, will be marked out using canes within the pegged out site limits. Within these transects the 'loop sweep' method will be employed to maximise ground coverage.

Where possible (and subject to the necessary consents, insurances and liabilities being in place) local amateur metal detectorists attached to the bone fide organisations will be invited to assist in this operation. In the event that these amateurs are unavailable, Headland staff familiar with the use of metal detectors will undertake the survey in their place.

The metal detectors will generally operate in the non-discrimination mode to ensure that both ferrous and non-ferrous artefacts are detected. In the event that certain areas are found to contain large quantities of modern metallic 'rubbish', discrimination modes may be employed.

On locating a metal detector reading the object will be 'pinpointed' and removed from the ground using an appropriate tool. No objects will be removed from a depth greater than the thickness of the modern overburden. In the event that a deeper reading is located, its co-ordinates will be recoded using the Total Station or DGPS for later investigation once the topsoil has been removed.

All metal objects will be placed in a plastic bag and given a unique object number based on the relevant site code. These will form part of the site archive. The objects will be returned to the Headland office at the earliest possible opportunity for assessment and further recording.

Trial trenching, strip and map

In general, the exposed surface will not be further cleaned after stripping by machine. Limited hand-cleaning will only be undertaken where such cleaning would substantially benefit the recording of archaeological deposits.

- The level at which archaeological deposits will be sampled will be decided by the Headland Project Manager in consultation with the County Archaeologist but will generally conform to the following standards:
- Sufficient contexts will be investigated in areas of structural remains, or other areas of specific activity to establish the relative and absolute chronology of the remains.
- In other areas, the intersections of major features will be excavated. Further sampling will be undertaken where there are clear indications that further artefactual, economic or palaeo-environmental evidence is likely to be recovered. Machine sampling may be used to augment the artefactual record if necessary.
- A systematic sample of non-structural pits will be half-sectioned where there are clear indications that further artefactual, economic or palaeo-environmental evidence is likely to be recovered.
- A systematic sample of non-structural post and stake holes will be half-sectioned. The number of such features excavated will be commensurate with establishing relationships and chronologies.

Detailed excavation

Surface cleaning

After the removal of the overburden the site will be hand-cleaned. This will aid the recognition of the presence and extent of any archaeological features, normally recognisable at this stage as differences in colour and/or texture of the soil. Surface cleaning will be carried out as appropriate by scraping the surface either with krafses or, for more detailed work, trowels. Where extensive areas of natural sub-soil devoid of archaeological interest are encountered, these will not be cleaned by hand.

Investigation of Archaeological Deposits and Features

The level at which archaeological deposits will be sampled will be decided in consultation with the County Archaeologist but will generally conform to the following standards:

- Significant contexts and relationships necessary to establish the sequence of development and function of the site will be investigated in areas of structural remains or other areas

of specific activity. (It is not envisaged that 100% of all such features will be necessarily be excavated).

- In other areas, at least 10% of all major non-structural linear features, including ditch terminals, will be subject to hand-excavation. In addition, all major linear feature intersections will be excavated. A selection of other linear features will be excavated at the same sampling level.
- A systematic sample of non-structural pits will normally be subject to a 50% sample by volume (ie will be half-sectioned); where features with multiple intersections are present, alternative strategies for their excavation, such as quadranting, may be adopted. Total excavation of some pits will be undertaken where this is considered to add substantially to the understanding of the site. In the case of very large features, such as extensive quarry pits, a hand-excavated sample of less than 50% may be appropriate. In the case of very deep features, machine excavation of part of the feature may be necessary to allow safe access for further excavation and recording. Normally, all such features will be excavated, although this will be reviewed in light of the numbers of such features present.
- A systematic sample of non-structural post and stake holes will be half-sectioned. The number of such features excavated will be commensurate with establishing relationships and chronologies.
- Midden deposits will be excavated in controlled collection units. These are likely to be spits within a grid system. If appropriate the entirety of such layers may be excavated but it is more likely that if the results indicate spatial patterning with diminishing numbers of finds then appropriate samples will be excavated.
- Layers, ie archaeologically significant deposits of soil, rubble etc, will be excavated using trowel, krafse and shovel. In the event that such layers are very extensive, it may be appropriate machine-excavate a proportion of the layer following sample hand-excavation.
- Samples suitable for palaeoenvironmental and economic studies will be retrieved where possible from colluvial and alluvial deposits, and palaeosols. If necessary, they will be recovered from machine excavated test pits the sides of which will be stepped or shored as appropriate.

Archaeological recording

All recording will be by Headland Archaeology Ltd standard method

Planning

The site grid will be defined by at least two intervisible stations.

Where appropriate the Total Station linked to the field computer will be used to draw large deposits and features such as pits and ditches into CAD. This method will also be used to record

the profile of single fill cut features. More intricate features such as cobbled surfaces and multi-fill sections will be recorded on drawing film and linked to the overall survey by reference points marked on the drawings and on the ground to be georeferenced using the survey instruments. In order to instantly be able to incorporate the outline of features recoded on drawing film on the overall digital site plan, a rough outline of these features will also be recorded digitally to be later replaced by the digitized plans.

Detailed plans will be at an appropriate scale (1:20, 1:10). Burials will be drawn at 1:10 or recorded by photographic means as described below.

A register of all drawings (plans and sections) will be kept. In a similar way auditing algorithms will be used to produce a register of all contexts recorded digitally to ensure a complete survey of all contexts.

Sections and Levelling

To facilitate the creation of a Digital Terrain Model (DTM) a series of 3-dimensional co-ordinates will be taken on the excavated surface and the area around. These co-ordinates will be recorded using a DGPS or Total Station.

Long sections of trenches showing layers will be normally drawn at 1:50 or 1:20. Exceptionally long sections designed to show major sedimentary sequences will be drawn at 1:50 or with differential vertical and horizontal scales. Sections of features or short lengths of trenches will be drawn at or 1:10.

Photography

Record photographs will be taken using colour transparencies and colour negative 35 mm films using SLR cameras.

A full photographic record, illustrating in both detail and general context the principal features and finds discovered will be maintained using the Headland Photographic Record Sheet. The photographic record will also include working shots to illustrate more generally the nature of the archaeological work.

A digital camera will also be used to provide instant images of selected finds and features.

Context Recording

A continuous unique numbering system for contexts will be operated. Written descriptions will be recorded on proforma sheets comprising factual data and interpretative elements.

Where stratified deposits are encountered a Harris Matrix will be compiled during the course of the excavation.

If practicable, the context information will be entered into an appropriate digital database during the fieldwork period.

Finds

All artefacts will be retained from hand excavated contexts unless they are of recent origin. In these cases sufficient of the material will usually be retained where it is important to validate the date and establish the function of the feature.

Bulk finds will be collected by context and stored in sealed and labelled plastic bags. Small finds will be individually recorded and packed as appropriate to the material.

Some categories of finds of limited intrinsic interest may be sampled and recorded on site where their retention is not considered essential to the archaeological aims and objectives of the Project and they would constitute an excessive storage burden. Examples are burnt stone or undifferentiated post medieval tile fragments.

Unstratified objects from topsoil or other modern deposits will not normally be retained except where they are collected for a specific purpose (as with test pits) or are of intrinsic interest either in their own right or in contributing to an understanding of the site.

Recovery will normally be by hand, except where bulk soil samples are taken for other purposes or for special recovery of small items (eg with cremation deposits).

In certain circumstances where unusual or extremely fragile and delicate objects are to be found, then their recovery will be by appropriate specialists.

A register of bulk finds and small finds will be maintained.

Finds Retention and Deposition

After analysis all identified finds and artifacts will normally be retained, although certain classes of building material or post medieval pottery may sometimes be discarded after recording if an appropriate sample is retained. However, no finds will be discarded without the prior approval of the nominated representative of the client and the receiving Museum.

Palaeoenvironmental sampling

Archaeological deposits will be sampled systematically in accordance with Headland Archaeology Ltd standard environmental sampling practice.

Different environmental sampling strategies may be employed according to established research targets and the perceived character, interpretive importance and chronological significance of the strata under investigation.

The sampling strategy and methodology can be summarised as follows:

Bulk samples, a minimum of 10 litres but up to 30 litres if possible, will be taken for wet sieving and flotation. Bulk samples will be taken from any waterlogged deposits present for assessment of organic remains.

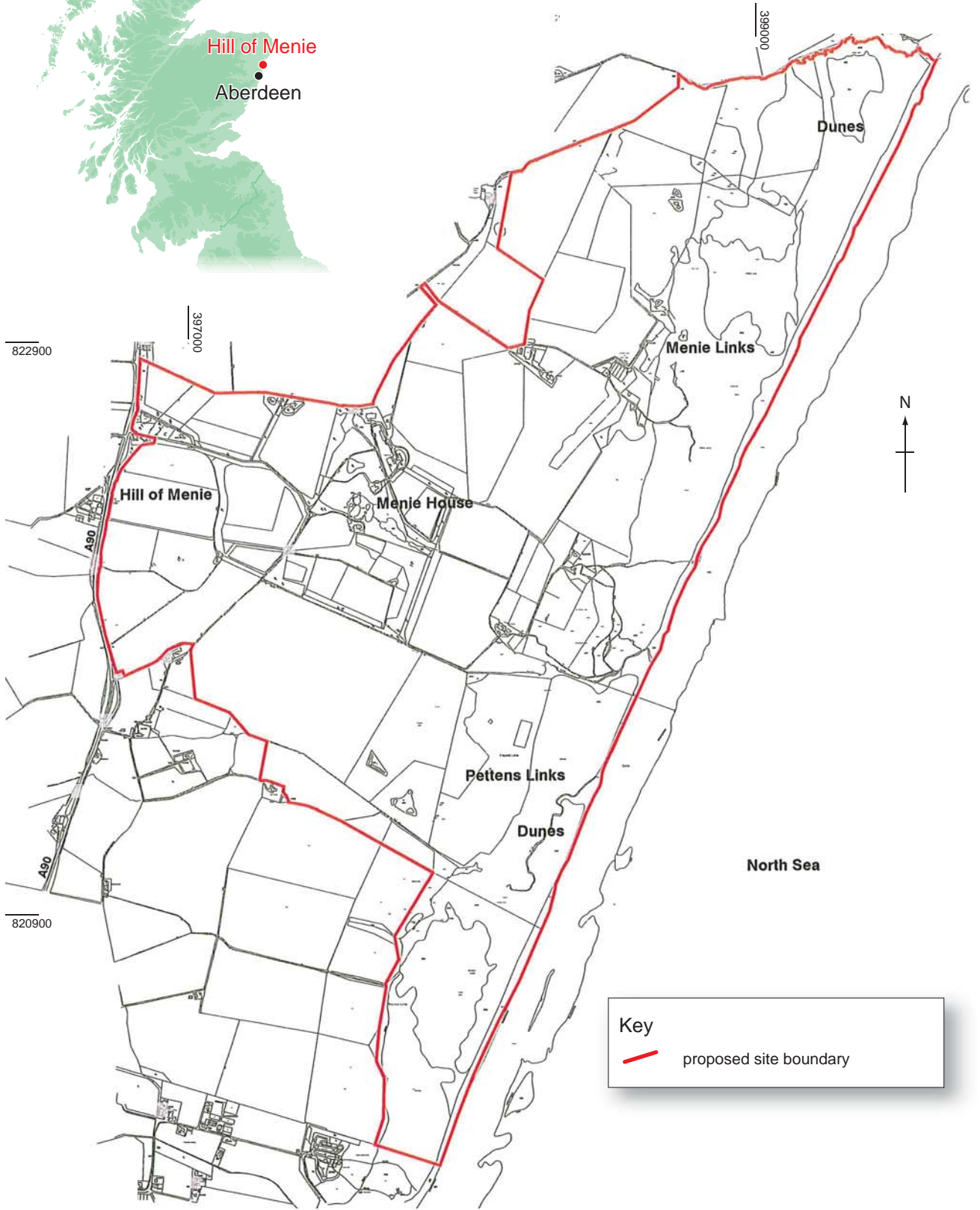
Each deposit in possible human cremations will be recovered in its entirety, depending on the preservation of the cremation it will either be excavated in controlled spits or recovered as a

sample and sieved to retrieve the cremated bone and any associated artifacts, and then processed by flotation to recover any associated charred plant remains.

Any organic artefacts that are retrieved during the excavation will be stored in appropriate conditions and assessed by a qualified conservator as a part of this contract.

Undisturbed kubiena tin or column samples of sediments will be taken for micromorphology of buried soils where these are likely to shed important light on the environmental development of the area.

A register of bulk finds and small finds will be maintained.



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