23 Birsay Bay landscape geophysical surveys, 2003–6

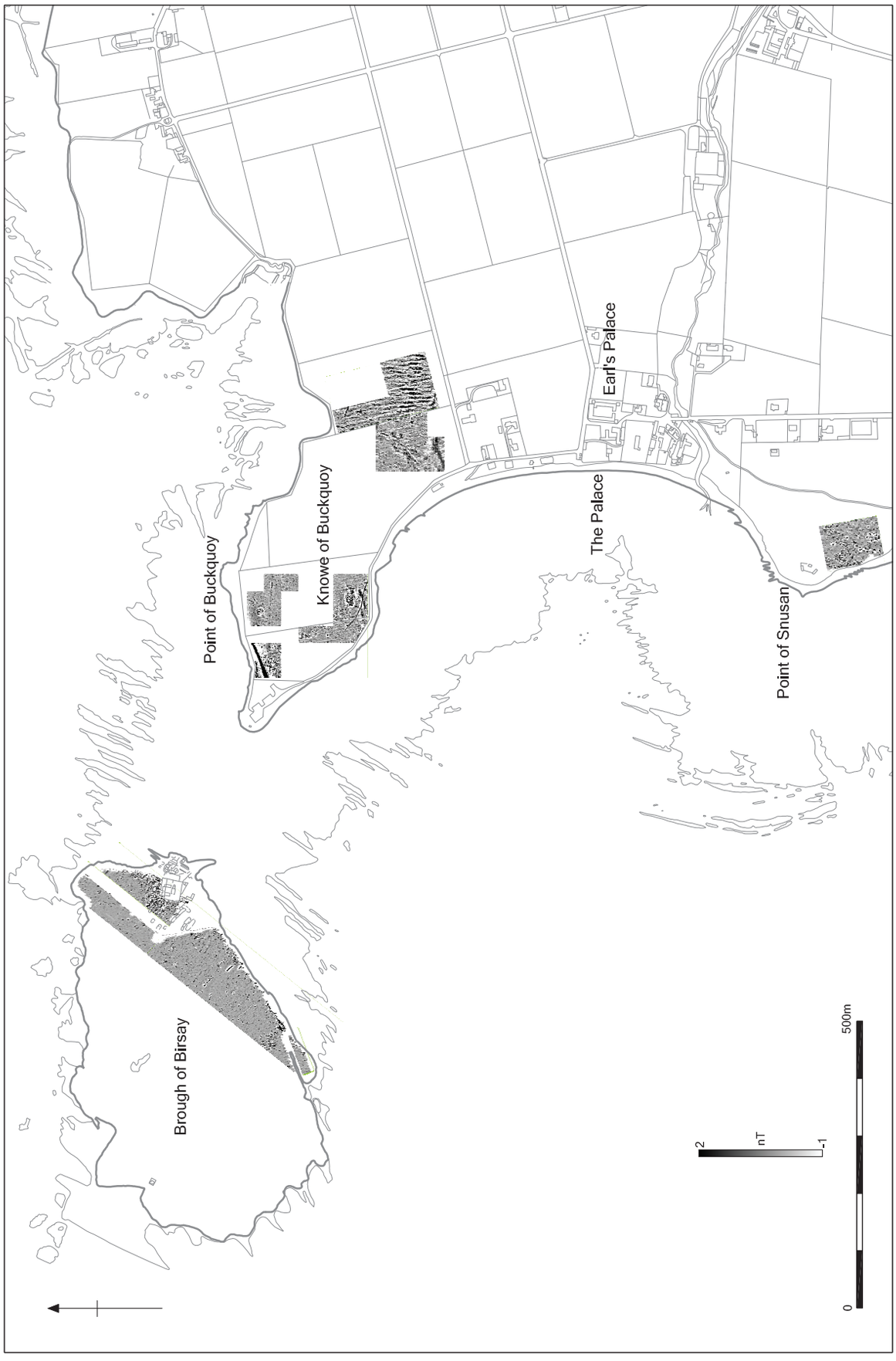
David W Griffiths with Susan Ovenden

23.1 Introduction

The Brough of Birsay is a distinctive geographical unit in one sense, but in another sense is part of a more extensive landscape comprising the rest of Birsay Bay and its hinterland (see Morris 1989, Chapter 1, especially 1–6). The Birsay-Skaill Landscape Archaeology Project was mentioned in 2.1 above, covering Birsay Bay along with the two west-facing bays to its south, Marwick and the Bay of Skaill. The project began in 2003 with a start-up grant from Orkney Islands Council and has continued since then, funded by OIC, Historic Scotland and Oxford University (Griffiths 2006; Griffiths *et al.* 2019). The choice of field research locations in Orkney was driven by a number of factors including mapping coastal and windblown sand deposits, beyond basic characteristics such as the possibility for permitted access and likely geological feasibility for magnetic survey (afforded by the predominance of the Stromness Old Red Sandstone). Landscape-scale geophysical survey undertaken in 2003, 2004 and 2006 has added considerably to the available detail on the extent of archaeological deposits around Birsay Bay and has contributed new contextual information to work undertaken on the Brough of Birsay. The extent of gradiometry survey around the bay is now considerable (Illus 23.1), even though this has been based on selective targeting of upstanding remains, and indications provided by rapid geophysical assessment techniques such as topsoil susceptibility mapping. For a more complete landscape coverage, yet more intensive and contiguous geophysical survey remains to be done in future.

Birsay Bay faces south-west, and curves around southwards from the Point of Buckquoy, a peninsula with a prominent point at HY 243284, via the central 'Palace' village area to the grass-covered links area which characterises the southern part of the bay. The present shape and profile of the coast is entirely a product of relatively-recent marine erosion, which is continuing despite recent efforts to stabilise it, and archaeological deposits including stone structural remains and middens are clearly visible protruding from the cliff sections. Birsay Bay, like the Bay of Skaill further to the south on Orkney's West Mainland coast, is a location of known significant archaeological potential, within a low erosive opening onto the Atlantic characterised in its southern part especially by extensive sand-dune systems. The acquisition of archaeological data in the past has been substantially driven and moulded by coastal erosion. Prior to 2003 the state of archaeological knowledge was highly discrete and site-specific, based on small-scale intensive excavation strategies in the past, and the *ad hoc* discovery of stray finds and deposits (see Morris 1983a and 1989, 2 and 6–8).

The Point of Buckquoy stands on low cliffs above a substantial wave-cut platform, and forms the nearest and most co-dependant landscape feature to the Brough itself. The wave-cut platform is one of the most substantial exposures in Orkney of the Stromness Flags sandstone beds, and it has been noted that cutting across it, along the north side of the Point of Buckquoy, is a clear exposure of a linear igneous dyke – a feature of Orkney geology and a complicating factor for magnetic survey (Mykura 1976, 96–7; Reed 1989, 1–5). The erosional frontage of Birsay Bay was subjected to a series of rescue excavations in the 1960s and 1970s as curatorial and academic archaeologists sought to counter a rapid loss of *in situ* data (Ritchie 1977; Morris 1989). Within the limitations of state-funded rescue site-focused archaeology, nevertheless a



Illus 23.1 Birsay Bay, location of gradiometry surveys (grey scale blocks)

contextual element was provided by a 'Survey of Coastal Sites' and a wider 'Environmental Survey' (see Morris 1989, 36–53). The excavation work was accompanied by surface topographic survey inland of the erosion face (see Morris 1989, 28–36), using the available technologies of the time (see below). The excavation strategy, whilst successful in that it produced a high-quality record of the sites investigated in terms of its purpose and funding basis was essentially reactive and dependant on an acute rescue ethos. A predictive element that might be afforded by a more extensive insight into the archaeological landscape, away from the immediate erosion zone, was not readily available at the time nor did funding conditions favour non-rescue work. Technology and thinking in landscape terms had moved on by the early twenty-first century. Modern landscape prospection techniques offer the opportunity to acquire new data, to contribute to the contextualisation and re-evaluation of existing excavated evidence, and also to contribute to an updated and informed curatorial strategy that seeks to manage the effects of coastal change.

23.2 Surveys on the Point of Buckquoy, 2003–5

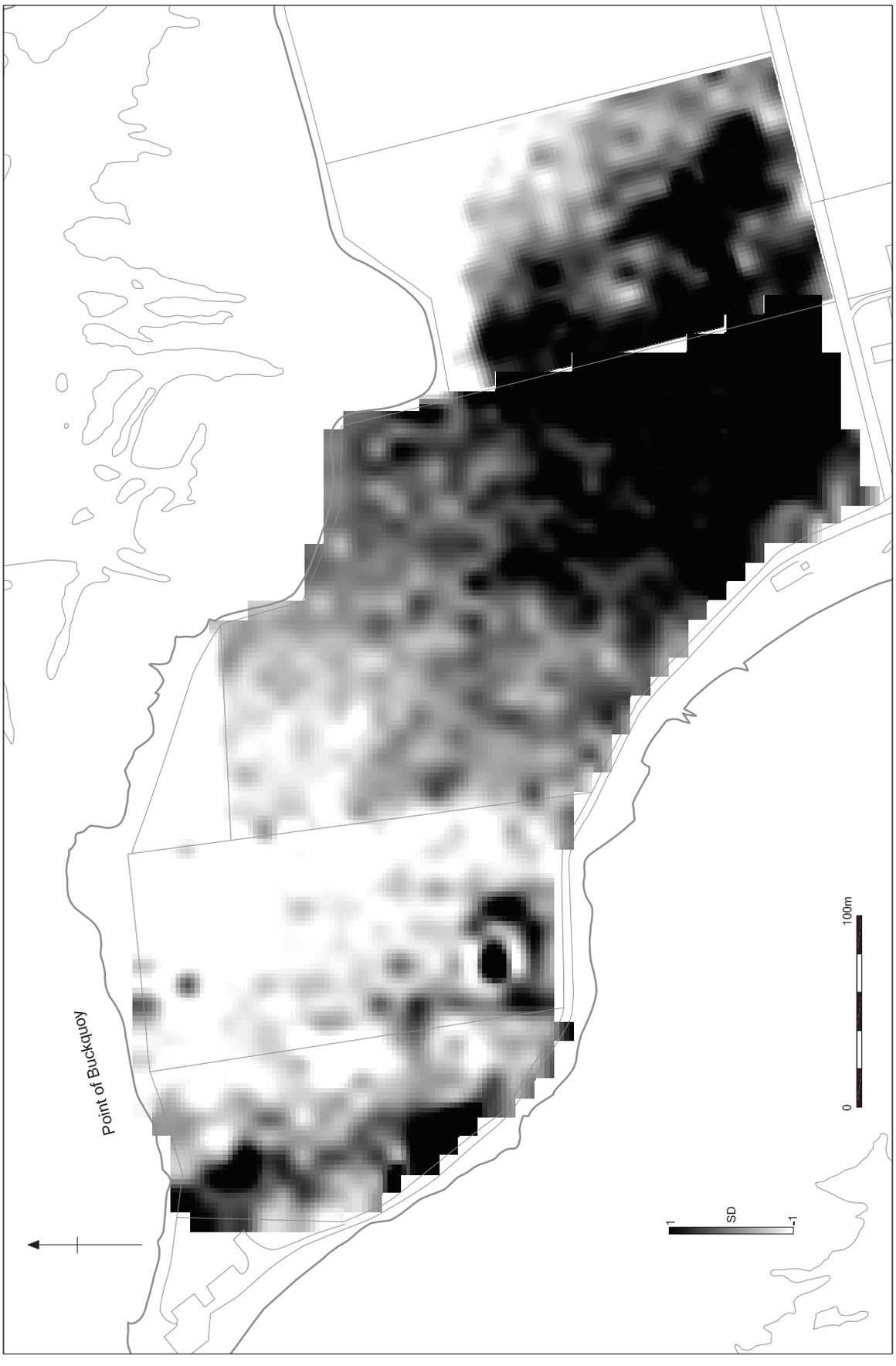
The Brough and Earl's Palace are Guardianship monuments, linked by a metalled track (the Brough Road) which passes along the southern edge of the Buckquoy peninsula – the rest of which comprises agricultural fields divided by nineteenth-century stone dykes, with a narrow coastal path along their northern edge. The four fields comprising the majority of the land surface of the Buckquoy peninsula were surveyed in 2003, 2004 and 2005. Survey work was initially undertaken by Oxford University in conjunction with Oxford Archaeotechnics, the latter handing over 2004–5 to Orkney College Geophysics Unit (formerly OCGU, now part of the UHI Archaeology Institute).

Away from the cliff-edge erosion zone, the only obvious archaeological presence here is a group of six upstanding mounds, all scheduled individually under SAM 1219 (NMRS HY22NW 13), all concentrated in the westernmost two fields (see Morris 1989, 28–36). John Fraser excavated part of the largest, the Knowe of Buckquoy, towards the south of the middle field in the 1930s (RCAHMS 1946, 19), but little useful indication remains of what he found (see Morris 1989, 26 and 36). F T Wainwright measured and described them in July 1960, and C D Morris's team contributed a plane-table survey of the mounds in 1982 (Morris 1989, 26 and 28–36). The north mound in the central field is topped by a roughly circular ring-cairn of large stones. Various suggestions have been aired about the origins and character of the mounds, most notably that the largest (the Knowe of Buckquoy) is a possible prehistoric chambered or stalled burial cairn, but nothing conclusive along these lines has been demonstrated to date.

The 2003 survey work began after the creation of a global site grid aligned on OS data and the creation of a topographic contour map with a topsoil magnetic susceptibility mapping survey using a Bartington 100mm coil at 10m intervals (Illus 23.2). This technique is ideal for establishing broad indications of contrast between zones of activity, where surface properties in the topsoil reflecting burning and other traces of past human settlement resulting from ploughing over zones of raised archaeological potential, are detectable as a diffuse spread in the upper 100mm or so. The magnetic susceptibility plot showed some interesting and, in some cases, unexpected results. Firstly, it showed a marked contrast amongst the 'five mounds', which tend for reasons of shorthand to be treated as a group. Three, the north-west mound in the west field, the north mound in the central field and the south mound in the central field (the Knowe of Buckquoy), together with the remaining section of the Buckquoy mound excavated by Ritchie in 1972 on the south-west boundary of the west field, showed enhanced magnetic susceptibility (indicated by darker shading on the plot). The central mound, which is bisected by the dyke between the west and central field showed, if anything, a reduced magnetic susceptibility over the background level, whereas the smallest mound, in the north-east corner of the west field, did not provide a conclusive result either way. This suggests that the five mounds represent divergent types of archaeological structure, with at least three showing some evidence for settlement activity.

Apart from the six mounds, magnetic susceptibility topsoil mapping showed a wider enhanced zone in the east of the survey area, which appeared to be trending eastwards into the next field (which time constraints and a slightly delayed silage harvest did not allow us to survey). This area was more of a surprise, and suggested itself as a target for the more intensive survey method planned, namely magnetometer survey using two separate Geoscan FM36 fluxgate gradiometers in 30m × 30m squares, with 1m-wide traverses taking readings every 0.25m, laid out by total station within the overall survey grid. In just under three days approximately 31 30m × 30m squares were completed.

In the western two fields, magnetometer survey was concentrated on the mounds and their immediate environs (Illus 23.3). The two mounds in the north of the westernmost field are located in close proximity to the igneous dyke, which is clearly visible as a thick black line on the grey scale plot, and appears to be congruous with the north coast of the Peninsula in this area. The small mound in the north-east corner of the field is completely masked by the overwhelming magnetic effects of the igneous dyke, whereas the north-west mound is visible but surrounded by a *penumbra* of higher readings. These may be a result of archaeological activity connected to the mound spreading into its immediate surroundings – or they may be explained by geological material from the igneous dyke being upcast and spread by natural and/or archaeological agency. The harder texture of the igneous rock (which is exposed on the wave cut platform a short distance to the north-east) suggests the former explanation is the more likely, but there can be no certainty prior to further investigation.



Illus 23.2 Point of Buckquoy magnetic susceptibility survey

Illus 23.3 Point of Buckquoy gradiometer survey, western area

The central mound showed no coherent structural pattern, but on its south-east side very close to the field boundary is a faint indication of a possible rectilinear structure. The two mounds in the central field showed complex internal structural indications – which in both cases appear sub-rectilinear in basis. The larger of the two, the Knowe of Buckquoy is yet more complex, with evidence of disruption probably caused by Fraser's 1930s excavation. Survey of the six mounds' environs produced more subtle readings generally in the range ±1nt over 0, but careful study of the results suggests that a range of archaeological features is represented. In the second field from the Point, a former field boundary is suggested by a transverse east–west line between the two mounds, and a curvilinear ditch shadows the southern edge of the Peninsula before terminating in the westernmost field. These two anomalies were investigated using small-scale targeted excavation in July 2004. The east–west linear anomaly across the mid-northern part of the field was revealed to be a substantial boulder built wall foundation at variance with the current pattern of late nineteenth–early twentieth century field dykes. This may possibly be part of the now-superseded irregular rectilinear field boundary system depicted on the 1760 'Aberdeen' Map (see below, Illus 23.5), although its date of origin remains uncertain. A strong curvilinear anomaly towards the southern edge of the field was shown to be a ditch, U-shaped in profile, and soil sampling of fills from this ditch produced carbonised grain (which unfortunately was not of high enough quality for AMS radiocarbon dating). In neither case was artefactual dating evidence obtained (Griffiths *et al*. 2019, 97–8).

The principal result of the other group of magnetometer survey squares to the east of the survey area (Illus 23.4) was a linear anomaly of compound positive and negative readings, apparently resulting from a composite of ditch and stone features. This seems to be crossing the neck of the peninsula in a roughly north–south direction, slightly convex towards the east, and dividing it from the mainland hinterland. A field boundary roughly in this position, although slightly convex towards the west, is visible on the 1760 Aberdeen Map (Illus 23.5), dividing 'Biggaquoy' land on the western portion of the peninsula from a large field 'Cleatfurrowes' occupying the majority of the landscape north of the Palace. If this was last depicted as a pre-modern field boundary, it may yet possibly have more ancient origins as a defensive work delineating the point from the mainland. Earthwork-delineated or defended promontories are known elsewhere in Orkney, such as the Point of Unstan, Stenness (HY 21 SE22) and Grunavi Point on Sanday (HY63 NW74), but in this case the internal area is large and could have included numerous settlements. The Dyke of Sean, which crosses the Brodgar Peninsula north of the Ring of Brodgar, and encloses the Ring and the complex of Neolithic sites at the Ness of Brodgar, may also offer a parallel.

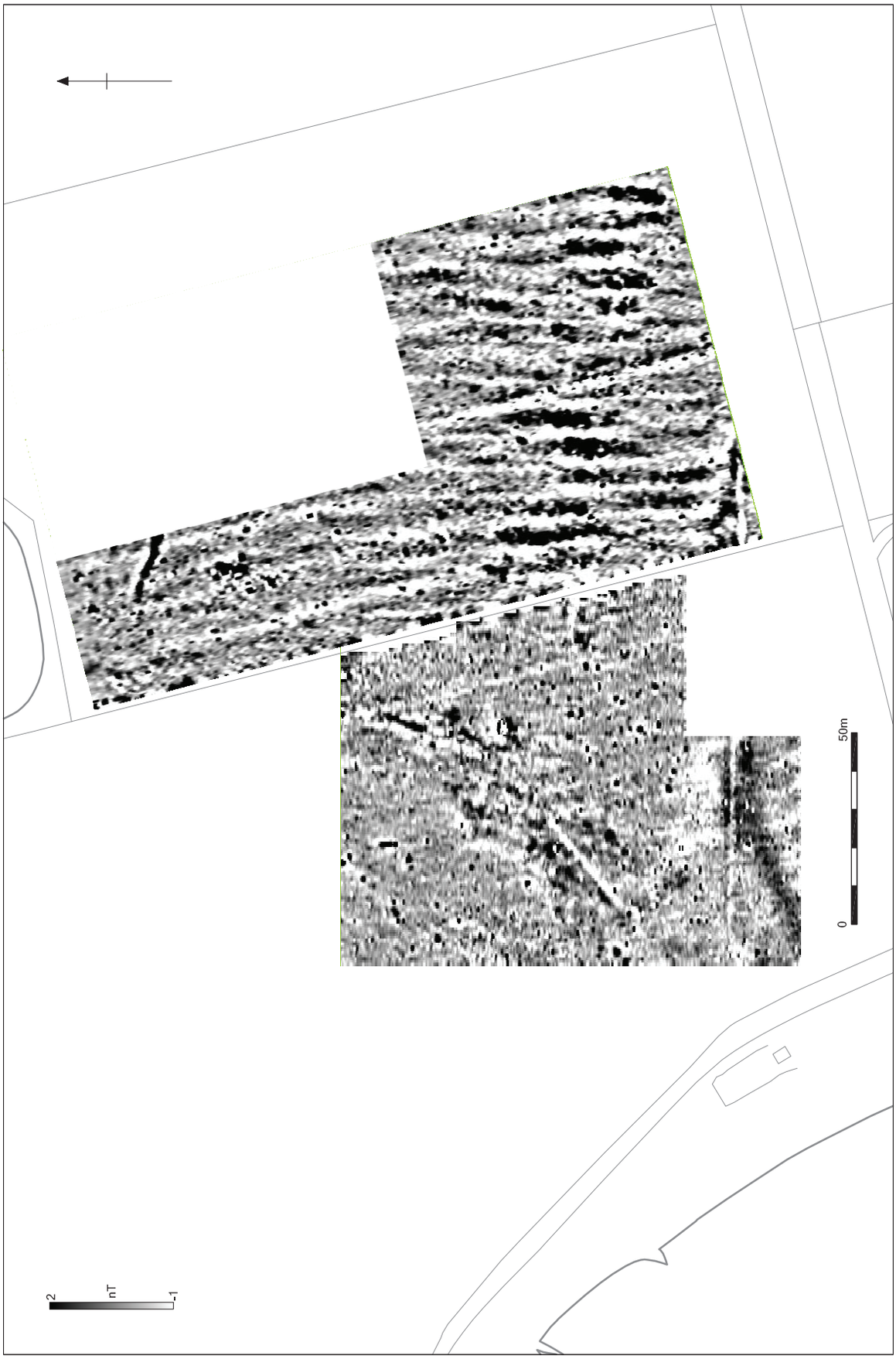
The line of the putative linear boundary crossing the neck of the Point of Buckquoy is angled rather than straight, and the angle appears to be respecting the internal position of a group of anomalies immediately to its west which may represent a pre-existing settlement. Rectilinear elements are visible within this group, including a north-east/south-west angled building with a square yard on its eastern side, which appears to be surrounded by a shadow of higher readings suggesting middenised soil may be present. East of the 'defensive' feature next to the field boundary, is a possible lobed structure.

All these provisional descriptions have yet to be tested and confirmed by further survey and excavation work. An extension of this geophysical survey area into the field immediately to the east (the fourth field east of the Point of Buckquoy) in February 2005 showed that the spread of magnetic susceptibility is broad but discrete and likely to represent *in situ* archaeological material being turned within the topsoil by later medieval to modern ploughing. The 2005 survey revealed particularly strong patterning caused by runrig cultivation ridges, a factor which is in accord with the obsolete field name mentioned on the 1760 map: 'Cleatfurrowes'.

23.3 Birsay Links survey, 2006

A survey was undertaken by OCGU on the Birsay Links, to the south of the Palace area, in August 2006, commissioned by Oxford University (see *OCGU2007a*). Because of its relative distance from the Brough of Birsay, only a brief summary of this work is offered here, and full reporting is to be found in the final publication of the Birsay-Skaill Landscape Project (Griffiths *et al.* 2019). Contained within the 2006 survey area are two sandy mounds, 'Mount Misery' (NMRS HY22NW4), and a second mound immediately to the south with 'no obvious sign of antiquity' (HY 22 NW3). Mount Misery was examined by Fraser in 1931, although a few crude stone implements were discovered, there were no definite traces of buildings (Morris 1989, 26 and 1996a, 33 and 34). Gradiometer survey was undertaken over approximately 0.75 hectares and coupled with topographic survey. Although the internal structure of the mounds did not reveal coherent patterns of definite archaeological potential, numerous pit-type anomalies and a possible platform area on the southern flank of Mount Misery were identified (Illus 23.6). A faint trace of a rectilinear structure was identified south-east of Mount Misery, but the area was heavily disturbed and contaminated with ferrous metals by the presence of a derelict twentieth-century rifle range with stone footings. The patterns of magnetic responses were clearly shown by the topographic survey to underlie overburdens of windblown sand, which had added to the 'mounded' profile of the sites and partially occluded the strength of the geophysical signal in areas of deeper surface sand deposits.

The large (almost certainly multi-period) settlement mound known as Saevar Howe or, historically, the 'Knowe of Saverough' (SM 1373, HY 22 NW5), immediately to the south of the Links survey area, is another case in point.



Illus 23.4 Point of Buckquoy gradiometer survey, eastern area

Illus 23.5 The 1760 'Aberdeen Map' © Orkney Library and Archive

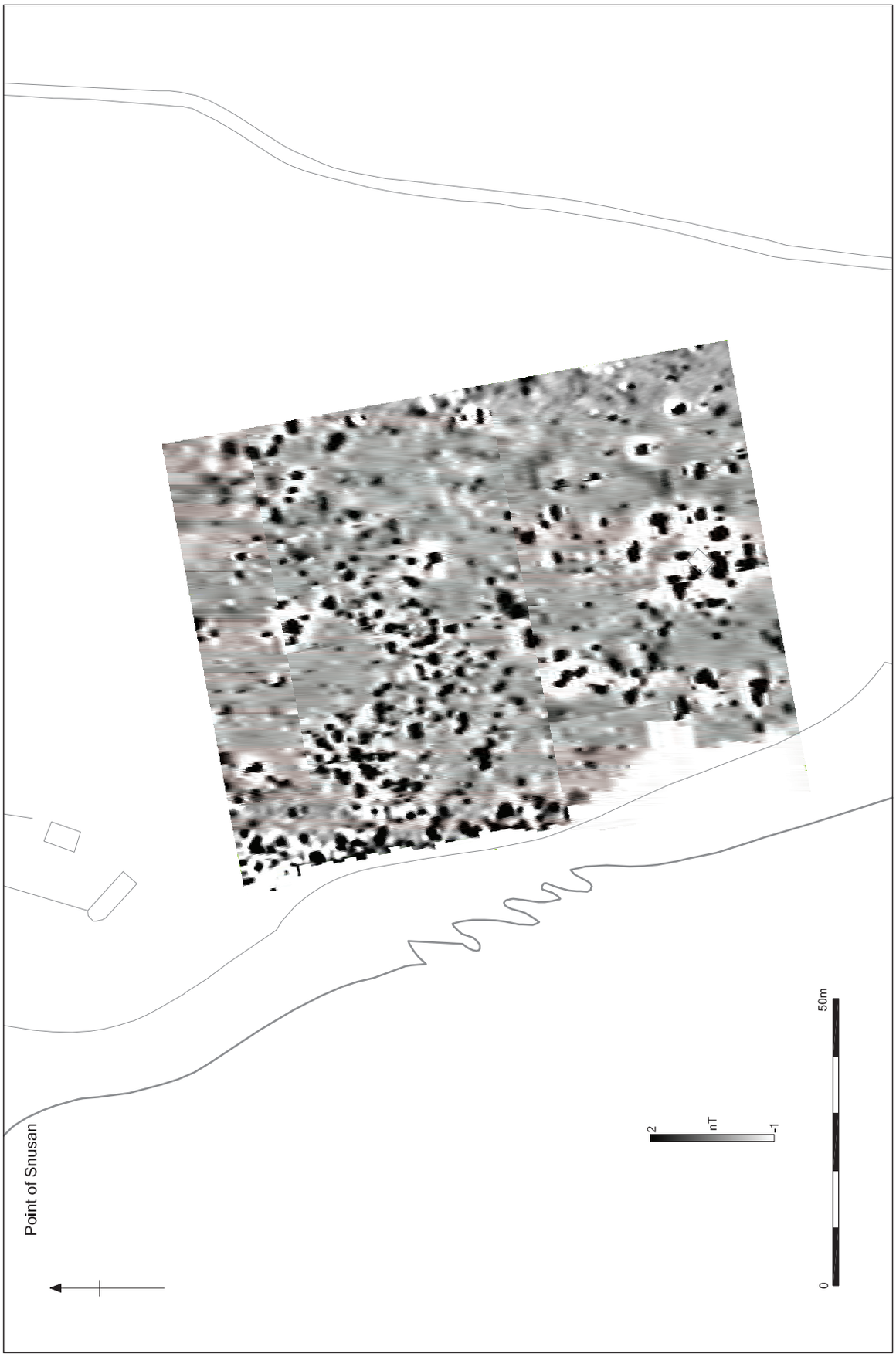
Test excavations by John W Hedges in 1977 (Hedges 1983) showed this sandy mounded site had, and probably still has, considerable archaeological potential, for the Pictish and early Viking periods in particular (Morris 1989, 23–4 and 279). Its seaward-facing flanks in particular are showing evidence of erosion, cattle trampling has affected its stability, and rabbit burrows have undermined the sandy overburden. Extensive metallic surface contamination represents a potential problem for magnetic geophysical survey (the hollow created by Hedges's excavation has attracted dumping of rusty metal and tractor parts) but a geophysical survey undertaken in 2011 produced some viable results (Griffiths *et al.* 2019, 51–2), assisting with the overall interpretation of the site.

The mounds on Birsay Links, to which should be added the extensive spread of deposits around the Beachview site (Morris 1996, 34–5), are therefore complex products of archaeological and natural accumulation processes. This phenomenon is also visible on a number of mound sites at the Bay of Skaill (Griffiths 2006), and also at Marwick Bay, where a scheduled coastal settlement mound (SM 2884, HY 22 SW30) was surveyed and part-excavated in 2009 (Griffiths *et al.* 2019, 43–5) which has produced two radiocarbon dates from the range cal AD 770–980 at 95.4% probability. These then provisionally appear to date it to the late Pictish/early Viking period *i.e.* the so-called 'Pictish–Viking Interface' (see Chapter 24, below).

23.4 Conclusion

These landscape-scale geophysical surveys, although they remain partial in extent, have added to the picture of archaeological knowledge around Birsay Bay presented by Morris (1989; 1996a). The coastal zone exposures of archaeology have been contextualised and can now be seen as part of a wider pattern of mounded settlement traces within a palimpsest of field systems of varying antiquity. The Buckquoy Peninsula itself may have been delineated from the Mainland by a north–south linear feature, the position of which appears to respect the position of an as-yet unexcavated settlement cluster at the eastern end of the peninsula. Within the area of the promontory, mounded settlement and possibly funerary sites reflect discrete concentrations of archaeological potential within the landscape.

The work described above has also proved what is already a growing consensus: that magnetometer survey and magnetic susceptibility topsoil mapping are highly



Illus 23.6 Gradiometer survey, Birsay Links (Mount Misery upper centre)

suitable for landscape reconnaissance in Orkney. As a research tool, they combine well with detailed topographic survey to provide a means of rapid investigation that is suitable both for open area reconnaissance and detailed studies of individual site foci. Their utility is compromised by aeolian sand over *c.* 1m deep (Griffiths and Ashmore 2011), although the presence of igneous dykes in the sandstone beds seems almost to be a point of positive archaeological interest, as opposed to merely being a hindrance to geophysical survey. The addition of further comparative work with other geophysical techniques, such as ground-penetrating radar (GPR), although not possible within the remit of the particular surveys reported here, would doubtlessly add even more to the picture and enable diverse possibilities for sub-surface modelling in advance of, or instead of, conventional excavation. It is important to stress, however, that the gathering of further essential information which can help to explain and enhance the geophysical data, such as soil micromorphology, stratigraphic sequencing and dating samples is only possible *via* intervention. Geophysics and surface survey are rarely enough alone to characterise fully a site or landscape. Where coastal exposures do not already permit this, targeted excavation is required to extract artefactual, environmental and dating materials. The landscape picture built up by these investigations casts considerable light not just on new but on existing archaeological knowledge, and may help inform future landscape conservation strategies in the face of the ever-present and indeed growing threat of coastal erosion.