National Roads Authority
Archaeological Geophysical Survey Database 2001-2010: Archive Report

This report has been archived by J. Bonsall, NRA Fellow at the University of Bradford. The archive was funded by and carried out under the auspices of, the National Roads Authority Research Fellowship Programme.

Survey Event No.	**64**
Survey Name	**Kells to North of Kells, M3 Clonee North of Kells (Contract 5)**

This Geophysical Report should be Referenced or Acknowledged as:

Bartlett, A.D.H., 2003. M3 Clonee to North of Kells; Report on Archaeogeophysical Survey, Section 4: Kells to North of Kells. Bartlett-Clark Consultancy. Unpublished Report. March 2003.

Detection Licence No.	02R059
Ministerial Directions No.	Not Applicable
NRA Route No.	M3
NRA Scheme Name	Clonee to North of Kells Scheme (bypass Dunshaughlin Navan Kells
NRA Scheme ID	MH/07/630

Survey carried out for Meath County Council

Survey funded by the National Roads Authority

Known problems with this report

Figures Unavailable

Depositor	James Bonsall, NRA Fellowship Programme
Primary Archive held by	Navan NRDO
Secondary Archive held by	Bartlett-Clark Consultancy

This archive was last updated on 06/12/2011

M3 CLONEE TO NORTH OF KELLS

Report on
Archaeogeophysical Survey 2002

Section 4: Kells to North of Kells

A.D.H. Bartlett

Surveyed by:

Bartlett-Clark Consultancy

25 Estate Yard, Cuckoo Lane,
North Leigh,
Oxfordshire OX29 6PW
(+ 44 1865 200864)

for:

N3 Meath Consult
for
Meath County Council and the
National Roads Authority

Surveyed under Duchas Licence Number 02R059

M3 CLONEE TO NORTH OF KELLS

Report on Archaeogeophysical Survey 2002

Section 4: Kells to North of Kells

1. Summary

This survey forms part of an archaeological evaluation of the route of the proposed M3 motorway, and other associated road developments. The motorway is to extend to the NW from Dublin, approximately following the line of the present N3. This report describes findings from the re-aligned route of the N3, which is to continue from the termination of the proposed M3 near Kells to the north west. Similar surveys have been undertaken of other sections of the scheme, and are reported on separately.

All accessible areas of the route were investigated by means of a recorded magnetometer scan, in which readings were collected along sample transects amounting to some 45% of the total area. The magnetometer survey was supplemented by the complementary technique of magnetic susceptibility surveying.

Findings include a number of sites at which linear features suggesting enclosures were found in association with evidence of possible occupation remains. At least two of these are near sites previously identified as of archaeological potential, including a ring fort. There is considerable magnetic activity of apparently geological origin towards the northern end of the route. Sites at which there is a possibility of fulacht fiadh remains were identified.

A.D.H. Bartlett

Bartlett - Clark Consultancy

25 Estate Yard
Cuckoo Lane
North Leigh
Oxfordshire OX29 6PW

+44 1865 200864

11 March 2003

Contents

Introduction	4
The proposed route	4
Survey Procedure	5
Results *(Described in 3 sections)*	7
Conclusions	9
Appendix (summary of findings)	11

Illustrations

The following plans at scales as stated are included with this report:

Figure1	Key to plan locations	1:25000
Figures S1 – S11	Magnetic susceptibility survey plots (with summary of magnetometer findings)	1:2500

Data Archive

Figures A1 – A22	Graphical (x-y) plots of magnetometer data, with interpretation.	1:1250
Figures B1 – B22	Grey scale plots of magnetometer data	1:1250

M3 CLONEE TO NORTH OF KELLS

Report on Archaeogeophysical Survey 2002

Section 4: Kells to North of Kells

2. Introduction

This survey forms part of an archaeological evaluation of the route across County Meath of the proposed M3 motorway, and other associated road developments. The motorway departs from the line of the present N3 near Clonee, NW of Dublin, and rejoins it some 50km to the north beyond Kells. The scheme incorporates bypasses around Dunboyne, Navan and Kells, and various other new or re-aligned access roads.

Three other section of the route were included in the programme of geophysical surveys carried out between late May and the end of July 2002, and one (the Dunslaughlin to Navan section), was the subject of a separate previous investigation [1]. This report describes findings from the route of the proposed new alignment of the N3, from Kells to North of Kells. Findings from the other three sections (Clonee – Dunslaughlin at the southern end of the route, Navan Bypass, Navan to Kells and Kells Bypass) are described in separate reports.

The same procedures (of recorded magnetometer sampling supplemented by magnetic susceptibility surveying) were used in all stages of the geophysical investigation. The introductory sections describing surveying procedure are therefore reproduced in each of the reports.

The survey was commissioned by N3 Meath Consult on behalf of Meath County Council and the National Roads Authority.

3. The Proposed Route

This survey covers the new route of the N3, which is to be constructed as a single carriageway road extending from the termination of the M3 at the intersection with the proposed N52 Kells bypass at Calliaghstown. The route continues for some 10km to the north west, and rejoins the existing line of the N3 at Derver. The route was surveyed in full except for fields obstructed by crops at the time of the fieldwork (24 July – 2 August 2002).

The route crosses a landscape of clayey glacial till with occasional outcrops of limestone bedrock. There are numerous drumlins and other small hills of glacial gravel in the northern part of the route (north of Castlekeeran). The final northern section crosses the floodplain of

the River Blackwater. The geological context is therefore comparable to that encountered on other sections of the route, where magnetometer surveying has produced a variety of positive findings. The clay and till soils are not strongly magnetic, but are usually sufficiently responsive for archaeological features, including at least some ditches and boundaries, to be detected. The gravel soils have a higher magnetic susceptibility, and should therefore permit the detection of archaeological features, although there is also an increase in the natural background noise level of the survey. (Certain categories of archaeological features, including graves and cemeteries, are difficult to detect by geophysical methods even in the most favourable conditions.)

The archaeological potential of the route was investigated during an initial archaeological assessment carried out by Margaret Gowen & Co. Ltd, and summarised in the Environmental Impact Statement (EIS) for the project [2]. This study established that the route avoids all known archaeological monuments, but identified 13 sites within 500m of the route, and other areas of archaeological potential. These include extensive wetlands, and areas near to known sites and findings.

4. Survey Procedure

The survey was carried out using the two techniques of magnetometer and magnetic susceptibility surveying, which are the methods usually employed for large scale evaluation work of this kind.

The results obtainable from magnetometer and magnetic susceptibility surveys are related, but they will not necessarily detect the same features or disturbances. The magnetometer responds to cut features such as ditches and pits when they are silted with topsoil, which usually has a higher magnetic susceptibility than the underlying natural subsoil. It also detects the thermoremanent magnetism of fired materials, notably baked clay structures such as kilns or hearths. Burning associated with past human occupation enhances the magnetic susceptibility of topsoil, increasing the magnetometer response from ditches and pits, and also making it possible to locate sites by magnetic susceptibility measurements on the superficial topsoil. Susceptibility surveying can therefore be used to obtain a broad indication of previously occupied or disturbed areas, although the readings may be affected by non-archaeological factors, including geology and land use. Areas of positive susceptibility response therefore often require further investigation, usually by detailed magnetometer surveying, before being accepted as archaeologically significant.

A geophysical investigation of an extended site of this kind, unless it is surveyed in full, requires a sampling strategy which provides sufficiently thorough coverage in terms of both detail and extent.

One procedure sometimes employed is magnetometer scanning, in which the operator tries to identify areas of apparent activity as the magnetometer is carried across the site, usually along transects at about 10m intervals. This provides initial coverage equivalent to about a 10% sample, but is very subjective, and is unreliable on weakly magnetic soils and in the presence of non-archaeological magnetic disturbances.

A more objective alternative is to record a continuous sample strip along the route, of a width sufficient to provide the required sample of the total area. It was decided for this project that such an approach could leave significant areas unsampled, particularly in those parts of the route where the proposed land-take is at its widest. The procedure followed was therefore to divide the surveyed area into parallel strips, and to increase the number of strips to provide wider coverage where required.

Readings were recorded across 9m wide sample blocks within each 20m wide strip of ground. This method provides 45% coverage of each 20m strip, and means that no point within that area lies more than 5.5m from the survey.

The results of the magnetometer survey are shown as graphical and grey scale plots at 1:1250 scale in two series of plans (A1-22 and B1-22), which make up the data archive included with this report. The plots represent readings collected along transects 1m apart within each 9m wide block. The blocks from each field are arranged on the plans in the same relative locations as on the ground. The graphical plots show the readings after standard processing operations including adjustments to the line spacing to correct for variations in the instrument zero setting, and numerical smoothing to reduce background noise levels. Additional 2D low pass filtering has been applied to the grey scale plots to reduce background noise levels and emphasise features of possible archaeological significance.

Outlines and cross hatching indicating selected magnetic anomalies of potential interest have been added to the graphical plots. The magnetic anomalies which have been outlined on the enclosed plots are those for which an archaeological origin cannot be wholly excluded, although they may also include occasional extraneous features. Anomalies which are strong or narrow in profile, asymmetrical, or which have a prominent negative peak are likely to be caused by buried stones, bricks or iron objects and have been excluded as far as possible from the interpretation. The distribution and degree of clustering of the features, and correlations between magnetometer and susceptibility findings, as well as other archaeological evidence, are all relevant in reaching an interpretation. The anomalies as outlined are intended to signify the approximate distribution and extent of areas of potentially significant activity, but it is not always practical to indicate all the individual features which are visible in the data plots. Areas of more concentrated activity of potential archaeological interest are marked by red cross hatching, rather than as clusters of individual features. Strong magnetic anomalies which are likely to be recent or non-archaeological origin are not necessarily included in the interpretation, although some highly disturbed areas are indicated by green cross hatching.

The susceptibility survey was based on readings taken at 12.5m intervals along the magnetometer transects (or in some cases along national grid lines, which may not have aligned with the transects). Readings were taken using Bartington MS2 susceptibility meters with the MS2D field probe. The readings are displayed as strips of shaded squares of density proportional to the readings at 1:2500 scale on figures S1 – S11. The interpretative outlines as shown on the magnetometer plots have been added to these drawings at reduced scale to provide a summary of the survey findings.

The survey was positioned in each field by reference to OS co-ordinates, and located with a sub-1m accuracy GPS system.

Land parcels are identified on the figures by means of the plot numbers as used in the ownership and access lists for the project. Fields within the same ownership are distinguished by letters (2120A, etc). The plans run from south east to north west.

5. Results

5.1 Figures S1 – S4: N52 at Calliaghstown, Kells to Drumbaragh (R163) (Magnetometer Plots A1 – A8)

There are small magnetic anomalies of uncertain significance in field 4000. Field 4001 has an unusually high background noise level, but no clearly interpretable features. Field 3071 at the south eastern end of the route was obstructed by hay bales, and could not be surveyed.

Strong non-archaeological magnetic disturbances perhaps indicate recent infilling in 4065 and at the eastern end of 4004. A number of pit-like anomalies in this field are too small to be interpreted with any confidence, but continue into 4003.

Coverage of field 4006 is incomplete because of boggy ground. This field is identified as of archaeological potential in the EIS because of the wet conditions. Conditions are therefore favourable for archaeological preservation, particularly of organic materials, but not necessarily for magnetometer surveying. Archaeological features may be buried at depth in the boggy ground, and magnetic detection is most effective at depths immediately below the ploughsoil.

There are no clear findings in 4007A, but there is an increase in susceptibility readings in 4007B and 4067. There are also weak but potentially significant magnetic anomalies including linear and other features (at A) in 4007B, and less definitely in 4067. These fields at Boolies adjoin a field immediately to the north in which archaeological findings including a subrectangular earthwork platform and a semicircular stone feature are noted in the EIS.

Coverage remains incomplete because of wet conditions in 4069A, but there are isolated magnetic anomalies, some of which could be recent interference, in 4069B. An apparent small rectilinear feature at B could be a fortuitous association of anomalies. Field 4009 was not surveyed because of a potato crop.

There are some relatively weak magnetic anomalies in 4010, but the susceptibility readings are unusually high. This is followed by a dense cluster of features (C) in 4011. These findings lie immediately to the north of a field containing a ring fort (RMP site ME016:026).

There are some small magnetic anomalies in 4015A, but these may be on disturbed or infilled ground close to a pond. A possible linear feature in 4015B lies parallel to the field boundary, and may relate to cultivation. Other linear disturbances which could indicate cultivation, or a former boundary, are visible in 4015D. Field 4015E was surveyed by susceptibility only, and

gave uniform readings. There are high susceptibility readings extending into 4016 from the area around the filled-in quarry in 4018A. A broad anomaly in 4016 could perhaps be a naturally silted hollow.

5.2 Figures S5 – S7: Drumbaragh to near Woodpole Cross Roads (Magnetometer Plots A9 – A14)

There is rubble scattered around the filled-in quarry in 4018A, which may contribute to the high susceptibility readings nearby. The susceptibility readings remain high in the following two fields. Detailed interpretation of the magnetometer results here is difficult because of a high background noise level, but there appear to be linear features (D, E), perhaps indicating enclosures, and other small anomalies in both fields.

Broad magnetic anomalies which perhaps indicate silted or infilled hollows were detected in 4022, but they appear to be randomly located, and do not form an interpretable plan.

There is a good correspondence between a group of linear features which could indicate enclosures, other magnetic anomalies, and locally raised susceptibility readings centred at F in 4024 – 4054A. These combined factors could perhaps together indicate a settlement site.

Such activity may continue into 4024 and 4025B-D, but the findings here are less distinct. Fields 4025B-C appear (on the basis of the survey plots) to be subdivided by electric fences, and there are other non-archaeological disturbances, but there are also some reasonably clear linear and other features (e.g. at G).

The succession of small fields from Keeran's Cross Roads to Woodpole Cross Roads (map S7, data plots A13-A14) each contain numerous small magnetic anomalies, some of which are clearly caused by iron or other intrusive debris. There are a few anomalies (as outlined) which could represent silted pits or other potential archaeological features, but there are few linear features to suggest enclosures, and no distinct concentrations of findings. The susceptibility readings are also relatively uniform. It therefore appears that these fields may have been disturbed through intensive cultivation, or nearness to former or recent habitation, but are unlikely to contain clearly defined archaeological sites. The EIS does record two souterrrains nearby to the east.

5.3 Figures S8 – S11: Woodpole Cross Roads to N3 at Derver (Magnetometer Plots A15 – A22)

There are disturbances in 4034 on the line of the former railway, but few other identifiable magnetic anomalies.

Findings around H in 4035 include linear features, not all of which align with existing boundaries, and other magnetic anomalies. The susceptibility readings are also high,

suggesting this could be an occupation site.

It is difficult to distinguish absolutely between the response obtained in 4035 and subsequent fields (4037A-C, 4038, 4039A). The magnetic response throughout is disturbed, as is often the case on gravel soils with high magnetic susceptibility, but there are fewer identifiable magnetic anomalies in these latter fields. Some of the disturbances in 4039A could be natural, or related to cultivation, but some of the stronger linear features perhaps suggest enclosures (e.g. J). Susceptibility readings here are particularly high.

There are additional distinct linear features in 4039B, which could again indicate former boundaries or enclosures. The anomalies at K align with an existing field boundary. Other significant individual features are difficult to identify.

The cluster of magnetic anomalies shaded at L in 4040 lies in wetland near the Blackwater river crossing, and so is perhaps a candidate for a fulacht fiadh site (ancient cooking site). Similar disturbances nearby in 4039C could also be significant, but are associated with strong individual magnetic anomalies, which suggests they are non-archaeological.

There are distinct magnetic anomalies in 4042A on the north bank of the Blackwater, but these are broad irregular disturbances of a kind suggesting silted hollows, which are often detected near watercourses. A nearby gravel hummock in 4042A gave slightly raised susceptibility readings. There are more broad pit-like magnetic anomalies in 4042B (green shading), and a linear feature was detected towards the north of the field.

The susceptibility values increase again, presumably with a return to gravel soil, in 4043A and 4043C. There is also an outcrop of bedrock nearby. These factors, combined with a lack of any clear plan to the detected features, suggest that the magnetic anomalies seen in 4043A-C could be mainly natural.

There are scattered small magnetic anomalies, but no clear focus of activity, in 4044, continuing into 4045A-C.

Possible linear markings in 4045C and E align with field boundaries, and so could be caused by ploughing. There is no clearly identifiable response near to the stone revetted mound on the boundary of 4045D-E.

6. Conclusions

The most convincing findings from this section of the route are perhaps the areas of apparent occupation activity near to known archaeological sites. There are particularly distinct findings near to the ring fort (ME016:026) in 4010 – 4069B, and perhaps also in 4007B at Boolies.

There are several other locations with linear anomalies suggesting enclosures in association with other features of potential archaeological interest on maps S5 to S8 in the central section of the route. Interpretation becomes more difficult due to high levels of background magnetic activity in the gravel landscape towards the northern end of the route. There is a possibility

that potentially significant findings here have been disregarded, or assumed to be natural. Possible enclosures and boundaries were detected in 4039B, but few other nearby areas of the survey show any ordered pattern of detected features.

There is an isolated group of magnetic anomalies on wet ground of a kind which could be consistent with the presence of fulacht fiadh remains at L in field 4040.

Report by:

A.D.H. Bartlett BSc MPhil

Bartlett - Clark Consultancy
Specialists in Archaeogeophysics

25 Estate Yard
Cuckoo Lane, North Leigh
Oxfordshire OX8 6PS

+44 1865 200864

11 March 2003
(revised 2 May and 11 June 2003)

W. Davies, P. Cottrell, D. Lewis, S. Brown and R. Ainslie participated in this project.

References

[1] N3 Navan to Dunslaughlin Road, Co. Meath. Report 2000/104 dated 5th January 2001 by GSB Prospection.

[2] Environmental Impact Statement Vol. 7A; Section E - Cultural Heritage. Navan to Kells and N52 Kells Bypass; Section 13: Archaeology. Report by Arup Consulting Engineers, including summary of assessment by Margaret Gowen & Co. Ltd.

M3 CLONEE TO NORTH OF KELLS

Archaeogeophysical Survey 2002
Section 4: Kells to North of Kells

Appendix: Summary of Findings

This list notes the more significant findings from the magnetometer survey of this route. The grading (1-4) given alongside each entry refers to the reliability of the geophysical evidence rather than the archaeological significance of the findings.

Grade 1: Distinct magnetic anomalies of probable archaeological origin.

Grade 2: Magnetic anomalies possibly including natural or recent disturbances, but which could in part be archaeologically significant.

Grade 3: Weak or isolated features; not necessarily archaeologically significant.

Grade 4: Strong magnetic anomalies of probably recent or natural origin.

Map (S1-11) and Plot No. (+ Feature Label)		Grade
S2 4007B (A)	Possible weak linear and other features in field with increased susceptibility readings near to archaeological findings at Boolies.	1-2
S3 4069B (B)	Apparent rectilinear feature. Near to other disturbances, and therefore possibly a chance grouping of anomalies.	2-3
S3 4010 - 4011 (C)	High magnetic susceptibility readings and magnetic anomalies suggest settlement remains in field immediately north of ring fort (ME016:026).	1

cont./

Map (S1-11) and Plot No. (+ Feature Label)		Grade
S5		
4018B-4018C (D, E)	Possible enclosures and other features in fields with high susceptibility readings.	2
S6		
4024-4045A (F)	Enclosures, etc, similar to 4018C above	1-2
	(and may continue into 4024 and 4025B-D: e.g. at G).	2-3
S7		
4027 -4026B	Scattered magnetic anomalies, but no clear concentrations of features.	3
S8		
4035 (H)	Linear and other anomalies with high susceptibility readings (settlement site ?)	1-2
S9		
4039A (J)	Linear features perhaps indicating enclosures, and raised susceptibility readings.	1-2
S9		
4039B	Former field boundary (K), and perhaps other linear features.	2
S9		
4040 (L)	Isolated magnetic anomalies in wetland (- possible fulacht fiadh ?)	2-3
S10		
4042A-B	Magnetic anomalies near River Blackwater. Possibly natural silted hollows.	3-4
S10		
4043A-C	Small magnetic anomalies and high susceptibility. Possibly natural.	2-3
