Appendix 3A – Figures

Coolshamrock SID
Heritage Assets within 2km
Figure 3.1

Key

- Development Boundary
- 2km Study Area
- National Monuments in State Care
- Historic Gardens and Designed Landscapes
- National Inventory of Architectural Heritage
- Record of Monuments and Places
- Zone of Theoretical Visibility

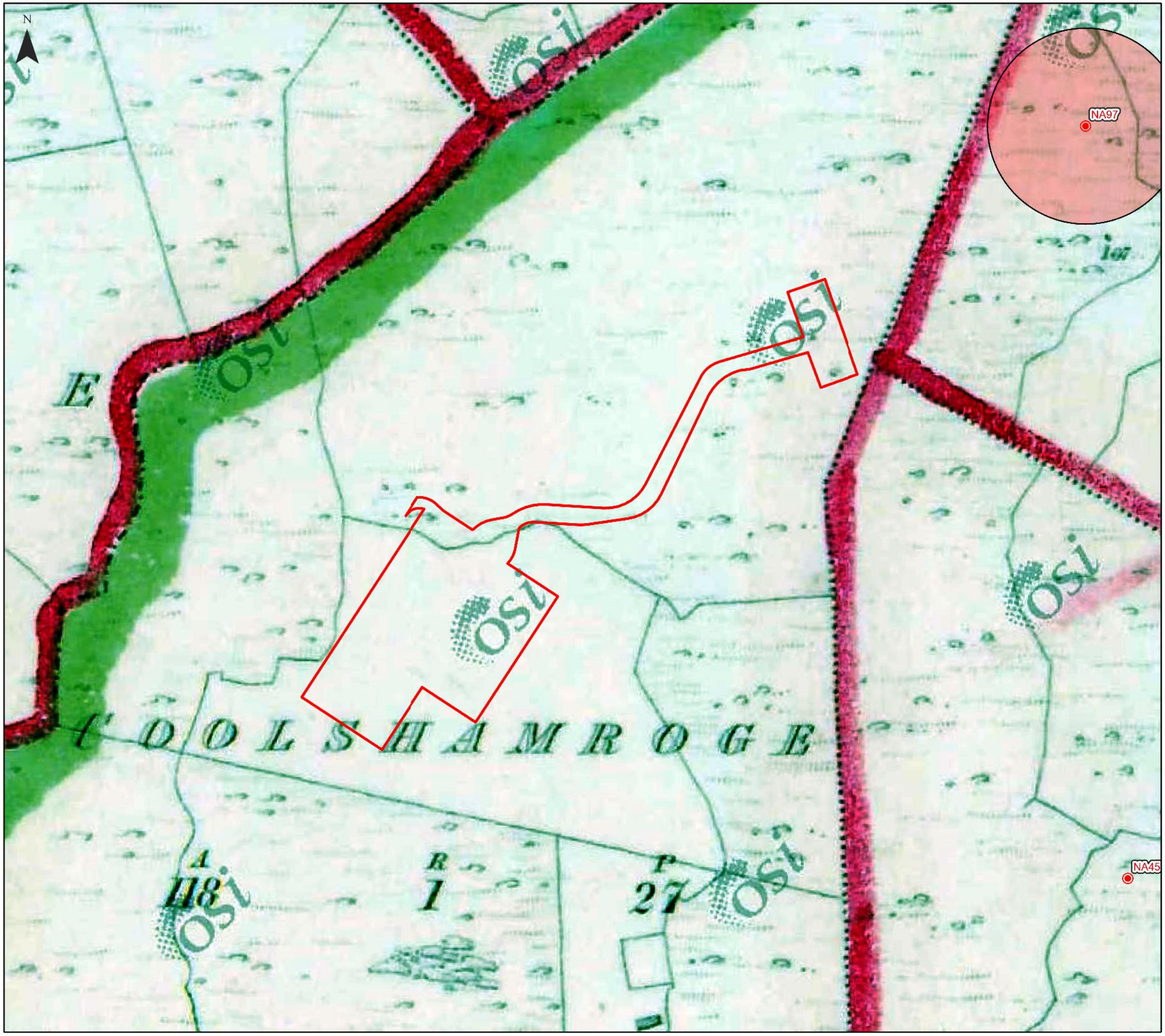
Neo Office Address:
Johnstown Business Centre, Johnstown House, Naas, Co. Kildare

0 0.5 1 2 Kilometres

Date: 13/01/2023
Drawn By: Michael Briggs
Scale (A3): 1:16,000
Drawing No: NEO00848/032I/A

neo ENVIRONMENTAL

Coolshamrock SID
OSI 6" Historic Map (1829-1842)
Figure 3.2



Key

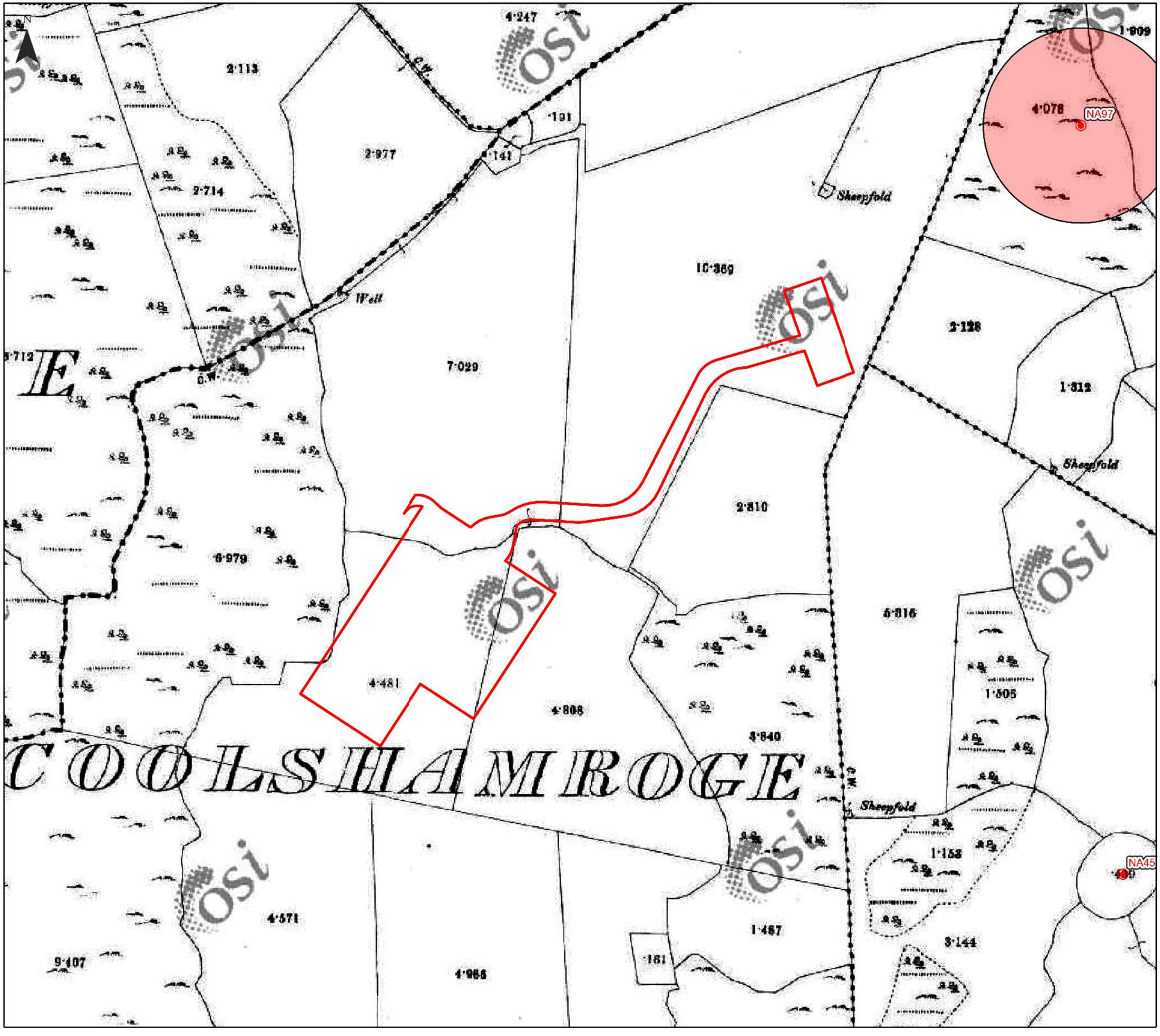
- Development Boundary
- Record of Monuments and Places
- Zone of Notification

Neo Office Address:
Johnstown Business Centre, Johnstown House, Naas, Co. Kildare

Date: 13/01/2023
Drawn By: Michael Briggs
Scale (A3): 1:2,250
Drawing No: NEO00848/033I/A

neo ENVIRONMENTAL

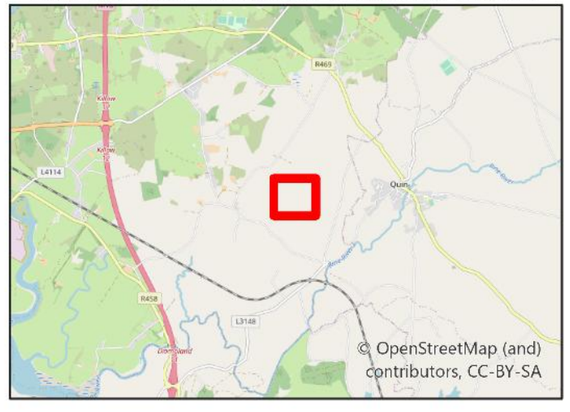
Coolshamrock SID
OSI 25" Historic Map (1897-1913)
Figure 3.3



Key

- Development Boundary
- Record of Monuments and Places
- Zone of Notification

Neo Office Address:
Johnstown Business Centre, Johnstown House, Naas, Co. Kildare



Date: 13/01/2023
Drawn By: Michael Briggs
Scale (A3): 1:2,250
Drawing No: NEO00848/034I/A

NEO ENVIRONMENTAL

Coolshamrock SID
Lidar Data (2m DTM)
Figure 3.4

N

NA97

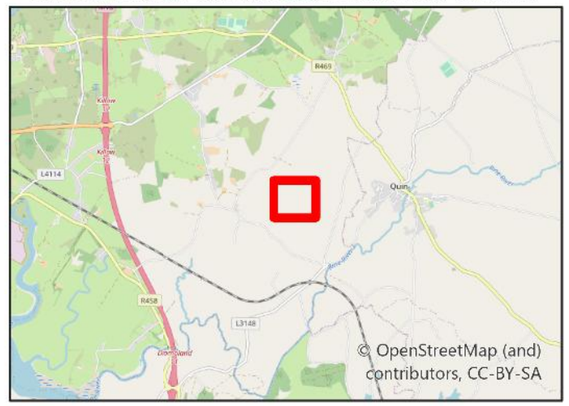
NA45

Key

- Development Boundary
- Record of Monuments and Places
- Zone of Notification

0 100 200 400 Metres

Neo Office Address:
Johnstown Business Centre, Johnstown House, Naas, Co. Kildare



Date: 13/01/2023
Drawn By: Michael Briggs
Scale (A3): 1:2,250
Drawing No: NEO00848/035I/A

neo ENVIRONMENTAL

Appendix 3B – Table of Heritage Assets

Table 1: Heritage Assets within the 2km Study Area

Neo Ref.	Database No.	Name	Distance (km)	Indirect Impact
National Monuments in State Care				
NA01	15 (RMP CL042-027002-)	Quin Abbey	1.85	Low to negligible
Historic Gardens and Designed Landscapes				
NA02	3591	Glebe House	1.75	Negligible
NA03	3593	Castlefergus House	1.85	Not in ZTV
NA04	3599	Ballyhannan House	1.00	Negligible
NA05	3602	Ballykilty House	1.65	Negligible
NA06	3652	Quinville Abbey	1.65	Negligible
Historic Buildings within the National Inventory of Architectural Heritage				
NA07	20403405	Kilbreckam Silver Mines	1.60	Negligible
NA08	20404207 (RPS 038)	Ardsollus Station (former)	1.30	Not in ZTV
NA09	20404208 (RPS 041)	Ballyhannon House	1.00	Negligible
NA10	20404209	Milestone, Quinville South	1.65	Negligible
NA11	20404210	Quin Bridge	1.75	Negligible
NA12	20404214	Saint Finghin's Church	1.75	Negligible
Sites within the Record of Monuments and Places (to 2km)				
NA13	CL034-105----	Ringfort - rath	2.00	Negligible
NA14	CL034-109----	Ringfort - cashel	1.90	Negligible
NA15	CL034-112----	Megalithic structure	2.00	Negligible
NA16	CL034-119001-	Children's burial ground	0.55	Negligible
NA17	CL034-119002-	Building	0.50	Negligible
NA18	CL034-120----	Ringfort - cashel	1.20	Negligible
NA19	CL034-121----	Earthwork	1.65	Negligible
NA20	CL034-122----	Ringfort - rath	1.95	Negligible
NA21	CL034-124001-	Ringfort - cashel	1.55	Negligible
NA22	CL034-124002-	Souterrain	1.55	Negligible
NA23	CL034-125----	Ringfort - cashel	1.30	Negligible
NA24	CL034-126----	Ringfort - rath	1.30	Negligible
NA25	CL034-127----	Ringfort - rath	1.15	Negligible

NA26	CL034-128001-	Ritual site - holy well	1.80	Negligible
NA27	CL034-129002-	Redundant record	2.00	Negligible
NA28	CL034-130001-	Ringfort - cashel	1.20	Negligible
NA29	CL034-130002-	Cairn - unclassified	1.20	Negligible
NA30	CL034-131----	Ringfort - cashel	1.20	Negligible
NA31	CL034-132001-	Redundant record	1.40	Negligible
NA32	CL034-132002-	Ringfort - cashel	1.40	Negligible
NA33	CL034-193----	Fulacht fia	1.90	Negligible
NA34	CL042-005----	Enclosure	1.95	Not in ZTV
NA35	CL042-006----	Enclosure	1.80	Negligible
NA36	CL042-007----	Enclosure	1.60	Negligible
NA37	CL042-008----	Enclosure	1.70	Negligible
NA38	CL042-011001-	Enclosure	0.70	Low to negligible
NA39	CL042-012001-	Enclosure	0.40	Low to negligible
NA40	CL042-012002-	Enclosure	0.30	Low to negligible
NA41	CL042-013----	Ringfort - rath	1.60	Not in ZTV
NA42	CL042-014----	Enclosure	0.55	Low to negligible
NA43	CL042-015001-	Ringfort - cashel	0.85	Negligible
NA44	CL042-015002-	Enclosure	0.80	Negligible
NA45	CL042-016----	Ringfort - cashel	0.35	Low to negligible
NA46	CL042-017----	Enclosure	1.00	Negligible
NA47	CL042-018----	Water mill - unclassified	1.25	Not in ZTV
NA48	CL042-019----	Children's burial ground	1.60	Negligible
NA49	CL042-020----	Ceremonial enclosure	1.85	Negligible
NA50	CL042-021----	Enclosure	1.05	Negligible
NA51	CL042-022001-	Barrow - unclassified	1.20	Negligible
NA52	CL042-022002-	Fulacht fia	1.20	Negligible
NA53	CL042-022003-	Fulacht fia	1.20	Negligible
NA54	CL042-023----	House - 18th/19th century	1.65	Negligible
NA55	CL042-023001-	Architectural feature	1.65	Negligible
NA56	CL042-027----	Settlement deserted - medieval	1.75 – 1.90	Negligible
NA57	CL042-027001-	Castle - Anglo-Norman masonry castle	1.75 – 1.90	Negligible
NA58	CL042-027002-	Religious house - Franciscan friars	1.75 – 1.90	Negligible
NA59	CL042-027003-	Church	1.75 – 1.90	Negligible

NA60	CL042-027004-	Graveyard	1.75 – 1.90	Negligible
NA61	CL042-027005-	Ritual site - holy well	1.75 – 1.90	Not in ZTV
NA62	CL042-027006-	Ritual site - holy well	1.75 – 1.90	Negligible
NA63	CL042-027007-	Ecclesiastical enclosure	1.75 – 1.90	Negligible
NA64	CL042-027008-	Redundant record	1.75 – 1.90	Not in ZTV
NA65	CL042-027009-	Graveyard	1.75 – 1.90	Negligible
NA66	CL042-027010-	Wall monument	1.75 – 1.90	Negligible
NA67	CL042-027011-	Graveslab	1.75 – 1.90	Negligible
NA68	CL042-027012-	Graveslab	1.75 – 1.90	Negligible
NA69	CL042-027014-	Redundant record	1.75 – 1.90	Negligible
NA70	CL042-027015-	School	1.75 – 1.90	Negligible
NA71	CL042-027016-	Graveslab	1.75 – 1.90	Negligible
NA72	CL042-027017-	Graveslab	1.75 – 1.90	Negligible
NA73	CL042-027018-	Graveslab	1.75 – 1.90	Negligible
NA74	CL042-027019-	Graveslab	1.75 – 1.90	Negligible
NA75	CL042-027020-	Graveslab	1.75 – 1.90	Negligible
NA76	CL042-027021-	House - 17th century	1.75 – 1.90	Negligible
NA77	CL042-027022-	House - medieval	1.75 – 1.90	Negligible
NA78	CL042-027023-	Road - road/trackway	1.75 – 1.90	Negligible
NA79	CL042-059----	Castle - tower house	1.85	Not in ZTV
NA80	CL042-060001-	Enclosure	1.60 – 1.70	Negligible
NA81	CL042-060002-	Enclosure	1.60 – 1.70	Negligible
NA82	CL042-060003-	Enclosure	1.60 – 1.70	Negligible
NA83	CL042-060004-	Enclosure	1.60 – 1.70	Negligible
NA84	CL042-060005-	Enclosure	1.60 – 1.70	Negligible
NA85	CL042-060006-	Enclosure	1.60 – 1.70	Negligible
NA86	CL042-060007-	Enclosure	1.60 – 1.70	Negligible
NA87	CL042-060008-	Hut site	1.60 – 1.70	Negligible
NA88	CL042-061----	Enclosure	1.60 – 1.70	Negligible
NA89	CL042-120----	Ringfort - cashel	0.30	Low to negligible
NA90	CL042-128----	Enclosure	1.75	Negligible
NA91	CL042-129----	Enclosure	1.85	Negligible
NA92	CL042-130----	Standing stone	1.80	Negligible
NA93	CL042-142001-	Standing stone	1.50	Negligible
NA94	CL042-142002-	Enclosure	1.50 – 1.60	Negligible
NA95	CL042-142003-	Hut site	1.50 – 1.60	Negligible

NA96	CL042-142004-	Hut site	1.50 – 1.60	Negligible
NA97	CL042-143----	Enclosure	0.20	Negligible
NA98	CL042-144----	Enclosure	0.40	Low to negligible
NA99	CL042-162----	Enclosure	1.95	Negligible
NA100	CL042-171----	Fulacht fia	0.90	Negligible
NA101	CL042-172----	Fulacht fia	0.90	Negligible
NA102	CL042-192----	Enclosure	1.80	Not in ZTV
NA103	CL042-193----	Enclosure	1.65	Not in ZTV

Appendix 3C – Plates

Plate 1 – Improved grassland in Fields 3/4, facing northeast

Plate 2 – Improved grassland with thistles in Fields 3/4, facing south

Plate 3 – Improved grassland (grazed) in Field 2, facing west

Plate 4 – disturbed ground with mature trees in Field 3, facing south

Appendix 3D – Geophysical Survey Report

Coolshamrock Solar Farm

Co. Clare

Archaeological Geophysical Survey

Report Status: Final

MGX Project Number: 6646

MGX File Ref: 6646f-005.doc

6th December 2022

Confidential Report To:

Neo Environmental Ltd.
83-85 Bridge Street
Ballymena
Co. Antrim
BT43 5EN

Report submitted by :

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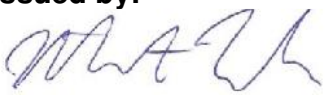
Issued by:



Author: Hartmut Krahn (Senior Geophysicist)

Reviewer: Martin Wetzel (Senior Archaeologist)

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Minerex
Geophysics Limited

eastern atlas

Subsurface Geophysical Investigations

EXECUTIVE SUMMARY

1. Minerex Geophysics Ltd. (MGX) carried out an archaeological geophysical survey consisting of magnetic gradiometry for the proposed Coolshamrock Solar Farm. The survey area consisted of agricultural fields with a combined size of 22ha. The archaeological consultants are Neo Environmental Ltd. and the developer is Renewable Energy Systems Ltd.
2. The survey was carried out between the 10th and the 14th October 2022 under detection device consent No 22R0336 issued by the National Monuments Survey of the Department of Housing, Local Government and Heritage.
3. The main objectives of the survey were to determine archaeological features and deposits and to recommend targets for direct archaeological testing or for avoiding construction.
4. The methodology consisted of a magnetic gradiometry surface survey using a LEA-MAX system with 10 Eastern Atlas sensors pulled by an ATV. The spacing between adjacent sensors is 50 cm and the measuring points are 5 to 10 cm apart along each survey line. All points are accurately positioned using RTK-GNSS in the Irish Transverse Mercator (ITM) coordinate system.
5. The results are greyscale image in 256 shades with black/white as +/- 100nT, +/- 20nT and as +/- 5nT. The magnetic gradient data with the +/- 5nT data range is displayed on Maps 2a to 2e. The AutoCAD drawings also contain the greyscale images with the +/- 100nT and +/- 20nT range.
6. The interpretation is displayed on Maps 3a to 3d and the interpretation strategy is explained in detail in this report.
7. The survey did not find magnetic patterns that could be interpreted as probable archaeological features.
8. Seven areas with possible archaeological features (cyan) were identified and it is recommended to test these or avoid construction here. They are generally clusters of weak anomalies. They could also have a non-archaeological cause.
9. Six historical boundaries (yellow) correlating with OSI historical maps were identified.
10. The survey found six underground drains or former field boundaries (blue). Most of these seem to represent former boundaries between fields.
11. Targeted testing can be done very efficiently as it is possible to pinpoint the locations with coordinates from this report on site.
12. Areas with archaeological potential can be also avoided during the planning or construction phase of the solar farm.

CONTENTS

List of Tables, Maps and Figures:

1. INTRODUCTION

1.1 Background

Minerex Geophysics Ltd. (MGX) carried out an archaeological geophysical survey consisting of magnetic gradiometry for the proposed Coolshamrock Solar Farm. The survey area is 22ha in size and consists of agricultural fields that are proposed for a solar farm. The development is being proposed by Renewable Energy Systems Ltd. and the main archaeological consultant for the project is Neo Environmental Ltd.

The survey was carried out under the National Monuments Survey Permit No 22R0336 of the Department of Housing, Local Government and Heritage under the National Monuments Acts (1930 – 2014).

The fieldwork was carried out between the 10th and the 14th October 2022.

The purpose of the survey is to mitigate the risk of the development damaging archaeological deposits and features. This survey is an indirect, non-destructive survey and any interpreted archaeological features may not necessarily prove to be of archaeological origin.

Light orange numbers on the drawings are field numbers allocated by Neo Environmental Ltd. They are placed such that they do not obscure magnetic anomalies.

1.2 Objectives

The main objectives of the geophysical survey were:

- To determine archaeological features and deposits
- To identify unknown archaeological sites
- To recommend targets for direct archaeological testing

1.3 Site Description

The study area (Map 1) consists of a larger area in the NE (Fields 1 – 4) and then smaller areas along the proposed cable route Fields 5 – 11). The area in the north slopes towards a large drain along the NW boundary of the site. There is a former quarry located between the four fields. In the west a forest borders on the survey area. In field 4 is a concrete plate with three walls used for dumping material. There is a lot of scrap metal lying around these fields.

Fields 5 and 6 contain a survey corridor along the access track and the proposed cable route.

The area in the west for the cable route goes through smaller fields. Field 8 contains long reeds and some deep ditches, this seems to be a drained peat bog and this field could not be accesses for the survey.

1.4 Archaeology

In the Record of Monuments and Places (RMP) there are no archaeological features recorded within the survey area.

The historical information on field boundaries was taken from the Ordnance Survey of Ireland (OSI) historic maps. They are referred to in the interpretation where relevant to the survey results.

1.5 Geology

The overburden consists of glacial tills derived from limestones. The rock is generally shallow with karstified bedrock outcrop or subcrop. Fen peat is noted on the geological maps in the area of Field 8 (GSI, 2022).

The bedrock geology in the East consists of the Tubber formation, described as crinoidal and cherty limestone and dolomite. In the western area is underlain by Visean Limestone, described as undifferentiated Limestone.

The geological strata are suitable for the magnetic gradiometry method.

1.6 Report

This report contains the results and interpretation of the archaeological geophysical survey. Maps are included to illustrate the results of the survey. More detailed descriptions of the geophysical methods and measurements can be found in Clark et al. (1990), David et al. (1995), English Heritage (2008) and Bonsall et al. (2014). The client provided digital survey background maps.

The interpretative nature and the non-invasive survey methods must be taken into account when considering the results of this survey and Minerex Geophysics Limited cannot give any guarantees regarding the subsurface present, despite using appropriate procedures to conduct, interpret and present the data.

2. GEOPHYSICAL SURVEY

2.1 Methodology

The magnetic gradiometry methodology was proposed during the tender phase. The survey areas are indicated on the maps by the orange outline.

The survey areas included the fields where future solar panels and a cable route are proposed.

2.2 Magnetic Gradiometry

The methodology consisted of conducting a large-scale magnetic gradiometry survey using the flexible and mobile LEA-MAX (Eastern Atlas) system. The system consists of a flexible array of 10 Fluxgate-Foerster gradiometer probes (FEREX 4.032 Con 650) towed by an ATV. The distance between each of the ten gradiometer probes is 50 cm, the row spacing of the measuring points between 5 and 10 cm, depending on the speed. The positioning was realised with the help of an RTK-GNSS.

The measured and stored value is the difference in the vertical magnetic field and the value in nT (Nanotesla) between the sensors. If the value is positive then the lower sensor has a higher magnetic field than the upper sensor. The vertical sensor separation is 0.65m.

The prospection of the survey areas is done by driving parallel profiles at 5 m intervals. Data is recorded by meandering measurements in only one direction and the zero level of probes and recording device (digitiser LEA-D2) is defined before the measurements. For measurement and evaluation the software EAL is used (proprietary development for the magnetic measurement system LEA).

Unprocessed raw data are in binary format, they are matched with the GNSS position data and transmitted as data in ASCII format. The individual steps of data processing (e.g. despike, destripe, deslope) are described in the report and differentiated in the interpretation of archaeologically induced anomalies.

The results of the magnetometer prospection are output as GeoTiff as well as in PNG in at least three dynamics for the vertical difference of the Z-component (vertical gradient) of the magnetic field in the projection ETRS 89 UTM Zone 29, EPSG: 25829.

The visualisation of the data is done in greyscale images with 256 greyscales from white to black stored in Tiff format.

The positioning of the geophysical data is done by RTK (real time kinematic) using two dual frequency GNSS receivers as base and rover. The rover is permanently fixed to the mobile sensor array. The relative accuracy of the RTK positioning is ±5 cm.

Photo 1: Magnetic Gradiometer with 10 sensors front view

Photo 2: Magnetic Gradiometer with 10 sensors back view

Photo 3: Magnetic Gradiometer with 10 sensors top view

2.3 Site Work

Data acquisition was carried out between the 10th and the 14th October 2022. Weather conditions were favourable throughout the acquisition period. Health and safety standards were adhered to at all times.

The survey was carried out as continuously as possible with a view to obtain the best coverage. In field 8 high reed vegetation prevented the survey. There are some smaller areas within fields where the survey could not be done (e.g. Field 4 concrete platform).

3. RESULTS AND INTERPRETATION

The interpretation of geophysical data was based on the known responses of geophysical measurements, typical physical parameters for subsurface features that may underlay the site, and the experience of the authors.

3.1 Magnetic Gradiometry Processing

The magnetic gradiometry data was processed as follows: Referencing to the Irish Transverse Mercator grid, filtering the raw data and displaying it as a greyscale image in 256 gradations of black and white as +/- 100nT, +/- 20nT and as +/- 5nT.

The magnetic data is shown against a white background as we did not receive Ordnance Survey base maps from the client.

The magnetic gradient data with the data range of +/- 5nT are shown in maps 2a to 2e. The AutoCAD drawings also contain the greyscale images with the range +/- 100nT and +/- 20nT. They are switched off in the viewports, but can be shown when working with the AutoCAD drawings and are part of this report, which is supplied in *.dwg format. An example for the +/- 20nT data is in Map 4 and an example for +/- 100nT on Map 5.

3.2 Magnetic Anomalies and Archaeology

Magnetic gradiometry finds small anomalies that typically indicate archaeological cuts or fills such as former ditches, pits or postholes. Postholes are very small and can only be found under optimal conditions and in conjunction with other patterns or when they form a larger pattern such as a circular array.

Thermoremanent features are burnt deposits that may indicate features such as kilns, smelting furnaces, hearths and burnt mounds.

Interpretations follow certain patterns, and linear, circular, curved, ellipsoidal and rectangular shapes are often man-made, while less organised and more random shapes are often caused by geological or hydrogeological or similar natural processes.

Cultivation furrows are often recognisable in the data, by the repeating pattern of parallel lines.

Magnetic anomalies relevant to archaeological features are typically in the range of +/- a few nanotesla (nT) and are therefore shown as grey areas or lines in the images.

Rapid changes between white and black hues indicate strongly magnetised objects in the soil, which are likely to be ferrous magnetic metal pieces (ferritic litter). Many of these objects are pieces of iron that are lost in agriculture by machinery or introduced by fertiliser or fencing material.

Magnetic anomalies indicative of archaeological remains may also be caused by historical or modern processes such as building development, gardens, agriculture and construction work (e.g. foundations, pipelines and masts for overhead power lines).

Some fields have been intensively cultivated in the past through ploughing and cultivation, resulting in the destruction or scattering of possible archaeological remains within the plough depth. Therefore, the evidence and interpretations in the current survey assume a greater depth than the maximum ploughing and cultivation depth.

3.3 Interpretation

The interpretation is shown on Maps 3a to 3d, which are superimposed on the data with +/- 5nT.

There are a number of magnetic anomalies that may be of archaeological origin. The interpretation highlights these and gives a possible cause or reason for these anomalies. The interpretation is overlaid on the maps by the colours explained below. Not every black or grey dot indicating the source of a small magnetic anomaly is drawn in the interpretation.

Green: Anomalies highlighted in green indicate probable archaeological features or deposits in the subsurface. They may be the main targets for further investigation or may be avoided in construction. However, they may also turn out not to be of archaeological origin.

Cyan: These lines indicate a possible archaeological origin, but may also have other causes, such as historical or modern.

Yellow: Anomalies highlighted in yellow indicate a pattern consistent with the historic maps seen on the Ordnance Survey of Ireland's online map viewer (www.osi.ie). The historic maps cover the years from 1829 to 1930 in four sets of maps. The extent to which this is of archaeological potential or relevance must be assessed by the client's archaeologist.

Blue: These anomalies are almost certainly interpreted as existing subsurface drainage lines or former field boundaries or both.

Orange arrows: These symbols indicate a ploughing or cultivation pattern, with the arrows indicating the direction. Usually one double arrow is drawn in a larger area of a cultivation pattern.

Pink G: “G” indicates a geological cause visible in the magnetic data. It can be linear or curved and has a striated and smeared appearance corresponding to the geological strata terminating shallow below the surface. The magnetic field is often caused by slight variations in the magnetic material between more or less tilted rocks. Generally there is one ‘G’ placed in the centre of a pattern covering a larger area.

Red: Indicates buried magnetic metal such as former fences.

Red LIRM: Indicates the location of a past lightning strike with 'Lightning Induced Remanent Magnetisation' (LIRM).

Black/White: Such dots in the maps indicate strongly magnetised objects in the ground, e.g. pieces of ferrous magnetic metal.

3.4 Recommendations

Probable or possible archaeological features in the subsurface can either be bypassed and avoided during planning and construction or investigated by targeted archaeological test excavations to determine the cause of the magnetic indication.

It is advisable to communicate with the relevant landowners first, as they may be able to recall how an area was used, whether there were permanent or temporary buildings or structures, or whether other activities took place.

Targeted trial trenching is recommended on all probable or possibly archaeologically interpreted features where a construction project is planned. This may reveal that some of them are not archaeological in origin. It is also possible that they are physically extinct but a magnetic anomaly remains in the ground ('ghost'). In which case the survey represents the record but there are no further constraints on the construction of the site.

If archaeological remains have been found during trial excavations, the geophysical interpretation should be checked and the results may improve the interpretation.

The magnetic field is precisely mapped in the ITM system. This makes it possible to define test sections with particularly high accuracy (cm) achieving results quickly, purposefully and very efficiently.

3.5 Conclusions by Maps

All Maps: A large amount of scrap metal can be seen in the fields and in the magnetic data, through the black/white anomalies.

The survey did not show anomalies that could have been interpreted as of archaeological origin.

The areas in the NE show cultivation patterns and patches of former fields that were, over time, improved for farming. In these areas of shallow limestone outcrop it is customary by farmers to rip out rock to create a thin layer of topsoil for cultivation. This creates small fields that are improved over time into larger fields. The magnetic pattern shows original smaller fields with rectangular and triangular shape.

There is a geological separation in a SW to NE direction between areas of shallow rock (to the SE) and thicker overburden (possible containing not only till but also more recent alluvial sediments). This is indicated by a long blue line in Field 1. There is a change in the background magnetic pattern between these two areas.

Map 3a: There is possible archaeology (cyan) interpreted at the northern end of Field 2, with a cluster of weak anomalies overlaid with the background pattern of shallow rock and former cultivation ridges.

Some linear anomalies (yellow) could be matched with historic field boundaries.

The area on this map is mainly showing patterns of geology with shallow rock and former cultivation ridges.

Map 3b: Fields 3 and 4 also show former cultivation patterns, shallow rock and a lot of scrap metal in the west.

In the SE of Field 4 there are weaker anomalies packed together in four clusters interpreted as possible archaeology.

Map 3c: This map shows former cultivation patterns, shallow rock and some zones with metal.

Map 3d: Field 7 has two small area with interpreted possible archaeology (cyan) by showing clusters of weak anomalies. Field 8 could not be surveyed because it is a peat area with long reeds.

The following table summarises the interpretation and the amount of features found:

Probable Archaeological Feature	Green	None
Possible Archaeological Features	Cyan	7 Clusters
Historical Field Boundary (OSI Map)	Yellow	6 Lines
Subsurface drainage or former field boundaries	Blue	6 Lines

4. REFERENCES

1. **Bonsall, J., Gaffney, C., Armit, I., 2014.** Preparing for the future: A reappraisal of archaeo-geophysical surveying on Irish National Road Schemes 2001 – 2010, Bradford.

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5. **GSI, 2022.** Online Bedrock Geological Map of Ireland. Geological Survey of Ireland 2022.

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CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	Coolshamrock Solar Farm Archaeological Geophysical Survey
TITLE	Map 1a: Overview Map

SCALE:	1:8000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Magnetic Gradiometry Survey Locations:

Survey Area

1 Field Numbers

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CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	Coolshamrock Solar Farm Archaeological Geophysical Survey
TITLE	Map 1b: Overview Map with Aerial Photo Background

SCALE:	1:8000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Magnetic Gradiometry Survey Locations:

Survey Area

1 Field Numbers

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CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	CoolshamrockSolar Farm Archaeological Geophysical Survey
TITLE	Map 2a: Magnetic Gradient Map with +/- 5nT

SCALE:	1:2000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Magnetic Gradiometry Survey Locations:

Survey Area

1 Field Numbers

The grey-scale image shows the magnetic gradient between the lower and upper sensor (0.65m vertical separation) in nT (nanoTesla) with a range of +/- 5 nT.
Black (positive) indicates that the magnetic field at the lower sensor (approx. 0.3m above ground) is higher than the magnetic field at the upper sensor (approx. 0.95 above ground).

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CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	CoolshamrockSolar Farm Archaeological Geophysical Survey
TITLE	Map 2b: Magnetic Gradient Map with +/- 5nT

SCALE:	1:2000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Magnetic Gradiometry Survey Locations:

Survey Area

1 Field Numbers

The grey-scale image shows the magnetic gradient between the lower and upper sensor (0.65m vertical separation) in nT (nanoTesla) with a range of +/- 5 nT.
Black (positive) indicates that the magnetic field at the lower sensor (approx. 0.3m above ground) is higher than the magnetic field at the upper sensor (approx. 0.95 above ground).

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CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	CoolshamrockSolar Farm Archaeological Geophysical Survey
TITLE	Map 2c: Magnetic Gradient Map with +/- 5nT

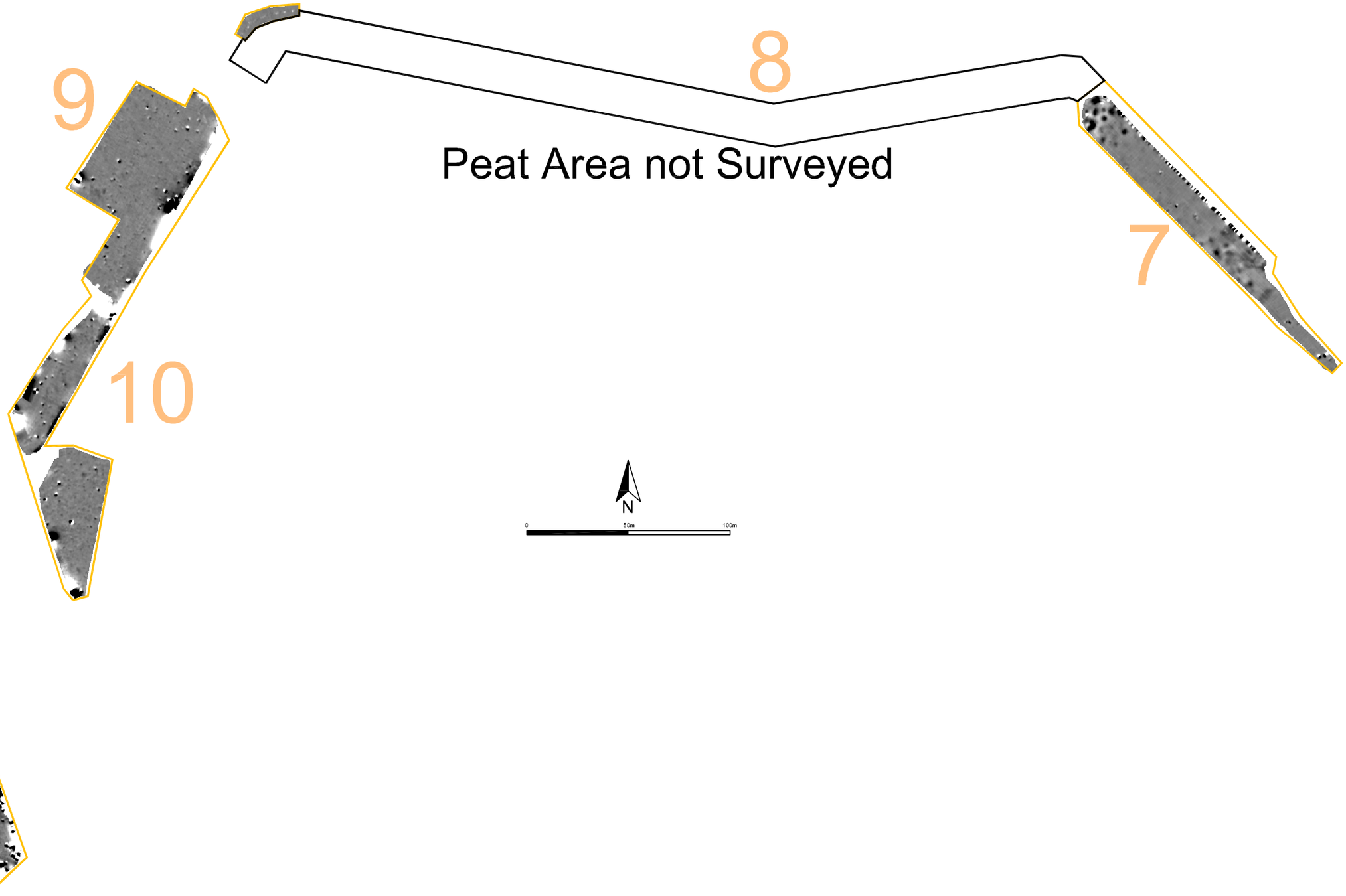
SCALE:	1:2000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Magnetic Gradiometry Survey Locations:

Survey Area

1 Field Numbers

The grey-scale image shows the magnetic gradient between the lower and upper sensor (0.65m vertical separation) in nT (nanoTesla) with a range of +/- 5 nT.
Black (positive) indicates that the magnetic field at the lower sensor (approx. 0.3m above ground) is higher than the magnetic field at the upper sensor (approx. 0.95 above ground).



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CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	CoolshamrockSolar Farm Archaeological Geophysical Survey
TITLE	Map 2d: Magnetic Gradient Map with +/- 5nT

SCALE:	1:2000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Magnetic Gradiometry Survey Locations:

Survey Area

1 Field Numbers

The grey-scale image shows the magnetic gradient between the lower and upper sensor (0.65m vertical separation) in nT (nanoTesla) with a range of +/- 5 nT.
Black (positive) indicates that the magnetic field at the lower sensor (approx. 0.3m above ground) is higher than the magnetic field at the upper sensor (approx. 0.95 above ground).

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CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	CoolshamrockSolar Farm Archaeological Geophysical Survey
TITLE	Map 3a: Magnetic Gradient Map with +/- 5nT with Interpretation

SCALE:	1:2000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Interpretation of Magnetic Gradient Map:

- Archaeology
- Possible Archaeology
- Historical Map Features
- Drainage/Extinct Field Boundary
- Cultivation Direction
- G — Geological Feature
- Buried Magnetic Metal
- Magnetic Metal Indication (Black/White)

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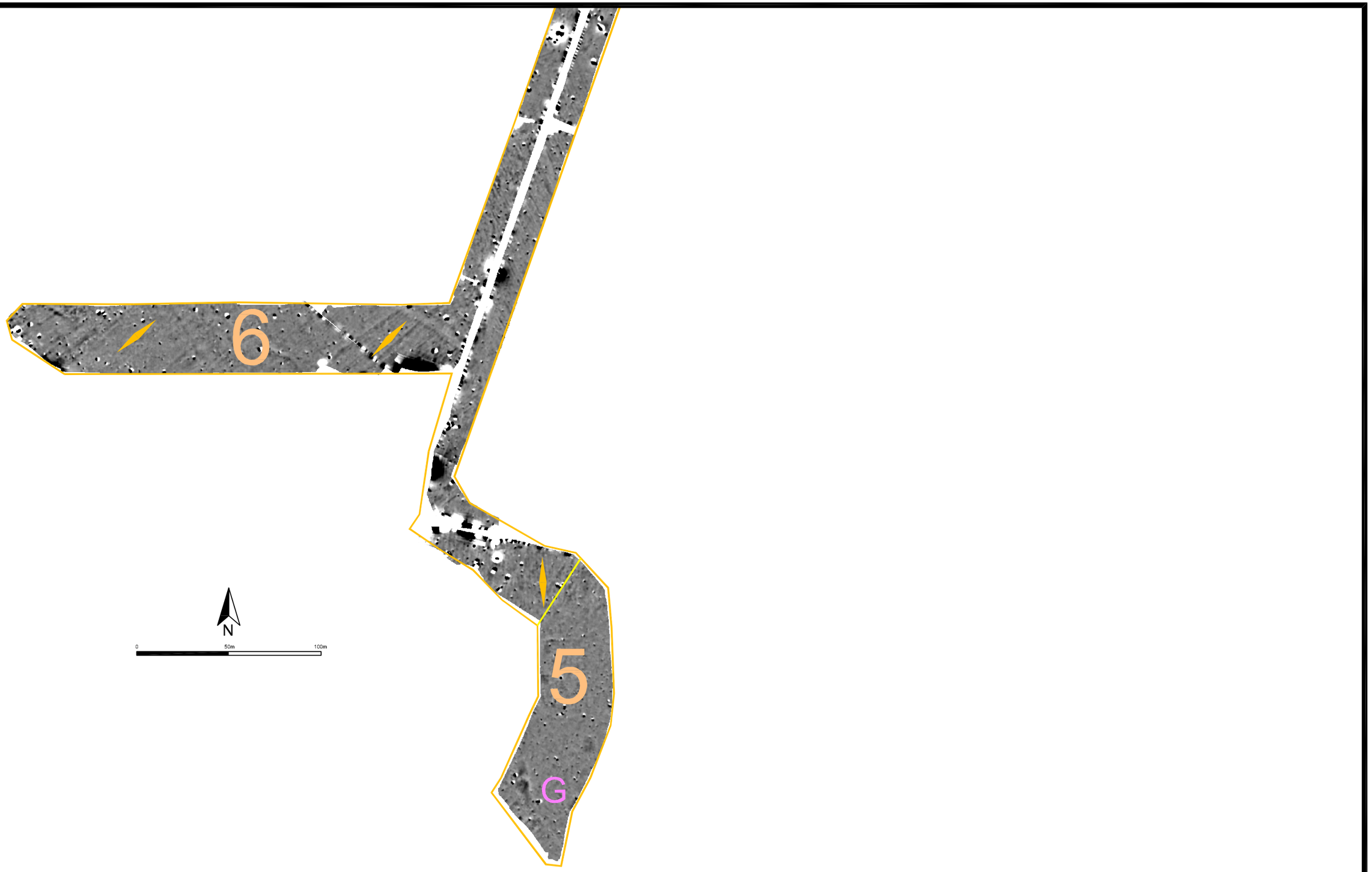
CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	CoolshamrockSolar Farm Archaeological Geophysical Survey
TITLE	Map 3b: Magnetic Gradient Map with +/- 5nT with Interpretation

SCALE:	1:2000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Interpretation of Magnetic Gradient Map:

- Archaeology
- Possible Archaeology
- Historical Map Features
- Drainage/Extinct Field Boundary
- Cultivation Direction
- G — Geological Feature
- Buried Magnetic Metal
- Magnetic Metal Indication (Black/White)



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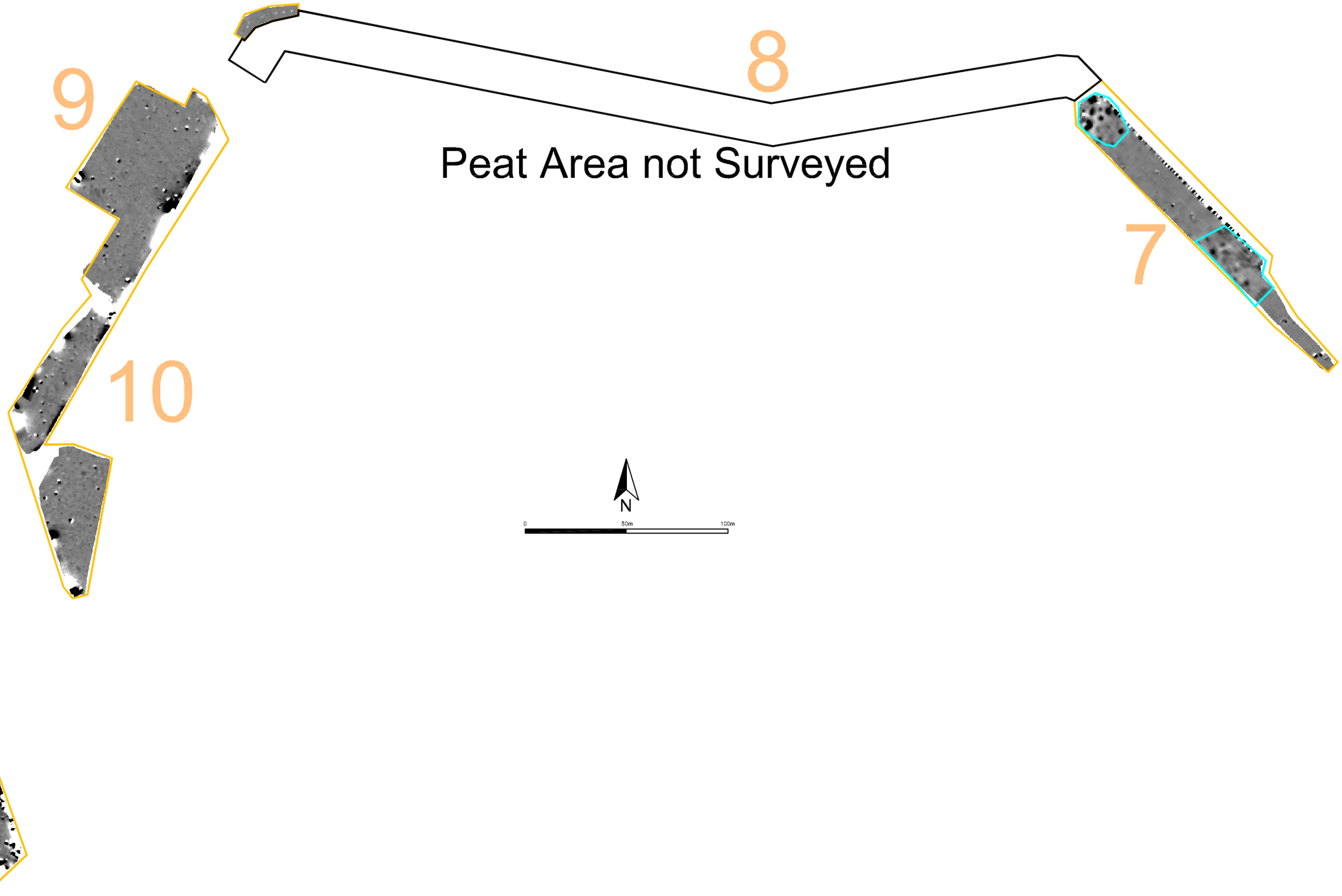
CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	CoolshamrockSolar Farm Archaeological Geophysical Survey
TITLE	Map 3c: Magnetic Gradient Map with +/- 5nT with Interpretation

SCALE:	1:2000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Interpretation of Magnetic Gradient Map:

- Archaeology
- Possible Archaeology
- Historical Map Features
- Drainage/Extinct Field Boundary
- Cultivation Direction
- G — Geological Feature
- Buried Magnetic Metal
- Magnetic Metal Indication (Black/White)



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CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	CoolshamrockSolar Farm Archaeological Geophysical Survey
TITLE	Map 3d: Magnetic Gradient Map with +/- 5nT with Interpretation

SCALE:	1:2000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Interpretation of Magnetic Gradient Map:

- Archaeology
- Possible Archaeology
- Historical Map Features
- Drainage/Extinct Field Boundary
- Cultivation Direction
- G Geological Feature
- Buried Magnetic Metal
- Magnetic Metal Indication (Black/White)

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CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	CoolshamrockSolar Farm Archaeological Geophysical Survey
TITLE	Map 4: Magnetic Gradient Map with +/- 20T

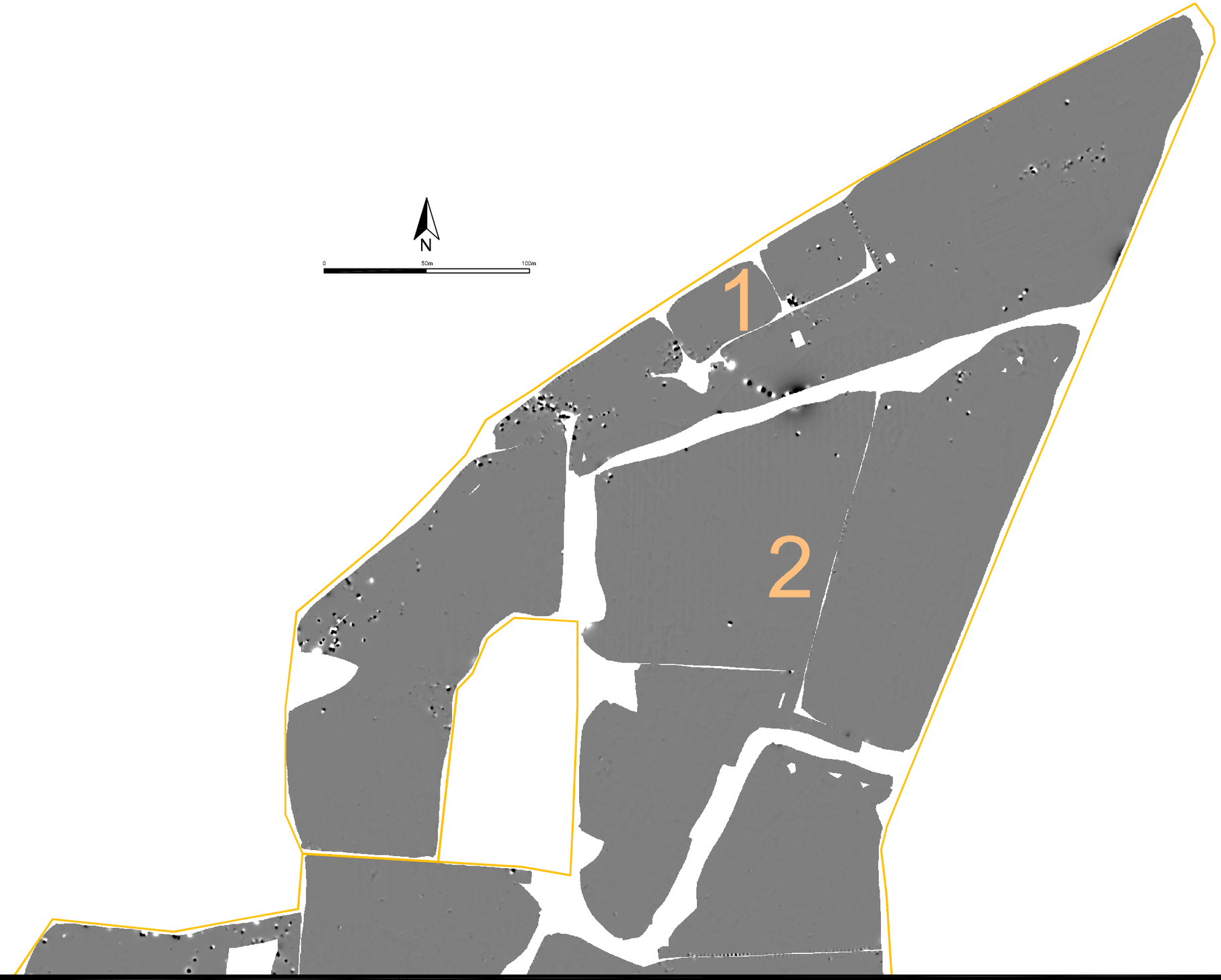
SCALE:	1:2000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Magnetic Gradiometry Survey Locations:

Survey Area

1 Field Numbers

The grey-scale image shows the magnetic gradient between the lower and upper sensor (0.65m vertical separation) in nT (nanoTesla) with a range of +/- 20 nT.
Black (positive) indicates that the magnetic field at the lower sensor (approx. 0.3m above ground) is higher than the magnetic field at the upper sensor (approx. 0.95 above ground).



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CLIENT	Neo Environmental Ltd. Renewable Energy Systems Limited
PROJECT	CoolshamrockSolar Farm Archaeological Geophysical Survey
TITLE	Map 5: Magnetic Gradient Map with +/- 100T

SCALE:	1:2000 @ A3
PROJECT:	6646
DRAWN:	HK
DATE:	06/12/2022
MGX FILE:	6646f_Maps.dwg
STATUS:	Final

LEGEND: Magnetic Gradiometry Survey Locations:

Survey Area

1 Field Numbers

The grey-scale image shows the magnetic gradient between the lower and upper sensor (0.65m vertical separation) in nT (nanoTesla) with a range of +/- 100 nT.
Black (positive) indicates that the magnetic field at the lower sensor (approx. 0.3m above ground) is higher than the magnetic field at the upper sensor (approx. 0.95 above ground).