

Proposed Gathabawn Windfarm Project

Environmental Impact Assessment Report

Chapter 15: Cultural Heritage



September 2026

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CHAPTER 15 CULTURAL HERITAGE

EIAR 15.1 INTRODUCTION

EIAR 15.1.1 Competent Expert

This Cultural Heritage Chapter was prepared by SLR Consulting Ltd and presents the results of a cultural heritage impact assessment encompassing both buried archaeological remains and above ground-built heritage for the Proposed Development.

The authors of this report are as follows:

Gwynnaeth McCullough (BSc Archaeological and Forensic Sciences (Hons), ACIfA) is a Senior consultant at SLR Consulting, and the technical lead for the archaeological and cultural heritage chapter of this EIAR. She has several years of experience as a consultant, providing input into large scale renewable energy schemes across the UK and the Republic of Ireland, having a strong knowledge of statutory planning policy and guidance. Gwynnaeth is therefore familiar and experienced in the assessment of these projects, including onshore cable routes and grid connections, wind farms, solar farms and BESS sites, upon cultural heritage.

Katja Watson (MSc Cultural Heritage, PCIfA), is a Senior Heritage Consultant at SLR Consulting with three years of experience. She has experience in assessing and management of cultural heritage effects associated with renewable energy schemes and energy infrastructure across the UK. She has contributed to numerous wind farm projects, undertaking baseline studies, assessment of direct impacts and advising on embedded mitigation.

Harleigh Broughton (MA Archaeology and Social Anthropology (Hons), PCIfA) is a Project Heritage Consultant at SLR Consulting and has provided technical support for this chapter. She has experience with EIA assessments within the UK and has experience with complex assessments of archaeological landscapes in renewable energy schemes.

Technical quality assurance was undertaken by John Trehay BA (Hons) MCIfA (Technical Discipline Manager – Heritage). He has several years of extensive experience providing advise and guidance on heritage issues on major development projects across the UK and Ireland, as well as internationally. As well as contributing to environmental statements, and all the desk-based heritage assessment and research they entail, he is also experienced in project managing invasive and non-invasive works by archaeological contractors. John regularly acts as an expert heritage witness at local plan examinations and public inquiries.

EIAR 15.1.2 Sources of Information

Consultation, desktop studies and fieldwork were carried out in order to gather information on the baseline environment.

Table 15-1: Sources of Baseline Information for Cultural Heritage

Consultation Sources
Consultation with the Department of Housing, Local Government and Heritage was undertaken on the 2nd of January, 2024. Their response was received on the 19th and 20th of February 2024, and is summarised below: • Recommends a Cultural Heritage Impact Assessment (CHIA), including an Archaeological Impact Assessment (AIA). • The CHIA should include a robust desk-study supported by in field inspection and visual impact assessment. • Some monuments may have a substantial scale of setting which would need to be assessed. • The setting assessments should set out the key characteristics of the monument and its existing environment, what aspects of its environment contribute towards its setting, and the degree to which this setting is integral to the significance and appreciation of the monument. The positive and negative effects of the development upon the setting should be assessed, and supported by appropriate illustrations of the monument, its setting and the development. • The AIA should also involve examination of development layout/design drawings, documentary, cartographic, photographic research and fieldwork, including where possible geophysical survey. The Proposed Development Site is located within a wider area of known archaeological settlement and activity, and should include an assessment on the wider archaeological landscape utilising a sufficient study area. After some design changes, a round of consultation was undertaken on the 10th of November 2025 with the National Monument Service, the Kilkenny County's Kilkenny Heritage, and County Laois' archaeologist. The consultation outlined the methodology to be adopted for the EIA, and matters scoped in and out of further assessment. Figures with the updated design were provided, including a ZTV out to 5km and a baseline figure. A consultation response was received from the Office of Public Works on the 7th of September, 2026. They note that the following national monuments be scoped in for assessments for setting effects: 1. NM 74 Grangefertagh Round Tower & Church, Grangefertagh, Co. Kilkenny – 5.35 km (also raised by NMS in consultation meeting with AMS on 11th November 2022) 2. NM 282 Ballylarkin Church, Ballylarkin Upper, Co. Kilkenny – 5.50 km 3. NM 376 Rathealy, Ringfort, Rathealy, Co. Kilkenny – 8.67 km
Desktop Sources
• National Monuments Service (NMS) • National Museum of Ireland (NMI) • Record of Monuments and Places (RMP) • National Inventory of Architectural Heritage (NIAH) • Sites and Monuments Record (SMR) • Historic Environment Viewer • Kilkenny City and County Development Plan 2021 • Kilkenny City and County Development Plan 2021 – 2027 Appendix: Record of Protected Structures (County Only); • Laois County Development Plan 2021 – 2027 • Laois County Development Plan 2021 – 2027. Appendix 1: Record of Protected Structures • Historic 6-inch First Edition Colour Ordnance Survey Map • Historic 6-inch First Edition Black and White Ordnance Survey Map – Published 1843 – 1844 • Historic 25-inch Ordnance Survey Map – Published 1904 • Historic 6-inch Edition Black and White Ordnance Survey Map – Published 1905

- Aerial photography
 - LiDAR datasets
 - Previous archaeological investigations relevant to the site
- Review of the other EIA Report Chapters:
- Chapter 5: Description of the Development
 - Chapter 14: The Landscape

Fieldwork

- Site walkover survey in August 2025 and August 2026 to survey the proposed turbine locations, areas of proposed infrastructure, the grid connection option route, known archaeology and recorded geophysical features within the site.
- Geophysical survey by Archaeological Management Solutions between April and July 2023.
- LiDAR survey in December 2025.

EIAR 15.1.3 Methodology Used

The evaluations for Cultural Heritage herein have been carried out in accordance with Framework and Principles for the Protection of the Archaeological Heritage (1999); Architectural Heritage Protection: Guidelines for Planning Authorities (2011); Regional Spatial and Economic Strategy for Southern Regional Assembly 2020-2032; the Chartered Institute for Archaeologists Standard and Guidance for Historic Environment Desk Based Assessment (2020); Transport Infrastructure Ireland Publications: Guidelines for Cultural Heritage Impact Assessment of TII National Road and Greenway Projects (2025); and the Environmental Protection Agency (2022) *Guidelines on the information to be contained in Environmental Impact Assessment Reports*. This methodology has been used to determine the significance of impacts to Cultural Heritage is based on a combination of the cultural heritage significance of the asset (where known), the probability of further assets being located within the affected areas and their likely significance, and the magnitude of effect on those assets to be caused by the implementation of the Proposed Development. The methodology can be found in full in [Appendix 15.1: Methodology for the evaluation of Cultural Heritage](#). The author's extensive experience with EIA preparation and cultural heritage management also informs this report.

A list of guidelines and legislation which were taken into account during the evaluation of this chapter is also included in [Appendix 15.1](#).

EIAR 15.1.4 Statement on Certainty and Sufficiency of Information Provided

This chapter has used available sources to inform the baseline study and assessment of effects that conform to peer-reviewed and regulatory standards. The methodology complies with the *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2022), ClfA's Standards and guidance for Historic Environment desk-based assessment (2014), the *Framework and Principles for the Protection of the Archaeological Heritage* (DAHGI 1999), the *Architectural Heritage Protection Guidelines for Planning Authorities* (DAHG 2011),

The method complies with, and summarises the proposals' compliance with, the National Monuments Acts 1930–2012 (as amended), the Heritage Act 2000, the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999 and the European Convention on the Protection of the Archaeological Heritage (ratified by Ireland 1997).

The EIA methodology also complied with Archaeological Heritage Policy Objective 9E of the Kilkenny City and County Draft Development Plan 2021–2027, which requires archaeological assessment of developments in the vicinity of all archaeological sites.

The geophysical magnetometer survey and LiDAR survey datasets were acquired and processed by specialist subcontractors with appropriate professional expertise and experience, using industry-standard methodologies and quality assurance procedures.

The following general limitations apply to the Cultural Heritage assessment presented in this chapter:

- The assessment uses available sources and databases to inform the baseline study and assessment at the time of writing. It therefore relies on the comprehensiveness of these sources. There is also potential for additional information to become available at a later date that may alter the assessment presented here;

In general, no significant difficulties were encountered in undertaking the assessment.

EIAR 15.2 SENSITIVE ASPECTS

EIAR 15.2.1 Overview of Cultural Heritage in the Local Environment

This chapter aims to assess the effects of the Proposed Development on the archaeological and cultural heritage landscape (for example, National Monuments and Protected Structures). The assessment is based on a desktop review of the accessible archaeological and cultural heritage data, including known areas of archaeological/cultural significance that are likely to be affected by the Proposed Development. A site assessment was also undertaken to establish direct and indirect impacts upon receptors in proximity to the Site. A description of likely significant effects is presented, and appropriate mitigation methods are proposed.

The Proposed Gathabawn Windfarm, referred to as the Proposed Development herein, is located within the administrative county of County Kilkenny. The area of the proposed development lies within a rural upland setting characterised by a mix of agricultural land, hedgerows, small woodlands, and scattered farmsteads. The landform is gently undulating to hilly, with moderate elevation and open views across the countryside. The area contained within the Site boundary comprises c.260.8ha, all of which is presently in pastoral or agricultural use.

The assessment also includes the potential effects of the Candidate Gathabawn Grid Connection, which consists of underground cabling between the Ballylehaun Area and the Ballyring Area, and extends c.9km between Ballyring and Moatpark through a gently undulating agricultural landscape comprising of field enclosures and roads.

EIAR 15.2.2 Zone of Influence/Study Areas

The area or zone of influence around the proposed Gathabawn Windfarm Project within which the sensitive aspects of the environment could be affected by the Project is called the Study Area herein. The Study Areas for the Sensitive Aspects of the Cultural Heritage environment are set out in the table below.

Table 15-2: Study Area of the Project in relation to sensitive aspects of the Cultural Heritage environment

Sensitive Aspect	Zone of Influence/Study Area	Justification for the Study Area extent
Indirect effects upon the setting of Designation cultural heritage assets	A 5km radius as measured from the proposed turbines A 0.5km radius as measured from the Parksgrove Substation	There is no guidance mandating the size of the study area required for the archaeological and cultural heritage assessment of wind farms. Based upon a review of the historic landscape and the exercise of professional judgement, two study areas were implemented for the purposes of the current assessment. Assets identified as having potential effects are those that lie within the ZTV, and have the potential for the operational turbines to affect aspects of their setting which contribute toward their cultural significance.
Direct impacts upon: - Designated cultural assets - Non-designated cultural heritage assets (SMR assets, newly identified)	A 1km radius as measured from the Construction Area, including Ballylehaun – Ballyring UGC.	There is no guidance mandating the size of the study area required for the archaeological and cultural heritage assessment of wind farms. Based upon a review of the historic landscape and the exercise of professional judgement,

assets from desk-based or in-field baseline study) • Unrecorded Subsurface Sites	A 0.5km study area from the Candidate Gathabawn Grid Connection (Ballyring-Parksgrove Underground Cabling, Parksgrove Substation and the Parksgrove-Moatpark Underground Cabling.	two study areas were implemented for the purposes of the current assessment.

EIAR 15.3 BASELINE ENVIRONMENT

The context and characteristics of the baseline environment, and the trends and evolution thereof, in relation to designated Cultural Heritage assets, non-designated cultural heritage sites (assets with no statutory protections), and potential archaeological sites of which currently identified.

The result of fieldwork and desktop surveys are summarised in the sections below, illustrated on the mapping listed below, with the detailed data included in the Appendices listed:

EIAR Figures (included at the end of this Chapter):

Figure 2a - e: Cultural Heritage Baseline Assets within the Study Area

EIAR Appendices (included at the end of this Chapter):

Appendix 15.2: Gazetteer of Assets

Appendix 15.3: Geophysical Survey Report

Appendix 15.4: Gathabawn LiDAR Survey Assessment

Appendix 15.5: Summary of Archaeological Excavations in the Study Area

EIAR 15.3.1 Context and Characteristics

EIAR 15.3.1.1 Known Heritage Assets within the Proposed Development

EIAR 15.3.1.1.1 Historic Mapping and Landscape Character

Proposed Gathabawn Windfarm: The 1km study area covers the townlands of Oldtown, Coolnacrutta, Glashare, Gorteennahilla, Ballylehaun, Rathlogan, Gorteennamuck, Scrub and Glenmacolla, Ballygowney, Coolcashin, Creenkill Beg, Creenkill More, Foyle North, Foyle South, Frankford or Ballykieran, Cullahill Mountain, in the western study area, and Lisdowney, Ballyring Lower, Ballyring Upper, Tentore, Garrydague, Tinnascarty, Tifeaghna (Mount Garret), Tifeaghna (Browne), Baunmore or Balleen Upper, Balleen Lower, Tinnaslatty, Monphole, Skinstown and Clontubbrid in the eastern study area.

These townlands are situated within the Baronies of Galmoy, Crannagh and Clarmallagh.

The study area features on the 1670 Down Survey maps, of these baronies, which show little detail but record what may be Glashare to the north of the study area, represented by a tower which is likely to refer to the castle present there. Several smaller nearby settlements that surround the study area are also documented, including Baunrickeen, Ballyspellan and Rathoscar, though the area contained within the Site itself appears devoid of settlement.

The earliest map of sufficient scale and detail to cover the development is the 1839 First Edition Ordnance Survey map. The main difference between this map and the Barony Map is a change in area coverage of woodland plantations and the formations of field boundaries, mainly boundaries that have since been removed to amalgamate fields.

The parish of Coolcashin is mentioned in the Topographical Dictionary of Ireland by Samuel Lewis (1837)¹ and is noted to comprise 2792 acres with 564 inhabitants currently. The parish of Glashare contained 619 inhabitants over 2703 acres. Other parishes and townlands within the study area are not further discussed

¹ libraryireland.com/topog/C/Coolcashin-Galmoy-Kilkenny.php

within this writing. County Kilkenny is described as comprising 536,686 acres, of which 417,117 are cultivated land and 96,569 bog and mountain, with a total population of 169,945 in 1831.

A review of the online historic mapping available from the National Library of Ireland and Irish townlands and historical map viewer online was undertaken.

Candidate Gathabawn Grid Connection: In addition, an assessment of the available historic mapping from the National Library of Scotland (NLS) database was completed for the proposed Grid Connection. The assessment revealed that the route of the Candidate Gathabawn Grid Connection is well-documented, as is the study area. Ballyragget is visible in the mid-19th century historic mapping. Known heritage assets, where recorded on mapping, will be discussed in the subsequent baseline sections.

Overall, historic mapping demonstrated that the agricultural landscape, which has remained largely unchanged since the mid-19th and early 20th centuries², with the addition of a farm track, through which the Underground Cabling is proposed to run alongside, alongside the construction of a series of farm buildings to the south of the route and farmhouses to the north. The majority of the landscape comprises agricultural land parcels, utilised for pastoral and arable practices, with Lisdowney Wood still present in the central section of the Ballyring-Parksgrove UGC. Land agglomeration and separation have occurred along the UGC, but the land remains utilised for agricultural activity. Therefore, this landscape is relatively unaltered; ongoing agricultural ploughing and grazing would have impacted the preservation of archaeological assets, albeit for their preservation, recording, and or truncation and destruction.

ElAR 15.3.1.1.2 Prehistoric Context

Proposed Gathabawn Windfarm: There is one asset of prehistoric date within the construction works boundary for the Ballylehaun-Ballyring UGC, an enclosure KK009-007----, located c.0.48km to the northeast of T7, within the public road. This asset is shown on **Figure 2b** and **Figure 2c**. Enclosures within the archaeological record in Kilkenny, and Ireland as a whole, can represent a variety of different forms, functions and dates, ranging from defensive or settlement enclosures to livestock management enclosures. As the earliest and most likely date for these assets of this nature is prehistoric, they are discussed as such within this section, unless a specific function or date has been provided within the archaeological record. There is an enclosure, KK009-023----, located adjacent to the site boundary at the Ballyring Section, c.0.1km to the northeast of T8. Another enclosure (KK009-003----), although not definitively prehistoric, is located c.10m from the Site boundary along the route of the windfarm cabling to the Ballylehaun Control Building, c.0.35km to the east of T3.

There are a further 32 assets of a prehistoric date within 1km from the Proposed Development, of which 24 are classified as enclosures. Many enclosures are concentrated on the lower slopes to the northwest of the proposed development overlooking or situated within the valleys and lower slopes, suggesting a preference for settlement on the lower valley terraces proximate to waterways and landscape corridors. These include KK003-029----, located c.70m to the north of the Site boundary, and KK008-032001-, located c.0.26km to the north of the Site boundary. KK008-032001- is a complex of features including a roughly circular enclosure and associated field banks (KK008-032002-), some of which may represent the remains of additional structures situated on a hilltop.

² Ordnance Survey (1842). County Kilkenny, Sheet 9. Available at: <https://maps.nls.uk/view/246837087> and Ordnance Survey (1902). County Kilkenny, Sheet 9. Available at: <https://maps.nls.uk/view/247669351>

Further enclosures are situated within valleys, including KK008-030----, situated 50m west of the Site, as well as KK003-027---- and KK003-047----, located adjacent to one another c.0.4km to the north of the Site boundary, and KK008-056001-, located c.0.77km to the southwest of the Site boundary. Their position within the fertile land of the valley suggests a more agricultural or domestic function, such as livestock enclosure or area of habitation. These assets are depicted on **Figure 2b**.

The remaining assets are primarily related to Fulacht Fiadh or burnt mounds. Fulacht Fiadh typically comprise three key components, namely a mound of heat-shattered stones, a hearth used to heat those stones, and a water-filled trough, often lined with wood or stone, into which the hot stones were placed to raise the water temperature. Most examples date to the mid to late Bronze Age, although earlier Neolithic and a few later medieval instances have also been identified. These assets are commonly located near natural water sources and were often positioned close to accessible stone deposits and woodland, which provided essential fuel.

There is a total of nine Fulacht Fiadh recorded within the 1km study area, primarily located along watercourses to the southwest of the Site's upper western landscape. A cluster of six Fulacht Fiadh (KK008-061----, KK008-147----, KK008-183----, KK008-184----, KK008-185---- and KK008-186----) recorded within the study area are clustered together in this manner, located between c.0.47km and 0.6km to the southwest of the Site boundary. The final asset of prehistoric date is comprised of a ring barrow (KK009-001----), located c.0.32km north of the Site boundary (Figure 2b) a funerary feature of which typically date to the prehistoric period, with the earliest examples being of Neolithic date, though some rare examples shown a continuation of this burial practice into the early medieval period.

The presence of enclosures within the study area suggests a structured and multifunctional use of the landscape during the prehistoric period. These features likely reflect a combination of domestic, agricultural, and possibly ritual or defensive activities. Their distribution across elevated ground with wide visibility as well as in valley clusters, indicates deliberate site selection based on social, environmental, and economic factors. Enclosures may have served as focal points for settlement, livestock management, or territorial demarcation. The high level of Fulacht Fiadh present within the study area suggests a relatively high level of activity during the prehistoric period, indicating relatively long-term reuse of the same area to the southwest of the Site. Though relatively common, Fulacht Fiadh are considered a distinctive element of Ireland's archaeological record, offering insight into prehistoric technology, economy, and social organisation. Constructed using locally sourced materials, they required considerable labour and resources, indicating their importance within early Irish communities. The presence of the ring barrow (KK009-001----) suggests the area to the north of the Site was of cultural significance, as ring barrows are often located in prominent positions, suggesting they were intended to be seen from afar, potential forming territorial markers or ceremonial focal points, reinforcing social identity and control over land. The presence of a ring barrow may indicate other significant remains within the area, as barrow monuments are often found in clusters.

Candidate Gathabawn Grid Connection: There are no prehistoric heritage assets recorded within the proposed Grid Connection and Cable Link.

There are eleven heritage assets of prehistoric date recorded within the Study Area. These comprise six enclosures (KK009-023----, KK009-024----, KK009-091----, KK009-103----, KK005-094----, and KK005-096----), four fulacht fiadh's or burnt mounds (KK009-094----, KK009-095----, KK009-097----, and KK009-098----) and a metalworking site (KK009-096----).

The metalworking site (KK009-096----) and potentially related burnt mound (KK009-095----) are located c.120m north of the Ballyring-Parksgrove UGC and c. 280m south of the L1807. The fulacht fiadh (KK009-097----) is recorded c.150m south of the KK009-095---- and KK009-096---- and c.40m south of the Ballyring-Parksgrove UGC. KK009-098---- is situated c.280m south of the UGC. All assets were discovered during

archaeological monitoring of a Bord Gáis Éireann gas pipeline development and subsequently excavated in 1999, likely leaving no archaeological remains behind.

In addition, three of the enclosures identified within the study area are recorded to the south of the Ballyring-Parksgrove UGC. KK009-024---- and KK009-103---- are located between two tributaries of the River Nore. Similarly, KK009-094---- is recorded in the floodplain of the River Nore, and within c.200m of two fulacht fiadh (KK009-094---- and KK009-098----). This cluster of three enclosures is likely associated with early prehistoric settlement and agricultural activity, utilising the gentle lowlands and access to natural water sources.

The numerous enclosures and fulacht fiadh in the study area suggest relatively high activity on the upper slopes of the River Nore during the prehistoric period. However, it is unlikely that any of these areas of activity would still exist within the candidate grid connection extent due to the previous construction of the road in which the UGC will be built within, nor do these trends indicate any potential more proximate to the river, where the grid connection leaves the road verge and enters agricultural lands, along the Nore River. Overall, prehistoric potential is low within the candidate grid connection development area.

EIAR 15.3.1.1.3 Medieval Context

Proposed Gathabawn Windfarm: There are no heritage assets of medieval date recorded within the Site boundary, with a total of 30 heritage assets of medieval date recorded within the study area. Of these assets, 23 are ringforts, recorded within the study area, primarily concentrated towards the western extent of the Site.

Though the archaeological record does not record specific dates for the recorded ringforts, assets of this type generally date to the early medieval period, with some examples dating as early as the Iron Age. Comprised of circular settlements, ringforts are generally understood to have been homesteads, with the enclosure around them providing defence against the frequent cattle raids common throughout early medieval Ireland. The placement of the ringforts within the study area within the landscape can be loosely divided into two categories, those with strong defensive locations atop or on the slopes of hills, and those situated within valleys, in more fertile lands that may have better supported agricultural activities and settlement.

There are a number of ringforts within the upland landscape around the Ballylehaun Section proximate to the boundary of the Site, including KK009-005---- and KK009-006----, located c.0.3km to the west and c.0.18km to the northwest of T7, and KK008-033---- c.0.19km to the southeast of T3. Further ringforts proximate to the Site but positioned on the outer slopes of the upper landscape toward valleys include KK008-031---- located c.50m south of the Site, LA034-032002- c.0.72km north of T1, KK008-060001- c.0.98km southwest of T5, and KK008-028---- and KK008-025----, located c.0.33km to the northwest and c.0.98km to the west of T2. These assets are depicted on **Figure 2b**.

It is known below-ground remains, which are no longer discernible, can extend from ringforts, including additional annexes of domestic or agricultural activity within boundaries or enclosures. The 2023 geophysical survey of the site identified features that may be associated with ringfort KK008-031----, namely a circular enclosure (c.43 m diameter) with pits, possibly post-holes, some showing strong magnetic responses suggesting burning. Additional burnt areas and linear features, likely ditches respecting the enclosure, were also detected.

A full list of the ringforts contained within the study area can be found in [Appendix 15.2: Gazetteer of Assets](#).

Three further assets are of a defensive nature. KK009-022---- relates to the remains of a motte and bailey castle, located c.0.63km to the southwest of the Ballyring Section. KK009-021---- is comprised of a moated site on the same Ballyring Upper Stream, c.0.60km to the northwest of the motte and bailey castle and c.0.6km southwest of the Site boundary, although only c.20m west of Facilitating Works FW9. The final defensive asset, KK008-026----, concerns Glashare Castle tower house, situated on a gentle elevation just

above the floodplain of the Coolnacrutta stream, c.0.8km south of the Site boundary. These assets are depicted on **Figure 2b** and **Figure 2d** respectively.

The Glashare Castle tower house (KK008-026----) is also proximate to remains of a medieval church (KK008-027001-) and graveyard (KK008-027002-) c.0.8km southwest of the Site boundary, and a deserted settlement of medieval date (KK008-145----), located c.0.53km to the west of the Site boundary in the valley south of the Ballylehaun Area.

The recorded evidence from the medieval period suggests the area was subject to prolonged use over this period, with changes to societal structure reflected within the archaeological record. The study area was primarily utilised for settlement and agriculture, as evidenced by a concentration of ringforts, particularly in the western portion of the study area. These enclosed farmsteads provided protection against cattle raids and were often associated with domestic and agricultural activity. One ringfort contains the remains of a possible early monastic site, indicating a change in land use over time, as settlements developed over the medieval period, including into more structured religious use. A motte and bailey castle in the east suggests strategic control of a river crossing, and a development from early defensive structures such as ring forts to larger structures like castles. Additionally, deserted medieval settlements and associated church and graveyards point to a nucleated community with ecclesiastical ties, again showing more structured development of domestic land use over time, as well as a shift into habitation within the more fertile land within the valleys, which include good access to major routeways such as rivers, rather than the upland landscape within the Site. Field systems linked to one ringfort further reflect organised land division and farming practices.

Candidate Gathabawn Grid Connection: There are two RMP's, namely KK009-014---- and KK009-015----, whose protection zones are directly adjacent to the Ballyring-Parksgrove UGC and Parksgrove Substation. The assets are ring-ditches, raths or ringforts, one of the most common archaeological features in Ireland, associated with settlement and located in idyllic landscapes with access to natural resources and transport links. Whilst the assets are not dated within the record, they are likely medieval.

The potential for remains to extend from these ringforts into the previously undeveloped land is high, and therefore, the potential for medieval remains within the grid connection and substation area is high in this area of the grid connection.

EIAR 15.3.1.1.4 Post-medieval Context

Proposed Gathabawn Windfarm: Whilst there are no recorded heritage assets of definitive post-medieval date within the Site boundary, with one potential asset of this date recorded during the walkover survey (the remains of a lime kiln, SLR1018), and the landscape comprises evidence of multiple phases of agricultural activity dating from at least the post-medieval (pre-famine) landscape to the modern.

SLR1018 comprises the remains of a lime kiln, located c.0.20km to the north of T6. The nature of this asset was confirmed through historic mapping, with the kiln being recorded on the 1st Edition OS map (Kilkenny – Sheet 9, surveyed 1839).

Three further assets of post-medieval date are recorded within the study area. The first of these, the remains of a mill shown as ruined on the 1839 OS map, (KK008-062----), likely dating to the 18th century or earlier, is located c.0.52km to the southwest of the Site boundary, in the valley south of the western portion of the Site.

KK009-041002- and KK009-041001- is located c.0.83km to the south of the Site boundary and is a church and irregularly shaped graveyard. These assets are depicted on **Figure 2c** and **Figure 2d** respectively.

The low level of evidence of recorded post-medieval activity within the Site boundary suggests activity during this period was likely focused within the surrounding settlements such as Johnstown and Lisdowney and is

widely due to the agricultural nature of activity within the Site from this period. A review of historical mapping shows the area contained within the Site as being in agricultural use, with little change during this period. The field boundaries as seen on the first edition 6 Inch OS Map (Kilkenny Sheet 9) OS largely remain intact from this period to the present day. Though there has been some amalgamation of smaller fields into larger ones, land use seems to have remained consistent through this period, resulting in few heritage assets of this date within the study area. Unlike many other European countries, which saw a rapid increase in population during this period and into the modern era, Ireland experienced a reduction in population due to the famines, both the Irish Famine which lasted from 1740-1741 and the Great Famine, which lasted from 1845-1849 and also consequently led to a further decrease in population due to emigration. The LiDAR survey (outlined and discussed in [Appendix 15.4](#)) has identified several features, including likely pre-famine field enclosures and landscapes, areas of defined cultivation and potential structures which may relate to buildings associated with farming activity.

Candidate Gathabawn Grid Connection: No heritage assets of post-medieval date are recorded within the Candidate Grid Connection.

There are seven assets of post-medieval date recorded within the study area. These comprise five NIAH and two SMR assets. Ballyconra House (**12400402**), Gates (**12400404**) and associated armorial plaques (**KK004-024----**) located c.210m west of the Parksgrove-Moatpark UGC, alongside the remains of two watermills (**12303001** and **KK010-122----**), Ballyragget National School (**12303002**) and Ballyragget Bridge (**12303003**) c.400m southeast of the Ballyring-Parksgrove UGC.

None of the recorded assets, the walkover or historic mapping record any post-medieval remains within the extent of the Candidate Gathabawn Grid Connection other than field boundaries. Therefore, there is a low potential for post-medieval remains of high interest within the grid connection.

ElAR 15.3.1.1.5 Modern Context

Proposed Gathabawn Windfarm: There are no recorded assets of a modern date within the Site boundary.

There are two recorded modern heritage assets recorded within the study area; 12400913 and 12400911. These assets are comprised of Creenkill National School, constructed in 1942 and located c.0.29km to the southeast of the Site boundary, within the village of Gathabawn (**Figure 2c**), and Foyle Bridge, c.125m south of the Facilitating Works

As with the post-medieval period, historic mapping shows the Site in agricultural use from this period onwards, with little change in land use to the present day. The field boundaries seen on historic mapping remain largely the same. The study area is unlikely to have experienced any notable change in the modern period, with any changes likely to comprise the addition of further buildings within the nearby settlements such as Gathabawn.

Candidate Gathabawn Grid Connection: There are no recorded modern assets within the grid connection extent or study area.

ElAR 15.3.1.1.6 Undated Context

Proposed Gathabawn Windfarm: There are no undated heritage assets recorded on the SMR within the Site boundary. However, during the 2023 geophysical survey, 251 individual features were recorded within the Site boundary that represent possible archaeology or natural features. Many of these features are likely to represent post-medieval field boundaries, while a number of curvilinear features are characteristic of land boundaries, with circular features being potential enclosures or ringforts. Additionally, a LiDAR survey was carried out on 27 December 2025, the full results of which are discussed in [Appendix 15.4](#). The LiDAR survey revealed 239 potential archaeological features, some of which correlate to assets identified because of the walkover and geophysical survey, particularly remnant field enclosures. The features identified through

geophysical survey and LiDAR are undated, though the characteristics of the majority of features, particularly the linear features recorded, are suggestive of a relict pre-famine agricultural landscape, likely of medieval to post-medieval date.

A full description of the features recorded as a result of the geophysical survey can be found in [Appendix 15.3](#).

A full description of the features recorded as a result of the LiDAR survey can be found in [Appendix 15.4](#).

There are a further 15 undated assets recorded by the SMR within the 1km study area.

Two undated assets are of an agricultural nature, namely KK008-032002- and KK009-005002-, comprised of a field system and a field boundary respectively. KK008-32002- is located c.0.25km to the north of the Ballylehaun Area Site boundary and comprises a series of field banks, some of which may form other structures, associated with an enclosure (KK008-032001-) (**Figure 2b**).

Located c.60m to the east of the Site boundary, encircled to the east, west and south by the site boundary associated with the Ballylehaun Area, KK009-005002- is a field boundary potentially associated with other features, including a ring fort (KK009-005----), suggesting a potentially medieval date, with the field walls adjoining the fosse of this enclosure to the north and south. A building of indeterminate date is also contained within this ring fort (KK009-005001-). A further larger enclosure (KK009-092----) is located directly south of these assets. The geophysical survey conducted in 2023 identified further features which may relate to these assets, recorded directly south of these enclosures. Two low-contrast penannular anomalies, (14-02) and (14-07), were identified within this survey area, measuring 11.4m and 9.5m in diameter respectively. Negative linear anomalies (14-11), (14-12), and (14-15) may represent infilled ditches or wall footings, possibly forming parts of a field system. Several positive linear and curvilinear anomalies also suggest ditch features, likely related to the same system. Strongly positive anomalies (14-01) and (14-17) produced signals indicative of burning activity, potentially representing a hearth, Fulacht Fiadh, furnace, kiln, burnt or charcoal spread, or even a modern bonfire. Analysis of data from the LiDAR survey found further features in this area, including a circular enclosure around 14-17 (SLR509), and what may be a continuation of KK009-005002- (SLR191). Further details of the results of the geophysical and LiDAR surveys can be found in [Appendix 15.3](#) and [Appendix 15.4](#).

Two parallel linear features (KK009-011002-) are recorded c.0.53km to the northeast of the Ballyring Area, in close proximity to an enclosure (KK009-011001-). Though their function is unknown their form suggests a field boundary, or earthworks associated with the nearby enclosure (**Figure 2d**).

KK008-060002- is also recorded as a house of indeterminate date, also contained within a ringfort (KK008-060001-). The asset comprises the remains of the footings of a substantial rectangular structure likely representing a house situated along the western edge of the ringfort's interior. It is probable that this building is not contemporary with the ringfort itself, but rather dates to a later phase of occupation, possibly from the late medieval period or thereafter. It is located c.0.56km to the southwest of the western Site boundary.

Located c.0.1km south of the site boundary at the Ballylehaun Section is a small area of designed landscape, comprising a large roughly circular enclosure of stone and earth, atop and inside of which trees have been planted (KK009-004----). Tree plantations of this type are frequently of post-medieval date, with some being entirely created during this period, whilst others may represent later plantations atop existing enclosures or ring forts.

No undated recorded heritage assets are within the Site boundary; however, 15 such assets occur within the surrounding study area, characterised by agricultural systems, settlement-related activity, ritual features, extractive sites, and later landscape modification. Recent geophysical and LiDAR survey results indicate further subsurface features, including possible enclosures, field systems, and evidence of burning, suggesting complex and multi-period activity in the wider landscape.

A full list of undated assets can be found in [Appendix 15.2](#).

Candidate Gathabawn Grid Connection: There are no undated heritage assets within the grid connection, nor within the study area.

ElAR 15.3.1.2 Built Heritage

Proposed Gathabawn Windfarm: Architectural heritage assets within the 1km study area comprise rural buildings of villages, modest churches and farmsteads and small scale country houses of regional importance, built of masonry and slate or ceramic tiles. Traditional architecture comprise everyday works of craftsmen such as town houses, thatched cottages and farm complexes. These buildings have been modernised, likely originally having traditional construction methods such as thatch roofs but now having ceramic roofing (e.g. 12400808).

The architectural assets within the study areas have a local sense of setting, being local, such as the Saint Muntachan's Catholic Church and Creenkill National School within the village of Gathabawn (Figure 2c: 12400912 and 12400913 respectively). Foyle Bridge (12400911) is also within the study area, located c.125m from the site boundary at Facilitating Works FW8.

The land within the Site does not form the agricultural setting for any designated architectural assets; it does not comprise the agricultural landscape for designated farmsteads or other agricultural buildings, nor parkland or demesne for large or small country houses. There are also no built heritage assets with a more complex setting which incorporates the Proposed Development, such as tower houses or castles.

Candidate Gathabawn Grid Connection:

The designated built heritage assets within the grid connection 0.5km study area comprise a small country house (Ballyconra House; 12400402 and 12400404) and buildings on the western edge of Ballyragget comprising a school (12303002) a mill (12303001) and a bridge (12303003). Due to the scale of the grid connection development, there is no potential direct or indirect effects upon any built heritage assets within the study area for the grid connection development.

ElAR 15.3.1.3 Intangible Cultural Heritage

Proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection: The National Inventory of Intangible Cultural Heritage (ICH) holds a comprehensive list of protected social practises, rituals and festive events, of which are linked to the communities, settlements and landscapes of Ireland. These practices may be primarily anthropological, but may involve physical spaces or materials related to a place. It is, therefore, important to identify all aspects of these traditions in local landscapes, and assess whether a development could impact any aspect of these traditions and if any aspect of their practices could be affected. These effects, in regards to the proposed development and candidate grid connection, can be caused by changes in land use and environmental change.

The following ICH traditions have been identified to be practised within the wider local communities by an anthropological survey of the land owners involved with the development:

- Hurling (Iománaíocht) at Galmoy, west of Johnstown, and Lisdowney;
- Weaving of St. Brigid's Crosses in schools;
- Keeping, possibly breeding, of Cannemara Horses;
- Sheep dog training at Johnstown;
- Set dancing and traditional music at Durrow; and
- Beekeeping at Ballyring.

Making St. Brigid's Crosses, hurling, set dancing and traditional music have set out spaces and clubs in which they are undertaken, within schools or the local towns of Johnstown, Lisdowney and Durrow. The proposed development wouldn't interfere with any aspect of these practises. The land within the proposed development and candidate grid connection is not associated with any of these traditional practices, nor is it used as a dedicated space by the local population or a source of materials for their required materials.

The land within the proposed development would also not restrict access to the public or agricultural practises, such as livestock keeping, would be maintained within the immediate vicinity of the proposed development. Therefore, any such activities within the vicinity of the development, such as sheep dog training and cattle breeding, would be able to proceed without interference. The level of vegetation removal within the pastoral grassland within the landscape is also not predicted to have any effect on beekeeping practises at Ballyring.

Overall, the proposed wind farm would not affect any of the identified intangible cultural heritage practices, traditions and crafts of the local population.

EIAR 15.3.2 Existing Sources of Impacts

The existing occurrence of damage to Cultural Heritage within the Construction Area and Site have been considered. There is no current substantial changes or degradation occurring to cultural heritage receptors within the Construction Area; there is potential for new field boundaries to be established or fencing installed, which would cause mild ground disturbance to unknown and potential archaeological sub-surface remains, due to the nature of the land being used for livestock and pasture.

There is general potential for effects of climate change to increase potential degradation occurring to cultural heritage receptors; there is general potential for effects of climate change to increase potential degradation of assets, due to changes in soil hydrology from extreme weather changes, such as a lower or higher than average rainfall. Such events can effect the preservation of soils in situ by movement or erosion, although such effects are not evident on the Site.

EIAR 15.3.3 Importance, Sensitivity and Vulnerability to Change

EIAR 15.3.3.1 Importance

The importance rating for each Cultural Heritage receptor was based on evidence from the baseline studies, fieldwork, using professional judgement, and with reference to the factors set out in [Appendix 15.1](#). Additional guiding factors that were considered included the status (i.e., designation and level of statutory protection) of the Cultural Heritage receptor, the condition/preservation, special interest, group value, rarity, visibility in the landscape, fragility/vulnerability, amenity value and local significance (DAHG 2011, 24–30; TII 2025, 73).

The Importance and Sensitivity of Cultural Heritage receptors is presented in the table in Section EIAR 15.4.4, 4th column 'Cultural Heritage Significance'.

EIAR 15.3.4 Evolution of the Baseline Environment (the 'Do-Nothing' scenario)

'The do-nothing alternative is a general description of the evolution of the key environmental factors of the site and environs if the proposed project did not proceed' (EPA 2022, 35).

There will be no adverse impact on the Cultural Heritage environment from the Project if the Proposed Development does not proceed. The area encompassed by the RLB and overall Study Area will remain in their current state, although there is a **slight** potential for adverse effects to occur as a result of weather events associated with climate change, ongoing agricultural activity such as ploughing, tree growth causing root damage, as well as other unforeseen circumstances (see Section EIAR 15.3.2.4).

EIAR 15.3.5 Climate Change effects to Cultural Heritage

Primary climate change impacts have the potential to affect Cultural Heritage in a number of ways (DCHG, 2019). The priority negative impacts of Climate Change in the vicinity of the proposed scheme are likely to be soil movement (landslip/erosion) caused by intense rainfall, long dry periods and storms.

Climate change may also result in increased flooding which may cause damage to archaeological sites. The impacts of this flooding can be long lasting and have the potential to damage Cultural Heritage sites causing structural damage, partial loss or complete loss of built and archaeological heritage owing to velocity of streams and dynamic impact of floating objects, potential contamination of built and archaeological heritage and collections by flood water and deterioration in the drying-out phase (e.g. salts, microbiological activity), potential loss of historic fabric during flood prevention works, emergency response and post-flood recovery and rebuilding.

EIAR 15.4 IMPACT OF THE PROPOSED DEVELOPMENT

This Section comprises an evaluation of the impacts of the proposal on the receiving Cultural Heritage environment.

EIAR 15.4.1 Criteria and Methodology

The criteria used for impact evaluation in this report is based on the Environmental Protection Agency (2022) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*. The methodology for determining the significance of impacts to Cultural Heritage is based on a combination of the cultural heritage significance of the asset (where known), the probability of further assets being located within the affected areas and their likely significance, and the magnitude of effect on those assets to be caused by the implementation of the Proposed Development, as outlined in [Appendix 15.1](#).

EIAR 15.4.2 Source-Pathway-Receptor

The following sources of impacts and pathways for these impacts to the identified receptors (sensitive aspects) of Cultural Heritage are listed below.

EIAR 15.4.2.1 Sources of Impact

Construction Phase

- All construction groundwork footprint involved in the construction of turbine bases, cabling, track widening, construction of compounds and substations etc;
- Placement of temporary infrastructure (temporary construction compounds, facilitating works along the turbine delivery route);
- Widening of site entrances;
- Movement of plant/machinery; and
- Removal of features for trackways.

Operational Phase

- Operation of twelve (12 no.) wind turbines.

Operational and Decommissioning Phases

- Works during operation and decommissioning would not require any activities that would increase the footprint of ground disturbances compared to that of the construction phase, and therefore operation and decommissioning is only discussed in terms of indirect impacts upon setting.

EIAR 15.4.2.2 Pathways

- Direct (e.g. mechanical or manual excavation)
- Indirect (e.g. changes in hydrology, visual changes within the setting of an asset)

EIAR 15.4.2.3 Receptors

- Designated (Legally Protected) Sites and their settings (RMP, RHM, SMR Protection Zones, National Monuments, monuments with preservation orders, RPS, NIAH);
- Non-designated recorded assets (e.g. SMR assets not listed on the RMP, field boundaries, identified potential archaeological features on the LiDAR and geophysical surveys); and
- Unrecorded, currently unidentified, subsurface sites (e.g. areas of archaeological potential).

EIAR 15.4.3 Overview of the Proposed Development

The proposed Gathabawn Windfarm Project comprises 12 wind turbines with an overall blade tip height of 150m for T6, T7 and T9, and 170m for all other turbines, and all associated foundations and hard-standing areas in respect of each turbine, cabling, access roads, windfarm substation, lattice tower meteorological mast 30m in height and all ancillary associated and facilitating works and activities.

EIAR 15.4.4 Evaluation of effects on Cultural Heritage

A summary of the findings of the evaluation of the effects of the proposed Gathabawn Windfarm Project on Cultural Heritage are listed in the table below. The relevant phases of the development are the construction, operational and decommissioning phases which are denoted by C, O and D respectively.

Asset	Designation	Infrastructure	Cultural Heritage Significance	Magnitude of Impact	Significance of Effect	Is the Effect Significant in EIA Terms?	Mitigation	Residual Effects
Construction Phase								
Enclosure (KK009-007----) <i>See Section EIAR 15.4.5.1</i>	Record of Monuments and Places	Track	Medium	Low adverse	Slight	No	Mitigation proposed	Though the impact upon the asset as a result of ground disturbing construction works would remain the same, recording any remains through mitigation works would bring about a beneficial effect due to the preservation of the record of the asset.
Potential archaeological remains identified through geophysical survey <i>See Section EIAR 15.4.5.6</i>	Non-designated	Primary Site infrastructure	Low-Medium	Non – Medium/High Adverse	None – Moderate/Significant	No	Mitigation proposed	Though the impact upon the asset as a result of ground disturbing construction works would remain the same, recording any remains through mitigation works would bring about a beneficial effect due to the preservation of the record of the asset.
Potential archaeological remains identified through LiDAR survey		Primary Site infrastructure	Low-Medium	None – Medium/High Adverse	None – Moderate/Significant	No	Mitigation proposed	Though the impact upon the asset as a result of ground disturbing construction works would remain the same, recording any remains through mitigation works would bring about a

Asset	Designation	Infrastructure	Cultural Heritage Significance	Magnitude of Impact	Significance of Effect	Is the Effect Significant in EIA Terms?	Mitigation	Residual Effects
See Section EIAR 15.4.5.7								beneficial effect due to the preservation of the record of the asset.
Unknown prehistoric remains See Section EIAR 15.4.5.8		Primary Site infrastructure	Low - Medium	Low to High Adverse	Slight - Significant	No	Mitigation proposed	Though the impact upon the asset as a result of ground disturbing construction works would remain the same, recording any remains through mitigation works would bring about a beneficial effect due to the preservation of the record of the asset.
Unknown medieval remains See Section EIAR 15.4.5.9		Primary Site infrastructure	Low - Medium	Medium to High Adverse	Slight – Moderate	No	Mitigation proposed	Though the impact upon the asset as a result of ground disturbing construction works would remain the same, recording any remains through mitigation works would bring about a beneficial effect due to the preservation of the record of the asset.
Operational Effects								
Ringfort (KK009-006----) See Section EIAR 15.4.5.2	Record of Monument and Places	Setting effects	Medium	Medium Adverse	Moderate	No	N/A	N/A

Asset	Designation	Infrastructure	Cultural Heritage Significance	Magnitude of Impact	Significance of Effect	Is the Effect Significant in EIA Terms?	Mitigation	Residual Effects
Ringfort (KK008-060001-) <i>See Section EIAR 15.4.5.3</i>	Record of Monument and Places	Setting effects	Medium	Very low Adverse	Slight	No	N/A	N/A
Megalithic Tomb (KK008-124001-) <i>See Section EIAR 15.4.5.4</i>	Record of Historic Monuments	Setting effects	High	None	None	No	N/A	N/A
Hillfort (KK008-124002-) <i>See Section EIAR 15.4.5.5</i>	Record of Historic Monuments	Setting effects	High	None	None	No	N/A	N/A

EIAR 15.4.5 Evaluation of Impacts to Cultural Heritage with Potential to be Significant**EIAR 15.4.5.1 Impact on Enclosure KK009-007----**

Sensitive Aspect: Legally Protected Sites

Importance: **RMP - Medium**

Impact Source(s) Direct impact

Impact Pathway(s) Construction within the protection zone

Project Stage Construction Phase

Overview of Impact (general):

Negative, adverse, permanent, direct impacts to unrecorded associated subsurface remains during groundworks.

Examination of the Impact:

Proposed Gathabawn Windfarm Impact: There are no works associated with the proposed windfarm within the Zone of Notification for this asset, with the closest works relating to the T7 hardstand, c.385m to the southwest. As a result, there will be no impact on the asset from the Proposed Gathabawn Windfarm construction works.

Candidate Gathabawn Grid Connection Impact: An enclosure's (KK009-007----) Zone of Notification is located within the Ballylehaun-Ballyring UGC within the public road. These remains have potential to inform our understanding of the prehistoric land use in the area. However due to the previous truncation of the asset by the existing road, the cable corridor construction within the extent of the road would follow this section of previous impact upon the asset. Complete removal of this asset would be considered a high adverse impact, however as its unlikely that its associated remains within the Zone of Notification would be impacted, it is likely to be a low adverse impact at most. This would result in an overall Slight significance of impact. This would not be considered significant in EIA terms.

Impact Magnitude	Low Adverse	Impact Significance: (pre-mitigation)	Slight
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Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

WM08 GM08	<u>Pre-construction licenced archaeology surveys</u> and investigations will be carried out in advance of construction works taking place, at identified locations within the construction works area boundary. These surveys will include photographic surveys, townland/civil parish boundary surveys, wade and detection surveys, geophysical surveys and/or archaeological test trenching as required. The nature and scope of these surveys will be agreed with the National Monuments Service (NMS). The archaeologists will also provide a toolbox talk to construction teams. This will aim to outline the importance of archaeology, the legal implications of destroying it without appropriate reporting and recording, how to identify potential archaeology, outline a protocol and who to report it to when potential archaeology is found,
GM25	<u>Section 12 Notification</u> applications for any works within a Zone of Notification shall be submitted and approved by the National Monuments Service, with mitigation agreed upon approval for these assets
WM79 GM65	<u>Preservation of Archaeological Records</u> during construction works will be through the following: - Strip, map and sample in areas where construction activities will strip the topsoil (turbine hard standing areas, borrow pits) and there are geophysical anomalies and LiDAR features present; - Watching brief on areas of soil stripping that are within 10m of recorded or potential archaeology, including geophysical and LiDAR features.

Effectiveness of Mitigation:

Though the impact upon the asset as a result of ground disturbing construction works would remain the same, recording any remains through mitigation works would bring about a beneficial effect due to the preservation of the record of the asset.

Residual Impact Significance (post-mitigation):**Slight****EIAR 15.4.5.2 Impact on Ringfort – rath KK009-006----**

Sensitive Aspect: Legally Protected Sites

Importance: **SMR – Medium** (as per Section EIAR 15.3.3)

Impact Source(s) Operation of turbines

Impact Pathway(s) Indirect effect upon setting

Project Stage Operational Phase

Overview of Impact (general):

Ringforts are defensive and domestic settlements dating from the Iron Age to early medieval. They are often built strategically positioned within naturally defensive and controlling landscapes, sometimes visually linked to other ringforts. Negative long-term visual impact from turbines during the Operational Phase.

Examination of the Impact:

The asset comprises a ringfort, positioned within the north of Gorteennamuck, on the peak of a hill. Comparative to the other ringforts within the landscape, this one occupies a significant prominent position, from which it has views over a number of ringforts and landscape features, indicating that this ringfort was positioned with a highly strategic purpose. As it's setting therefore contributes highly to its understanding, experience and appreciation, its sensitivity to indirect setting impacts is considered greater.

The ringfort is a raised circular area c.38.5m in diameter, enclosed by a c.2.1m high, flat topped, earth covered stone bank. A fosse and slight external earthwork encircle the ringfort. The east side is better preserved, due to gentler topography, whilst the west side faces steeper slopes, causing the bank to slump into the fosse. There is a triangular projection on the north-northwest side, where a slope passes over the fosse and up to the bank, possibly forming an extension. The main approach is a causeway indicating an entrance on the northeast side, with a narrower causeway to the southwest. There is a potential field earthwork to the southwest,

The ringfort is located within upland pasture, overlooking agricultural landscapes of pasture and field enclosures, with isolated farmsteads and domestic dwellings. The four turbines of Lisdowney Wind Farm are visible on the east skyline, c.3.4km from the asset. with surrounding views from its raised bank, overlooking the valleys and their water courses to the south and east as well as the upland landscape to the west, north and east. The slopes to the north, east and southwest are steep, whilst the southeast slopes are more gradual.

There are a number of other, potentially contemporary, ringforts within the landscape of which have intervisibility with the asset, most prominently KK009-005---- : Ringfort. The asset overlooks this ringfort, which is situated c.0.4km southwest on the lower slopes, positioned on a knoll between the slopes of the asset's hill and another hill to the west. This dip in which the ringfort is positioned likely to defend this potential access to the asset directly from the valley to the south. KK008-064---- : Ringfort, c.0.85km to the south, is not visible from this asset, but forms part of a chain with KK009-005----, and therefore they are likely to form a chain of defensive settlements, strategically aligned for defence.

KK008-033---- is also visible from the asset, on a plateau with surrounding views. Its position is likely for an agricultural purpose, being positioned on a plateau within the upland landscape with limited surrounding views, with a history of agricultural use. It may also have been part of a defensive front from the asset's northwest.

Up to four more ringforts have potential visibility with the ringfort, of which may have formed a defensive complex to the east of the asset. Both KK009-010---- and KK009-020001 are located c.2km east along a rising ridge across the valley to the east, whilst KK009-018---- and KK009-009---- are located c.1.3km east along the watercourse down in the valley. These ringforts, including the asset, may form a defensive complex over this valley, protecting the approach northward, although their distances make their functional relationship uncertain.

The ringfort's position and outward views contribute to the asset's setting; its location utilises natural topography to create a defensive position, whilst also providing it with surrounding views. Its position would have also provided it access southeast to the valley to the south, providing control over this route in the landscape, and the ability to observe and access other ringforts within the landscape. The southeast is the only approach with a gentle gradient, providing the fort with a bottlenecked and defensible approach, accessed on its southwest or northeast sides, whilst defended along another access point to the southwest. Of its surrounding views, the viewsheds that contribute primarily to the ability to understand, experience and appreciate the asset's setting are south, toward the valley, to KK008-064---- and KK009-005----. Key views also comprise north and northwest views, toward KK008-033----, which may have been a defended agricultural settlement related to the asset. Views east toward the complex of ringforts over and within the valley may also contribute to how we can further understand the relationships and strategic placement of these ringforts with one another.

Proposed Gathabawn Windfarm Impact: The ringfort would have visibility of all 12 turbines; T1 – 5 to the west, T6-7 to the south, and T8-12 3.8km to the east-southeast. Except from the modern farmsteads and isolated domestic houses within the views from the ringfort, and four turbines at Lisdowney Wind Farm c.3.3km to the east, this would introduce an aspect of renewable infrastructure to the setting of the asset. The asset is located just outside the site boundary, located c.0.18km to the north of the proposed location of T7. Whilst none of the turbines directly impeded upon the key directional views from the asset toward other ring forts, or its key views over the landscape, T7 and T6 would be considered to impede on views southward over the valley, and T7 may distract views from KK009-005---- toward the asset. Additionally, T3 would be directly behind views toward KK008-033---- whilst this does not block the intervisibility with the asset, the presence of the turbine would form a distraction when viewing the asset within its setting, and may distract from the ability to focus on the relationship between the two ringforts.

Whilst the ability to understand, experience and appreciate the intervisibility of the asset with these potentially contemporary ringforts and associated landscape characteristics would not be directly intervened by the turbines, the presence of turbines would detract from the focus on these aspects. With the only large-scale infrastructure within the visible landscape being four turbines located c.3.4km to the east at Lisdowney Wind Farm, the introduction of 7 turbines within close proximity to the ringfort would change this rural landscape character. Whilst this would have some, more minor, effects upon the other associated ringforts discussed, the KK009-006---- : Ringfort is situated the highest amongst these assets within the landscape, with the intention for surrounding outward views, and therefore is more susceptible to effects from visual changes. T7 and T6 would be visible along the intended approach to the ringfort, although upon its immediate approach these turbines would be outside of the views toward the ringfort.

Views southwest toward KK009-005---- would be intact, with T7 being located within the periphery of this view from the ringfort. Views east would be uninterrupted toward KK009-010----, KK009-020001, KK009-018---- and KK009-009----. Its views over the landscape to the north and northwest would also be affected, due to the presence of T3; this would introduce a similar distraction within key views toward KK008-033-- -, but not be considered to block or completely intervene with the understanding that these views contribute toward the asset's setting.

Overall, the development would erode to a clearly discernible extent the contributions of the asset's setting to its heritage significance; whilst the ability to understand, experience and appreciate the asset within its setting would be diminished, it would still be possible. The asset itself and its archaeological interests, and potential for further understanding with the wider landscape of ringforts, would also remain intact. Overall, the magnitude of impact would be medium, resulting in a moderate significance of effect.

Candidate Gathabawn Grid Connection Impact: During the operational phase, the only above-ground evidence of the candidate grid connection would be the Parksgrove Substation, located 9.1km east of the

asset. It is therefore not considered that the candidate grid connection will have any impacts on the setting of this asset.			
Impact Magnitude	Medium adverse	Impact Significance: (pre-mitigation)	Moderate
Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.			
Mitigation by Design	Embedded mitigation has already taken place through design, by reducing the hub height of the T6 and T7 (and thereby reducing the four-times tip height separation distance from local houses) enabled these turbines to be micro-sited further east, into the periphery of the key views from the asset outlined above. This has reduced the presence of the turbines within key views southwest toward KK009-005----, which was identified as a strategic view and important to understand, experience and appreciate the asset within its setting.		
WM106	<u>Cultural heritage interactive database:</u> Offsetting of effects will be further provided by the implementation of an interactive database which will enable members of the local community to record folklore and other intangible cultural heritage of the area around the Gathabawn Windfarm Project. This database will be available to the public, for example through the local libraries and online, the data will be checked before being made publicly available, and the database will be demonstrated in the local schools, community centres and with local heritage groups. The windfarm owner will fund the ongoing maintenance of this database.		
<u>Effectiveness of Mitigation:</u> Remedy/offsetting establishes a platform for people to provide the values they attribute to their cultural heritage environment, and to better understand, protect, preserve and promote their local intangible heritage. Contributes to knowledge gain which advances our understanding of the past and helps to enhance a sense of community pride and identity. Creates a platform to engage with diverse groups of people who may connect through ‘citizen science’.			
Residual Impact Significance (post-mitigation):			Moderate

EIAR 15.4.5.3 Impact on Ringfort – rath KK008-060001-

Sensitive Aspect: Legally Protected Sites

Importance: **RMP - Medium**

Impact Source(s) Operation of turbines

Impact Pathway(s) Indirect effect upon setting

Project Stage Operational Phase

Overview of Impact (general):

Negative long-term visual impact from turbines during the Operational Phase.

Examination of the Impact:

The asset comprises a ringfort, a defensive and domestic settlement type dating mostly to the early medieval period, although same date as early as the Iron Age, and are often built on previous Bronze Age sites. They are often built strategically positioned within naturally defensive and controlling landscapes, sometimes visually linked to other ringforts.

The asset comprises a three-ring ringfort constructed on a risen knoll extending south into the mouth of the valley through the Clomantagh Hills, to the south of Cullahill Mountain. The ringfort comprises three circular embankments, with a partial fourth on its northeast side where there is a causeway entrance. There are remains of a house within the ringfort located on the west side, which is likely not contemporary with the ringfort, but re-used it in the late medieval period or later. Ringforts with substantial earthworks such as the asset are considered to have been occupied by members a high social status.

The ringfort is situated in enclosed pasture, of which has a high density of earthworks surrounding it, though it is unsure whether they are related to the asset. The visible landscape comprises mostly undeveloped enclosed field systems, with modern farmsteads located within east and southwest views from the asset, including c. 0.3km east and c.0.23km south. The M8 motorway is within western views, and a number of other isolated domestic dwellings and farmsteads are within western and eastern views.

The ringfort is located on an extended promontory from the hill to the north, with steep slopes to the south and west, with a natural approach along its connecting ridge line to the northeast. The fort overlooks the river valley, looking up the corridor of the valley to the east and the opening of the valley directly to the west, intersecting with the flat landscape and the River Goul to the west. The Coolnacrutta stream follows the valley from the east and passes to the south of the ringfort, passing along the base of its south slopes, and continues northwest. The KK008-063---- Ringfort is located c.0.4km to the south across the river, on the north facing slopes of the valley, and is likely related to the asset, forming a pair of ringforts which form a 'gateway' at the entrance of the valley from the River Gouls plains.

The aspects which contribute toward the asset's setting are its strategic position within the landscape, and plan with the neighbouring ringfort (KK008-063----). The elevated position provides views along the valley to the southeast and west, and the steep slopes to its south and west form natural defensive features from western approaches, being able to control and defend against movements into the valley from the west and east. The river at the base of its southern slopes provides a water source, but an additional defensive boundary, forcing an easier approach from its steep west slopes. Its approach from the northeast forms a bottleneck approach to the ringfort, for which the fourth bank on the east side would have provided extra defence. Approaches from the east would have been channelled into a single view from the ringfort, being easily visible and defended against. The neighbouring ringfort on the south side of the valley would have mimicked this level of protection on the south side and formed two points of control across this entrance and route through the valley.

Proposed Gathabawn Windfarm Impact: The asset will have visibility of up to eleven turbines, including T3, T4 and T5 within north views above the hill skyline, and T6 and T7 in the periphery of east views above the north slopes of the valley. Whilst views of these turbines are not within direct views of the aspects above which contribute toward the asset, T6 and T7 would be situated within the periphery of views southeast along the valley. The two turbines would potentially cause a distraction within these southeast views, detracting from the contribution that this view makes towards the understanding, appreciation and

experience of the asset's cultural significance. Although T3, T4 and T5 would be positioned within the views from KK008-063---- toward the asset, these turbines would be situated sufficiently higher above the skyline, not being within the key frame of the viewshed between the two assets. At most, the turbines would cause a slight distraction, eroding to a very minor extent the contributions of the asset's setting toward its cultural heritage significance. Overall, the magnitude of impact would be very low adverse, resulting in a slight significance of effect.

Candidate Gathabawn Grid Connection Impact: During the operational phase, the only above-ground evidence of the candidate grid connection would be the Parksgrove Substation, located c.10.7km east of the asset with no intervisibility. It is therefore not considered that the candidate grid connection will have any impacts on the setting of this asset.

Impact Magnitude	Very Low Adverse	Impact Significance: (pre-mitigation)	Slight
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Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

Mitigation by Design	Embedded mitigation involved the micro-siting of turbines, primarily T6 and T7. This moved these turbines further out of views from the asset along the valley, and reduced any potential distraction they may cause.
WM106	<u>Cultural heritage interactive database:</u> Offsetting of effects will be further provided by the implementation of an interactive database which will enable members of the local community to record folklore and other intangible cultural heritage of the area around the Gathabawn Windfarm Project. This database will be available to the public, for example through the local libraries and online, the data will be checked before being made publicly available, and the database will be demonstrated in the local schools, community centres and with local heritage groups. The windfarm owner will fund the ongoing maintenance of this database.

Effectiveness of Mitigation:

Remedy/offsetting establishes a platform for people to provide the values they attribute to their cultural heritage environment, and to better understand, protect, preserve and promote their local intangible heritage. Contributes to knowledge gain which advances our understanding of the past and helps to enhance a sense of community pride and identity. Creates a platform to engage with diverse groups of people who may connect through 'citizen science'.

Residual Impact Significance (post-mitigation):	Slight
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EIAR 15.4.5.4 Impact on Megalithic tomb KK008-124001-

Sensitive Aspect: Legally Protected Sites

Importance: RHP – High

Impact Source(s) Operation of turbines

Impact Pathway(s) Indirect effect upon setting

Project Stage Operational Phase

Overview of Impact (general):

Negative long-term visual impact from turbines during the Operational Phase.

Examination of the Impact:

The asset comprises the remains of a ruined cairn located within the remains of a prehistoric hillfort, possibly a Linkardstown-type burial or traditional passage tomb, at the peak of Mount Garret hill (349m aOD), measuring c.25m in diameter and 1-2m in height. Six kerb stones are exposed on the west side, and a concrete hill peak marker is located within the middle. The asset was investigated by Graves in 1851³ which identified a central chamber (2m in length, 1.35m in width and 1m in depth) roofed by two flag stones. Its east side had four large stones, and five stones arranged in a similar way on the west side. The north end was built up with small stones, whilst the south side was closed by a large slab set on its edge. The chamber contained two adult human skeletons, and c.2m south of the chamber a small cist held cremated bone and sherds of pottery, likely from an urn or food vessel. The asset is also located within the remains of a hillfort, although it is likely the burial was built after the abandonment of the fort.

Prehistoric funerary monuments such as these are typically placed in an area of landscape which provides views over important landscapes and features, including valleys, wide lowland views and waterways. The monument's placement in the landscape is intentional, being placed on the highest peak within the landscape, providing the asset with impressive views over the flood plains of the River Goul and beyond to the west, as well as the valley of the Nuenna River to the south with further upland landscapes forming the skyline in the backdrop. Whilst the asset's entrance is indicated to be on the south side, it is likely that it was approached from the east slopes of Mount Garret, where the slopes are more gradual, providing a path around to the north side of the asset. This route would have further emphasised the asset on the highest point of the hill with the grand south and west views as its backdrop. The entrance is more likely to have been symbolic of the indicated view for those buried within the monument.

The asset's contributing setting has remained mostly intact, maintaining its surrounding views, as its landscape has remained rural, with some commercial forestry on the lower slopes of the hill, and with modern developments comprising minor intrusions within the lower plains and valley. Due to the asset being on the highest point in the surrounding landscape, there are a number of operational windfarms within view, including four at Lisdowney c.7km to the northeast, multiple phases of Lisheen Wind Farm and Bruckana Wind Farm c.10km to the west, Ballybay Wind Farm and Foyle Wind Farm c.8-10km to the south. However, due to the elevation of the asset, visibility of these turbines does not compete or diminish the scale of the asset's height or its views within the landscape. The grandness of this location indicates a level of importance to those within the burial, and it also captures a landscape that likely held great significance during this period. Its setting contributes to how we can further understand, experience and appreciate the asset and burial practices during this period.

Proposed Gathabawn Windfarm Impact: The proposed development would introduce up to nine turbines present within views c.5km to the north and c.6.5km to the east (Visual reference). Of the outlined aspects that contribute to the setting of the asset, views northward and northeast toward the proposed turbines contribute very little to the asset's setting other than maintaining a non-developed area of upland, with

³ Graves, Rev. J. 1849-51 Observations of the excavation of a cairn at Cloghmanty Hill. Journal of the Royal Society of Antiquaries of Ireland 1, 289-94.

nothing competing with the asset's height when facing the asset from its southern entrance. As no turbines would be visible within key views south or west over the lower landscape, nor along the approach to the asset, the ability to understand, experience and appreciate the asset within its setting would remain unchanged. Additionally, the presence of the turbines would not be considered to cause a distraction in north views, as the scale of the turbines would equally not cause degradation to the sense of elevation of the asset, and its visual scale over its contributing views. Overall, it would be considered that the turbines would have no magnitude of effect upon its setting, resulting in no significance of effect.

Candidate Gathabawn Grid Connection Impact: During the operational phase, the only above-ground evidence of the candidate grid connection would be the Parksgrove Substation, located c.12.2km east of the asset. It is therefore not considered that the candidate grid connection will have no magnitude of effect on the setting of this asset.

Impact Magnitude	No Magnitude of Effect	Impact Significance: (pre-mitigation)	No Significance
Mitigation and Monitoring Measures: No further mitigation is proposed, as no magnitude of change has been identified.			
Residual Impact Significance (post-mitigation):			No Significance

EIAR 15.4.5.5 Impact on Hillfort KK008-124002-

Sensitive Aspect: Legally Protected Sites

Importance: RMP - High

Impact Source(s) Operation of turbines

Impact Pathway(s) Indirect effect upon setting

Project Stage Operational Phase

Overview of Impact (general):

Negative long-term visual impact from turbines during the Operational Phase.

Examination of the Impact:

The asset comprises the remains of a hillfort located on the flat summit of Mount Garret (349 aOD). The hillfort measures c.205m in diameter, taking up a circular area on the peak of Mount Garret, enclosed by a single grass-covered stoney bank except from the northwest quadrant where it been stripped, likely by the later pastoral land enclosures. To the east-southeast side, there is evidence of upright stones and low stone slabs both internally and externally, indicating that the grass-covered bank was originally a wall (c.2.8m in width).

Hillforts are constructed on elevated areas of the landscape in order to utilise the natural landscape as defensive features, whilst providing the fort with views over certain areas which they would want to observe for anyone approaching but also control. These are typically 'corridors' or major routeways through the landscape, formed by water courses or valleys. The asset is located on one of the highest summits within the landscape, with dominating views over the Nuenna River valley between the Slieveardagh Hills to the south and southeast, and over the lower plains to the south and west over the River Goul. The asset's setting contributes to its significance due to its strategic and defensible position in the landscape; its wide scoping views over the main routeways through the landscape would have provided the fort with the ability to observe approaches and movements and would have been a dominant feature within the landscape along these routes. Views to the north do not extend further than the immediate local area of the fort, due to the continuation of the Mount Garret ridge. It is located centrally to the gradual and most accessible slopes on the east side, forming a corridor from the southeast valley and a defensible bottle neck, preventing accessibility to the fort from a more advantageous angle. The topography would make approaches from the lower landscape to the south and west difficult, whilst approaching from the north would have been visible upon the approach.

Due to the asset being on the highest point in the surrounding landscape, there are a number of operational windfarms within view, including four at Lisdowney c.7km to the northeast, multiple phases of Lisheen Wind Farm and Bruckana Wind Farm c.10km to the west, and Ballybay Wind Farm and Foyle Wind Farm c.8-10km to the south. However, due to the elevation of the asset, visibility of these turbines does not compete or diminish the scale of the asset's height or its views within the landscape.

Proposed Gathabawn Windfarm Impact: The proposed development would introduce up to 9 turbines present within views c.5km to the north and c.6.5km to the east (Visual reference). As outlined above, the primary viewsheds which the fort focuses on are to the east, south and west, which contribute toward the strategic positioning of the fort and its defensive characteristics. As only short views along the ridge of Mount Garret contribute towards the asset's setting to the north and northeast, and there are no long-distance views which contribute towards understanding, experiencing and appreciating the defensive character, the turbines within these viewsheds are not expected to cause any effects upon the fort's setting. The dominance in which the fort holds within the landscape would remain intact with the presence of the turbines, as they would not be to such a scale that would diminish the prominence of the hillfort. Overall, it would be considered that the turbines would have no magnitude of effect upon its setting, resulting in no significance of effect.

Candidate Gathabawn Grid Connection Impact: During the operational phase, the only above-ground evidence of the candidate grid connection would be the Parksgrove Substation, located c.12.2km east of

the asset. It is therefore not considered that the candidate grid connection will have no magnitude of effect on the setting of this asset.

Impact Magnitude	No Magnitude of Effect	Impact Significance: (pre-mitigation)	No Significance
Mitigation and Monitoring Measures: No further mitigation is proposed, as there is no magnitude of change identified.			
Residual Impact Significance (post-mitigation):			No Significance

EIAR 15.4.5.6 Impact on potential archaeological remains identified through geophysical survey

Sensitive Aspect: Unrecorded Subsurface Sites

Importance: **Low – Medium**

Impact Source(s) Construction activities involving groundbreaking works

Impact Pathway(s) Physical truncation or complete removal of features

Project Stage Construction Phase

Overview of Impact (general):

Negative long-term direct impact from construction works and activities during the Construction Phase.

Examination of the Impact:

The geophysical features identified are potential archaeological remains, however their potential for archaeological significance is undefined; their character and level of preservation are undefined and could range from natural features, which have no significance, to medium due to their potential contributions to the regional archaeological record. Where features contribute toward our understanding of the archaeological context, they would be considered to be of archaeological significance. Therefore, the potential significance of these remains range from none to medium.

Proposed Gathabawn Windfarm Impact: In a worst-case scenario where the Proposed Development would result in the complete removal of these features, this would be a high adverse magnitude of impact. 'Complete removal' would be determined dependent on the type of remains, their extent, and professional judgement. It is unlikely that any remains would be of above medium significance, and due to the nature of the proposals and the construction footprint, would likely truncate remains rather than entirely remove them in a wider area. Therefore, impacts are considered to be medium to high adverse.

As these features are of potentially natural features of no archaeological significance to potentially medium archaeological significance, complete removal in a worst-case scenario would result in no effect to moderate/significant effects, based on professional judgement. Determining the level of effect is not definitive without investigations of these features.

Candidate Gathabawn Grid Connection Impact: Geophysical surveys have not been carried out at the Parksgrove Substation, or along the route of the candidate grid connection, apart from at the Ballyring Area where geophysical surveys were carried out in the area in the area of T8 and T9. It is noted that the Ballyring-Parksgrove UGC will be located within windfarm site roads in this area, and will have no further impact on potential archaeological remains. The potential for unknown remains along the Candidate Gathabawn Grid Connection is evaluated in Section EIAR 15.4.5.8 – 15.4.5.9.

Impact Magnitude	None to Medium/High adverse	Impact Significance: (pre-mitigation)	None – Moderate/Significant
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Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

Mitigation by Design	Embedded mitigation involved the micro-siting of turbine foundations and hardstanding areas and site roads to avoid potential archaeological remains identified through geophysical surveys. See Section 14.4.6
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WM08 GM08	Pre-construction licenced archaeology surveys and investigations will be carried out in advance of construction works taking place, at identified locations within the construction works area boundary. These surveys will include photographic surveys, townland/civil parish boundary surveys, wade and detection surveys, geophysical surveys and/or archaeological test trenching as required. The nature and scope of these surveys will be agreed with the National Monuments Service (NMS). The archaeologists will also provide a toolbox talk to construction teams. This will aim to outline the importance of archaeology, the legal implications of destroying it without appropriate reporting and recording, how to identify potential archaeology, outline a protocol and who to report it to when potential archaeology is found,
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WM26	Archaeological Monitoring of all initial groundworks will be carried out by the Project Archaeologist under licence during construction works. Test trenching is proposed in areas where geophysical features of an archaeological nature will be truncated by substantial groundworks, such as construction foundations, to first validate the presence of, or lack thereof, archaeological features. Strip, map and sampling can be undertaken in areas of soil stripping. The nature/scope of the groundworks monitoring will be agreed with the National Monuments Service (NMS).
WM79 GM65	Preservation of Archaeological Records during construction works will be through the following: - Strip, map and sample in areas where construction activities will strip the topsoil (turbine hard standing areas, borrow pits) and there are geophysical anomalies and LiDAR features present; - Watching brief on areas of soil stripping that are within 10m of recorded or potential archaeology, including geophysical and LiDAR features.
WM80 GM66	Cultural heritage features: Protective barriers or fencing will be installed/erected at identified cultural heritage features to prevent machinery or plant encroaching on the site/feature and to increase awareness of the presence of the site/feature with the construction personnel. Toolbox talks will be provided to construction personnel regarding the cultural heritage feature(s).
<u>Effectiveness of Mitigation:</u> Though the impact upon the asset as a result of ground disturbing construction works would remain the same, recording any remains through mitigation works would bring about a beneficial effect due to the preservation of the record of the asset.	
Residual Impact Significance (<i>post-mitigation</i>):	
None – Moderate/Significant	

EIAR 15.4.5.7 Impact on potential archaeological remains identified through LiDAR survey

Sensitive Aspect: Unrecorded Subsurface Sites

Importance: **Low – Medium**

Impact Source(s) Construction activities involving groundbreaking works

Impact Pathway(s) Physical truncation or complete removal of features

Project Stage Construction Phase

Overview of Impact (general):

Negative long-term direct impact from construction works and activities during the Construction Phase.

Examination of the Impact:

The LiDAR survey identified a wide range of potential archaeological features across the Site, including possible prehistoric enclosures, medieval ringforts or settlement-related elements, and extensive pre-famine agricultural field systems. As with the geophysical results, the archaeological significance of these features cannot yet be fully defined, as their character, date and level of preservation remain untested. However, the morphological clarity and diagnostic form of several larger circular enclosures, particularly those consistent with medieval ringforts or early settlement remains, indicate that such features are likely to be of low to medium archaeological significance. In contrast, the numerous linear features interpreted as pre-famine agricultural boundaries, drainage elements and small enclosures contribute to the understanding of historic land-use but are generally more common and less sensitive; these are therefore assessed as being of low significance. Overall, the LiDAR results present a spectrum of potential significance, ranging from low for widespread agricultural traces to moderate where features have clear architectural or settlement characteristics, reflecting their varying contributions to the archaeological landscape.

Proposed Gathabawn Windfarm Impact: In a worst-case scenario where the Proposed Development would result in the complete removal of these features, this would be a high adverse magnitude of impact. 'Complete removal' would be determined dependent on the type of remains, their extent, and professional judgement. However, the majority of features are likely to be truncated rather than completely removed, resulting in magnitude of effect of medium at most.

As these features are of potentially natural features of no archaeological significance or potentially of medium archaeological significance, complete removal in a worst-case scenario would result in no effect to moderate/significant effects. Determining the level of effect is not definitive without investigations of these features.

Candidate Gathabawn Grid Connection Impact: LiDAR surveys have not been carried out at the Parksgrove Substation, or along the route of the candidate grid connection, apart from at the Ballyring Area where a LiDAR survey was carried out in the area in the area of T8 and T9. Open source data was used where possible proximate to the Parksgrove Substation⁴. It is noted that the Ballyring-Parksgrove UGC will be located within windfarm site roads in this area, and will have no further impact on potential archaeological remains. The potential for unknown remains along the Candidate Gathabawn Grid Connection is evaluated in Section EIAR 15.4.5.8 - 9.

Impact Magnitude	None – Medium/High Adverse	Impact Significance: (pre-mitigation)	None – Moderate/Significant
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Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

⁴ [IE GSI Open Topographic \(LiDAR\) Data Ireland ITM Download Viewer | opendata](#)

Mitigation by Design	Embedded mitigation involved the micro-siting of turbine foundations and hardstanding areas and site roads to avoid potential archaeological remains identified through LiDAR surveys. See Section 14.4.6
WM08 GM08	<u>Pre-construction licenced archaeology surveys</u> and investigations will be carried out in advance of construction works taking place, at identified locations within the construction works area boundary. These surveys will include photographic surveys, townland/civil parish boundary surveys, wade and detection surveys, geophysical surveys and/or archaeological test trenching as required. The nature and scope of these surveys will be agreed with the National Monuments Service (NMS). The archaeologists will also provide a toolbox talk to construction teams. This will aim to outline the importance of archaeology, the legal implications of destroying it without appropriate reporting and recording, how to identify potential archaeology, outline a protocol and who to report it to when potential archaeology is found,
WM26	<u>Archaeological Monitoring of all initial groundworks</u> will be carried out by the Project Archaeologist under licence during construction works. Test trenching is proposed in areas where geophysical features of an archaeological nature will be truncated by substantial groundworks, such as construction foundations, to first validate the presence of, or lack thereof, archaeological features. Strip, map and sampling can be undertaken in areas of soil stripping. The nature/scope of the groundworks monitoring will be agreed with the National Monuments Service (NMS).
WM79 GM65	<u>Preservation of Archaeological Records</u> during construction works will be through the following: Strip, map and sample in areas where construction activities will strip the topsoil (turbine hard standing areas, borrow pits) and there are geophysical anomalies and LiDAR features present; Watching brief on areas of soil stripping that are within 10m of recorded or potential archaeology, including geophysical and LiDAR features.
WM80 GM66	<u>Cultural heritage features</u> : Protective barriers or fencing will be installed/erected at identified cultural heritage features to prevent machinery or plant encroaching on the site/feature and to increase awareness of the presence of the site/feature with the construction personnel. Toolbox talks will be provided to construction personnel regarding the cultural heritage feature(s).
<u>Effectiveness of Mitigation:</u> The LiDAR survey aimed to both inform the baseline assessment as well as form a method of mitigation. The LiDAR data now also serves as preservation by record of assets, primarily the series of field enclosures of which it has captured, to inform on the formation of field enclosures of the pre-famine landscape. Though the impact upon the asset as a result of ground disturbing construction works would remain the same, recording any remains through mitigation works would bring about a beneficial effect due to the preservation of the record of the asset.	
Residual Impact Significance (<i>post-mitigation</i>):	
None – Moderate/Significant	

EIAR 15.4.5.8 Impact on Unknown prehistoric remains

Sensitive Aspect: Unknown Subsurface Sites

Importance: **Low - Medium**

Impact Source(s) Construction activities involving groundbreaking works

Impact Pathway(s) Physical truncation or complete removal of features

Project Stage Construction Phase

Overview of Impact (general):

Negative long-term direct impact from construction works and activities during the Construction Phase.

Examination of the Impact:

Proposed Gathabawn Windfarm Impact: The potential for prehistoric remains within the Site is high, due to the presence of prehistoric enclosures and assets (Figures 2a-e) and potential features identified on the geophysical and LiDAR survey; there may be further yet unidentified areas of potential. Further geophysical anomalies and LiDAR features (circular and penannular features, such as anomalies 11-07, 13-01, 14-02, 14-05, as well as large circular enclosures SLR507, SLR518, SLR509, SLR510) which may be characteristic of prehistoric settlement activity. The data indicates that the Site itself was an area of settlement and potential cultivation activity, with Fulacht Fiadh and burial assets located outside of the upland landscape within the Site, with preference for the lower valleys. Therefore, the likely remains for the prehistoric period would comprise settlement remains such as enclosures. Potential for cultivation remains is less likely due to later agricultural activity, likely removing identifiable remains from previous periods.

Remnant prehistoric settlement and agricultural remains would have the potential to contribute to our understanding of settlement and farming practices of a period in the region of which little is known and are therefore of low to medium archaeological significance. In the worst case scenario, complete removal of such remains would be considered a high adverse magnitude of impact upon assets. It is unlikely that, due to the construction footprint of the development, all potential unknown remains would be completely removed, but more likely partially truncated, resulting in magnitudes of effect ranging from low to medium adverse. Low to high potential magnitudes of effect upon low to medium cultural heritage significance, resulting in a **slight to, at most, a significant** effect, in which the latter would be considered significant in EIA terms. Determining the significance of these remains and therefore the overall effect is not definitive without archaeological investigations of these features.

Candidate Gathabawn Grid Connection: The Ballylehaun-Ballyring UGC is predominantly located within the public road and under hardcore surfaces at the windfarm site, and while it does bisect the Zone of Notification for enclosure KK009-007---, it has been determined that the impacts on this asset will not be significant (Section EIAR 15.4.5.1). There are no other known prehistoric assets, or potentially prehistoric assets identified from site investigations, with potential to be impacted by underground cabling works or the construction of the Parksgrove Substation. Should any prehistoric remains be present, they would have the potential to contribute towards our understanding of the prehistoric local land use and activity of this period. Considering the scale of the cable trench, it would be unlikely to cause impacts greater than low adverse upon prehistoric remains of which would likely be of low to medium significance. This would therefore result in a potential slight significance of effect should any prehistoric remains be present within the extent of the cable groundworks.

Impact Magnitude	Low to High Adverse	Impact Significance: (pre-mitigation)	Slight - Significant
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Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

Mitigation by Design	Embedded mitigation involved the micro-siting of turbine foundations and hardstanding areas and site roads to avoid as far as possible medieval field boundaries and veteran hawthorn trees. See Section 14.4.6
WM08 GM08	Pre-construction licenced archaeology surveys and investigations will be carried out in advance of construction works taking place, at identified locations within the construction works area boundary. These surveys will include photographic surveys, townland/civil parish

	boundary surveys, wade and detection surveys, geophysical surveys and/or archaeological test trenching as required. The nature and scope of these surveys will be agreed with the National Monuments Service (NMS). The archaeologists will also provide a toolbox talk to construction teams. This will aim to outline the importance of archaeology, the legal implications of destroying it without appropriate reporting and recording, how to identify potential archaeology, outline a protocol and who to report it to when potential archaeology is found,
WM26	<u>Archaeological Monitoring of all initial groundworks</u> will be carried out by the Project Archaeologist under licence during construction works. Test trenching is proposed in areas where geophysical features of an archaeological nature will be truncated by substantial groundworks, such as construction foundations, to first validate the presence of, or lack thereof, archaeological features. Strip, map and sampling can be undertaken in areas of soil stripping. The nature/scope of the groundworks monitoring will be agreed with the National Monuments Service (NMS).
WM79 GM65	<u>Preservation of Archaeological Records</u> during construction works will be through the following: Strip, map and sample in areas where construction activities will strip the topsoil (turbine hard standing areas, borrow pits) and there are geophysical anomalies and LiDAR features present; Watching brief on areas of soil stripping that are within 10m of recorded or potential archaeology, including geophysical and LiDAR features.
WM80 GM66	<u>Cultural heritage features:</u> Protective barriers or fencing will be installed/erected at identified cultural heritage features to prevent machinery or plant encroaching on the site/feature and to increase awareness of the presence of the site/feature with the construction personnel. Toolbox talks will be provided to construction personnel regarding the cultural heritage feature(s).
<u>Effectiveness of Mitigation:</u> Though the impact upon the asset as a result of ground disturbing construction works would remain the same, recording any remains through mitigation works would bring about a beneficial effect due to the preservation of the record of the asset.	
Residual Impact Significance (<i>post-mitigation</i>):	
Slight - Significant	

EIAR 15.4.5.9 Impact on unknown medieval remains

Sensitive Aspect: Unknown Subsurface Sites

Importance: **Low - Medium**

Impact Source(s) Construction activities involving groundbreaking works

Impact Pathway(s) Physical truncation or complete removal of features

Project Stage Construction Phase

Overview of Impact (general):

Negative long-term direct impact from construction works and activities during the Construction Phase.

Examination of the Impact:

Proposed Gathabawn Windfarm Impact: The study area contains a concentration of medieval assets, particularly ringforts, which are primarily located in the western portion of the study area, indicating long-term settlement and agricultural use. Several ringforts lie close to proposed turbine locations, with geophysical and LiDAR survey results indicating subsurface features potentially associated with these monuments, such as, anomalies 06-01, 06-02, 07-03, which may indicate the presence of early medieval rural settlement activity. In addition, ringfort-scale features at the Ballylehaun Area recorded as a result of the LiDAR survey such as SLR506 and SLR507 (with its southeast-facing entrance typical of early medieval defended or domestic enclosures) further suggest previously unrecorded activity from this period. Potential trackways (SLR113, SLR114) in the area of the T2 hardstand appear to connect with circular enclosures (SLR503, SLR504), hinting at medieval access routes or stock management systems, and many features occur in clusters close to known ringforts, reinforcing the impression of a settlement rich landscape. Linear features detected through geophysics, LiDAR, and walkover surveys, absent from first edition OS maps (surveyed 1839), may also be medieval in origin. Given the high number and distribution of known assets, and the presence of geophysical anomalies and LiDAR features which may represent ring forts and agricultural remains such as field boundaries, there is a high potential for previously unrecorded medieval archaeological remains within the development area associated with the identified settlement areas. These may include defensive or domestic structural elements, or associated field systems, which would be considered of slightly less significance, contributing in part to our overall understanding.

Remnant medieval settlement and agricultural remains would have the potential to contribute to our understanding of settlement and farming practices during this period in the region and are therefore of low archaeological significance. Complete removal of such remains would comprise a high adverse magnitude of impact upon assets of low cultural heritage significance, resulting in a moderate effect in EIA terms.

Candidate Gathabawn Grid Connection Impact: The Parksgrove Substation is located adjacent to the Zone of Notification (ZoN) for ringfort KK009-014----, and while it is determined that the impact on the ringfort will be not significant (Section EIAR 15.4.7), there is potential for unrecorded medieval remains associated with this asset located outside the ZoN to be impacted by substation construction works and trenching works. Ring-ditch KK009-015---- is also located c.35m from Ballyring-Parksgrove UGC trenching works. Associated remains which would contribute toward our understanding of the land use outside of the ringfort would be considered to be of low cultural significance. The substation and cable route would cause a large area of sub-surface impacts, and therefore is likely to truncate or completely remove features associated with the ringfort. Therefore, the magnitude of effect of medium - high adverse, upon remains, resulting in a slight - moderate impact significance.

Impact Magnitude	Medium - High Adverse	Impact Significance: (pre-mitigation)	Slight - Moderate
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Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.	
WM08 GM08	<u>Pre-construction licenced archaeology surveys</u> and investigations will be carried out in advance of construction works taking place, at identified locations within the construction works area boundary. These surveys will include photographic surveys, townland/civil parish boundary surveys, wade and detection surveys, geophysical surveys and/or archaeological test trenching as required. The nature and scope of these surveys will be agreed with the National Monuments Service (NMS). The archaeologists will also provide a toolbox talk to construction teams. This will aim to outline the importance of archaeology, the legal implications of destroying it without appropriate reporting and recording, how to identify potential archaeology, outline a protocol and who to report it to when potential archaeology is found,
WM26	<u>Archaeological Monitoring of all initial groundworks</u> will be carried out by the Project Archaeologist under licence during construction works. Test trenching is proposed in areas where geophysical features of an archaeological nature will be truncated by substantial groundworks, such as construction foundations, to first validate the presence of, or lack thereof, archaeological features. Strip, map and sampling can be undertaken in areas of soil stripping. The nature/scope of the groundworks monitoring will be agreed with the National Monuments Service (NMS).
GM24	<u>Archaeological Monitoring of initial groundworks</u> in Parksgrove and Moatpark will be carried out by the Project Archaeologist under licence during construction works. The nature/scope of the groundworks monitoring will be agreed with the National Monuments Service (NMS). This will include a Watching Brief on areas of track construction, soil stripping, or grid connection works that are within 10m of recorded or potential archaeology, including geophysical and LiDAR features.
WM79 GM65	<u>Preservation of Archaeological Records</u> during construction works will be through the following: • Strip, map and sample in areas where construction activities will strip the topsoil (turbine hard standing areas, borrow pits) and there are geophysical anomalies and LiDAR features present; • Watching brief on areas of soil stripping that are within 10m of recorded or potential archaeology, including geophysical and LiDAR features.
WM80 GM66	<u>Cultural heritage features:</u> Protective barriers or fencing will be installed/erected at identified cultural heritage features to prevent machinery or plant encroaching on the site/feature and to increase awareness of the presence of the site/feature with the construction personnel. Toolbox talks will be provided to construction personnel regarding the cultural heritage feature(s).
<u>Effectiveness of Mitigation:</u> Though the impact upon the asset as a result of ground disturbing construction works would remain the same, recording any remains through mitigation works would bring about a beneficial effect due to the preservation of the record of the asset.	
Residual Impact Significance (post-mitigation):	
Slight - Moderate	

ElAR 15.4.6 Embedded Mitigation

The layout/design of the development's infrastructure and turbine locations have involved a number of micro-siting revisions in order to avoid or minimise impacts upon known archaeological features to first preserve archaeological remains in-situ, such as SMR records, Zones of Notification and historic field boundaries, as well as potential archaeological features identified by the geophysical survey, LiDAR survey. This involved the reorientation of turbine bases, locations of borrow pits, movement of tracks and cabling, revision of the wind farm cable link and more. The site boundary was revised at the Ballylehaun Area to ensure the Zones of Notification for enclosures KK008-030---, KK009-003---- and KK009-092----, and ringfort KK008-033---- are not impacted, while the site boundary at Ballyring was amended to remove the ZoN for enclosure KK009-023----. In addition, T6 and T7 were micro-sited to reduce their visual presence within views

from Gorteennamuck ringfort (KK009-006----) and Rathlogan ringfort (KK008-060001-), out of their views over their topographical focus and where they have visual associations with other ringforts.

EIAR 15.4.7 Impacts to Cultural Heritage which will not be Significant

All of the remaining effects of the proposed Gathabawn Windfarm Project on Cultural Heritage will not be significant. A short evaluation of these effects is provided below.

Evaluation of the Not Potentially Significant Effects on Designated Cultural Heritage Sites

Impact on Grangefertagh Round Tower & Church (NM 74) (O): Not significant. The Grangefertagh round tower is an 8 story tower measuring 31.5m tall, built from limestone, and was once part of St. Ciarán's 6th century ecclesiastical monastery. The church is part of the later priory established in the 13th century, on the site of the 6th century monastery, for the Canons Regular of St. Augustine. The tower was intended as a sign of wealth, and refuge from Viking raiders and attacks, using ladders to access the upper floors, although this failed when an attack set the tower on fire and killed lector Eochaidh O'Cuim.

The tower sits within an ecclesiastical enclosure, previously part of a monastic structure which would have extended across the Site around the tower upon its now modern approach to the west. The tower and the ecclesiastical enclosure sit within a wider area of rural landscape, historically being part of medieval settlement and agricultural land holdings. The only remaining upstanding structures alongside the tower is the medieval to post-medieval church. The church has multiple built phases from the 13th to 16th century, before its decline. The church is now in a state of ruin, having gone into disuse when its roof collapsed in the late 18th century.

The proximity of the monastery to a historic main route through the landscape, now extant as the M8, was likely intentional to be proximate to trade routes and communications; the tower would have marked it as a feature of prestige in the landscape, and would have been intended to be seen along this main route.

The tower, which once stood amongst the monastery, now sits alone within the ecclesiastical enclosure, and is therefore missing a high level of its context, which is infilled by an information board upon the modern west approach to the tower. The presence of the later church within the enclosure, and burial features, maintains the setting of an ecclesiastical Site, and together with the tower contribute the understanding, experience and appreciation of the evolution of the ecclesiastical Site. The rural grounds around the Site, also contribute towards the understanding of the early and later monastery and priory, of which would have relied on income from the land and trade with the main travel route to the east.

The approach to the asset would historically be along the road extending from the M8, facing west, until coming around the north of the tower to its west side. The tower is a prominent feature in the landscape upon this approach, and remains the focus in these views, as intended from the historic main route.

The prominence of the tower, as approaching from the west and facing east, is maintained even with two overhead lines passing through the enclosure, and modern buildings on the north side. Vegetation screens most external views, maintaining the focus on the remains within the enclosure; the tower, priory remains and the burial features. However, due to its impressive scale, the tower maintains the focus throughout the enclosure. The only external views which are incorporated into its setting are west rural views of field enclosures, which contribute toward the rural setting of the asset.

Whilst all 12 of the proposed turbines are predicted to be visible in a bare-earth scenario, only seven within the Ballylehaun section (5.35km east) would be proximate enough to be prominent (VP14) within the bare-

earth wireline. However, given the existing screening, the turbines' visibility would be considerably reduced, with only T6 being prominent within unscreened views on the east side of the enclosure.

No turbines would be visible upon the approach to the tower until the immediate west approach, in which the turbines would be indiscernible except T6. T6 in this view would not be greater in scale than the existing overhead line poles within the enclosure, and the modern buildings to the north side of the enclosure. Nor would the turbine compete with the scale and focus of the tower and church. External views east outward from the enclosure toward the land within the Site do not contribute toward the setting of the assets, as they do not contribute toward the understanding, experience and appreciation of the tower's function and the ecclesiastical, economic and rural aspects in which the monastery, and later priory, functioned. Overall, the presence of turbines would not be introduced into any key views which contribute to the asset's cultural significance by way of setting, nor would they distract from the aspects which do contribute, including the focus upon the tower within the wider landscape. No magnitude of impact is predicted and therefore results in no significance of effect.

Impact on Ballylarkin Church (NM 282) (O): Not significant. The monument comprises a small 13th century parish church situated within a field system, built by James Schortal and Catherine White in 1350, to function as a private chapel for the nearby family residence. The record of a medieval deserted settlement (KK013-017----) is said in the Down Survey (1655-6) to show a castle and cluster of houses, likely to be the seat of the Shortals at Ballylarkin, and the reason for the location of the church. The significance of the church derives primarily from its architectural interests, including three main phases of development, which informs the initial and later uses of the church, and the Sheela-na-gig (KK013-018003-) which is now in the National Museum of Ireland.

The location of the church was intended to be within a practical distance for the personal use of the Schortal family, and potentially later used as a defensive refuge during times of conflict, and therefore its views are less important than its spatial planning with the settlement c.0.5km to the northwest. The modern road and hedgerows also create a boundary between the church and the settlement on the west side, essentially separating the two spaces and their interspatial understanding. Its existing approach is through a gate from the west, but it was likely that its north doorway was aligned with the historic settlement prior to the construction of the road, separating the two's spatial understanding.

Although the wireline (VP35), see **LVIA Photomontages Book 3**, indicates that all 12 of the turbines would be visible from the asset, 10 of which include turbine hubs, the photomontages indicate that due to screening only the Ballyring section of the proposed wind farm would have visible turbines, comprising five. The setting of the church does not extend beyond its local setting, comprising of its relationship with the medieval Ballylarkin settlement and its function as a church and place of refuge and defence during conflict. The turbines to the north would not intervene or detract from any views between the church and the associated settlement, to the west, more than the existing road and hedgerows. Long-distance views to the Ballyring section c.5.5km to the north do not contribute toward its aspects of setting which contributes to its cultural heritage significance. Overall, no magnitude of impact is predicted, resulting in no significance of effect.

Impact on Rathealy, Ringfort (SM 376) (O) (outwith Figure 1a-o): Not significant. The ringfort is classed as a trivallate fort, a type of ringfort comprising of three concentric banks and fosses and are considered to be of a higher status and more elaborate than the more common singular or double banked ringforts. It has a raised oval internal area, with the entrance in the east through breaks in the earthworks with gentle slopes. Such is the size and complexity that the ringfort is also classed as a castle ringwork.

Rathealy ringfort is located slightly below the crest on an extended ridge, providing the ringfort with surrounding views over two parallel valleys to the northeast and southwest. This would provide the ringfort with views over all of its approaches, and contribute toward how we understand, experience and appreciate

the ringfort as a defensive settlement, being strategically positioned to be able to control its approaches and monitor the landscape in which it occupied. Within its current setting, its surrounding views also comprise isolated farmsteads and housing, which intermittently block views, including views to the east and northwest, although the intended strategic position and surrounding views are still understandable.

Whilst there is potential visibility of up to 10 of the proposed turbines (c.8.67km north), the distance of the development is far outside the contributing aspects of the ringfort's setting. The turbines sit within , whilst the focus of the ringfort's setting comprises the lower slopes of the valleys to the northeast and southwest, overlooking the landscape in which it would have controlled and monitored as part of its defensive function. The proposed wind turbines would not be present within these northeast and southwest downward facing views over the landscape, and would not be considered to cause more of a distraction than the existing modern developments such as the farmsteads already within these views or overhead lines following the roadways to the southwest and east. Overall, no magnitude of impact is predicted, resulting on no significance of impact.

Impact on Enclosure KK009-023 (C): Slight impact. The enclosure (KK009-023----) and its associated remains recorded adjacent to the site boundary at the Ballyring Area. These remains would be of moderate archaeological interest, given their potential through investigation to inform our understanding of prehistoric land use in the area, however, as the remains have been subject to truncation by an existing farm track, it is less likely that the asset would be of moderate archaeological interest. Complete removal of this asset would be considered a high adverse impact. Given that ground works would remain entirely within the area of the existing track and there would be no construction works within the Zone of Notification, it is not anticipated that any new direct impacts would arise from the works along the track and installation of cabling. This would result in a slight significance of effect which would be considered **not significant** in EIA terms.

Impact on Ringfort KK009-014---- (C): Slight direct impact. Ringfort KK009-014---- is located adjacent to the grid connection route and substation from the construction works area associated with the Candidate Gathabawn Grid Connection in the townland of Parksgrove. There will be no construction works within the Zone of Notification for this asset, however cable trenching works could impact unrecorded subsurface remains associated with the asset outside of its Zone of Notification. Therefore, it is determined that the impact on Ring-ditch's associated remains will be low adverse, upon an asset of medium significance, resulting in a Slight significance of effect. In addition, the ringfort's setting was likely both domestic and strategic, positioned on the west coast of the River Nore for domestic life, a boundary for defense, and communication and transport along the river. It's likely key aspects of setting that contribute towards its cultural significance comprise views along the river to the north and southeast, which are also its likely intended approaches. The substation would be constructed to the north of the ringfort, which would be within one of its key views northward, along the River Nore. However, due to its already forested land conditions to the north, and the N77 road to the east forming a barrier between the ringfort and the river, the substation would not cause further effects upon its setting than currently exist. Views from the ringfort should trees be cleared from its earthworks, southeast and across the River Nore would remain intact, and the intelligibility of the asset's strategic and connective setting would be retained. Overall the magnitude of change would be low adverse on an asset of medium significance, resulting in a slight significance of effect.

EIAR 15.4.7.1 Evaluation of the Not Significant Effects on Previously Unrecorded/Not Protected Sites

Impact on Townland Boundaries from windfarm construction works (C): Not Significant. At the Ballylehaun Area, construction of Site Entrances No. 1 and No. 2, as well as widening a section of the public road L58141 may impact on the townland boundary of Coolnacrutta and Glashare, which is located along the centre of this road. Construction of the access road between T2 and T3 will have a direct impact on the townland boundary of Glashare and Ballylehaun, while the access road between T5 and T6 will directly impact the

townland boundary of Ballylehaun and Gorteennamuck. The access road to the met mast will directly impact a small section of the Ballylehaun and Rathlogan townland boundary.

At the Ballyring Area, the access road to T10 will directly impact the townland boundary of Tentore and Ballyring Upper, while the access road to T11 will also directly impact this townland boundary at a different location. The access road between T8 and T9 will directly impact the townland boundary of Ballyring Upper and Ballyring Lower. Facilitating Works FW9 will also directly impact the townland boundary of Foyle South and Coolcashin.

Townland boundaries often survive by record, often being removed and be fundamentally administrative. In this landscape, these boundaries can be perceived through roads, tracks and field enclosures, of which, as outlined above, will be truncated in certain sections. Many of the proposed aspects of infrastructure follow these townland boundaries, however, where the proposed infrastructure would cross these boundaries, it would interrupt a section of the linear landscape patterns. This would cause a slight effect in the way the historic landscape is understood, experienced and appreciated, but would not entirely remove the clear demarcation of townlands within the overall landscape, nor effect our records of land demarcation through mapping. The overall magnitude of change to these boundaries would be considered very low adverse, resulting in a Not Significant significance of effect.

Impact on Townland Boundaries from the Candidate Gathabawn Grid Connection (C): Not Significant. The Candidate Gathabawn Grid Connection is routed to cross 12 no. townland boundaries. Four of those townland boundaries occur along the route of the Ballylehaun-Ballyring UGC within the public road (Ballylehaun and Gorteennamuck; Gorteennamuck and Ballygowney; Ballygowney and Coolcashin; and Ballygowney and Ballyring Upper), six of those townland boundary crossings occur along the route of the Ballyring-Parksgrove UGC (Ballyring Upper and Ballyring Lower; Ballyring Lower and Lisdowney; Lisdowney and Seskin South; Seskin South and Grange; Grange and Ballyconra; and Ballyconra and Parksgrove), with the remaining two townland boundary crossings occurring on the route of the Parksgrove-Moatpark Cable (Parksgrove and Ballyconra; Ballyconra and Moatpark).

Two of the townland boundaries have existing crossings or infrastructure at the point of interaction with the Candidate Gathabawn Grid Connection, the Seskin South and Grange townland boundary, which is crossed with an existing farm track, and the Parksgrove Moatpark townland boundary, which is in the centre of the River Nore, which the Parksgrove-Moatpark Cable will cross via directional drill. The Ballyring-Parksgrove UGC will also cross the Ballyring Upper and Ballyring Lower townland boundary within a section of the access road to T9. All of the other townland boundaries will require new crossings to facilitate the construction of the Candidate Gathabawn Grid Connection.

As outlined above, the truncation of physical remnant townland boundaries would cause a slight effect in the way the historic landscape is understood, experienced and appreciated, but would not entirely remove the clear demarcation of townlands within the overall landscape, nor effect our records of land demarcation through mapping. The overall magnitude of change to these boundaries would be considered very low adverse, resulting in a Not Significant significance of effect.

EIAR 15.4.8 Consideration of the Whole Project Impact**EIAR 15.4.8.1 Construction Phase**

The baseline assessment to ascertain the archaeological context and predictive model for the Site has involved desk-based research, archaeological walkovers, a geophysical survey, and a LiDAR survey, which has identified a landscape of general moderate to high archaeological potential, dating back to the prehistoric period.

The construction phase of the development and grid connection has not been identified to impact any designated cultural heritage assets, and has been identified to impact non-designated assets such as historic field boundaries, which have been outlined and recorded using high-resolution LiDAR data.

Overall, based on the known archaeological context of the landscape, and the concentration of geophysical survey features and their characteristics and scale, there is potential for further archaeological remains to be identified within the footprint of the Site. Whilst this would cause potential permanent impacts upon this archaeological baseline, including prehistoric and medieval remains, the mitigation measures, designed and implemented in agreement with the National Monument Service and the Kilkenny County Archaeologist, would provide valuable information and context for the archaeological profile within this landscape, which has otherwise had limited investigation. This would not reduce the impacts, as the physical removal of archaeological remains would be irreversible, but the beneficial effects of investigative works and records should be considered.

In addition, public outreach schemes are proposed, such as online databases where local communities can access valuable datasets, including the LiDAR survey data, and collate their heritage on the heritage library. Additional options, such as signboards at historic sites within the Site, are proposed to assist the public in both accessing and understanding the historic landscape.

EIAR 15.4.8.2 Operational Phase

The proposed development would introduce a number of aspects of infrastructure into the landscape of the Site, but the proposed turbines would have the greatest scale of visual change, and therefore, the assessment has focused on the indirect effects of the proposed turbines.

The following assets were included in an early desk-based review of potential effects upon the setting of assets, utilising a ZTV that extended out to a 5km radius from the turbines:

- Site and Monument Records
- Recorded Monuments and Places
- Records of Historic Monuments
- National Monuments
- Buildings on the National Inventory of Architectural Heritage

Of the above, only those that are considered to have potential significant setting impacts were assessed in-field during a comprehensive site survey in August, 2025. Those visited are as follows:

- KK009-006---- : Ringfort - rath: GORTEENNAMUCK;
- KK008-060001- : Ringfort - rath: RATHLOGAN;
- KK008-124002- : Hillfort: CLOMANTAGH (Mountgarret);
- KK008-124001- : Megalithic tomb - passage tomb : CLOMANTAGH (Mountgarret);
- NM 74 – Grangefertagh Round Tower & Church;

- KK013-016---- : Castle - motte : BALLYLARKIN LOWER;
- NM 282 – Ballylarkin Church; and
- 12305022 : Uppercourt House : house, and associated buildings and landscape.

Of those visited, the following have been considered to be brought forward for a full indirect impact assessment within the CHIA:

- KK009-006---- : Ringfort - rath : GORTEENNAMUCK and its views with other ringforts;
- KK008-060001- : Ringfort - rath : RATHLOGAN;
- KK008-124002- : Hillfort : CLOMANTAGH (Mountgarret);
- KK008-124001- : Megalithic tomb - passage tomb : CLOMANTAGH (Mountgarret);
- NM 74 – Grangefertagh Round Tower & Church;
- NM 282 – Ballylarkin Church; and
- NM 376 – Rathealy, Ringfort.

Overall, whilst the turbines are visually distinctive within their landscape, none of the assets assessed would be significantly affected by the introduction of the turbines within their setting. The ability to understand, experience and appreciate the assets within their setting would remain intelligible, albeit they would cause a distraction in certain views. Overall, **it is considered that the presence of the turbines, or any aspect of the developments infrastructure, would not affect the setting of an asset to such a degree that its cultural significance would be significantly impacted.**

The grid connection would be entirely beneath the ground with the exception of the substation, of which the assessment identified that, whilst it would affect the setting of KK009-014----, it would not erode the asset's setting to such a degree than modern infrastructure already has that would prevent the understanding of its contextual setting.

EIAR 15.4.8.3 Decommissioning Phase

Upon decommissioning of the Proposed Gathabawn Windfarm, the visual changes which have caused adverse effects upon the assets settings above will be reversed. The archaeological remains within the Site will be permanently removed, but no further direct impacts are predicted through the decommissioning of the Site. The archaeological records from mitigation measures, and public benefit schemes will have provided an increased knowledge of the archaeological context within the landscape. Overall, the impact of the Whole Gathabawn Windfarm Project during decommissioning is evaluated as Neutral.

EIAR 15.4.9 Environmental Protection Measures

In addition to the mitigation measures identified in Section EIAR 15.4.5, additional measures which form part of standard windfarm construction/operation will be implemented during the construction/operation/decommissioning of the Gathabawn Windfarm development to protect the Cultural Heritage environment and avoid/reduce these not significant effects. These environmental protection measures are identified below and are included in the Environmental Management Plan 2026 for the Gathabawn Windfarm Project which accompanies the planning application.

Table 15-3: Environmental Protection Measures for Non-Significant Effects

WM08	<u>Pre-construction licenced archaeology surveys</u> and investigations will be carried out in advance of construction works taking place, at identified locations within the construction works area boundary. These surveys will include photographic surveys, townland/civil parish boundary surveys, geophysical surveys and/or archaeological test trenching as required. The nature and scope of these surveys will be agreed with the National Monuments Service (NMS). The archaeologists will also provide a toolbox talk to construction teams. This will aim to outline the importance of archaeology, the legal implications of destroying it without appropriate reporting and recording, how to identify potential archaeology, outline a protocol and who to report it to when potential archaeology is found.
WM26	<u>Archaeological Monitoring</u> of all initial groundworks will be carried out by the Project Archaeologist under licence during construction works. Test trenching is proposed in areas where geophysical features of an archaeological nature will be truncated by substantial groundworks, such as construction foundations, to first validate the presence of, or lack thereof, archaeological features. Strip, map and sampling can be undertaken in areas of soil stripping. The nature/scope of the groundworks monitoring will be agreed with the National Monuments Service (NMS).

EIAR 15.5 CUMULATIVE EFFECTS WITH OTHER PROJECTS

Other existing and permitted projects and projects advanced in the planning system out to 10km were examined for their potential to cumulatively affect Cultural Heritage with the proposed Gathabawn Windfarm Project. These projects are referred to as 'Other Projects' herein.

A Cumulative Study Area is set out below and Other Projects located within this Study Area are identified and examined for in-combination effects.

Cumulative Study Areas: A 10km Cumulative Study Area has been used to identify likely developments that would have a similar scale of impact upon the same receptors identified within this assessment in regard to setting effects.

The Other Projects which occur within the Cumulative Study Areas were subject to a cumulative scoping exercise, see Chapter 5 Description of the Development Appendix 5.4. As a result of this scoping exercise, some of these Other Projects were scopedd IN for evaluation of cumulative effects, and these projects are listed below.

The Other Projects which have been Scoped-In to the cumulative evaluations herein identified in **Figure 15.3: Other Projects Scoped-In to the Cultural Heritage Cumulative Evaluation** (included at the end of this chapter).

EIAR 15.5.1 Evaluation of Cumulative Impacts with Other Projects

The potential for cumulative effects with Other Projects is evaluated hereunder. The evaluation takes into account existing sources of impacts or damage identified in Section EIAR 15.3.2.

EIAR 15.5.1.1 Operational Phase Cumulative Effects

Other Projects Scoped In: Seskin WF (in-planning).

- Seskin WF: The submitted assessment for Seskin identified no impact on assets that have been identified within this EIA Chapter. The Seskin Wind Farm ZTV indicates that the visibility of the turbines would be present primarily eastward, and would not be prevalent in the landscapes extending toward the Proposed Gathabawn Windfarm. Therefore, no potential cumulative impacts have been identified on receptors in relation to the Gathabawn Windfarm proposals and other cumulative developments of a similar scale within 10km.

EIAR 15.5.2 Cumulative Evaluation - all Other Projects considered collectively

There have been no identified potential cumulative effects of the proposals in relation to any other identified proposed developments currently in application or consented.

EIAR 15.6 SUMMARY CONCLUSION

This assessment has considered data from a diverse range of sources to identify any heritage assets which may be directly or indirectly affected by the Proposed Development. The potential cumulative effects have also been assessed.

The archaeological baseline of the Site was investigated by desk-based assessment, an archaeological walkover, a geophysical survey and a LiDAR survey, due to the known presence of archaeology within the Site. LiDAR also successfully recorded the pre-famine agricultural landscape within the Site. These investigations have been compiled to complete a comprehensive dataset to identify and assess potential direct impacts upon archaeological remains within the Site. Of the assets identified there are no assets within the Proposed Gathabawn Windfarm site boundary. However an enclosure (KK009-007----) is just outside the identified construction works area boundary associated with the Candidate Gathabawn Grid Connection and has the potential to be proximate enough to be truncated to some degree, although due to construction activities remaining within the road it is unlikely. A slight significance of effect was identified upon an Enclosure (KK009-007----). This is not considered significant in EIA terms.

Further archaeological remains identified through geophysical survey, site investigation and LiDAR have been assessed based on predictions of what their potential highest cultural significance could be. These features have the potential to have cultural significance of low to medium, based on their characteristics, and therefore a high adverse degree of change would result in a moderate to significant effect. Similarly, further potential archaeological remains of prehistoric and medieval date could remain undetected in the Site, some of which may be associated with known monuments (KK009-003----, KK009-023----, and KK009-014----). These remains have the potential to have a low to medium level of cultural significance, and therefore a higher adverse degree of change, should they be heavily truncated by development, would result in a slight to moderate significance of effect, and potentially, but less likely, a significant effect.

Whilst post-consent mitigation strategies would not reduce the direct impacts upon archaeological remains, the information obtained from archaeological works would considerably offset these effects to some degree by providing an archaeological record of investigations from the Site and therefore preserving them by record. The current surveys to date have provided significant contributions to the archaeological baseline information within this landscape.

The indirect impact assessment identified and assessed cultural heritage assets where their settings are sensitive to change due to the contribution to their cultural significance, and the presence of the proposed turbines would have potential impacts upon their settings. Of the assets assessed, a moderate significance of effect was identified upon Gorteennamuck ringfort (KK009-006----), and a slight significance of effect was identified upon Rathlogan ringfort (KK008-060001-). These effects would not be considered significant in accordance with the EPA guidance (2022).

EIAR 15.7 Glossary, List of Abbreviations**Glossary of Terms**

Term	Definition
Archaeological Heritage	All remains and objects and any other traces of humankind from the past, the preservation and study of which help to retrace the history of humankind and our relationship with the natural environment. Includes known archaeological sites and monuments, areas of archaeological potential, underwater archaeology and archaeological objects.
Gathabawn Windfarm	Twelve wind turbines are proposed for two areas – seven turbines in the Ballylehaun area and five turbines in the Ballyring area. In addition to the turbines and their hardstanding areas, the windfarm also includes site access roads, two Control Buildings; a met mast, underground cabling, temporary works to facilitate turbine deliveries, and other associated and ancillary works.
Candidate Gathabawn Grid Connection	Underground cabling between the Ballylehaun and Ballyring Areas (Ballylehaun-Ballyring UGC), underground cabling from the Ballyring Area (from Ballyring Control Building) to a new substation at Parksgrove (Ballyring-Parksgrove UGC), the Parksgrove Substation, and underground cabling from the substation to the existing Eirgrid Ballyragget Substation in Moatpark (Parksgrove-Moatpark UGC).
Gathabawn Windfarm Project	Gathabawn Windfarm and Candidate Gathabawn Windfarm Grid Connection
Built Heritage	Standing structures, buildings, traditional and designed, and groups of buildings including streetscapes and urban vistas, which are of architectural, historical, archaeological, artistic, engineering, scientific, social or technical interest, together with their setting, attendant grounds, fixtures, fittings and contents.
Cultural Heritage	A group of resources inherited from the past that people identify independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. It includes all aspects of the environment resulting from the interaction between people and places through time.
Designated	A Cultural Heritage receptor that has been assessed by the relevant authority as significant and requiring formal protection and/or inscription on a register.
Intangible Cultural Heritage	The practices, representations, expressions, knowledge and skills as well as the instruments, objects, artefacts and cultural spaces that communities, groups and individuals recognise as part of their Cultural Heritage.
Receptor	Any element in the environment with demonstrable Cultural Heritage significance which is subject, or potentially subject, to impacts because of the Proposed Scheme.
Sensitive Aspect	Any sensitive receptor in the local Cultural Heritage environment which could be impacted by the project, used interchangeably with 'Receptor' above.
Setting	The aspects of and environment of a place that contributes positively or negatively to its cultural significance by how it is understood, experienced and appreciated.

List of Abbreviations

Abbreviation	Full Term
AOD	Above Ordnance Datum
CIfA	Chartered Institute for Archaeologists
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
LiDAR	Light Detection and Ranging
NIAH	National Inventory of Architectural Heritage
NM	National Monument
SMR	Scheduled Monument Record
RMP	Record of Monuments and Places
RHM	Record of Historic Monuments
RPS	Record of Protected Structures

EIAR 15.8 Reference List

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- Includes the first edition 6-inch maps (1829–1842), later revisions, and the 25-inch series (1863–1924), all scanned and georeferenced for digital use.

EIAR 15.9 List of Figures

FIGURES (overleaf)

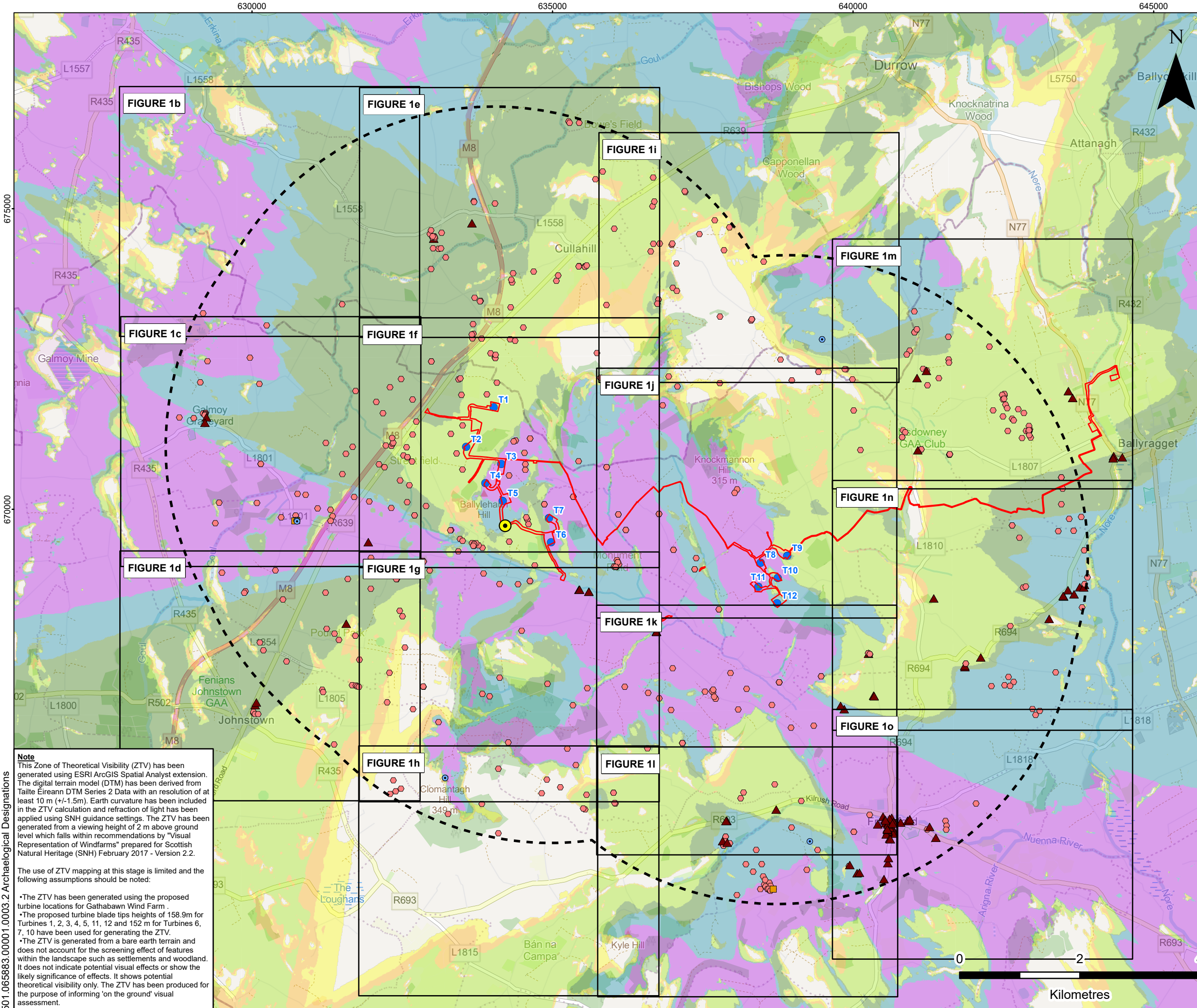
Figure 1a - o	Cultural Heritage with ZTV out to 5km
Figure 2a - e	Cultural Heritage Baseline Assets within Study Area
Figure 15.3	Other Projects Scoped-In to the Cultural Heritage Cumulative Evaluations

EIAR 15.10 List of Appendices

APPENDICES (overleaf)

Appendix 15.1	Methodology for the evaluation of Cultural Heritage
Appendix 15.2	Gazetteer of Assets
Appendix 15.3	Geophysical Survey Report
Appendix 15.4	Gathabawn LiDAR Survey Assessment
Appendix 15.5	Summary of Archaeological Events within the Study Area

Figures



LEGEND

Construction Works Area

Turbine Locations 5 km Buffer

Proposed Turbine Location

Met Mast Location

Archaeological Designations

Record of Historic Monument (RHM)

National Monument

Scheduled Monument Record (SMR)

Building on the National Inventory of Architectural Heritage (NIAH)

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Turbines Theoretically Visible

1 - 2

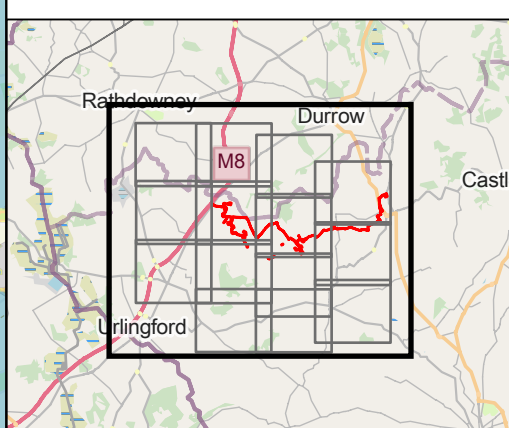
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ECOPower

SLR

GATHABAWN WIND FARM

CULTURAL HERITAGE
IMPACT ASSESSMENT

HERITAGE DESIGNATIONS

FIGURE 1a

Scale 1:60,000 @ A3

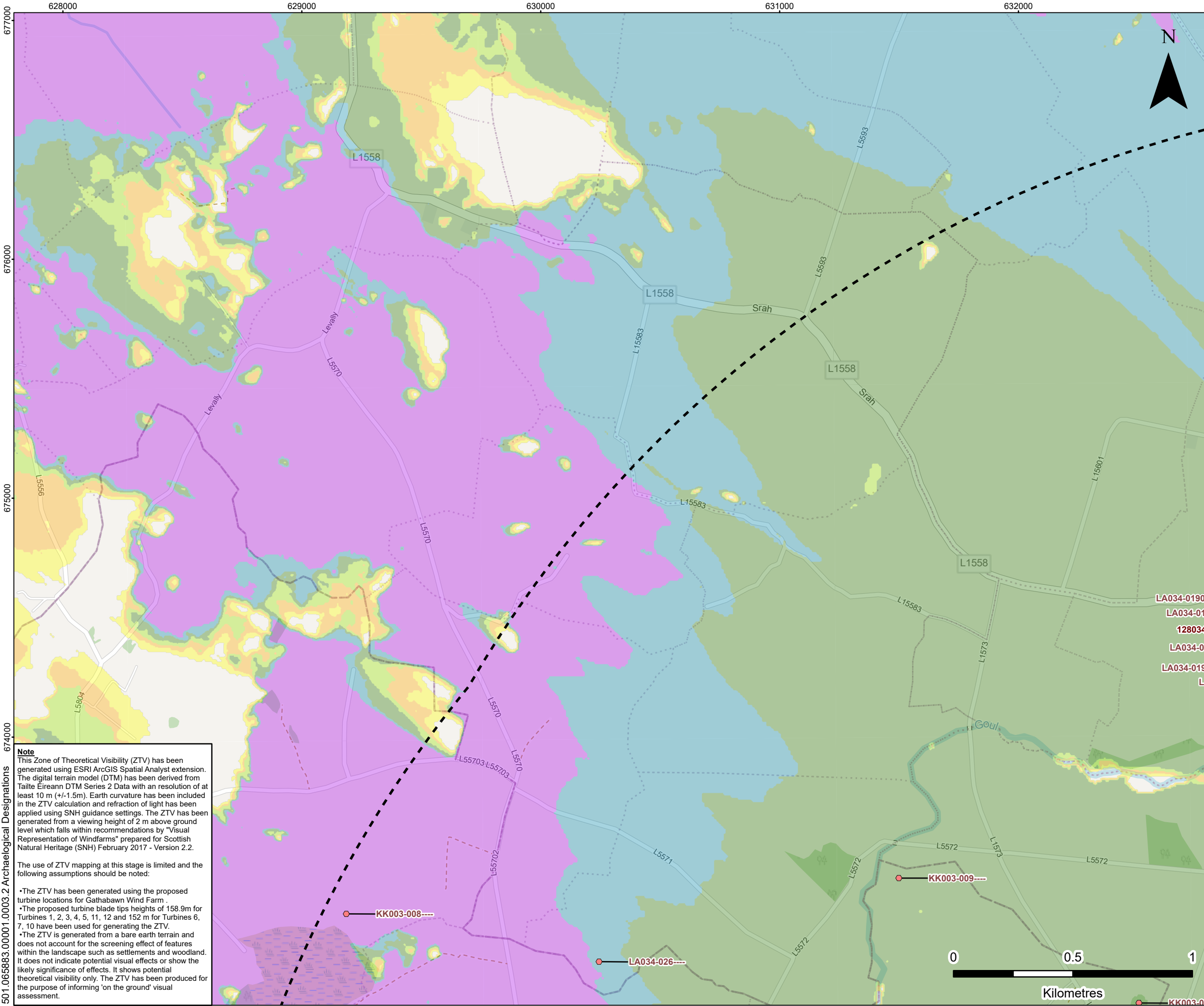
Date SEPTEMBER 2026

Note
This Zone of Theoretical Visibility (ZTV) has been generated using ESRI ArcGIS Spatial Analyst extension. The digital terrain model (DTM) has been derived from Tallte Éireann DTM Series 2 Data with an resolution of at least 10 m (+/-1.5m). Earth curvature has been included in the ZTV calculation and refraction of light has been applied using SNH guidance settings. The ZTV has been generated from a viewing height of 2 m above ground level which falls within recommendations by "Visual Representation of Windfarms" prepared for Scottish Natural Heritage (SNH) February 2017 - Version 2.2.

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- The proposed turbine blade tips heights of 158.9m for Turbines 1, 2, 3, 4, 5, 11, 12 and 152 m for Turbines 6, 7, 10 have been used for generating the ZTV.
- The ZTV is generated from a bare earth terrain and does not account for the screening effect of features within the landscape such as settlements and woodland. It does not indicate potential visual effects or show the likely significance of effects. It shows potential theoretical visibility only. The ZTV has been produced for the purpose of informing 'on the ground' visual assessment.

501.065883.00001.0003.2 Archaeological Designations



LEGEND

Construction Works Area

Turbine Locations 5 km Buffer

Archaeological Designations

Scheduled Monument Record (SMR)

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Turbines Theoretically Visible

1 - 2

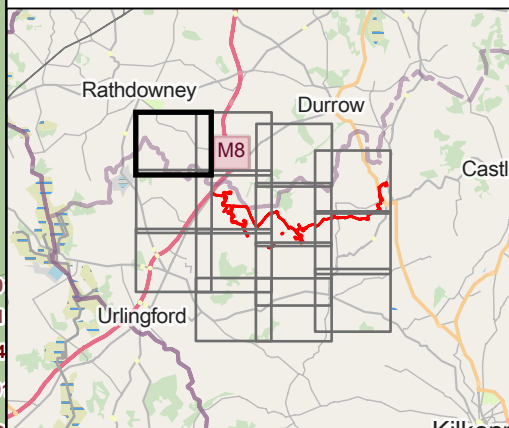
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CULTURAL HERITAGE
IMPACT ASSESSMENT

HERITAGE DESIGNATIONS

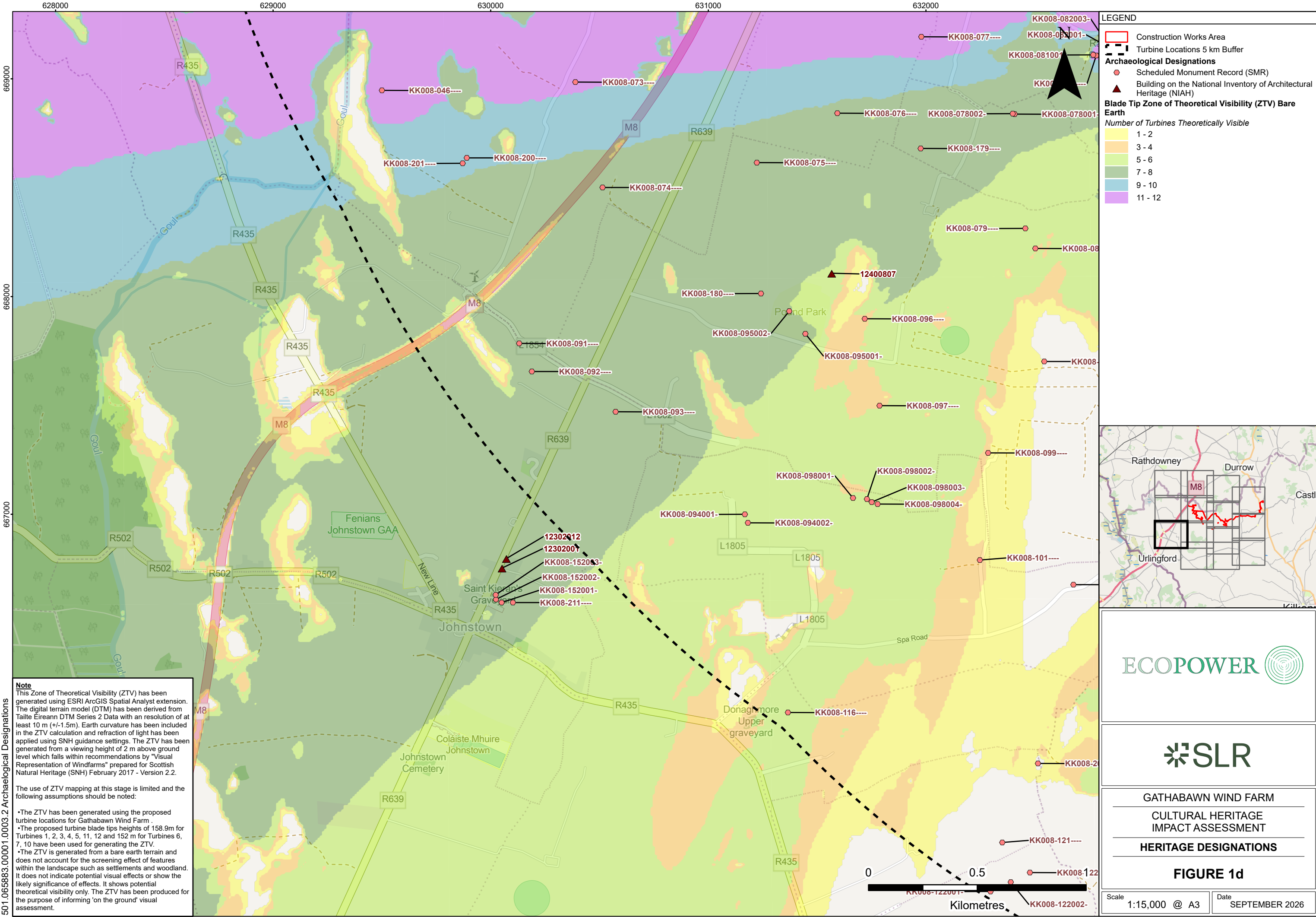
FIGURE 1b

Scale1:15,000 @ A3DateSEPTEMBER 2026

Note
This Zone of Theoretical Visibility (ZTV) has been generated using ESRI ArcGIS Spatial Analyst extension. The digital terrain model (DTM) has been derived from Tailte Éireann DTM Series 2 Data with an resolution of at least 10 m (+/-1.5m). Earth curvature has been included in the ZTV calculation and refraction of light has been applied using SNH guidance settings. The ZTV has been generated from a viewing height of 2 m above ground level which falls within recommendations by "Visual Representation of Windfarms" prepared for Scottish Natural Heritage (SNH) February 2017 - Version 2.2.

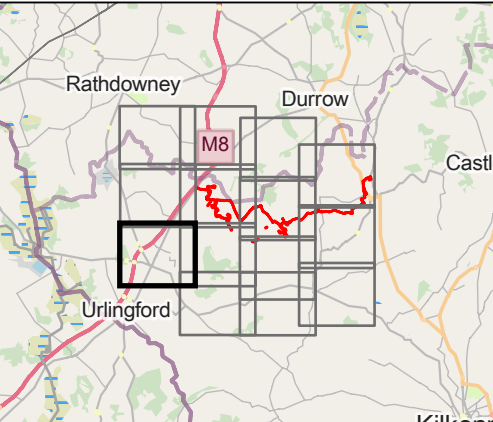
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LEGEND

- Construction Works Area
- Turbine Locations 5 km Buffer
- Archaeological Designations**
 - Scheduled Monument Record (SMR)
 - Building on the National Inventory of Architectural Heritage (NIAH)
- Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth**
- Number of Turbines Theoretically Visible**
 - 1 - 2
 - 3 - 4
 - 5 - 6
 - 7 - 8
 - 9 - 10
 - 11 - 12



GATHABAWN WIND FARM

CULTURAL HERITAGE

IMPACT ASSESSMENT

HERITAGE DESIGNATIONS

FIGURE 1d

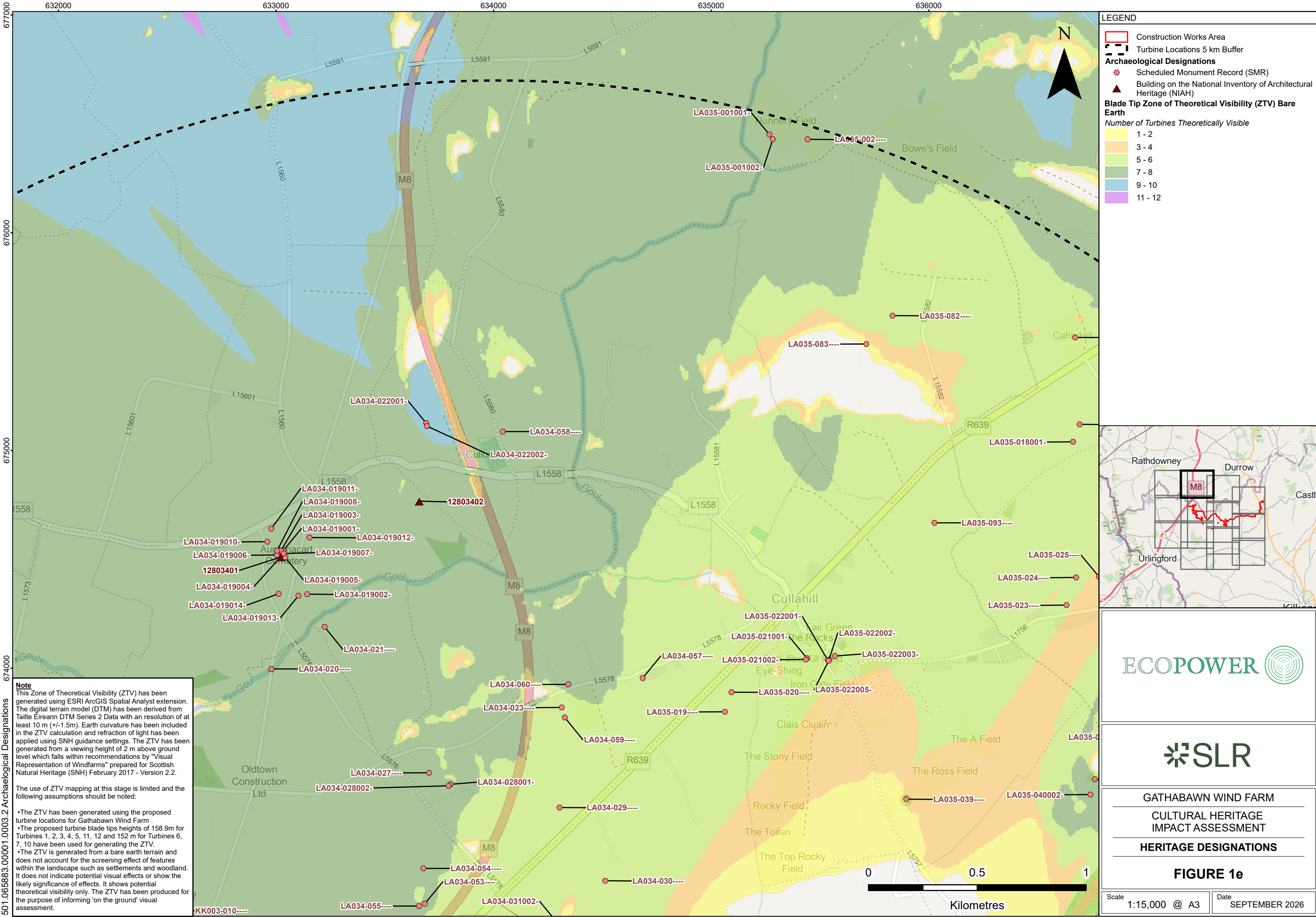
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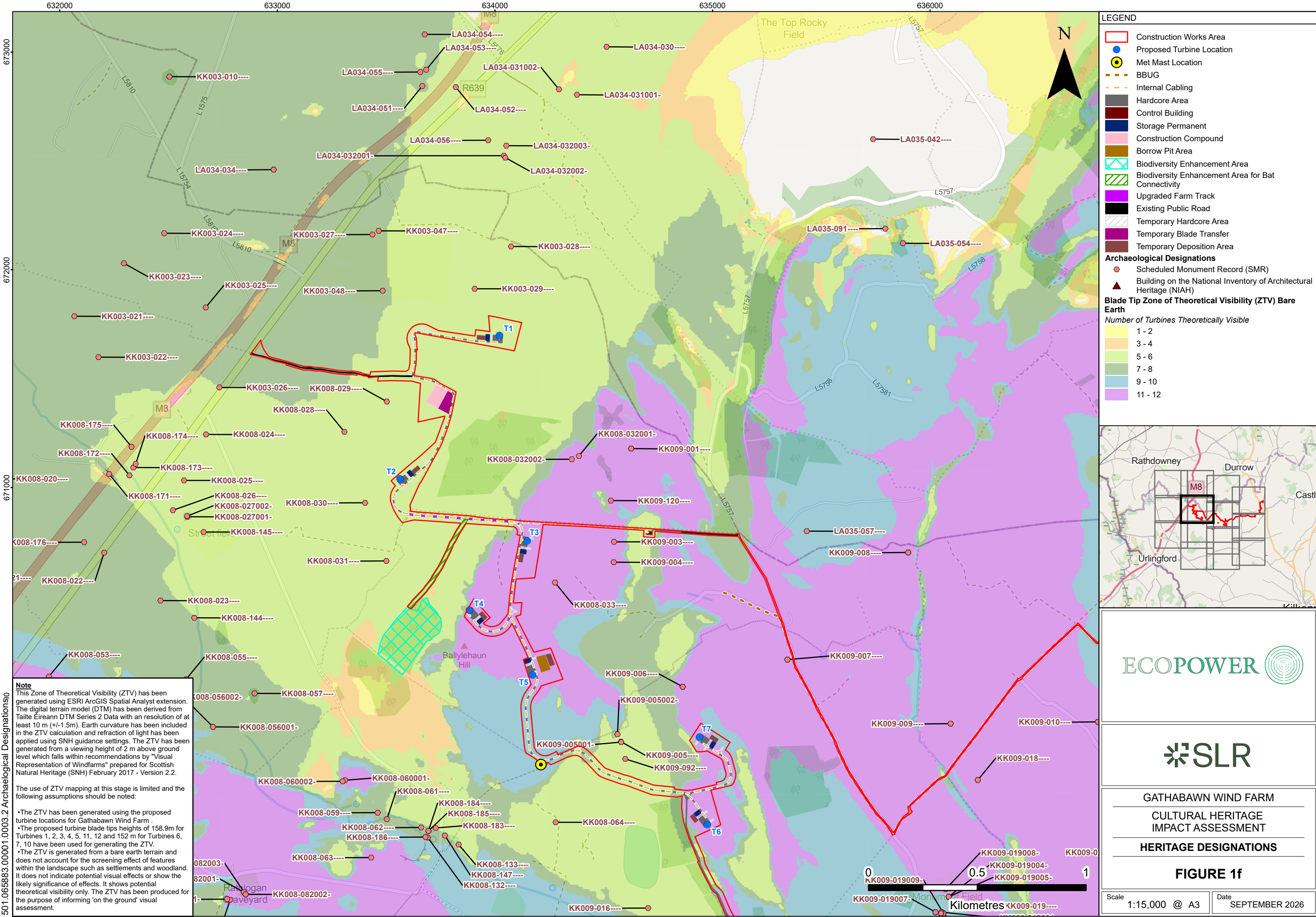
Date SEPTEMBER 2026

Note
This Zone of Theoretical Visibility (ZTV) has been generated using ESRI ArcGIS Spatial Analyst extension. The digital terrain model (DTM) has been derived from Tailte Éireann DTM Series 2 Data with an resolution of at least 10 m (+/-1.5m). Earth curvature has been included in the ZTV calculation and refraction of light has been applied using SNH guidance settings. The ZTV has been generated from a viewing height of 2 m above ground level which falls within recommendations by "Visual Representation of Windfarms" prepared for Scottish Natural Heritage (SNH) February 2017 - Version 2.2.

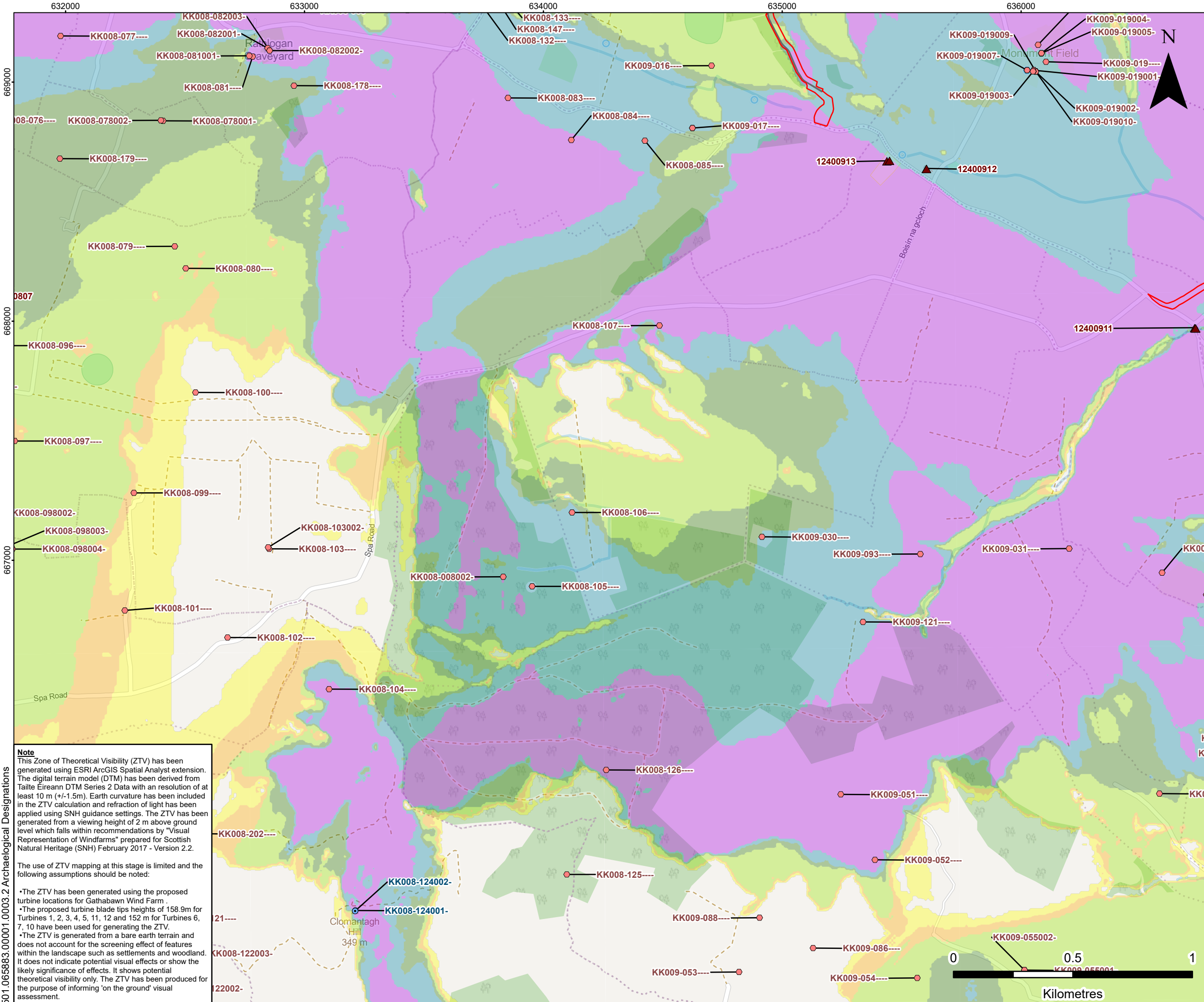
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501.065883.00001.0003.2 Archaeological Designations



LEGEND

Construction Works Area

Turbine Locations 5 km Buffer

Hardcore Area

Archaeological Designations

Record of Historic Monument (RHM)

Scheduled Monument Record (SMR)

Building on the National Inventory of Architectural Heritage (NIAH)

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Turbines Theoretically Visible

1 - 2

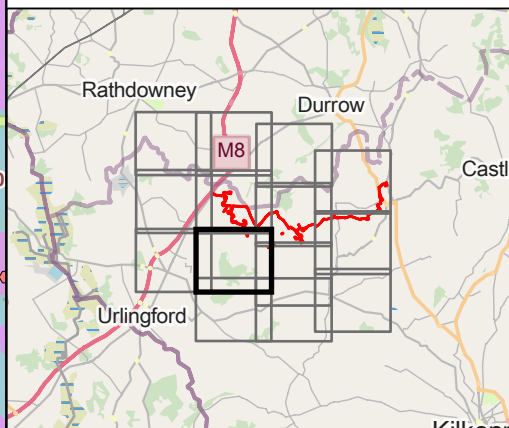
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GATHABAWN WIND FARM

CULTURAL HERITAGE
IMPACT ASSESSMENT

HERITAGE DESIGNATIONS

FIGURE 1g

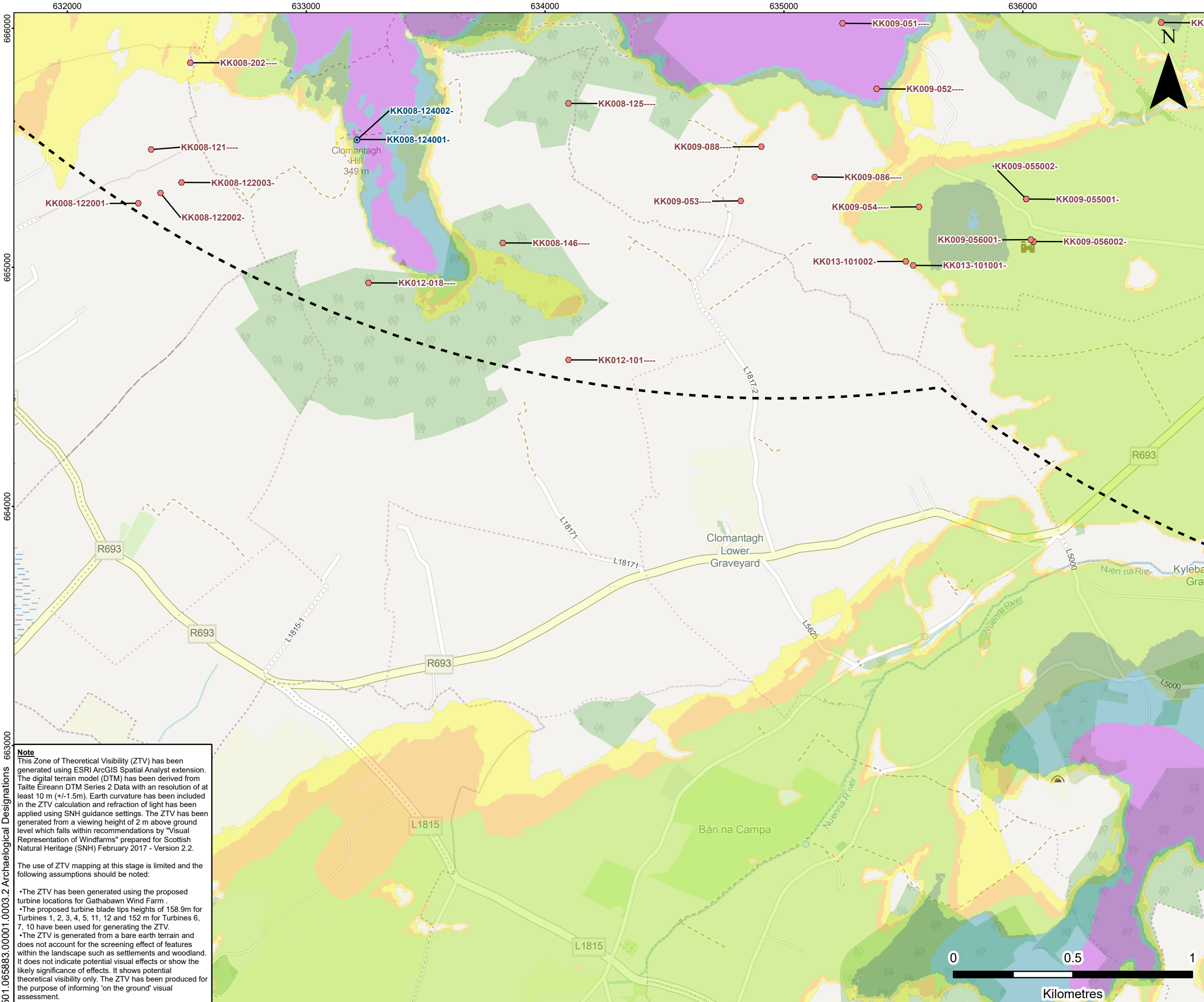
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Date SEPTEMBER 2026

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LEGEND

Construction Works Area

Turbine Locations 5 km Buffer

Archaeological Designations

Record of Historic Monument (RHM)

Scheduled Monument Record (SMR)

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Turbines Theoretically Visible

1 - 2

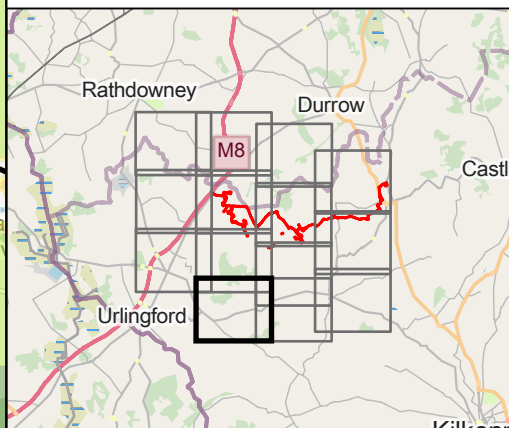
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GATHABAWN WIND FARM

CULTURAL HERITAGE
IMPACT ASSESSMENT

HERITAGE DESIGNATIONS

FIGURE 1h

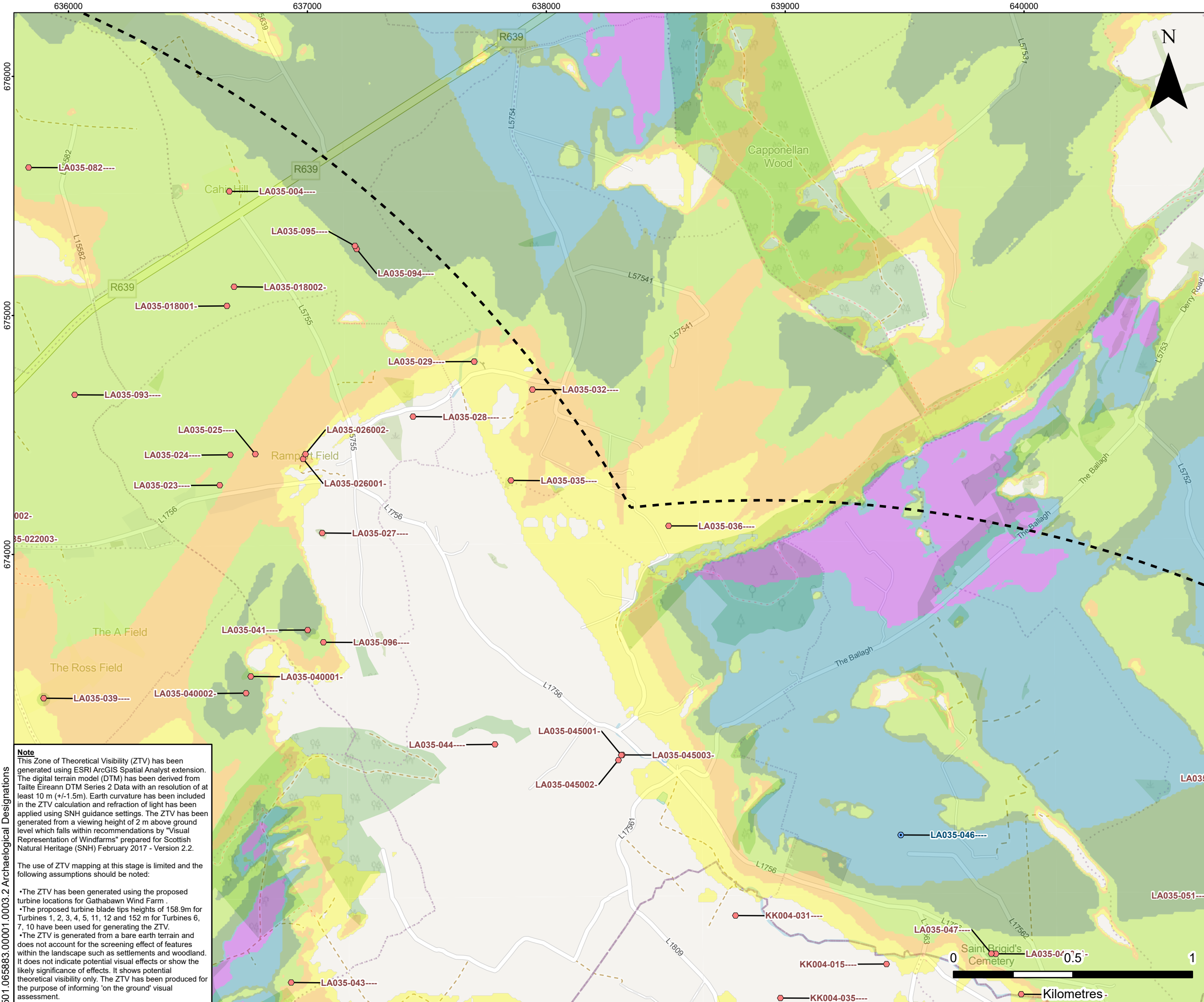
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DateSEPTEMBER 2026

Note
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LEGEND

Construction Works Area

Turbine Locations 5 km Buffer

Archaeological Designations

Record of Historic Monument (RHM)

Scheduled Monument Record (SMR)

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Turbines Theoretically Visible

1 - 2

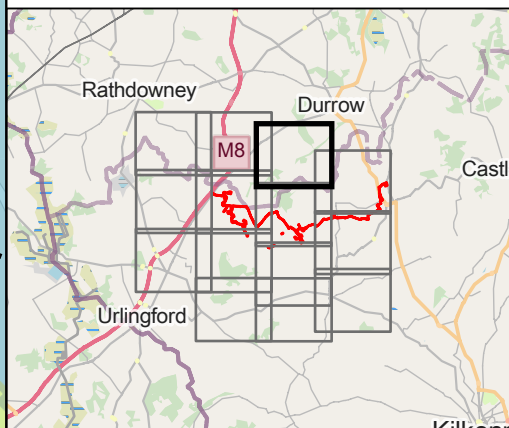
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GATHABAWN WIND FARM

CULTURAL HERITAGE
IMPACT ASSESSMENT

HERITAGE DESIGNATIONS

FIGURE 1i

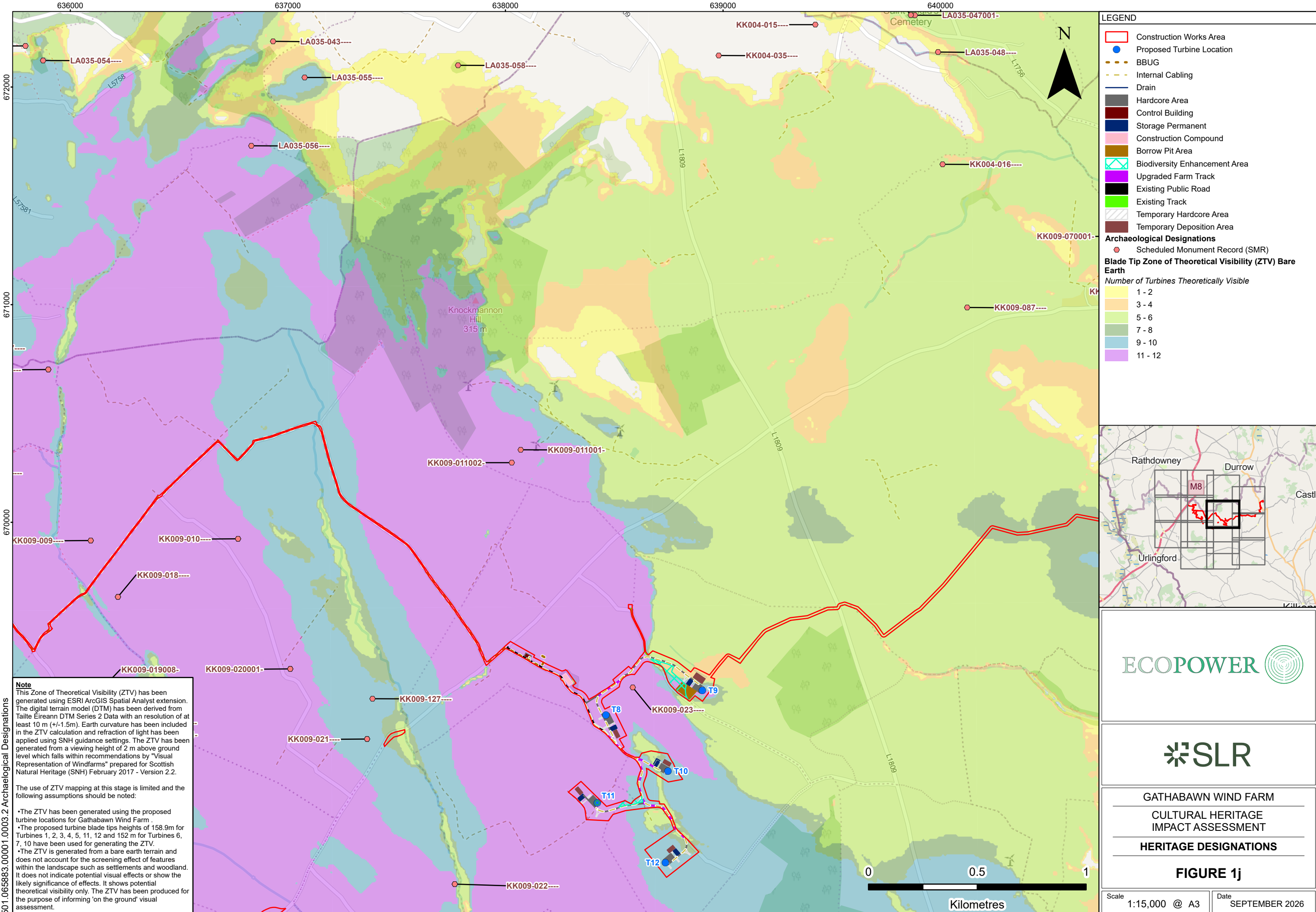
Scale 1:15,000 @ A3

Date SEPTEMBER 2026

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LEGEND

Construction Works Area

Proposed Turbine Location

BBUG

Internal Cabling

Drain

Hardcore Area

Control Building

Storage Permanent

Construction Compound

Borrow Pit Area

Biodiversity Enhancement Area

Upgraded Farm Track

Existing Public Road

Existing Track

Temporary Hardcore Area

Temporary Deposition Area

Archaeological Designations

Scheduled Monument Record (SMR)

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Turbines Theoretically Visible

1 - 2

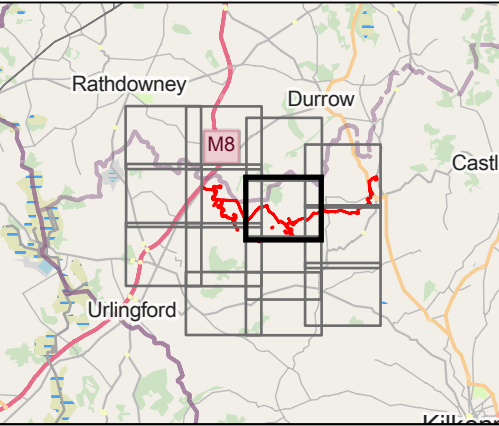
3 - 4

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7 - 8

9 - 10

11 - 12



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GATHABAWN WIND FARM

CULTURAL HERITAGE
IMPACT ASSESSMENT

HERITAGE DESIGNATIONS

FIGURE 1j

Scale

1:15,000 @ A3

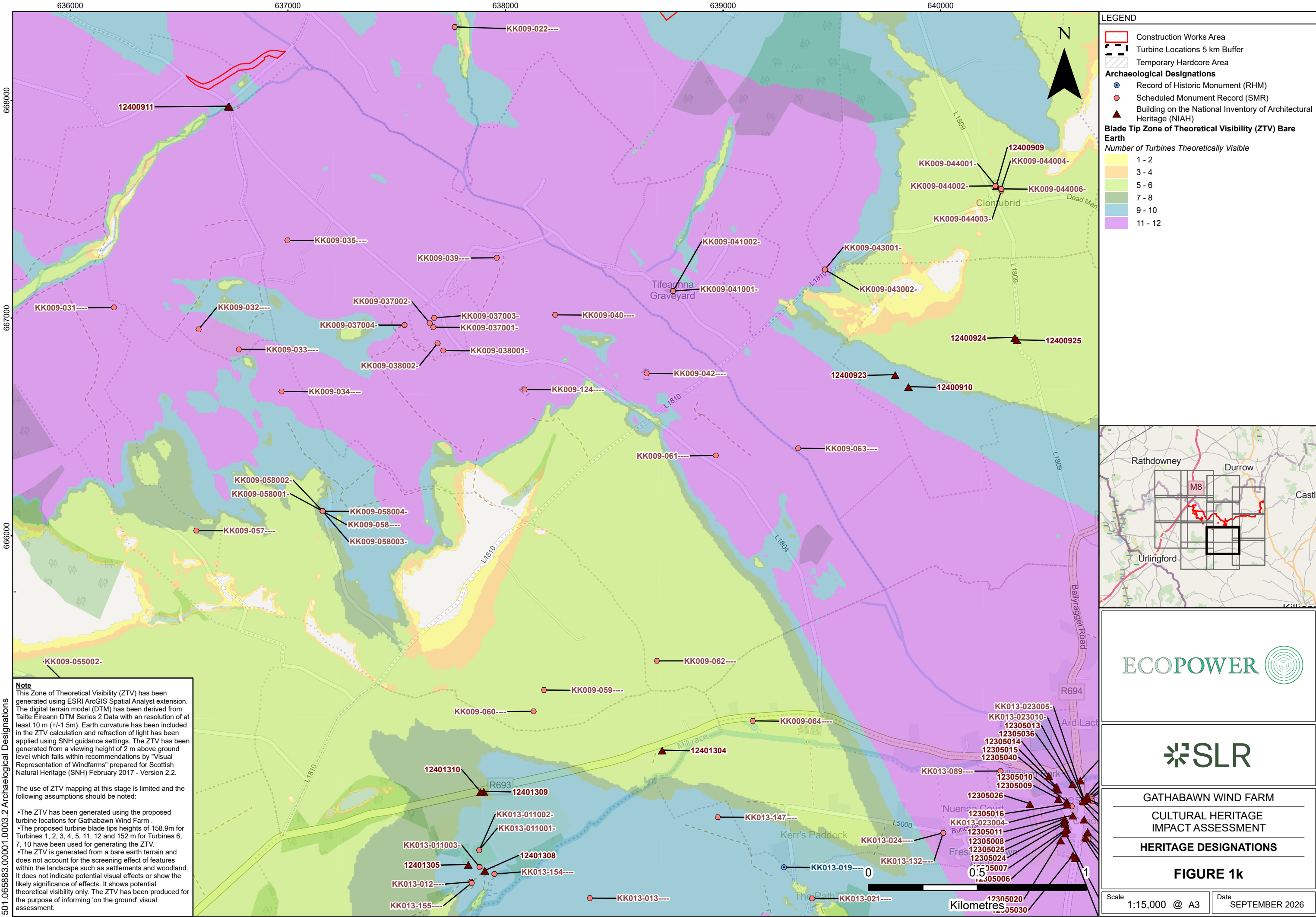
Date

SEPTEMBER 2026

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LEGEND

Construction Works Area

Turbine Locations 5 km Buffer

Temporary Hardcore Area

Archaeological Designations

Record of Historic Monument (RHM)

Scheduled Monument Record (SMR)

Building on the National Inventory of Architectural Heritage (NIAH)

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Turbines Theoretically Visible

1 - 2

3 - 4

5 - 6

7 - 8

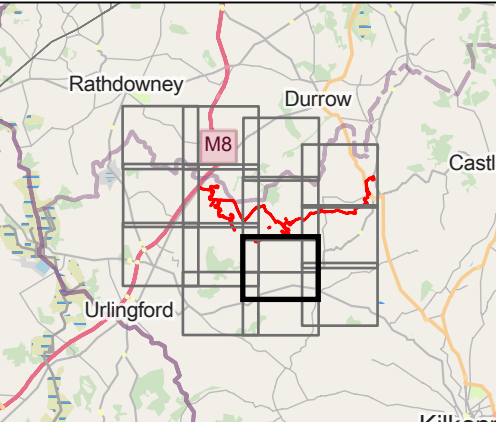
9 - 10

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GATHABAWN WIND FARM

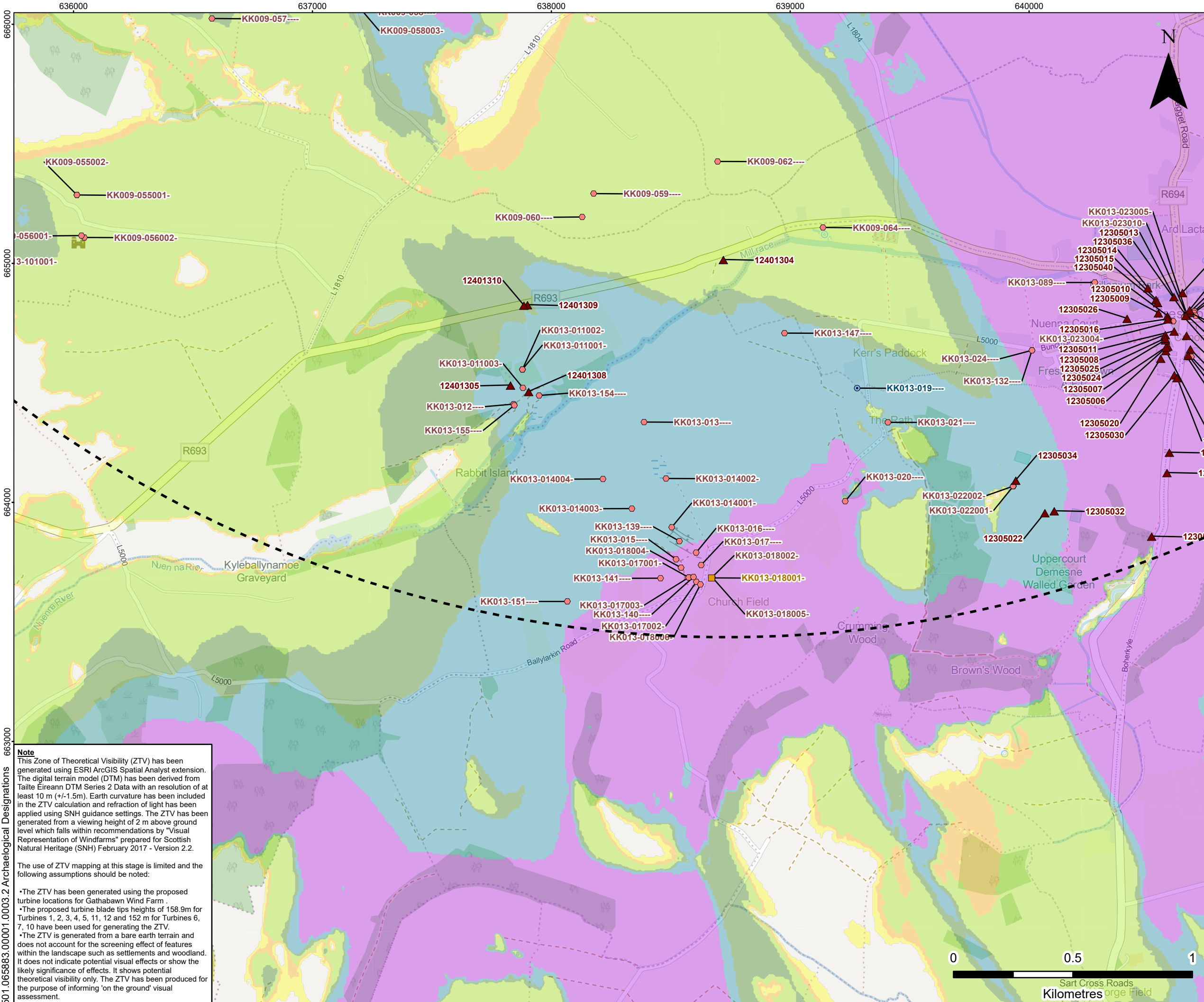
CULTURAL HERITAGE
IMPACT ASSESSMENT

HERITAGE DESIGNATIONS

FIGURE 1k

Scale 1:15,000 @ A3

Date SEPTEMBER 2026



LEGEND

Construction Works Area

Turbine Locations 5 km Buffer

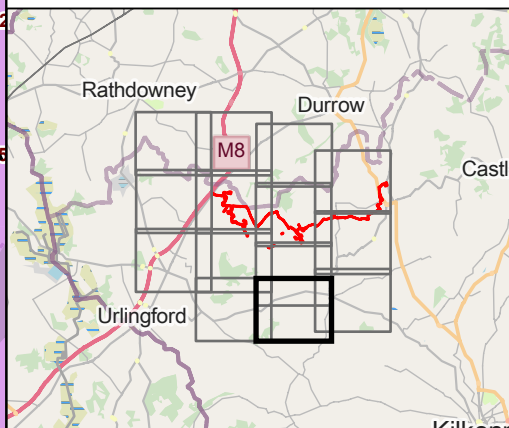
Archaeological Designations

- Record of Historic Monument (RHM)
- National Monument
- Scheduled Monument Record (SMR)
- Building on the National Inventory of Architectural Heritage (NIAH)

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Turbines Theoretically Visible

- 1 - 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 10
- 11 - 12



Note
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GATHABAWN WIND FARM

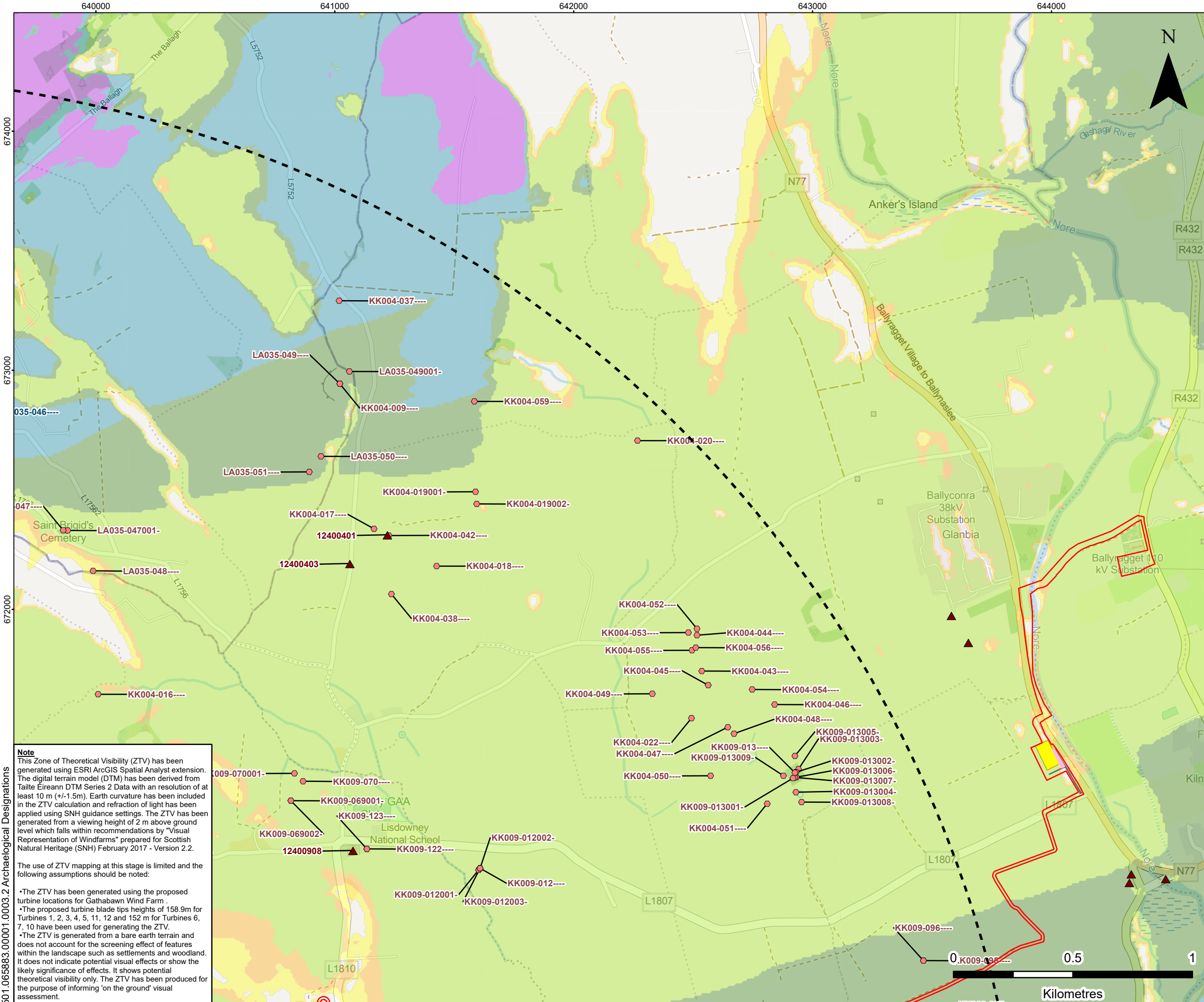
CULTURAL HERITAGE
IMPACT ASSESSMENT

HERITAGE DESIGNATIONS

FIGURE 11

Scale 1:15,000 @ A3

Date SEPTEMBER 2026



LEGEND

Construction Works Area

Turbine Locations 5 km Buffer

Substation

Hardcore Area

Construction Compound

Archaeological Designations

Scheduled Monument Record (SMR)

Building on the National Inventory of Architectural Heritage (NIAH)

Blade Tip Zone of Theoretical Visibility (ZTV) Bare Earth

Number of Turbines Theoretically Visible

1 - 2

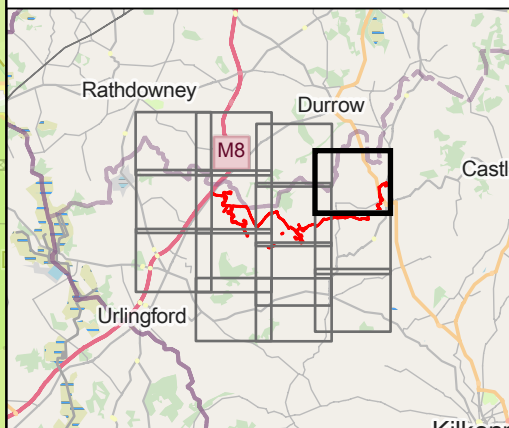
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ECOPOWER

SLR

GATHABAWN WIND FARM

CULTURAL HERITAGE
IMPACT ASSESSMENT

HERITAGE DESIGNATIONS

FIGURE 1m

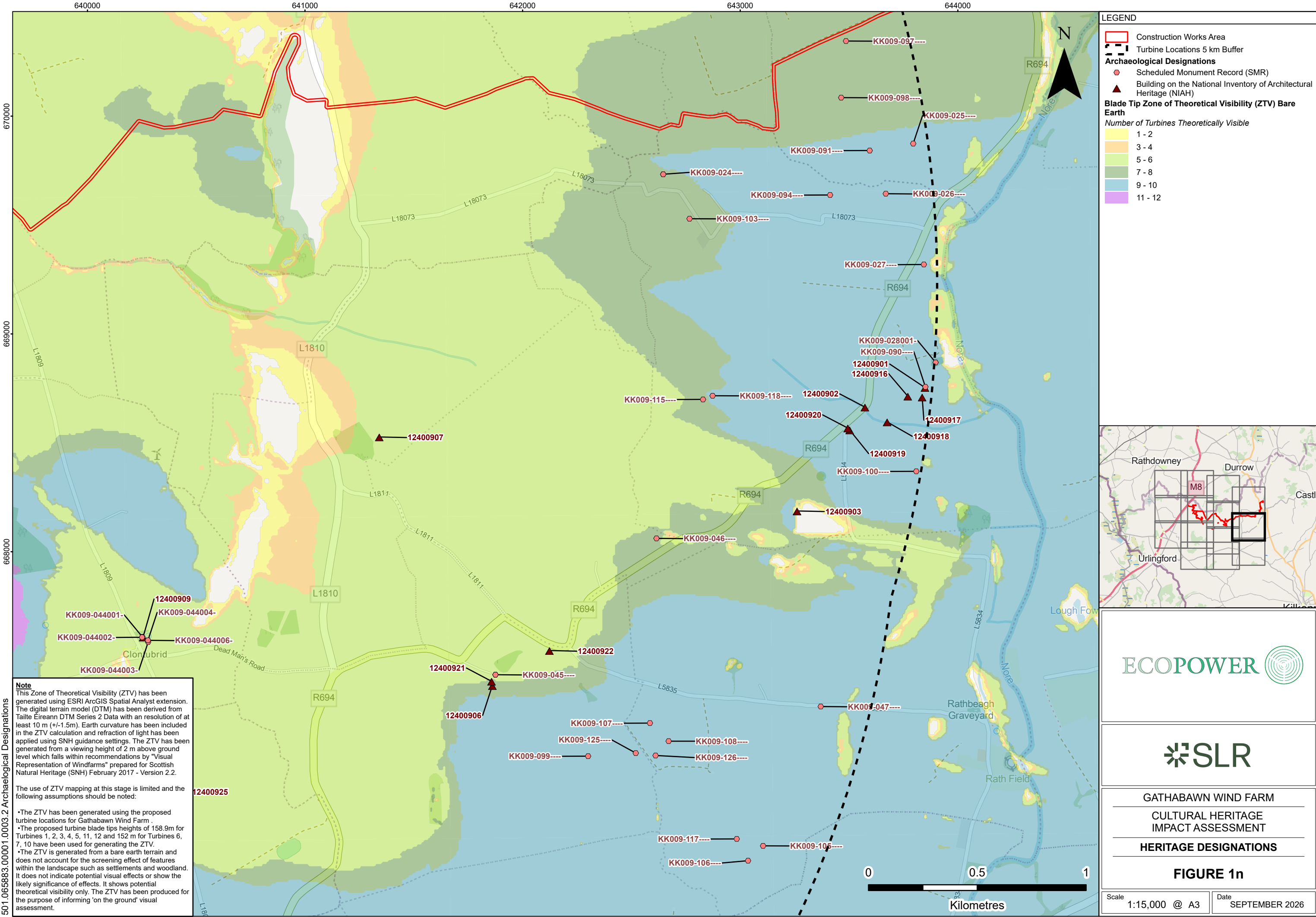
Scale1:15,000 @ A3

DateSEPTEMBER 2026

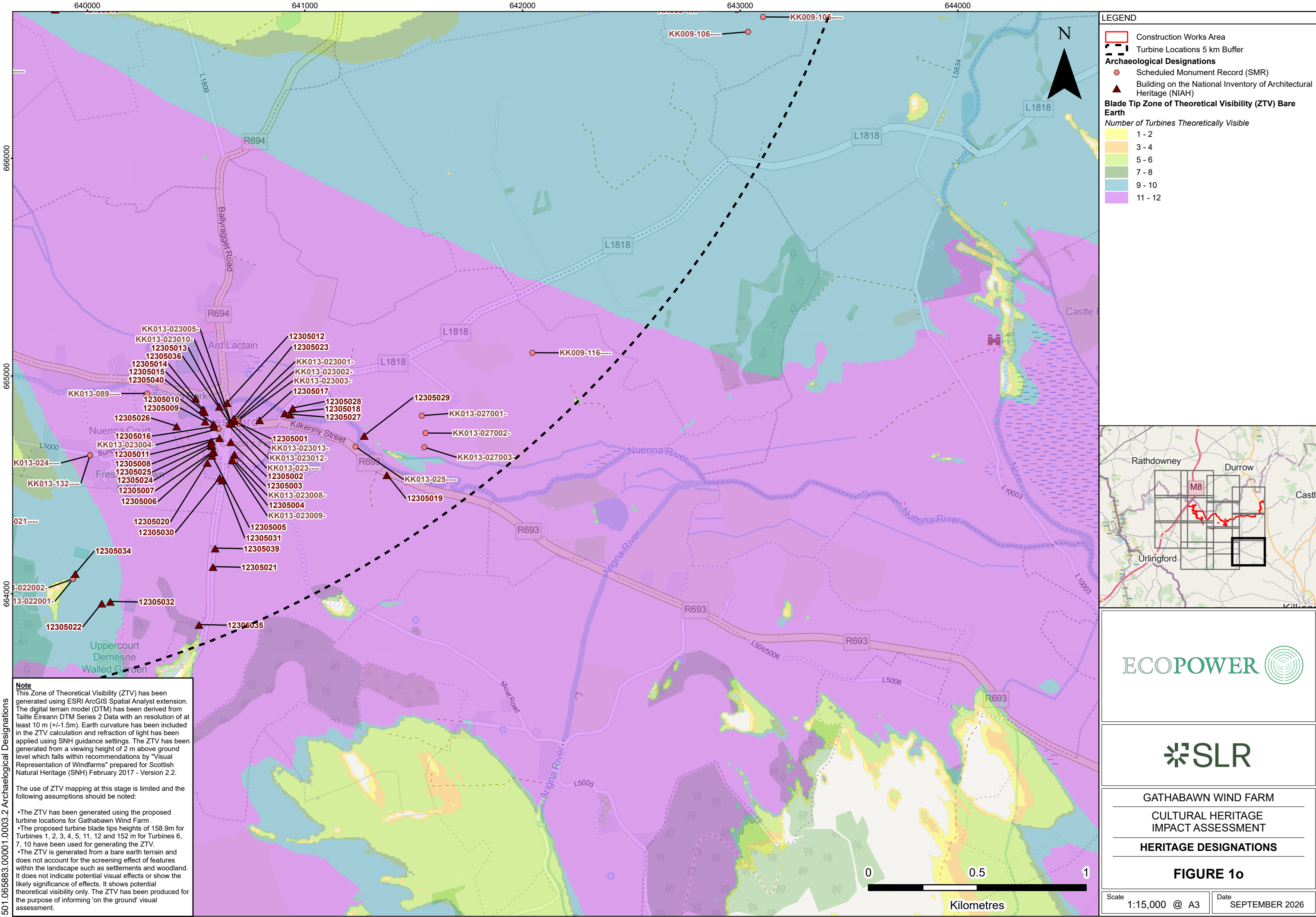
Note
This Zone of Theoretical Visibility (ZTV) has been generated using ESRI ArcGIS Spatial Analyst extension. The digital terrain model (DTM) has been derived from Tailte Éireann DTM Series 2 Data with an resolution of at least 10 m (+/-1.5m). Earth curvature has been included in the ZTV calculation and refraction of light has been applied using SNH guidance settings. The ZTV has been generated from a viewing height of 2 m above ground level which falls within recommendations by "Visual Representation of Windfarms" prepared for Scottish Natural Heritage (SNH) February 2017 - Version 2.2.

The use of ZTV mapping at this stage is limited and the following assumptions should be noted:

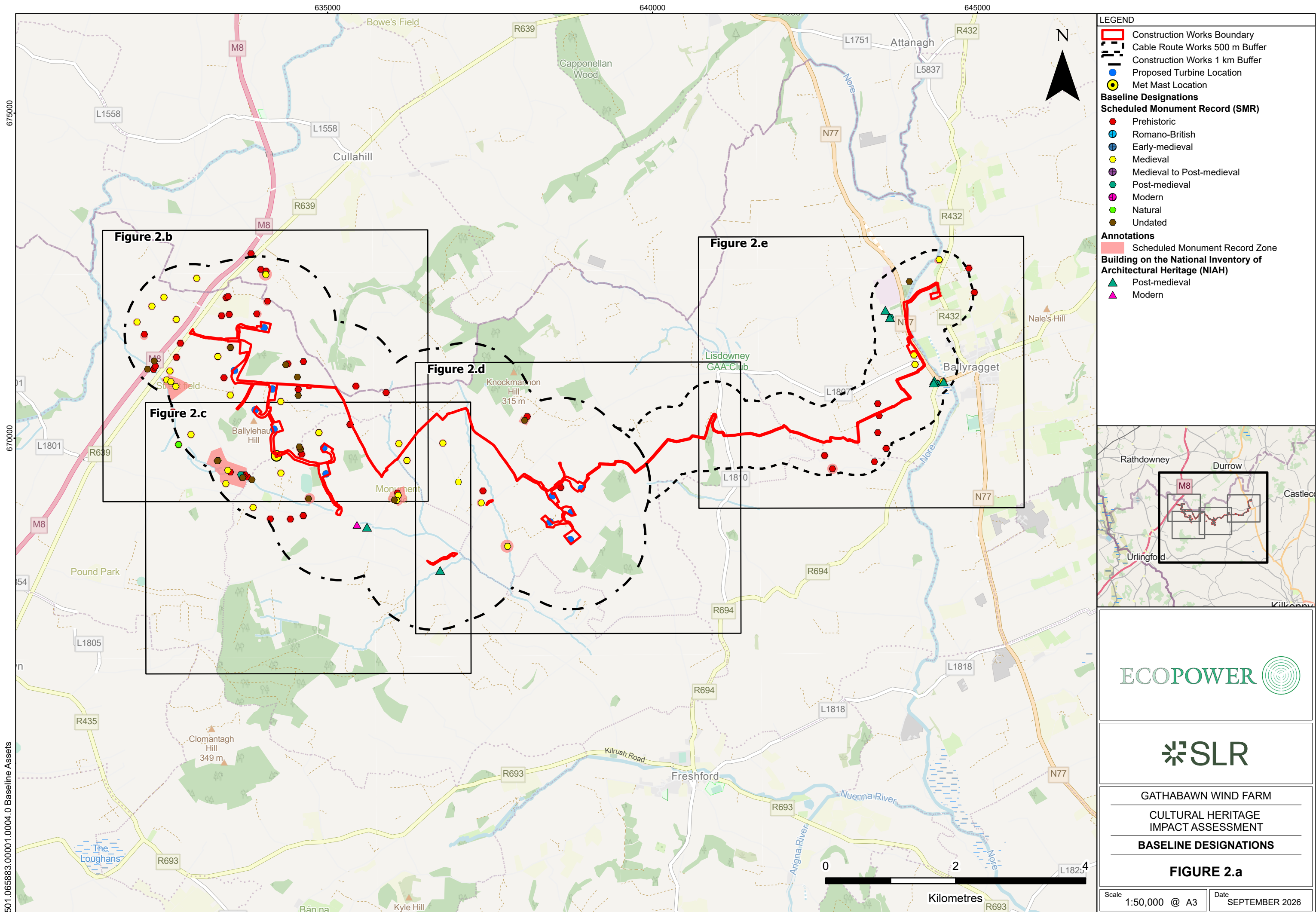
- The ZTV has been generated using the proposed turbine locations for Gathabawn Wind Farm .
- The proposed turbine blade tips heights of 158.9m for Turbines 1, 2, 3, 4, 5, 11, 12 and 152 m for Turbines 6, 7, 10 have been used for generating the ZTV.
- The ZTV is generated from a bare earth terrain and does not account for the screening effect of features within the landscape such as settlements and woodland. It does not indicate potential visual effects or show the likely significance of effects. It shows potential theoretical visibility only. The ZTV has been produced for the purpose of informing 'on the ground' visual assessment.



501.065883.00001.0003.2 Archaeological Designations



501.065883.00001.0003.2 Archaeological Designations



LEGEND

Construction Works Boundary

Cable Route Works 500 m Buffer

Construction Works 1 km Buffer

Proposed Turbine Location

Met Mast Location

Baseline Designations

Scheduled Monument Record (SMR)

Prehistoric

Romano-British

Early-medieval

Medieval

Medieval to Post-medieval

Post-medieval

Modern

Natural

Undated

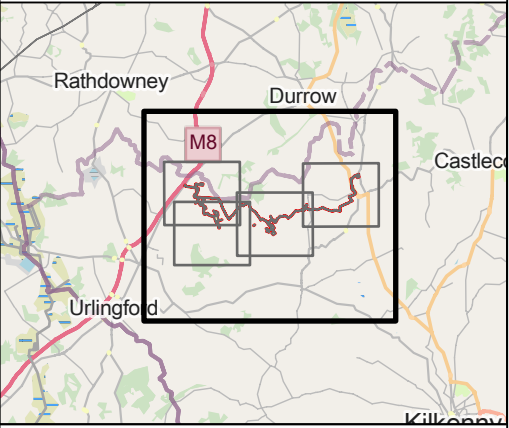
Annotations

Scheduled Monument Record Zone

Building on the National Inventory of Architectural Heritage (NIAH)

Post-medieval

Modern



ECOPOWER

GATHABAWN WIND FARM

CULTURAL HERITAGE
IMPACT ASSESSMENT

BASELINE DESIGNATIONS

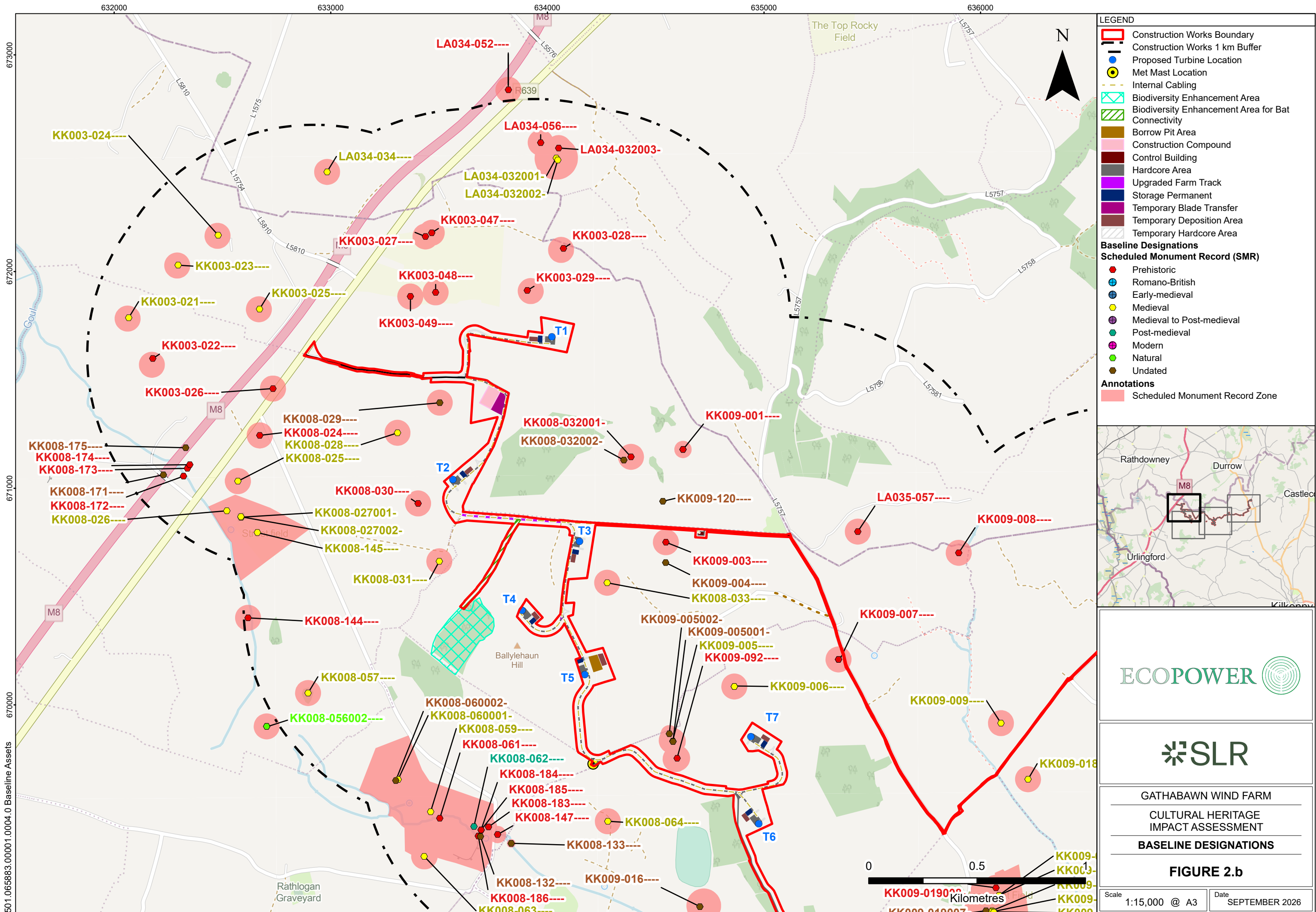
FIGURE 2.a

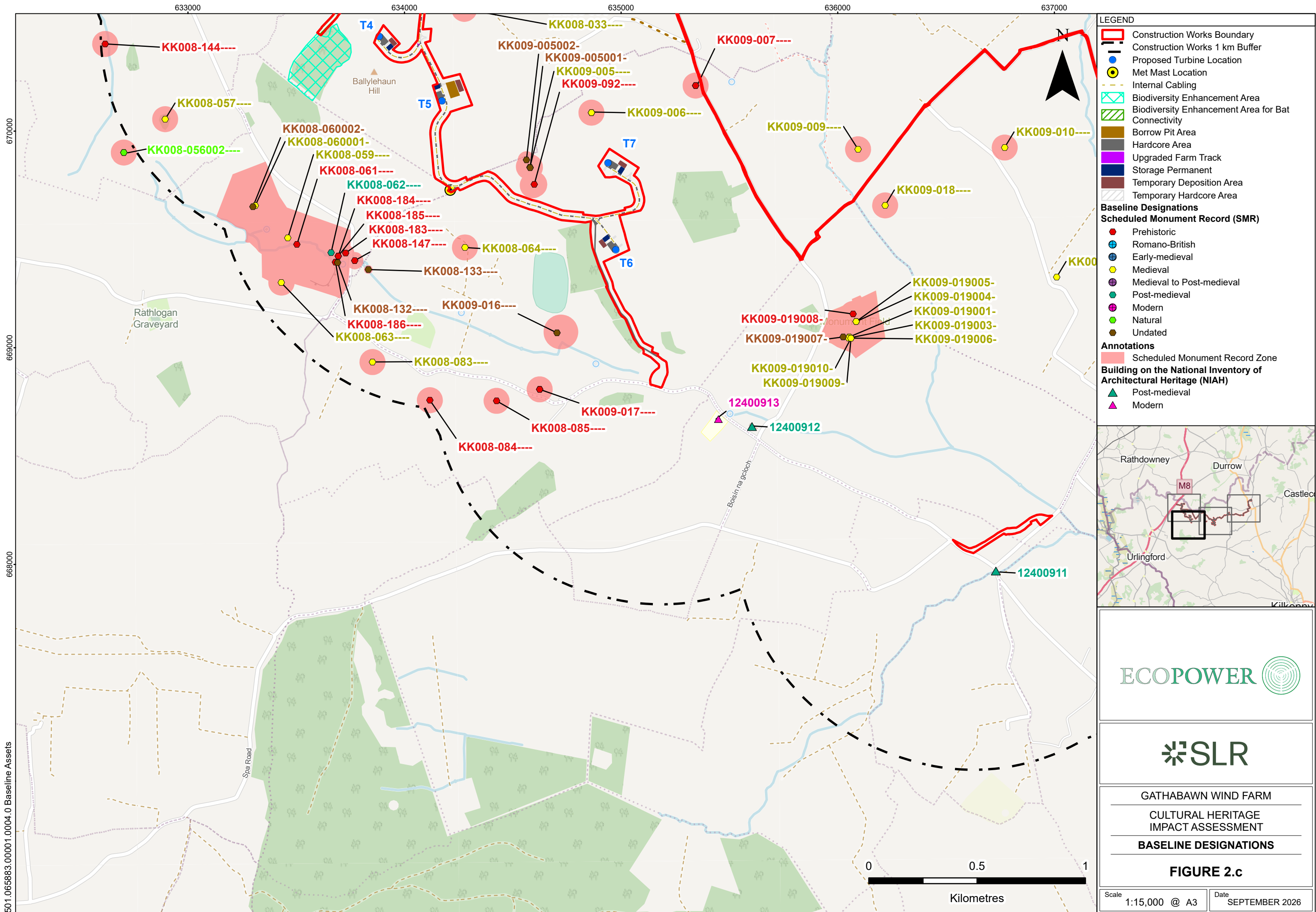
Scale

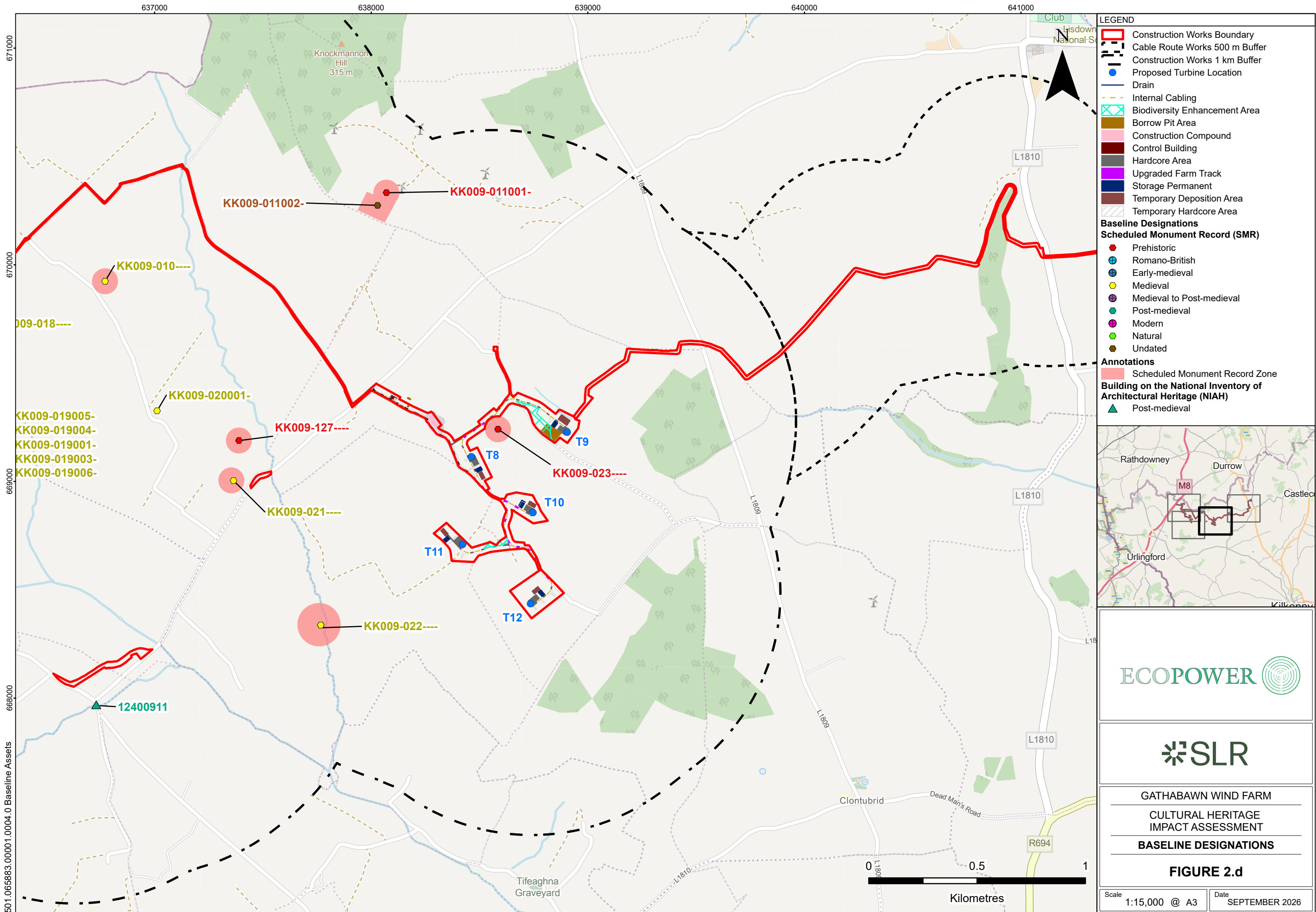
1:50,000 @ A3

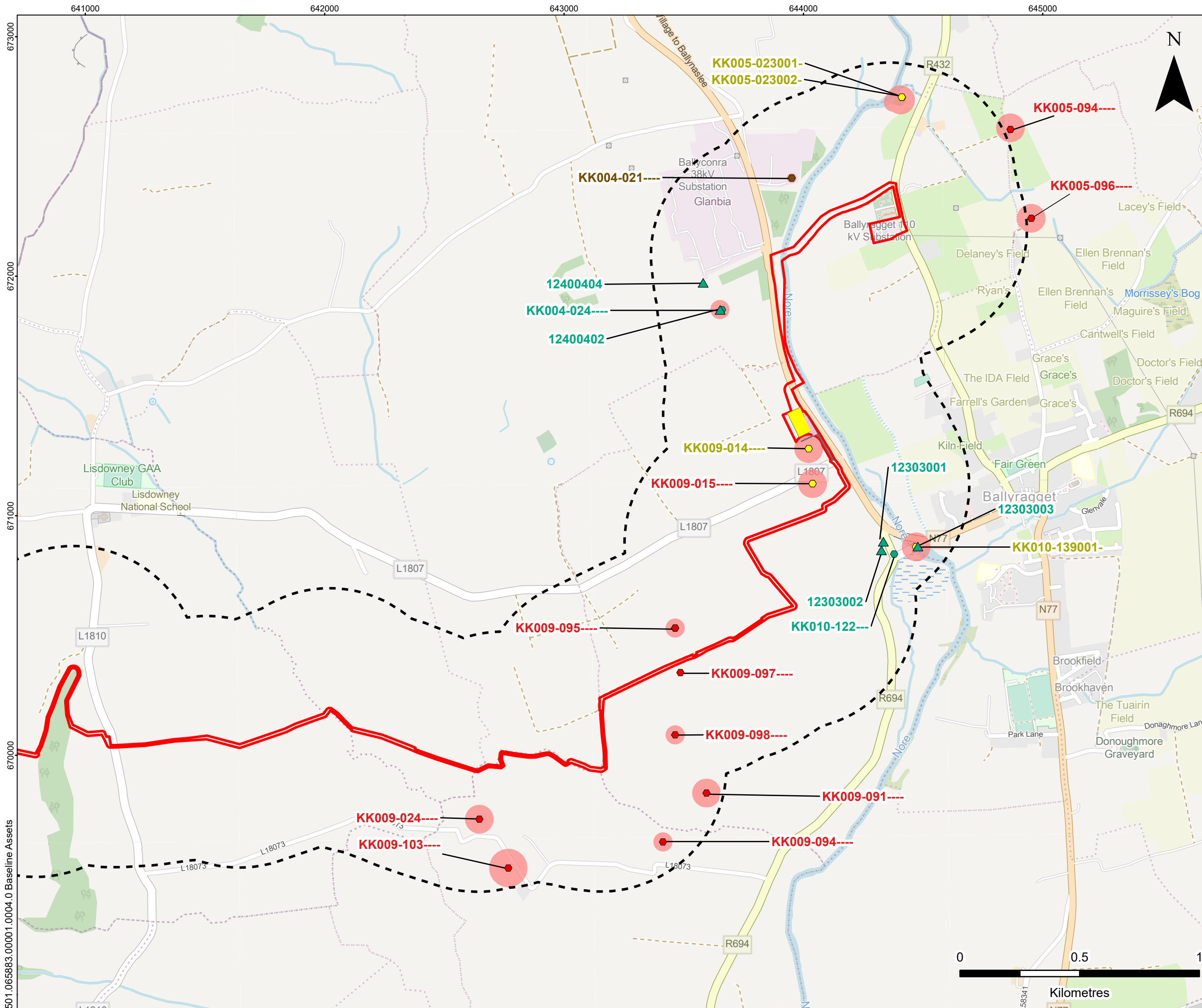
Date

SEPTEMBER 2026









LEGEND

- Construction Works Boundary
- Cable Route Works 500 m Buffer
- Construction Works 1 km Buffer
- Construction Compound
- Hardcore Area
- Substation

Baseline Designations

Scheduled Monument Record (SMR)

- Prehistoric
- Romano-British
- Early-medieval
- Medieval
- Medieval to Post-medieval
- Post-medieval
- Modern
- Natural
- Undated

Annotations

- Scheduled Monument Record Zone

Building on the National Inventory of Architectural Heritage (NIAH)

- Post-medieval

ECOPOWER

SLR

GATHABAWN WIND FARM

CULTURAL HERITAGE

IMPACT ASSESSMENT

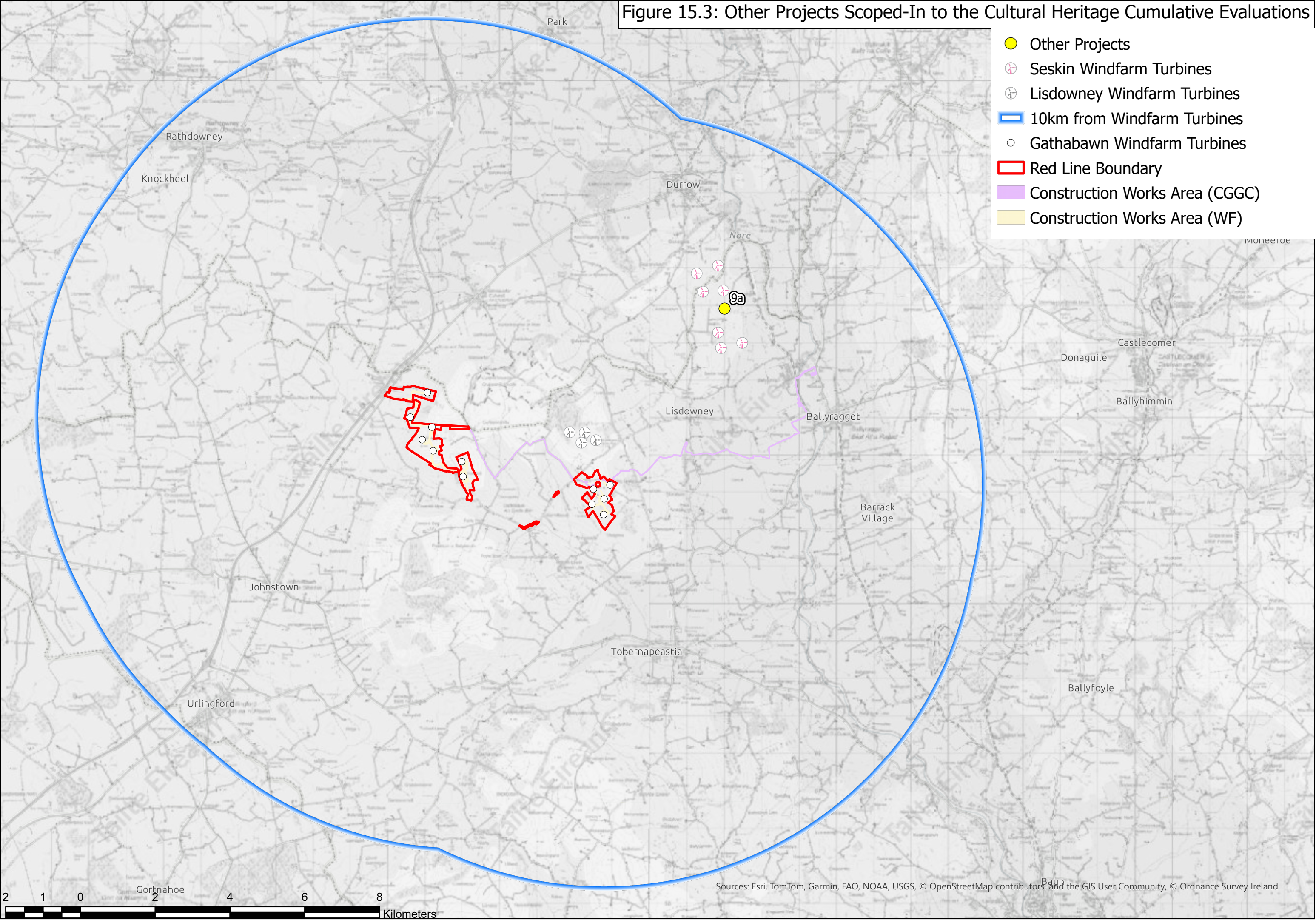
BASELINE DESIGNATIONS

FIGURE 2.e

Scale 1:15,000 @ A3

Date SEPTEMBER 2026

Figure 15.3: Other Projects Scoped-In to the Cultural Heritage Cumulative Evaluations



Appendix to Chapter 15: Cultural Heritage

Appendix 15.1: Methodology for the evaluation of Cultural Heritage

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A15.1 Methodology Applied during the Preparation of Chapter 15: Cultural Heritage

A15.1.1 Legislation, Regulations & Guidance Documents

The following legislation and regulations have been taken into account in this EIA Report:

- National Monuments Acts of 1930 to 2014 (including the National Monuments (Amendment) Act 1994) and the Historic and Archaeological heritage and Miscellaneous Provisions Act 2023, where the latter has replaced the former
- Planning and Development Act (2000) as amended
- National Cultural Institutions Act 1997
- Heritage Act 1995
- Revised General Scheme of Monuments and Archaeological Heritage Bill 2021

The recommendations in the guidelines listed below have been considered during the preparation of the chapter:

- Framework and Principles for the Protection of the Archaeological Heritage (1999)
- Architectural Heritage Protection: Guidelines for Planning Authorities (2011)
- Regional Spatial and Economic Strategy for Southern Regional Assembly 2020 – 2032
- Chartered Institute for Archaeologists Standard and Guidance for Historic Environment Desk Based Assessment (2020)
- Transport Infrastructure Ireland Publications: Guidelines for Cultural Heritage Impact Assessment of TII National Road and Greenway Projects, September 2025; and
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022)

A15.1.1.1 Regional Spatial and Economic Strategy for Southern Regional Assembly 2020-2032

Relevant Regional Policy Objectives to Cultural Heritage and the proposals are as follows:

Section 7.3.3 Built Heritage and Archaeology

“RPO 207: Archaeological Investigation

Where proposed development may have implications for recorded archaeological monuments /sites, zones of archaeological potential, or undiscovered archaeology, local authorities should ensure that decisions relating to development (including infrastructure associated with broadband, telecommunications and renewable energy installation of services installation and major road/rail infrastructure) are informed by an appropriate level of archaeological investigation undertaken by qualified persons.”

A15.1.1.2 Kilkenny City and County Development Plan 2021

Volume 1 County:

“Objective 9C: To protect archaeological sites and monuments (including their setting), underwater archaeology, and archaeological objects, including those that are listed in the Record of Monuments and Places, and in the Urban Archaeological Survey of County Kilkenny or newly discovered sub-surface and underwater archaeological remains.

Objective 9D To carry out further research on the eighteen archaeological landscapes as identified in the Preliminary Audit of Archaeological Landscapes in County Kilkenny.

Objective 9E To develop an enhanced policy framework for the three priority sites identified in Section 9.3.1.1 above, plus for any additional sites identified through Objective 9D above.”

Development Management Requirements:

- To endeavour to preserve in situ all archaeological monuments, whether on land or underwater, listed in the Record of Monuments and Places (RMP), and any newly discovered archaeological sites, features, or objects by requiring that archaeological remains are identified and fully considered at the very earliest stages of the development process and that schemes are designed to avoid impacting on archaeological heritage
- To require archaeological assessment, surveys, test excavation and/or monitoring for planning applications in areas of archaeological importance if a development proposal is likely to impact upon in-situ archaeological monuments, their setting and archaeological remains.
- To ensure that development within the vicinity of a Recorded Monument is sited and designed appropriately so that it does not seriously detract from the setting of the feature or its zone of archaeological potential. Where upstanding remains of a Recorded Monument exist a visual impact assessment may be required to fully determine the effect of any proposed development.
- To require the retention of surviving medieval plots and street patterns and to facilitate the recording of evidence of ancient boundaries, layouts etc. in the course of development

A15.1.2 Methodology Used for Baseline Environment and Impact Evaluations

The criteria used to assess the direct and indirect effects of the Proposed Development upon Cultural Heritage was guided by ‘Guidelines on the Information to be Contained in Environmental Impact Assessment Reports’, published by the Environmental Protection Agency (EPA) in 2022.

In accordance with the EPA (2022) Environmental Impact Assessment Guidelines, the assessment identifies effects as either direct or indirect, adverse or beneficial, and short-term, long-term, or permanent.

Direct effects are those which change the cultural heritage significance of an asset through physical alteration. For purposes of this assessment, indirect effects are those effects which cause change within the asset’s setting and thereby change the cultural heritage significance of an asset.

Direct effects on the cultural heritage significance of an asset have been assessed on the basis of a combination of the cultural heritage significance of the asset (where known), the probability of further assets being located within the affected areas and their likely significance, and the magnitude of effect on those assets to be caused by the implementation of the Proposed Development.

Indirect effects on the significance of cultural heritage assets have been identified and assessed with reference to the EPA Guidelines (2022). The assessment has been carried out in the following stages:

- Initial assessment of intervisibility and other factors leading to the identification of potentially affected assets
- Assessment of the cultural heritage significance of potentially affected assets
- Assessment of the contribution of the setting to the cultural heritage significance of those assets
- Assessment of the magnitude of effect of the Proposed Development on the contribution of settings to the cultural heritage significance of assets (by causing change within those settings); and
- Prediction of the significance of the effect.

Where direct effects on known archaeological features have been identified, mitigation by design has been proposed wherever possible. Where not possible, mitigation by means of a proportionate level of

archaeological recording is proposed, pending agreement with the Kilkenny Council Planning Authority. Any mitigation works will be outlined within a Project Design which will be authorised by the Kilkenny Council Planning Authority.

A15.1.3 Effects Scoped Out

Assets were assessed for aspects which contribute to their cultural significance, and whether these aspects were at risk of being directly or indirectly effected by the proposals. The following were scoped out:

- Effects upon heritage assets more than 5km from the Proposed Development unless identified as being particularly sensitive to change
- Effects on the setting of cultural heritage within 5km not intervisible with the proposals, as shown by the ZTV, and where there are no identified shared viewpoints of the heritage assets which contributes our understanding, appreciation and experience of the assets; and
- Assets within 5km and identified to have potential intervisibility using the ZTV but have no risk of adverse effects to their setting by the proposals within the scoping report and during the Site visit and settings assessment, undertaken in August 2025.

A15.1.4 Assessment of Heritage Significance

To allow for a detailed, justifiable, and intelligible determination of the significance of effects upon archaeology and cultural heritage, it is necessary to establish a consistent terminology for discussing the importance of heritage assets. This is referred to variously across the heritage statute, policy and guidance documentation, including ‘importance’, ‘interest’, ‘significance’, ‘special interest’ and ‘character’ amongst others. For the purposes of this assessment, the term ‘significance’ has been used consistently hereafter.

The *Framework and Principles for the Protection of Archaeological Heritage*¹, which relates specifically to archaeology, provides the following:

“Any material remains which can contribute to understanding past societies may be considered to have an element of archaeological significance... Archaeological significance or interest may also be seen in terms of the potential for sites, monuments or artefacts to enable people to experience directly the evidence for past societies and through this allow them to better understand and appreciate their own past.”

A more detailed approach is provided within Architectural heritage protection: guidelines for planning authorities², which conceives of heritage significance as deriving from the following categories of ‘special interest’:

- Architectural
- Historical
- Archaeological
- Artistic
- Cultural

¹ Department of Arts, Heritage, Gaeltacht and the Islands. 1999.

² Department of Arts, Heritage, Gaeltacht and the Islands, 2011.

- Scientific
- Technical; and
- Social

This guidance, which derives from the terms of the Granada Convention, makes the further point that these categories are not mutually exclusive, such that an asset might derive its significance from one, multiple or all these interests.

In accordance with this guidance, the significance of the heritage assets described within this assessment is discussed in terms of these contributing interests, enabling consistent, detailed, justifiable, and intelligible determinations of heritage significance to be made.

For the purposes of assessment Table 1 shows the potential levels of the heritage significance of an asset related to designation, status and grading, and where non-designated, to a scale of Highest to Negligible importance. This table acts as an aid to consistency in the exercise of professional judgement and provides a degree of transparency for others in evaluating the conclusions reached by this assessment.

Table 1: Heritage Significance

Heritage Significance	Explanation
Highest	Sites of international importance, including: World Heritage Sites;
High	Site of National importance, including: National Monuments, including those recorded on the Sites and Monuments Record (SMR) Nationally Important assets recorded in the National Inventory of Architectural Heritage (NIAH) Nationally Important assets included in the Record of Protected Structures
Medium	Sites of Regional importance, including: Sites on the Record of Monuments and Places, found within the relevant County Development Plan Regionally Important assets recorded in the National Inventory of Architectural Heritage (NIAH) Regionally Important assets included in the Record of Protected Structures
Low	Sites of minor importance or with little of the asset remaining to justify higher importance. Locally Important assets recorded in the National Inventory of Architectural Heritage (NIAH)
Negligible	Negligible or no heritage significance
Unknown	Further information is required to assess the significance of these assets.

A15.1.5 Magnitude of Impact

Determining the magnitude of any likely impacts requires consideration of the nature and extent of the change to the baseline cultural heritage conditions that would result from the construction, operation and decommissioning of the proposed development.

Impacts of a direct (e.g. physical truncation of buried remains as a result of ground disturbance), and/or indirect (e.g. adverse change to the setting of a cultural heritage asset, either by visual changes or sensory such as noise, and by indirect physical changes, such as change in hydrology or vibration).

The changes assessed comprise indirect change (e.g., visible change, noise, vibration, traffic movements affecting the setting of the asset). Impacts may be beneficial or adverse and may be short term, long term or permanent. The magnitude of impact has been assessed with reference to the criteria set out in Table 2. The magnitude of both beneficial and adverse impact is assessed according to the scale of impact, from high to neutral/none.

Table 2: Magnitude of Impact

Magnitude of Impact	Explanatory criteria
High Beneficial	The project would considerably enhance the heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Medium Beneficial	The project would enhance to a clearly discernible extent the heritage significance of the affected asset, or the ability to understand, appreciate and experience it.
Low Beneficial	The project would enhance to a minor extent the heritage significance of the affected asset, or the ability to understand, appreciate, and experience it.
Very Low Beneficial	The project would enhance to a very minor extent the heritage significance of the affected asset, or the ability to understand, appreciate, and experience it.
Neutral/None	The project would not affect or would have harmful and enhancing effects of equal magnitude on the heritage significance of the affected asset, or the ability to understand, appreciate, and experience it.
Very Low Adverse	The project would erode to a very minor extent the heritage significance of the affected asset, or the ability to understand, appreciate, and experience it.
Low Adverse	The project would erode to a minor extent the heritage significance of the affected asset, or the ability to understand, appreciate, and experience it.
Medium Adverse	The project would erode to a clearly discernible extent the heritage significance of the affected asset, or the ability to understand, appreciate, and experience it.
High Adverse	The project would considerably erode the heritage significance of the affected asset, or the ability to understand, appreciate and experience it.

A15.1.6 Significance of Impact

The significance criteria presented in Table 3. Table 4 provide a matrix that relates the heritage significance of the asset to the magnitude of impact on its significance (incorporating contribution from setting where relevant), to establish the likely overall significance of effect. Those assets which the matrix scores as Profound would be considered as receiving a significant effect.

Table 3: Significance Criteria

Significance	Description
Profound	The development would destroy all characteristics which are intrinsic to the asset.
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the environment.
Significant	The development would create an effect on a designated asset which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment
Moderate	An effect which alters the character of the environment in a manner that is consistent with existing or emerging trends
Slight	The development would not have an effect that causes noticeable changes in the character of the environment but without affecting its sensitivities
Not Significant/ Imperceptible	The development would have no effect which causes noticeable changes in the character of the environment but without significant consequences

Table 4: Significance of Effect Matrix

Magnitude of Effect	Significance (excluding negligible and unknown)			
	Highest	High	Medium	Low
High beneficial	Profound	Very Significant/Profound	Significant/Very Profound	Moderate
Medium beneficial	Profound	Significant	Moderate	Slight
Low beneficial	Very Significant	Slight/Moderate	Slight	Slight
Very low beneficial	Significant	Not Significant/Slight	Not Significant	Imperceptible/Not Significant
Neutral/None	Not Significant/ Imperceptible	Not Significant/ Imperceptible	Not Significant/ Imperceptible	Not Significant/ Imperceptible
Very low adverse	Significant	Not Significant/Slight	Not Significant	Imperceptible/Not Significant
Low adverse	Very Significant	Slight/Moderate	Slight	Slight
Medium adverse	Profound	Significant	Moderate	Slight
High adverse	Profound	Very Significant/Profound	Significant/Very Significant	Moderate

A15.1.7 Zone of Theoretical Visibility (ZTV) Analysis

The assessment of visual impact has been assisted by a bare earth ZTV analysis, presented in Figure 1. The ZTV analysis predicts the degree of visibility of the extant turbines within a study area around the Site, as it would be seen from the observer's eye. The ZTV model has been used to inform the likely effects on the setting of cultural heritage assets within the study area. The study area is defined as 5km from the extant turbines, due to the average line of sight and relationship between the assets and the surrounding landscape.

The ZTV is theoretical as it is based on a bare-earth model, meaning it is based on landform only and therefore does not take into account screening or filtering effects from vegetation, buildings or any other extant features. Therefore, it is likely to provide an overestimated degree of actual visibility.

Assets that fall outside the ZTV are excluded from further assessment, except where a view is identified that contributes to the setting of the heritage asset which has potential to be indirectly affected by the extant turbines.

A15.1.8 Cumulative Effects

The parameters for the cumulative assessment were identified using guidance provided by the EPA in Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022) and NatureScot in Version 5 of the Environmental Impact Assessment Handbook (2018)³.

A cumulative assessment will be conducted on any assets where direct or indirect (including setting) adverse effects arise on an asset or a group of assets from the proposed development of which also has potential direct or indirect adverse effects from another development of a similar scale.

Operational wind farms are considered as part of the baseline environment for setting assessments.

³ Appendix 1: Cultural Heritage Impact Assessment, Scoping Report; Paragraph 28 as well as Box Ap1.Info2

Appendix to Chapter 15: Cultural Heritage

Appendix 15.2: Gazetteer of Assets

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A15.2 Gazetteer of Assets

A15.2.1 Sites and Monuments Record Assets

Table 1: Assets on the Sites and Monuments Record within 1km from the Site boundary

SMRS	Other Designation	Monument Category	Period
KK003-021----	RMP	Ringfort - rath	Medieval
KK003-022----	RMP	Enclosure	Prehistoric
KK003-023----	RMP	Ringfort - rath	Medieval
KK003-024----	RMP	Ringfort - unclassified	Medieval
KK003-025----	RMP	Ringfort - rath	Medieval
KK003-026----	RMP	Enclosure	Prehistoric
KK003-027----	RMP	Enclosure	Prehistoric
KK003-028----	RMP	Enclosure	Prehistoric
KK003-029----	RMP	Enclosure	Prehistoric
KK003-047----	N/A	Enclosure	Prehistoric
KK003-048----	N/A	Enclosure	Prehistoric
KK003-049----	N/A	Enclosure	Prehistoric
KK008-023----	RMP	Ringfort - rath	Medieval
KK008-024----	RMP	Enclosure	Prehistoric
KK008-025----	RMP	Ringfort - rath	Medieval
KK008-026----	RMP	Castle - tower house	Medieval
KK008-027001-	RMP	Church	Medieval
KK008-027002-	RMP	Graveyard	Medieval
KK008-028----	RMP	Ringfort - rath	Medieval
KK008-029----	RMP	Quarry	Undated
KK008-030----	RMP	Enclosure	Prehistoric
KK008-031----	RMP	Ringfort - unclassified	Medieval
KK008-032002-	RMP	Field system	Undated
KK008-033----	RMP	Ringfort - rath	Medieval
KK008-055----	RMP	Building	Undated
KK008-056001-	RMP	Enclosure	Prehistoric
KK008-056002-	RMP	Earthwork	Natural
KK008-057----	RMP	Ringfort - rath	Medieval
KK008-059----	RMP	Field system	Medieval
KK008-060001-	RMP	Ringfort - rath	Medieval
KK008-060002-	RMP	House - indeterminate date	Undated

KK008-061----	RMP	Fulacht fia	Prehistoric
KK008-062----	RMP	Water mill - unclassified	Post-medieval
KK008-063----	RMP	Ringfort - rath	Medieval
KK008-064----	RMP	Ringfort - rath	Medieval
KK008-083----	RMP	Ringfort - rath	Medieval
KK008-084----	RMP	Enclosure	Prehistoric
KK008-085----	RMP	Enclosure	Prehistoric
KK008-107----	RMP	Ringfort – rath	Medieval
KK008-132----	N/A	Ritual site - holy well	Undated
KK008-133----	N/A	Ritual site - holy well	Undated
KK008-144----	RMP	Fulacht fia	Prehistoric
KK008-145----	RMP	Settlement deserted - medieval	Medieval
KK008-147----	RMP	Fulacht fia	Prehistoric
KK008-171----	N/A	Building	Undated
KK008-172----	N/A	Burnt mound	Prehistoric
KK008-173----	N/A	Fulacht fia	Prehistoric
KK008-174----	N/A	Fulacht fia	Prehistoric
KK008-175----	N/A	Kiln	Undated
KK008-183----	N/A	Fulacht fia	Prehistoric
KK008-184----	N/A	Fulacht fia	Prehistoric
KK008-185----	N/A	Fulacht fia	Prehistoric
KK008-186----	N/A	Fulacht fia	Prehistoric
KK009-001----	RMP	Barrow – ring-barrow	Prehistoric
KK009-003----	RMP	Enclosure	Prehistoric
KK009-004----	N/A	Designed landscape - tree-ring	Undated
KK009-005----	N/A	Ringfort - rath	Medieval
KK009-005001-	RMP	House - indeterminate date	Undated
KK009-005002-	RMP	Field boundary	Undated
KK009-006----	RMP	Ringfort - rath	Medieval
KK009-007----	RMP	Ringfort - rath	Medieval
KK009-008----	RMP	Ringfort - rath	Medieval
KK009-009----	RMP	Ringfort – rath	Medieval
KK009-011001-	RMP	Enclosure	Prehistoric
KK009-011002-	RMP	Linear earthwork	Undated
KK009-016----	N/A	Enclosure	Undated

KK009-017----	RMP	Enclosure	Prehistoric
KK009-018----	RMP	Ringfort - rath	Medieval
KK009-019001-	RMP	Church	Medieval
KK009-019002-	RMP	Graveyard	Medieval
KK009-019003-	RMP	Graveslab	Medieval
KK009-019004-	RMP	Settlement deserted – medieval	Medieval
KK009-019005-	RMP	Castle – unclassified	Medieval
KK009-019006-	RMP	Graveslab	Medieval
KK009-019007-	RMP	Ritual site – holy well	Medieval
KK009-019008-	N/A	Enclosure	Prehistoric
KK009-019009-	N/A	Cross-slab	Medieval
KK009-019010-	N/A	Cross-slab	Medieval
KK009-020001-	RMP	Ringfort - rath	Medieval
KK009-021----	RMP	Moated site	Medieval
KK009-022----	RMP	Castle – motte and bailey	Medieval
KK009-023----	RMP	Enclosure	Prehistoric
KK009-035----	RMP	Ringfort - rath	Medieval
KK009-041001-	RMP	Church	Medieval
KK009-041002-	RMP	Graveyard	Medieval
KK009-092----	N/A	Enclosure	Prehistoric
KK009-127----	N/A	Enclosure	Prehistoric
LA034-032001-	RMP	Religious house - unclassified	Medieval
LA034-032002-	RMP	Ringfort - rath	Medieval
LA034-032003-	RMP	Enclosure	Prehistoric
LA034-034----	RMP	Ringfort – rath	Medieval
LA034-051----	N/A	Enclosure	Prehistoric
LA034-052----	N/A	Enclosure	Prehistoric
LA034-056----	N/A	Enclosure	Prehistoric
LA035-057----	N/A	Enclosure	Prehistoric

Table 2: Assets on the Sites and Monuments Record within 500m of the Candidate Gathabawn Grid Connection

SMRS	Other Designations	Monument Category	Period
KK004-021---	RMP	Architectural Fragment	Post-medieval
KK004-024---	RMP	Armorial plaque	Medieval
KK004-024001-	NIAH 12400402	Ballyconra House	Post-medieval
KK005-023001-	RMP	Motte	Medieval
KK005-023002-	RMP	Castle	Medieval
KK005-094---	N/A	Enclosure	Prehistoric
KK005-096----	RMP	Enclosure	Prehistoric
KK009-0010----	RMP	Ringfort – rath	Medieval
KK009-014----	RMP	Ringfort – rath	Medieval
KK009-015----	RMP	Ring-ditch	Prehistoric
KK009-023----	RMP	Enclosure	Prehistoric
KK009-024---	RMP	Enclosure	Prehistoric
KK009-091----	RMP	Enclosure	Prehistoric
KK009-094--	N/A	Fulacht Fiadh	Prehistoric
KK009-095---	N/A	Burnt mound	Prehistoric
KK009-096----	RMP	Metalworking site	Prehistoric
KK009-097----	N/A	Fulacht Fiadh	Prehistoric
KK009-098---	N/A	Fulacht Fiadh	Prehistoric
KK009-103---	N/A	Enclosure	Prehistoric
KK010-122---	NIAH 12303001	Watermill	Post-medieval
KK010-139001-	RMP	Ford	Medieval
KK010-139002-	NIAH 12303003	Bridge	Post-medieval
LA035-057----	N/A	Enclosure	Prehistoric
N/A	NIAH 12303002	Ballyragget School	Post-medieval
N/A	NIAH 12400404	Ballyconra House: gates/railings/walls	Post-medieval

A15.2.2 National Inventory of Architectural Heritage Assets**Table 3: National Inventory of Architectural Heritage Assets within 1km of the Site boundary**

Register Number	Description	Name	Period
12400911	Bridge	Foyle Bridge	Post-medieval
12400912	Church/Chapel	Saint Muntchan's Catholic Church	Post-medieval
12400913	School	Greenkill National School	Modern

Table 4: National Inventory of Architectural Heritage Assets within 500m of the Candidate Gathabawn Grid Connection

Register Number	Description	Name	Period
12303001	Mill (Water)	-	Post-medieval
12303002	School	Ballyragget National School	Post-medieval
12303003	Bridge	Ballyragget Bridge	Post-medieval
12400402	House	Ballyconra House	Post-medieval
12400404	Gates/Railings/Walls	Ballyconra House	Post-medieval

Archaeological Geophysical Survey Gathabawn Windfarm Project, Co. Kilkenny



Archaeological
Management Solutions



Prepared for Ecopower Limited

By Liamóg Roche, Dr James Bonsall and Ross Drummond

October 2023

TITLE PAGE

AMS Job No.:	J3183
Project Name:	Archaeological Geophysical Survey Gathabawn Windfarm Project, Co. Kilkenny
Client Name:	Ecopower Limited
Townland Names:	Ballyconra; Ballylehaun; Ballyring Lower; Ballyring Upper; Coole; Coolnacrutta; Glashare; Gorteennamuck; Moatpark; Rathduff; Tentore and Tinnalintan
Grid Reference (ITM):	638645, 668902 (project mid-point)
Dates of Survey:	3 April–6 July 2023
Detection Device Number:	23R0038
Detection Device Licence Holder:	Liamóg Roche BSc (Hons) (Archaeological Geophysical and Remote Sensing Director)
Geophysical Surveyors:	Liamóg Roche BSc (Hons) (Archaeological Geophysical and Remote Sensing Director), Marcin Leszczynski BSc (Hons) (Archaeological Geophysical and Remote Sensing Supervisor), José Manuel Salinas Villegas, Alan Danaher and Robert Mulraney (Archaeological Geophysical Survey Assistants)
Data Processing:	Liamóg Roche and Marcin Leszczynski
Graphics/Illustrations:	Dr James Bonsall
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Report Authors:	Liamóg Roche (BSc Hons), Dr James Bonsall and Ross Drummond
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AMS Cultural Heritage Consultancy Limited trading as Archaeological Management Solutions

Company Registration No. 721173

Fahy’s Road, Kilrush, Co. Clare. V15 C780

T +353 (0)65 906 2878

www.ams-consultancy.com

Disclaimer

The results, conclusions and recommendations contained within this report are based on information available at the time of its preparation. Whilst every effort has been made to ensure that all relevant data have been collated, the authors and AMS accept no responsibility for omissions and/or inconsistencies that may result from information becoming available subsequent to the report’s completion.

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Summary

This report describes the results of an Archaeological Geophysical Survey undertaken for the Gathabawn Windfarm Project, which is located to the northwest of Gathabawn, Co. Kilkenny and extends in a north—easterly direction, ending northwest of Ballyragget town. Surveys were carried out in the townlands of Ballyconra; Ballylehaun; Ballyring Lower; Ballyring Upper; Coole; Coolnacrutta; Glashare; Gorteennamuck; Moatpark, Rathduff, Tentore and Tinnalintan, Co. Kilkenny (Detection No.: 23R0038). The survey was undertaken by Archaeological Management Solutions (AMS) for Ecopower Limited between 3 April and 6 July 2023 in advance of the proposed Gathabawn Windfarm.

The geophysical investigation comprised a magnetometry survey using both quad bike and push cart systems. The survey areas focused on the proposed location of wind turbines, hardstands and new access roads that cross greenfield areas. Access to the lands for the purposes of these works was by agreement between the Archaeological Consultant and Ecopower Limited.

The survey aimed to characterise the extent of potential archaeological deposits and features. The geophysical survey characterised the extent of potential archaeological deposits. The magnetometry identified both cut features and burnt features clearly. Other than commonly identified pits, isolated points of burning and linear/curvilinear boundary features and drainage ditches, the most significant archaeological sites identified in the 'archaeological' or 'possible archaeological' categories were:

A 43m diameter pit-circle was identified at GS – 08, this represents the remains of KK008-031- - Ringfort – unclassified.

GS – 22 contains a possible oval enclosure measuring 12m by 10m and a rectilinear enclosure which may indicate the presence of a small field system, measuring 18m x 18m.

GS – 37 contains a small number of archaeological sites, including two pairs of parallel ditches, the northeast corner of KK05-094---- Enclosure and two ring-ditches.

Recommendations are subject to the agreement of the National Monuments Service of the Department of Housing, Local Government and Heritage, the National Museum of Ireland and the local planning authority where required and should only be carried out in accordance with the necessary approvals. Please note that the statutory and local authorities may issue alternative and/or additional recommendations/conditions.

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Abbreviations and Definitions

Abbreviation	Definition
AMS	Archaeological Management Solutions
DIER	Database of Irish Excavation Reports
GIS	Geographical Information System
GSI	Geological Survey Ireland
HEV	Historic Environment Viewer
ITM	Irish Transverse Mercator
NIAH	National Inventory of Architectural Heritage
NMS	National Monuments Service
OS	Ordnance Survey
RPS	Record of Protected Structures
RMP	Record of Monuments and Places
SMR	Sites and Monuments Record
WMS	Web Map Service
ZoN	Zone of Notification

Coordinate System

All grid coordinates in this report use the Irish Transverse Mercator (ITM) coordinate reference system unless otherwise stated.

1 Introduction

1.1 Project Background

This report describes the results of an Archaeological Geophysical Survey undertaken for the Gathabawn Windfarm Project, which is located to the northwest of Gathabawn, Co. Kilkenny and extends in a northeasterly direction, ending northwest of Ballyragget town (Detection No.: 23R0038). The survey was carried out in advance of the proposed location of wind turbines, hardstands and new access roads that cross greenfield areas.

The archaeological geophysical survey covered a total area of 83 ha, which traversed several townlands.

The investigation comprised an magnetometry survey, using both quad bike and push cart systems, and was undertaken by Archaeological Management Solutions (AMS) for Ecopower Limited from 3 April to 6 July 2023.

1.2 The Survey Areas

The proposed Gathabawn Windfarm Project development is located in north Co. Kilkenny, near Ballyragget town. The development will cover areas located in the townlands of Ballyconra; Ballylehaun; Ballyring Lower; Ballyring Upper; Coole; Coolnacrutta; Glashare; Gorteennamuck; Moatpark; Rathduff; Tentore and Tinnalintan. The midpoint of the survey areas was centred on 638645, 668902 (ITM).

The purpose of the geophysical survey was to determine whether the proposed location of wind turbines, hardstands and new access roads that crossed greenfield areas would impact any archaeological sites or remains which may exist. The targeted archaeological geophysical survey covered a total area of 83 ha and was carried out using magnetometry survey.

Table 1: Geophysical Survey Areas.

Survey Area	Area (ha)	ITM Easting	ITM Northing	Townland
GS-01	1.708465782	634017	671715	Coolnacrutta
GS-02	1.11743851	633991	671594	Coolnacrutta
GS-03	Descoped			
GS-04	0.944421734	633944	671476	Coolnacrutta
GS-05	1.761850818	633868	671344	Coolnacrutta
GS-06	1.96504796	633709	671063	Coolnacrutta
GS-07	3.61347016	633605	670851	Glashare; Ballylehaun

Survey Area	Area (ha)	ITM Easting	ITM Northing	Townland
GS-08	6.057881653	633287	670540	Glashare; Ballylehaun
GS-09	8.241469277	633997	670505	Ballylehaun
GS-10	Descoped			
GS-11	3.075583924	634298	670788	Ballylehaun
GS-12	2.932053113	634210	670160	Ballylehaun
GS-13	2.023311744	634166	669896	Ballylehaun
GS-14	2.685919985	634499	669705	Gorteennamuck
GS-15	1.525679668	634863	669599	Gorteennamuck
GS-16	2.015783407	635033	669713	Gorteennamuck
GS-17	2.697472703	635134	669521	Gorteennamuck
GS-18	2.04407465	638143	669406	Ballyring Upper
GS-19	0.854099217	638194	669290	Ballyring Upper
GS-20	0.91183465	638491	669284	Ballyring Upper
GS-21	0.923899752	638579	669301	Ballyring Upper
GS-22	3.835770775	638854	669263	Ballyring Lower
GS-23	2.539073507	638477	669091	Ballyring Upper
GS-24	0.699990821	638411	669065	Tentore; Ballyring Upper
GS-25	0.115629488	638512	668953	Tentore
GS-26	0.524802673	638597	668827	Ballyring Upper
GS-27	2.651328449	638729	668883	Ballyring Upper
GS-28	0.579923546	638644	668773	Ballyring Upper
GS-29	0.637031356	638568	668685	Ballyring Upper
GS-30	0.622370256	638457	668678	Tentore
GS-31	1.485072707	638354	668745	Tentore
GS-32	2.535331019	638767	668460	Ballyring Upper
GS-33	2.303271537	644071	673039	Ballyconra
GS-34	1.397465538	644294	673052	Ballyconra
GS-35	1.305351532	644487	673088	Coole
GS-36	2.044348887	643341	672747	Ballyconra
GS-37	9.584614229	644786	672601	Moatpark; Rathduff; Tinnalintan
GS-38	0.354719153	644519	672723	Moatpark

1.3 Purpose and Scope of this Assessment

The survey comprised an magnetometry survey, undertaken by Liamóg Roche (Archaeological Geophysical and Remote Sensing Director), Marcin Leszczynski (Archaeological Geophysical and Remote Sensing Supervisor), José Salinas, Alan Danaher and Robert Mulraney (Archaeological Geophysical Survey Assistants) from 3 April to 6 July 2023. The methodology was approved by the Archaeological Licensing Section of the National Monuments Service (NMS) and Consent to use a Detection Device under Section 2 (2) of the *National Monuments (Amendment) Act, 1987*, was issued to James Bonsall by the Minister for Housing, Local Government and Heritage: Detection Device No. 23R0038.

1.4 Topography, Soils and Geology¹

As the geophysical survey was carried out in 36 different survey areas (GS-01–GS-38) which traversed several townlands, with the topography, soils and geology encountered varying throughout the project. The details for each survey area are presented below in Table 2:

Table 2: Topographical, geological and soil information for each survey area.

Survey Area	Geology	Quaternary	Soils	Townland
GS-01	Crinoidal wackestone/packstone limestone	Till derived from limestones	Fine loamy drift with limestones	Coolnacrutta
GS-02	Crinoidal wackestone/packstone limestone	Till derived from limestones	Fine loamy drift with limestones	Coolnacrutta
GS-04	Crinoidal wackestone/packstone limestone	Till derived from limestones; Kartsified bedrock outcrop or subcrop	Fine loamy drift with limestones	Coolnacrutta
GS-05	Crinoidal wackestone/packstone limestone	Till derived from limestones	Fine loamy drift with limestones	Coolnacrutta
GS-06	Crinoidal wackestone/packstone limestone	Till derived from limestones	Fine loamy drift with limestones	Coolnacrutta
GS-07	Crinoidal wackestone/packstone limestone	Till derived from limestones; Karstified bedrock outcrop or subcrop	Fine loamy drift with limestones	Glashare; Ballylehaun

¹ Information from this table sourced from Geological Survey Ireland - http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple [Accessed: 21 July 2023].

Survey Area	Geology	Quaternary	Soils	Townland
GS-08	Crinoidal wackestone/packstone limestone	Till derived from limestones; Kartsified bedrock outcrop or subcrop	Fine loamy drift with limestones	Glashare; Ballylehaun
GS-09	Crinoidal wackestone/packstone limestone	Kartsified bedrock outcrop or subcrop	Fine loamy drift with limestones; Fine loamy drift with siliceous stones	Ballylehaun
GS-11	Crinoidal wackestone/packstone limestone	Kartsified bedrock outcrop or subcrop	Fine loamy drift with limestones; Fine loamy drift with siliceous stones	Ballylehaun
GS-12	Crinoidal wackestone/packstone limestone; Cherty, muddy, calcarenitic limestone	Kartsified bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Ballylehaun
GS-13	Cherty, muddy, calcarenitic limestone	Kartsified bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Ballylehaun
GS-14	Cherty, muddy, calcarenitic limestone; Muddy siltstone & silty mudstone	Kartsified bedrock outcrop or subcrop; Bedrock outcrop or subcrop; Till derived from Namurian sandstones and shales	Fine loamy drift with siliceous stones	Gorteennamuck
GS-15	Muddy siltstone & silty mudstone	Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Gorteennamuck
GS-16	Muddy siltstone & silty mudstone	Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Gorteennamuck
GS-17	Muddy siltstone & silty mudstone	Till derived from Namurian sandstones and shales; Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Gorteennamuck
GS-18	Muddy siltstone & silty mudstone; Thick flaggy sandstone and siltstone	Till derived from Namurian sandstones and shales	Fine loamy drift with siliceous stones	Ballyring Upper

Survey Area	Geology	Quaternary	Soils	Townland
GS-19	Muddy siltstone & silty mudstone; Thick flaggy sandstone and siltstone	Till derived from Namurian sandstones and shales; Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Ballyring Upper
GS-20	Thick flaggy sandstone and siltstone	Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Ballyring Upper
GS-21	Thick flaggy sandstone and siltstone	Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Ballyring Upper
GS-22	Thick flaggy sandstone and siltstone	Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Ballyring Lower
GS-23	Thick flaggy sandstone and siltstone	Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Ballyring Upper
GS-24	Thick flaggy sandstone and siltstone	Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Tentore; Ballyring Upper
GS-25	Thick flaggy sandstone and siltstone	Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Tentore
GS-26	Thick flaggy sandstone and siltstone	Till derived from Namurian sandstones and shales; Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Ballyring Upper
GS-27	Thick flaggy sandstone and siltstone	Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Ballyring Upper
GS-28	Thick flaggy sandstone and siltstone	Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Ballyring Upper
GS-29	Thick flaggy sandstone and siltstone	Till derived from Namurian sandstones and shales; Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Ballyring Upper
GS-30	Thick flaggy sandstone and siltstone	Till derived from Namurian sandstones and shales; Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Tentore

Survey Area	Geology	Quaternary	Soils	Townland
GS-31	Thick flaggy sandstone and siltstone	Till derived from Namurian sandstones and shales; Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones	Tentore
GS-32	Muddy siltstone & silty mudstone	Till derived from Namurian sandstones and shales; Bedrock outcrop or subcrop	Fine loamy drift with siliceous stones; Fine loamy drift with limestones	Ballyring Upper
GS-33	Crinoidal wackestone/packstone limestone	Gravels derived from Limestones	Fine loamy drift with limestones	Ballyconra
GS-34	Crinoidal wackestone/packstone limestone	Alluvium	River alluvium	Ballyconra
GS-35	Crinoidal wackestone/packstone limestone	Gravels derived from Limestones	Fine loamy drift with limestones	Coole
GS-36	Crinoidal wackestone/packstone limestone	Gravels derived from Limestones	Fine loamy drift with limestones	Ballyconra
GS-37	Cherty, muddy, calcarenitic limestone	Till derived from limestones; Bedrock or sub-outcrop	Fine loamy drift with limestones	Moatpark; Rathduff; Tinnalintan
GS-38	Cherty, muddy, calcarenitic limestone	Till derived from limestones; Bedrock or sub-outcrop	Fine loamy drift with limestones	Moatpark

1.5 Aims and Objectives

The aim of the archaeological geophysical survey was to identify potential archaeological remains.

This aim was achieved using the following objectives:

- Identify any geophysical anomalies of possible archaeological origin within the specified survey area.
- Accurately locate these anomalies and present the findings in map form.
- Describe the anomalies and discuss their likely provenance in a written report.
- Incorporate all the above into a report for the Client.
- Preparation and submission of archives of the project data and reports.

2 Archaeological and Historical Background

2.1 Recorded Monuments

There is one recorded archaeological monument within the footprint of areas to be surveyed. This comprises an unclassified ringfort at Glashare (KK008-031----) located within Survey Area GS-08. There are two other recorded archaeological sites located within 100m of the survey areas. The first comprises of an enclosure at Ballyring Upper (KK009-023----). The northwestern limit of the Zone of Notification (ZoN) for this lies within Survey Area GS-21. The second comprises another enclosure at Ballyconra (KK004-014----). The northern limit of the ZoN for this site lies within Survey Area GS-33.

The surrounding landscape around the geophysical survey areas for the Gathabawn Windfarm Project is rich in archaeological monuments and sites as seen in the attached maps (see Figure 2 –Figure 4), showing a varied sites types recorded on both the Record of Monuments and Places (RMP) and on the Sites and Monuments Record (SMR).

Table 3: Recorded archaeological sites within 100m of the survey areas.

SMR No.	Classification	Townland	ITM Easting	ITM Northing
KK004-014----	Enclosure	Ballyconra	644141	672957
KK008-031----	Ringfort - unclassified	Glashare	633498	670666
KK009-023----	Enclosure	Ballyring Upper	638582	669242
KK005-094----	Enclosure	Rathduff	644865	672613
KK005-095----	Field system	Rathduff	644935	672709
KK005-023001-	Castle - motte	Moatpark	644412	672747
KK005-023002-	Castle - unclassified	Moatpark	644411	672748

2.2 Previous Archaeological Investigations

According to the Database of Irish Excavation Reports (DIER) there are no previous investigations are recorded within the geophysical survey areas. However, previous archaeological investigations have taken place in several of the townlands with the survey traversed (see Table below).

Table 4: Previous archaeological excavations in surveyed townlands

Excavator/Licence No.	Site type	Townland
John Channing (AMS)/22E0847 and 22R0360	Multiple	Ballyconra ²

² <https://excavations.ie/report/2022/Kilkenny/0031929/> [Accessed: 21 July 2023].

Excavator/Licence No.	Site type	Townland
John Channing (AMS)/22E0847 and 22R0360	Multi-period	Ballyconra ³
Gill McLoughlin/22E0811	Settlement Cluster	Ballyconra ⁴
Gill McLoughlin/22E0813	Burnt mounds, kiln, Beaker pit, post-medieval work surface	Ballyconra ⁵
Anne-Marie Lennon/08E0368	No archaeological significance	Moatpark ⁶
Tara O'Neill/A015/027; E2142	No archaeological significance	Coolnacrutta ⁷
Colm Moriarty, Margaret Gowen and Co. Ltd/A027/000	Various	Glashare ⁸
Colm Hardy for Valerie J. Keeley Ltd/E002394	Burnt mounds, burnt spread, field clearance, hearths	Glashare ⁹

2.3 NMI Topographical Finds

There are no stray finds recorded in the NMI's online Finds Database as available on Heritage Maps, within the immediate area of the development, although this dataset is limited.¹⁰

2.4 Recorded and Listed Built Heritage Sites

There were no built heritage sites were recorded in the geophysical survey areas, however there were two sites in the vicinity of survey area GS-36 located to the south, within the townland of Ballyconra. One of the sites was listed on both the Record of Protected Structures (RPS) and the National Inventory of Architectural Heritage (NIAH) (Table 2).

Table 5: RPS and NIAH sites in close proximity of the survey site

Reg. No	Name/Site type	Townland
C312/NIAH 12400402	Ballyconra House - house	Ballyconra
NIAH 12400404	Ballyconra House - Gates/railings/walls	Ballyconra

³ <https://excavations.ie/report/2022/Kilkenny/0032795/> [Accessed: 24 July 2023].

⁴ <https://excavations.ie/report/2022/Kilkenny/0032409/> [Accessed: 21 July 2023].

⁵ <https://excavations.ie/report/2022/Kilkenny/0032709/> [Accessed: 24 July 2023].

⁶ <http://excavations.ie/report/2008/Kilkenny/0019743/> [Accessed: 21 July 2023].

⁷ Down on excavations.ie as Coolnaritta; located right on townland boundary with Oldtown - <https://excavations.ie/report/2007/Laois/0018044/> [Accessed: 21 July 2023].

⁸ <https://excavations.ie/report/2005/Kilkenny/0013795/> [Accessed: 24 July 2023].

⁹ <http://excavations.ie/report/2006/Kilkenny/0015770/> [Accessed: 24 July 2023].

¹⁰ <https://heritagemaps.ie/WebApps/HeritageMaps/index.html> [Accessed: 4 July 2023].

3 Methodology

3.1 Personnel

The geophysical survey was directed by Liamóg Roche (Archaeological Geophysical and Remote Sensing Director) under licence from the NMS. The survey was carried out by Liamóg Roche, Marcin Leszczynski (Archaeological Geophysical and Remote Sensing Supervisor), José Salinas, Alan Danaher and Robert Mulraney (Archaeological Geophysical Survey Assistants). The report has been written by Liamóg Roche and Ross Drummond. The investigation focused on a Study Area of c.83 ha.

3.2 Magnetometry

The survey employed a detailed magnetometer survey, recording the vertical magnetic gradient i.e. a fluxgate gradiometer. This technique measures variations in the magnetic properties of the soils. It is widely used in archaeological geophysical prospection due to its ability to detect and map a broad range of subsurface archaeological remains, including ditches and pits and burnt or fired features associated with metalworking and pottery production (Aspinall *et al.* 2008).

3.2.1 Data Capture

The survey recorded the vertical magnetic gradient, i.e., a fluxgate magnetometer. A Sensys MAGNETO MX PDA 5 Channel cart system was towed by a 2023 CFMOTO CFORCE 450 quad bike. Five Sensys FGM650 fluxgate gradiometer probes were mounted on a Sensys MAGNETO MX PDA 5 Channel cart system; each probe was spaced 0.5m apart. The magnetometer data were acquired gridlessly with Sensys MonMX Lite Software, connected to a Carlson BRX7 GNSS Smart Antenna RTK GPS, achieving a spatial resolution of 0.1m accuracy. Data were collected at ten times per second along the lines.

3.2.2 Data Processing

The magnetometry and GPS data were processed through Geoserver followed by DLMGPS 4.01-12 and finalised in Sensys MAGNETO 3.01-14. MAGNETO software was used for trace correction and equalisation.

3.2.3 Data Visualisation

The data were brought in to QGIS as a GeoTIFF for display and interpretation as greyscale images.

3.3 Data Management, Processing, and Interpretation

This project used QGIS (Version 3.22.14) as a Geographical Information System (GIS) to manage the project. QGIS is an open-source GIS which can be used to create, edit, visualise, analyse and publish

geospatial information.¹¹ This project used the long-term release version of the software (3.18.1) as the basic platform to access, view and analyse the geophysical visualisations produced in Snuffler. QGIS also allowed us to compare the visualisations with other relevant geospatial databases, record the analysis through digitising the morphology and magnitude of anomalies identified, and output a table catalogue of this analysis and corresponding maps.

For the purposes of this project, the following datasets were also accessed and/or downloaded:

- Tailte Éireann historical maps and orthographic photographs of the Study Areas, viewed online;¹²
- Sites and Monuments Record (SMR) point and polygon vectors as a Web Map Service (WMS);¹³
- National Inventory of Architectural Heritage (NIAH) point vector (downloaded from www.archaeology.ie);
- Record of Protected Structures (RPS) data;¹⁴
- Rivers and lakes as a WMS (downloaded from <https://gis.epa.ie/GetData>);
- National soils database as a vector layer (downloaded from <https://gis.epa.ie/GetData/Download>);
- Townlands vector layer.¹⁵

The following vector layers were generated for the project:

- A polygon for the Study Area;
- Polygons for each identified geophysical anomaly.

The dimensions of individual anomalies were calculated in QGIS using the measure tools. All anomalies are defined by polygons.

3.4 Standards

The geophysical survey and report follow the recommendations outlined by relevant best practice guidance documents as a minimum standard (Bonsall *et al.* 2014; David *et al.* 2008; Gaffney *et al.*

¹¹ QGIS. Quantum GIS v3.18.1. <https://www.qgis.org/en/site/>

¹² Accessed from <https://maps.archaeology.ie/HistoricEnvironment/>

¹³ SMR data accessed from <https://data.gov.ie/dataset/national-monuments-service-archaeological-survey-of-ireland>

¹⁴ RPS data accessed from <https://www.tipperarycoco.ie/heritage-and-conservation/protected-structures-record>

¹⁵ Vector layer downloaded from www.townlands.ie; townland names confirmed against the OS townlands list from <https://data.gov.ie/dataset/townland>.

2002; Schmidt *et al.* 2015). Geophysical data, shapefiles, figures and the text have been archived following the recommendations of the Archaeology Data Service (Schmidt & Ernenwein 2011). Raw geophysical data and GIS shapefiles are available in the archive.

3.5 Constraints

There were some constraints on the archaeological methods, most notably the presence of high voltage overhead power lines, which have created strong patterns of interference across some parts of the survey areas. The topography of survey area GS – 09 consisted of upland, moderately sloped pasture lands with long grass and frequent rock outcrops. This terrain prevented surveys from taking place across a portion of the survey area.

4 Results and Interpretation

4.1 Overview of the survey

The magnetometry surveys performed well across most of the survey areas, showing clear and coherent contrasts for archaeological features such as pits, ditches and potential areas of burning.

The magnetometry data (Figures 8—89), and the magnetometer interpretation (Figures 90—171) should be cross-referenced with the description (below) for a discussion of the anomalies.

A large number of ferrous (iron) dipolar anomalies were identified. These are likely to represent modern iron discarded in the topsoil, and in many cases reflect what we suspect are imported soils or disturbed ground. Widespread areas of interference were frequently encountered, mostly generated by fence lines or modern debris. In addition, geological anomalies were also encountered across some survey areas. Of the remaining anomalies, many represent commonly identified pits, isolated points of burning or linear/curvilinear boundary features and drainage ditches.

The most significant magnetometer anomalies have been numbered in the interpretation figures and are described below. These should be cross-referenced with the interpretation plots. A narrative of the most significant potential archaeological sites identified in each study area is given below.

4.2 Magnetometry Interpretation

4.2.1 GS – 01

[01-01] - This is a positive curvilinear anomaly that represents a possible ditch. It measures 51.2m length x 2m width.

[01-02] – A penannular anomaly that represents a possible ditch. Possibly forming an enclosing element. It measures 15.8m length x 1.3m width.

[01-03] – This is an area of positive magnetic enhancement which may have an archaeological or natural cause, that could include occupational disturbance, imported soils or ploughed out archaeological remains. It measures 118.3m length x 50m width.

4.2.2 GS – 02

[02-01] – A positive penannular anomaly that represents a possible ditch. Possibly forming an enclosing element. It measures 7.5m diameter.

[02-02] – A positive curvilinear anomaly that represents a possible ditch. It measures 13.6m length x 1.6m width.

[02-03] – This is a positive linear anomaly that corresponds to a field boundary represented on the historic 6-inch maps. It measures 32m length x 1.5m width.

[02-04] – This is a positive linear anomaly that corresponds to a field boundary represented on the historic 6-inch maps. It measures 79.2m length x 1.3m width.

[02-05] – This is a positive linear anomaly that corresponds to a field boundary represented on the historic 6-inch maps. It measures 34.7m length x 1.2m width.

[02-06] - This is a positive linear anomaly that represents a possible ditch. It measures 68.6m length x 1.9m width.

[02-07] – This is a positive curvilinear anomaly that represents a possible ditch. It measures 7.3m length x 1.9m width.

[02-08] – This is a positive curvilinear anomaly that represents a possible ditch. It measures 12.3m length x 1.9m width.

[02-09] – A strongly positive 'horseshoe' shaped anomaly 9m length x 2.3m width. This is a positive anomaly that has produced a signal suggesting an area of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires.

[02-10] – This area of positive magnetic enhancement may have an archaeological or natural cause, that could include occupational disturbance, imported soils or ploughed out archaeological remains. It measures 83m length x 38m width.

[02-11] – This area of positive magnetic enhancement may have an archaeological or natural cause, that could include occupational disturbance, imported soils or ploughed out archaeological remains. It measures 40m length x 9m width.

4.2.3 GS – 03

GS – 03 was descoped from the project – no surveys occurred and this survey area no longer exists.

4.2.4 GS – 04

No significant archaeological sites were identified in GS – 04.

4.2.5 GS – 05

[05-01] This is a positive curvilinear anomaly that represents a possible ditch or enclosing element. It measures 27.7m length x 2.2m width.

[05-02] – This is a positive linear anomaly that represents a possible ditch. It measures 52m length x 2.1m width.

[05-03] – This is a low contrast, positive penannular anomaly that represents a possible ditch or enclosing element. It measures 5.4m diameter.

[05-04] – This is a positive penannular anomaly that represents a possible ditch or enclosing element. It measures 16m diameter.

[05-05] – This is a positive linear anomaly that represents a possible ditch. It measures 12m length x 2.7m width.

4.2.6 GS – 06

[06-01] – This is a positive curvilinear anomaly that represents a possible ditch or field system element. It measures 76.8m length x 2m width.

[06-02] – This is a positive curvilinear anomaly that represents a possible ditch or field system element. It measures 17m length x 1.2m width.

[06-03] – This is a low contrast, positive curvilinear anomaly that represents a possible ditch or enclosing element. It measures 30.3m length x 1.5m width.

[06-04] – This is a low contrast, positive penannular anomaly that represents a possible ditch or enclosing element. It measures 10.2m diameter.

[06-05] – This is a positive linear anomaly that corresponds to a field boundary represented on the historic 6-inch maps. It measures 39.5m length x 1.5m width.

[06-06] – This is a positive linear anomaly that represents a possible ditch. It measures 14.4m length x 1.6m width.

[06-07] – This is a positive linear anomaly that represents a possible ditch. It measures 17m length x 1.9m width.

[06-08] – This is a positive linear anomaly that corresponds to a field boundary represented on the historic 6-inch maps. It measures 38.4m length x 1.4m width.

[06-09] – This is an area of positive magnetic enhancement that corresponds with a structure represented on the historic 6-inch maps. It measures 23.6m length x 16.2m width.

4.2.7 GS – 07

[07-01] – This is a positive 'L'-shaped linear anomaly that represents a possible ditch or field system. It measures 45m length x 1.4m width.

[07-02] – This is a positive anomaly that has produced a signal suggesting an area of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires. It measures 6.6m diameter.

[07-03] – This is a low contrast, positive penannular anomaly that represents a possible ditch or enclosing element. It measures 13.1m diameter.

[07-04] – This is a positive anomaly that has produced a signal suggesting an area of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires. It measures 11m length x 5.6m width.

[07-05] – This is a positive linear anomaly that corresponds to a field boundary represented on the historic 6-inch and 6-inch Cassini maps. It measures 28.8m length x 2.8m width.

[07-06] – This is a positive linear anomaly that corresponds to a field boundary represented on the historic 6-inch maps. It measures 62.8m length x 1.4m width.

[07-08] – This is an area of positive magnetic enhancement which may have an archaeological or natural cause, that could include occupational disturbance, imported soils or ploughed out archaeological remains. It measures 71.2m length x 28.6m width.

[07-09] – This is a positive anomaly that has produced a signal suggesting an area of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires. It measures 7.9m length x 6.2m width.

4.2.8 GS – 08

GS – 08, spread across four fields, contains a significant archaeological site located at KK008-031- - Ringfort – unclassified. This is a large enclosure [08-02] comprised of what appear to be isolated pits in a circular arrangement, possibly representing large post-holes. The pit-circle is 43m in diameter. The pits on the south side of the enclosure are strongly magnetic, suggesting in situ burning, which is different from the weaker responses on the north side of the enclosure. There are also indications of in situ burning inside the enclosure [08-03], [08-04], [08-40] and [08-41].

A small number of linear and curvilinear features, likely to represent ditches, were also identified. One of these [08-08] respects the extent of the enclosure.

A number of linear features within the survey area correspond to field boundaries depicted on historic maps. Two strongly positive anomalies [08-13] and [08-37] that have produced a signal suggesting an area of burning were also identified within the southwest of GS – 08. This could include a hearth, a

fulacht fiadh, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires.

4.2.9 GS – 09

Near surface (exposed) geology prevented much of the survey at GS – 09.

A strongly negative annular anomaly [09-10] measuring 6.5m diameter is present within the northeast of the survey area. This indicates a potential infilled ditch or wall footing and may represent a possible hut site. A further potential stone enclosure, located in the southwest corner of the central field is represented by [09-04]. This is visible topographically and may extend beyond the field boundaries which define the limits of the survey in this area. A negative curvilinear feature [09-08], also visible topographically, further bounds the enclosing element [09-04] to the northeast.

4.2.10 GS – 10

GS – 10 was descope from the project – no surveys occurred and this survey area no longer exists.

4.2.11 GS – 11

A weakly contrasting, penannular anomaly [11-07] may represent a ring ditch 13m in diameter.

Two positive linear anomalies [11-02] and [11-03] bisect the survey area and may represent ditch features. A number of weakly contrasting, negative linear anomalies were also identified and may represent infilled ditches or wall footings. Two parallel linear anomalies are present in the southeast corner of the survey area [11-12] and [11-13]. They bound an area of increased negative magnetic contrast and may represent the remains of a metal surface flanked by ditches.

4.2.12 GS – 12

Two positive rectilinear anomalies [12-07] and [12-12] may represent enclosing elements or small field systems. A further three potential penannular enclosing elements are indicated by [12-03], [12-10] and [12-11], although these are of weak magnetic contrast.

4.2.13 GS – 13

A ring-ditch [13-01] was identified at the northwest corner of GS – 13. It is 5m in diameter and may represent a hut site.

Two negative linear anomalies [13-06] and [13-07] may represent infilled ditches or wall footings.

4.2.14 GS – 14

Two low contrast penannular anomalies were identified within the survey area. These are represented by [14-02], at 11.4m diameter, and [14-07], at 9.5m diameter. [14-11], [14-12] and [14-15] are

negative linear anomalies which may represent infilled ditches or wall footings and may be elements of a field system. Several positive linear and curvilinear anomalies are also present within the survey area and are indicative of ditch features which may similarly be field system elements. Anomalies [14-01] and [14-17] are strongly positive anomalies that have produced a signal suggesting an area of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires.

4.2.15 GS – 15

[15-01] – This is a positive anomaly that has produced a signal suggesting an area of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires. It measures 7.6m diameter.

[15-02] – This is a positive anomaly that has produced a signal suggesting an area of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires. It measures 8.8m length x 5.3m width.

[15-03] – This is a positive linear anomaly that represents a possible ditch, possibly continued as anomaly [15-04]. It measures 37.5m length x 2.7m width.

[15-04] – This is a positive linear anomaly that represents a possible ditch, possibly a continuation of anomaly [15-03]. It measures 12.1m length x 2.1m width.

[15-05] – This is a positive linear anomaly that represents a possible ditch. It measures 18.5m length x 1.8m width.

4.2.16 GS – 16

No significant archaeological sites were identified in GS – 16.

There are indications of a sand/gravel pit near the centre of GS – 16.

4.2.17 GS – 17

No significant archaeological sites were identified in GS – 17.

There are indications of sand/gravel pits across the southern half of GS – 17. A number of positive linear and curvilinear anomalies are present within the survey area, some of which are respected by identifiable plough furrows, such as [17-12]. These may represent ditch features and elements of a field system.

4.2.18 GS – 18

[18-01] – This is a positive curvilinear anomaly that represents a possible ditch, potentially a field system. It measures 67.7m length x 1.9m width.

[18-02] – This is a positive curvilinear anomaly that represents a possible ditch, potentially a field system. It measures 25.2m length x 1.3m width.

[18-03] – This is a positive linear anomaly that corresponds to a field boundary represented on the historic 25-inch, 6-inch Cassini and historic 6-inch maps. It measures 25.8m length x 1.5m width.

[18-04] – This is a positive linear anomaly that corresponds to a field boundary represented on the historic 25-inch, 6-inch Cassini and historic 6-inch maps. It measures 82m length x 1.4m width.

[18-05] – This is a positive linear anomaly that represents a possible ditch, potentially a field system. It measures 88.7m length x 1.4m width.

[18-06] – This is a positive anomaly that has produced a signal suggesting an area of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires. It measures 11m length x 2m width.

[18-07] – This is a positive anomaly that has produced a signal suggesting an area of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires. It measures 2.8m length x 1.5m width.

[18-08] – This is a positive anomaly that has produced a signal suggesting an area of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires. It measures 6.1m diameter.

4.2.19 GS – 19

[19-01] – This is a positive linear anomaly that corresponds to a field boundary represented on the historic 25-inch, 6-inch Cassini and historic 6-inch maps. It measures 25.7m length x 1m width.

[19-02] – This is a positive linear anomaly that represents a possible ditch. It measures 8.5m length x 1.3m width.

4.2.20 GS – 20

The remains of a field system, indicated by plough furrows, can be seen across GS – 20 and GS – 21. [20-01], [20-02] and [20-03] are positive linear and curvilinear anomalies which may represent ditch features.

4.2.21 GS – 21

The remains of a field system, indicated by plough furrows, can be seen across GS – 21 and GS – 20. [21-07] represents a negative penannular anomaly which may indicate a wall or stone footing of a potential enclosing element 7.5m in diameter.

4.2.22 GS – 22

GS – 22 contains a possible oval enclosure [22-02] at the northwest end, although this is impacted by areas of interference in the corner of the field. If it is an enclosure, it measures 12m by 10m.

A rectilinear enclosure [22-22] may indicate the presence of a small field system along the northern edge of GS – 22. It measures 18m x 18m.

Further possible enclosing elements are represented by [22-01], [22-09] and [22-10]. A number of positive linear anomalies across the survey area represent possible ditch features, potentially elements of a field system.

4.2.23 GS – 23

This area is characterised by the presence of a large number of positive linear anomalies. Of these [23-5], [23-07], [23-08], [23-09] and [23-10] represent field boundaries present on historic maps while the remaining features are indicative of likely ditch features, possibly field boundaries or systems pre-dating the historic maps.

4.2.24 GS – 24

Two low contrast, positive linear anomalies [24-02] and [24-03] within the survey area are representative of field boundaries present on historic maps. A single, low contrast, positive linear anomaly [24-01] is indicative of a potential ditch feature.

4.2.25 GS – 25

No significant archaeological sites were identified in GS – 25.

4.2.26 GS – 26

No significant archaeological sites were identified in GS – 26.

Anomalies [26-01] to [26-05] represent positive linear and curvilinear anomalies which are indicative of ditch features. [26-06] is an anomaly which has produced a signal suggestive of an area of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires. Its 'horseshoe-shaped' nature is characteristic of a *fulacht fiadh* or a burnt spread and is suggestive of increased archaeological potential.

4.2.27 GS – 27

Anomalies [27-03] and [27-04] represent a field boundary depicted on historic maps. A small number of positive linear anomalies, likely representing ditch features were identified within the survey area along with three anomalies which may represent areas of burning, modern disturbance or imported material [27-11], [27-12] and [27-15].

4.2.28 GS – 28

Two anomalies within GS – 28 produced signals suggestive of areas of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires. A single positive linear ‘ditch-like’ feature was also identified in the southwest limit of the survey area.

4.2.29 GS – 29

Three elements of field boundaries represented on historic maps were identified within this area [29-08] – [29-10]. A number of other positive linear and curvilinear anomalies were identified and likely represent ditch features, potentially field system elements. Several potential areas of burning were also identified within the survey area. These could include hearths, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires.

4.2.30 GS – 30

A positive linear anomaly [30-02], identified in the southern part of the survey area, represents a field boundary present on historic maps. Several other positive linear anomalies were identified across the survey area and likely represent ditch features, possibly elements of a field system. One of these features [30-05] likely continues into GS – 31 as feature [31-05].

4.2.31 GS – 31

Two positive linear anomalies [32-04] and [32-05] may be representative of ditch features while anomalies [32-01] and [32-02] produced signals suggestive of areas of burning. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires.

4.2.32 GS – 32

This area is characterised by several linear anomalies representative of field boundaries depicted on historic maps. A large number of positive linear anomalies are present within the areas outlined by these boundaries. They respect the historic field boundaries, run parallel and are evenly spaced, indicating drainage features. Although positive linear anomalies [32-08] and [32-09] do not

correspond with features present on historic mapping they do appear as being respected by the drainage features present. This indicates they may be contemporary or related to the historic field system.

4.2.33 GS – 33

The ploughed out remains of a structure, visible on historic mapping, were identified as a collection of dipolar anomalies [33-21]. The survey area is bisected by a number of positive linear and curvilinear anomalies likely to represent ditch features and potentially a field system or other such features related to the control of livestock movements.

4.2.34 GS – 34

No significant archaeological sites were identified in GS – 34. This area is characterised by a high level of magnetic disturbance which may be the result of imported materials from events such as land reclamation or dumping.

4.2.35 GS – 35

No significant archaeological sites were identified in GS – 35. This area has been heavily impacted by the former railway lines which ran across the western side of the field and is visible as a widespread area of magnetic disturbance.

4.2.36 GS – 36

There are indications of sand/gravel pits across the western half of GS – 36.

A number of linear anomalies, [36-01], [36-03], [36-04], [36-05], [36-06], [36-08], [36-09], [36-10], [36-11] and [36-12], likely representing ditch features, potentially the remains of field systems, were identified across the survey area along with a single curvilinear feature [36-02] possibly representing an enclosing element. One anomaly produced a signal suggesting an area of burning [36-07]. This could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires.

4.2.37 GS – 37

GS – 37 contains a small number of archaeological sites.

There are two pairs of parallel ditches, [37-39] to [37-42], located at the northeast corner of the survey area. These may represent field divisions or may demarcate tracks.

The northeast corner of KK05-094---- Enclosure has been mapped as a ditched feature [37-54].

Two ring-ditches were identified, with diameters of 8m [37-08] and 10m respectively [37-01].

Three positive penannular anomalies [37-09], [37-10] and [37-59] are indicative of ditch features and may represent enclosing elements. A single rectilinear anomaly [37-29] may similarly represent an enclosing element.

A large number of positive linear anomalies, likely representing ditch features and potential field systems, are present across the survey area. Several anomalies producing a signal suggesting an area of burning were also present. These could include a hearth, a *fulacht fiadh*, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires.

4.2.38 GS – 38

No significant archaeological sites were identified in GS – 38, although a possible ditch associated with KK05-023001- Castle – motte, may be present, however it has been heavily impacted by interference [38-01].

5 Conclusions

The geophysical survey characterised the extent of potential archaeological deposits. The magnetometry identified both cut features and burnt features clearly. Other than commonly identified pits, isolated points of burning and linear/curvilinear boundary features and drainage ditches, the most significant archaeological sites identified in the 'archaeological' or 'possible archaeological' categories were:

- A 43m diameter pit-circle was identified at GS – 08, this represents the remains of KK008-031- - Ringfort – unclassified.
- GS – 22 contains a possible oval enclosure measuring 12m by 10m and a rectilinear enclosure which may indicate the presence of a small field system, measuring 18m x 18m.
- GS – 37 contains a small number of archaeological sites, including two pairs of parallel ditches, the northeast corner of KK05-094---- Enclosure and two ring-ditches.

5.1 Statement of Indemnity

The geophysical properties of subsurface features must contrast sufficiently with the surrounding soils/background variation and 'noise' to enable them to be detected and mapped using geophysical methods. As such, the clarity and definition of buried features can vary considerably, with some having well-defined signatures while others, lying on the threshold of background noise, are only barely visible or not visible at all, in geophysical imagery. A lack of geophysical anomalies cannot be taken to imply a lack of archaeological features.

6 References

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7 Figures



Figure 08 Magnetometry Data

For corresponding Interpretation see Figure 90

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)



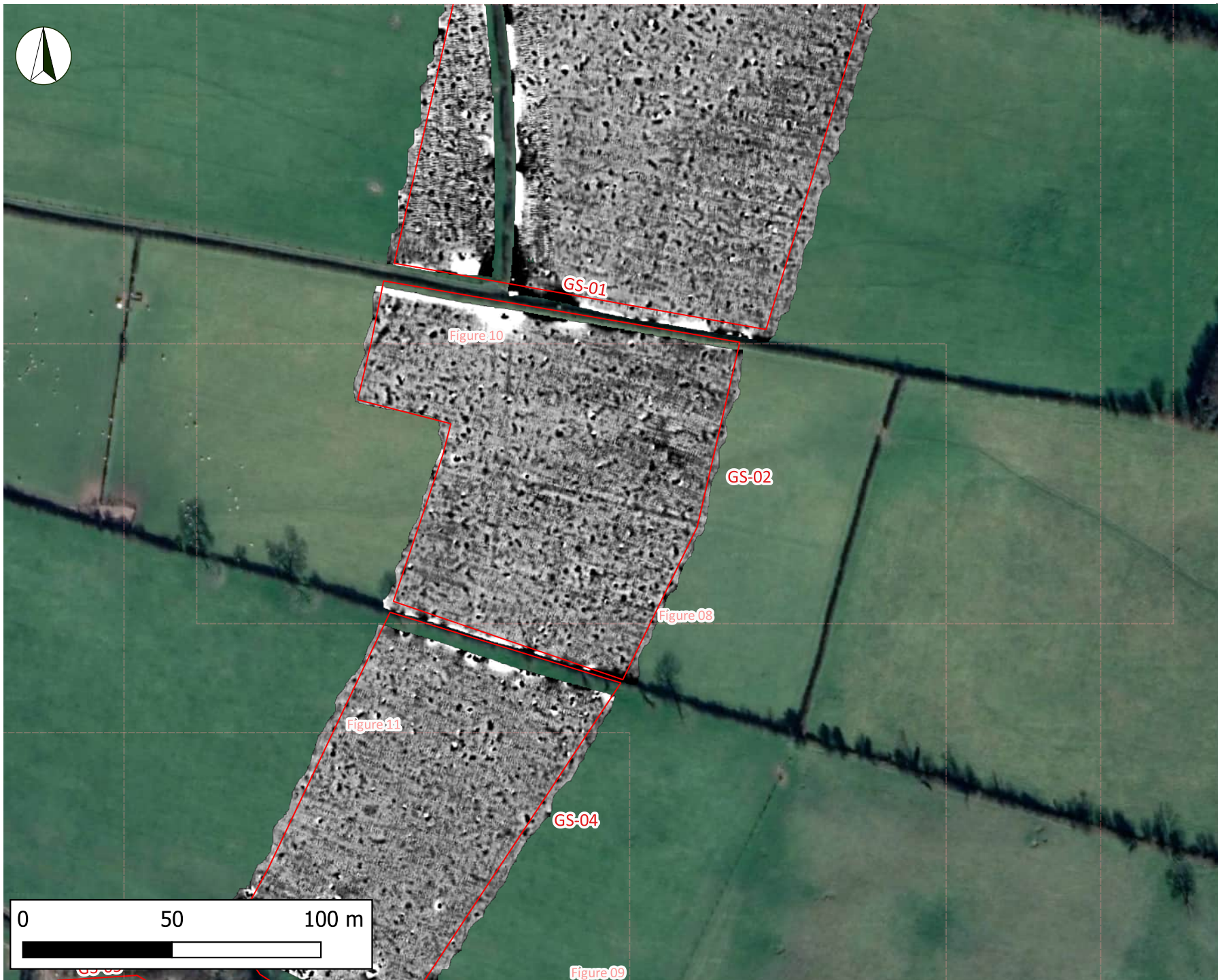


Figure 09 Magnetometry Data

For corresponding Interpretation see Figure 91

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

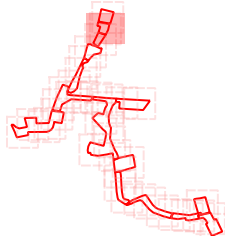
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 10 Magnetometry Data

For corresponding Interpretation see Figure 92

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 11 Magnetometry Data

For corresponding Interpretation see Figure 93

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 12 Magnetometry Data

For corresponding Interpretation see Figure 94

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)



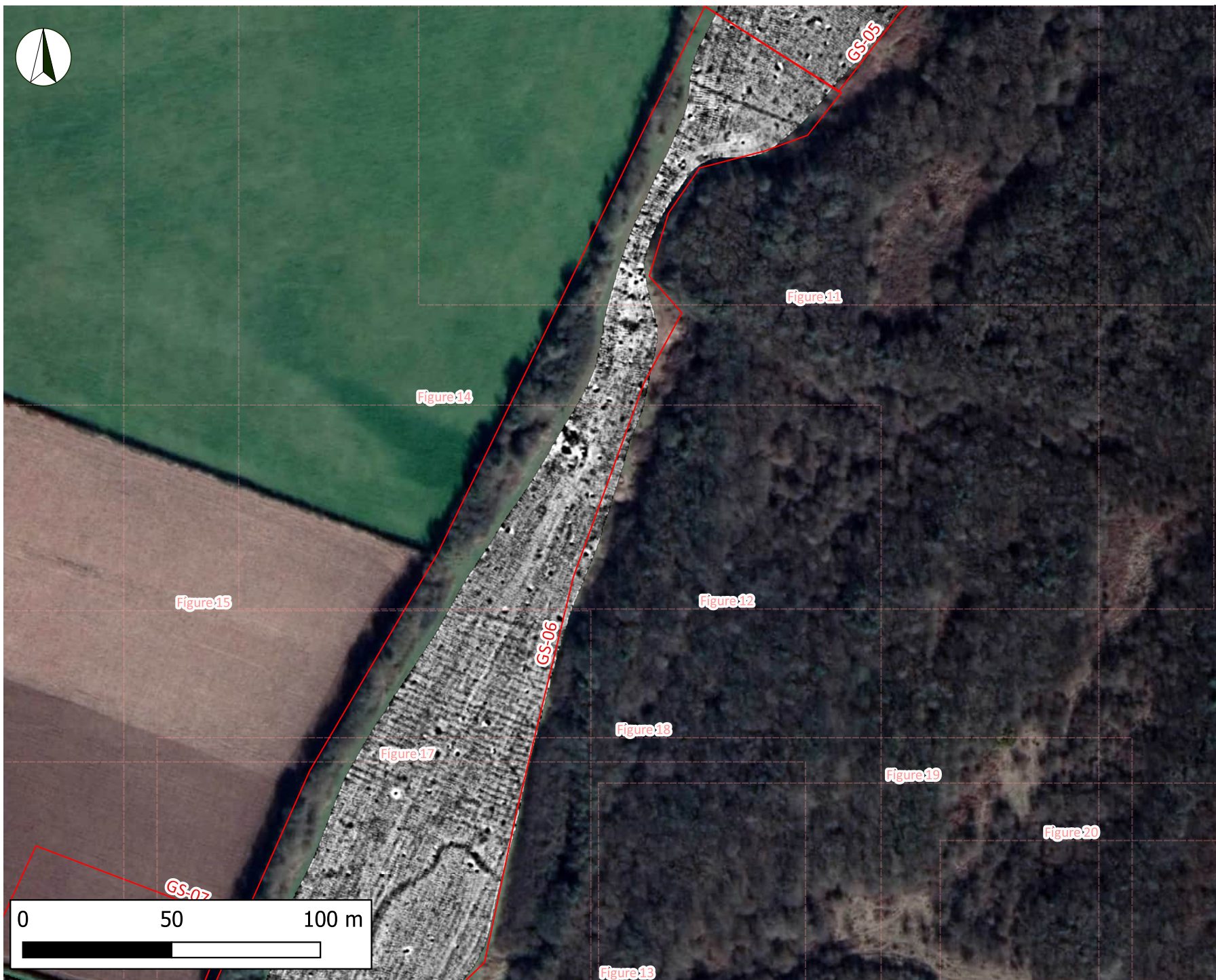


Figure 13 Magnetometry Data

For corresponding Interpretation see Figure 95

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 14 Magnetometry Data

For corresponding Interpretation see Figure 96

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 15 Magnetometry Data

For corresponding Interpretation see Figure 97

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 16 Magnetometry Data

For corresponding Interpretation see Figure 98

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 17 Magnetometry Data

For corresponding Interpretation see Figure 99

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 18 Magnetometry Data

For corresponding Interpretation see Figure 100

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

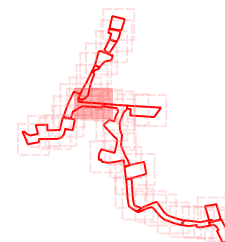
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT
(white) to +3nT (black)





Figure 19 Magnetometry Data
For corresponding Interpretation see Figure 101
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 20 Magnetometry Data
For corresponding Interpretation see Figure 102
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 21 Magnetometry Data

For corresponding Interpretation see Figure 103

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)



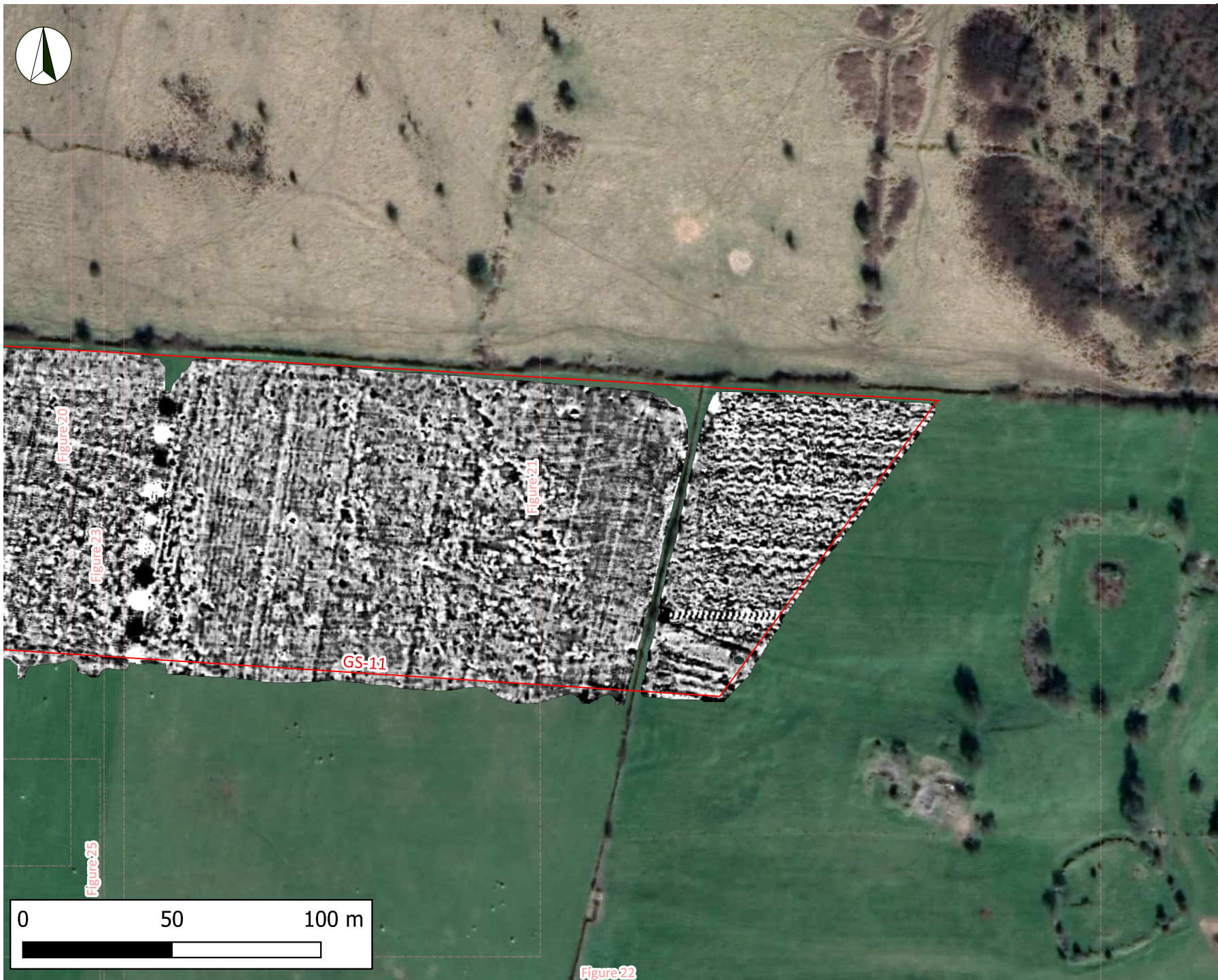


Figure 22 Magnetometry Data

For corresponding Interpretation see Figure 104

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 23 Magnetometry Data

For corresponding Interpretation see Figure 105

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

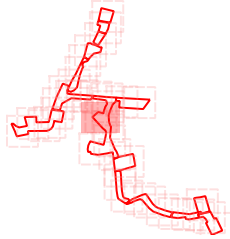
Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 24 Magnetometry Data
For corresponding Interpretation see Figure 106
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 25 Magnetometry Data

For corresponding Interpretation see Figure 107

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 26 Magnetometry Data

For corresponding Interpretation see Figure 108

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

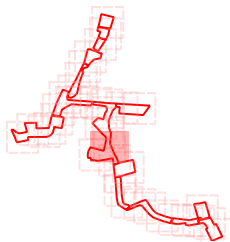
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 27 Magnetometry Data

For corresponding Interpretation see Figure 109

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

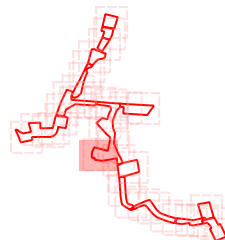
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 28 Magnetometry Data

For corresponding Interpretation see Figure 110

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 29 Magnetometry Data

For corresponding Interpretation see Figure 111

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 30 Magnetometry Data
For corresponding Interpretation see Figure 112
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 31 Magnetometry Data

For corresponding Interpretation see Figure 113

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

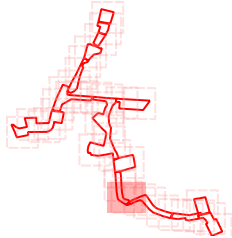
Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 32 Magnetometry Data
For corresponding Interpretation see Figure 114
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 33 Magnetometry Data

For corresponding Interpretation see Figure 115

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 34 Magnetometry Data
For corresponding Interpretation see Figure 116
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 35 Magnetometry Data

For corresponding Interpretation see Figure 117

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 36 Magnetometry Data

For corresponding Interpretation see Figure 118

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 37 Magnetometry Data

For corresponding Interpretation see Figure 119

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 38 Magnetometry Data

For corresponding Interpretation see Figure 120

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

Survey Area

Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)

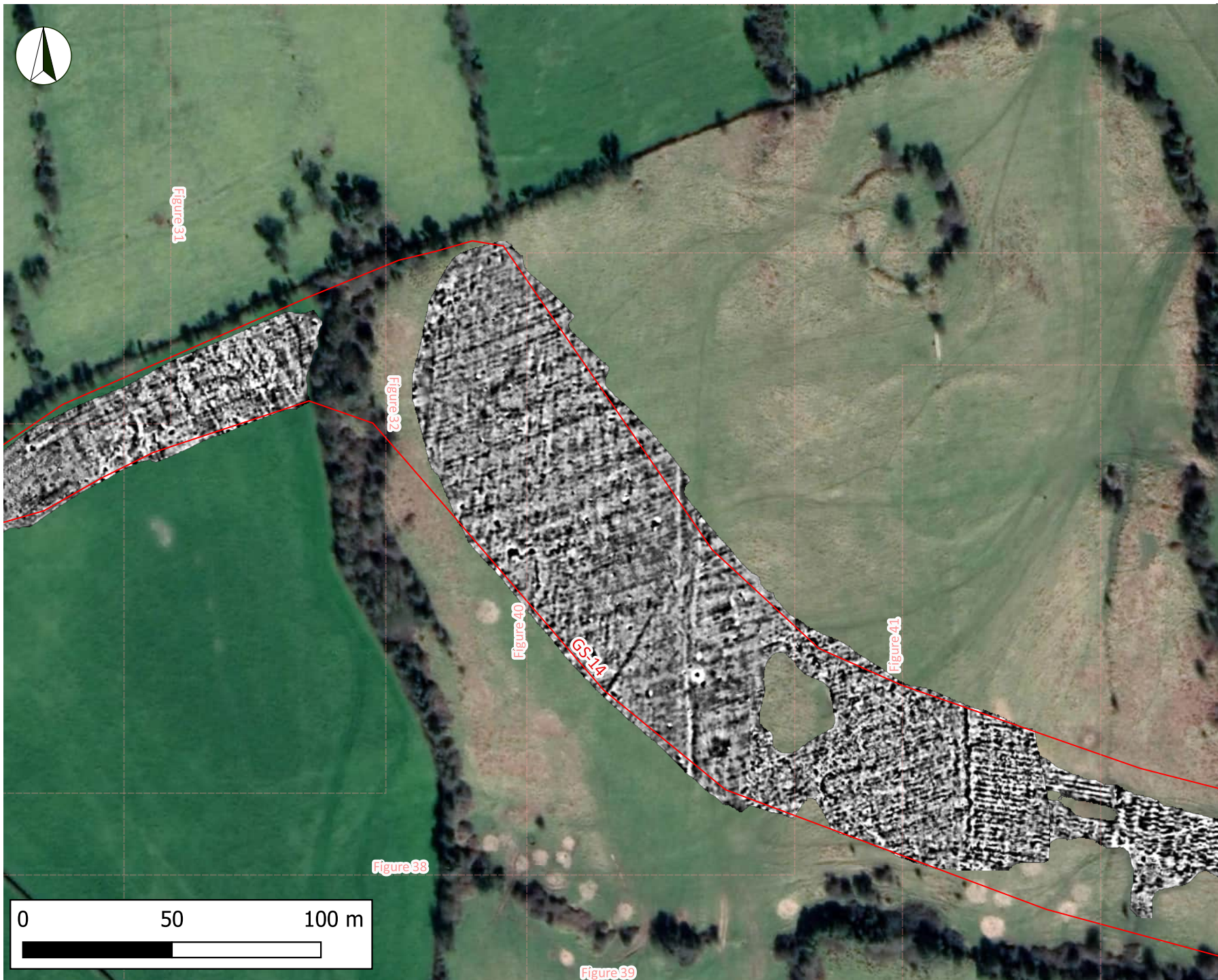


Figure 39 Magnetometry Data

For corresponding Interpretation see Figure 121

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)



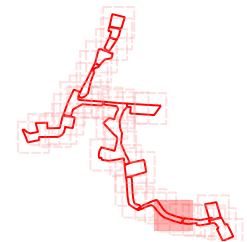


Figure 40 Magnetometry Data

For corresponding Interpretation see Figure 122

Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 41 Magnetometry Data
For corresponding Interpretation see Figure 123
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 42 Magnetometry Data

For corresponding Interpretation see Figure 124

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT
(white) to +3nT (black)





Figure 43 Magnetometry Data

For corresponding Interpretation see Figure 125

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT
(white) to +3nT (black)





Figure 44 Magnetometry Data

For corresponding Interpretation see Figure 126

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 45 Magnetometry Data

For corresponding Interpretation see Figure 127

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0



Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 46 Magnetometry Data
For corresponding Interpretation see Figure 128
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 47 Magnetometry Data

For corresponding Interpretation see Figure 129

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

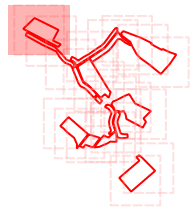
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 48 Magnetometry Data

For corresponding Interpretation see Figure 130

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

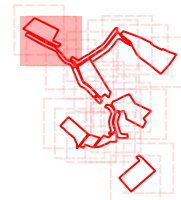
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

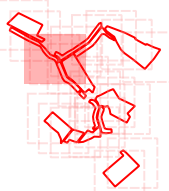
Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 49 Magnetometry Data
For corresponding Interpretation see Figure 131
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

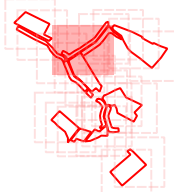
Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 50 Magnetometry Data
For corresponding Interpretation see Figure 132
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 51 Magnetometry Data

For corresponding Interpretation see Figure 133

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 52 Magnetometry Data

For corresponding Interpretation see Figure 134

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 53 Magnetometry Data

For corresponding Interpretation see Figure 135

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 54 Magnetometry Data
For corresponding Interpretation see Figure 136
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 55 Magnetometry Data

For corresponding Interpretation see Figure 137

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

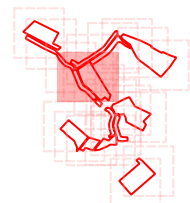
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 56 Magnetometry Data

For corresponding Interpretation see Figure 138

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

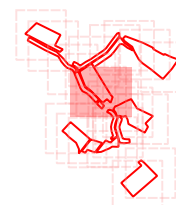
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 57 Magnetometry Data

For corresponding Interpretation see Figure 139

Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

Survey Area

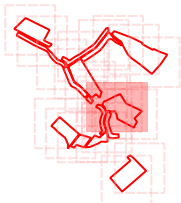
Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)



Figure 58 Magnetometry Data
For corresponding Interpretation see Figure 140
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)







Figure 60 Magnetometry Data

For corresponding Interpretation see Figure 142

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 61 Magnetometry Data

For corresponding Interpretation see Figure 143

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

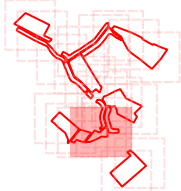
Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 62 Magnetometry Data
For corresponding Interpretation see Figure 144
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 63 Magnetometry Data

For corresponding Interpretation see Figure 145

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 64 Magnetometry Data

For corresponding Interpretation see Figure 146

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 65 Magnetometry Data

For corresponding Interpretation see Figure 147

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

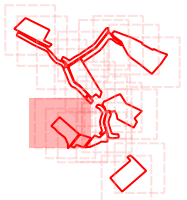
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 66 Magnetometry Data

For corresponding Interpretation see Figure 148

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

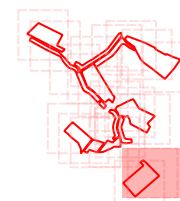
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 67 Magnetometry Data

For corresponding Interpretation see Figure 149

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 68 Magnetometry Data

For corresponding Interpretation see Figure 150

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

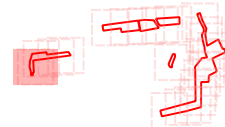
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)



Figure 68



Figure 69 Magnetometry Data

For corresponding Interpretation see Figure 151

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

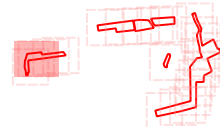
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 70 Magnetometry Data

For corresponding Interpretation see Figure 152

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

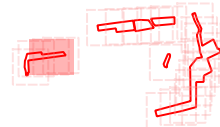
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)



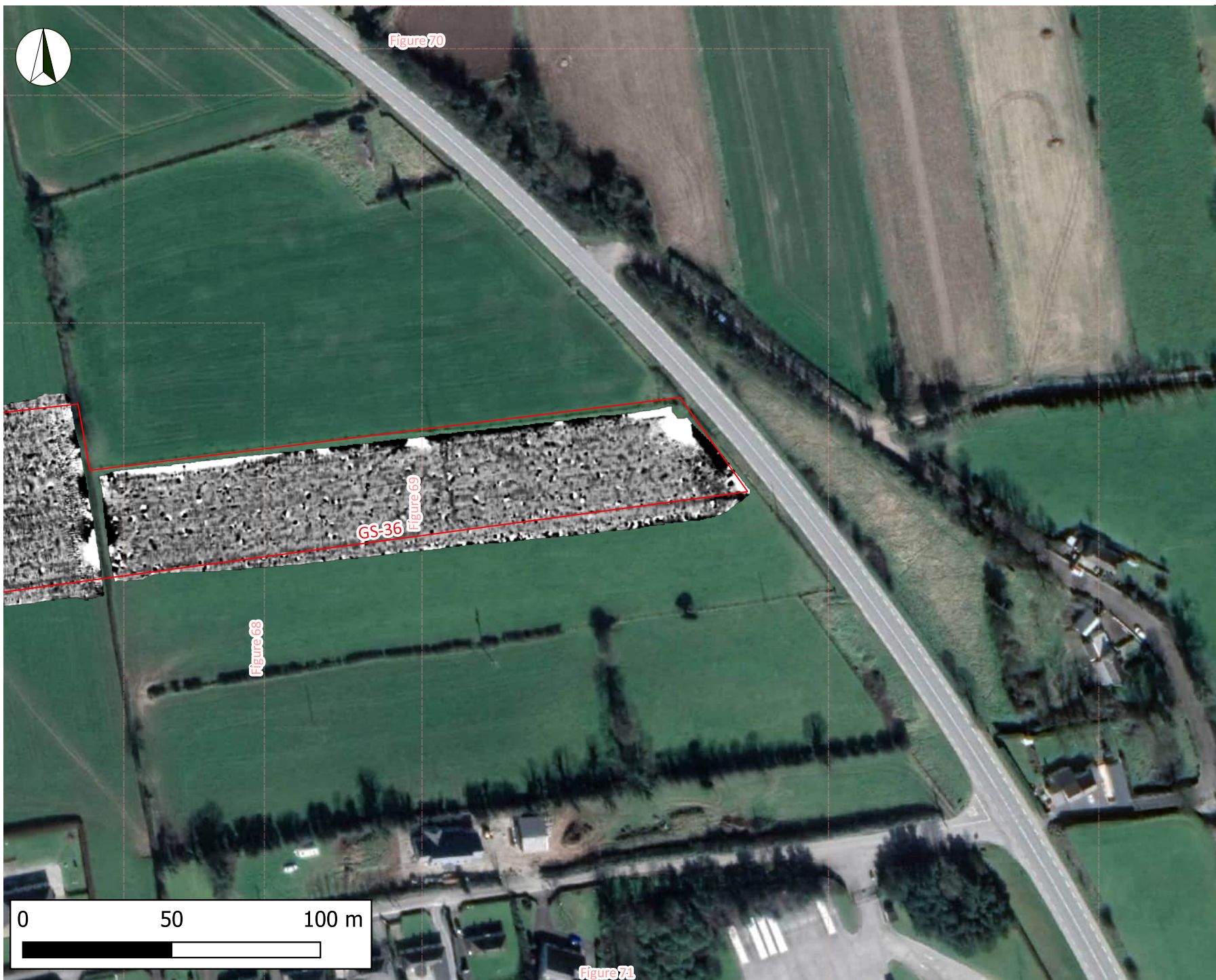


Figure 71 Magnetometry Data

For corresponding Interpretation see Figure 153

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

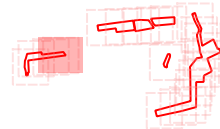
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)



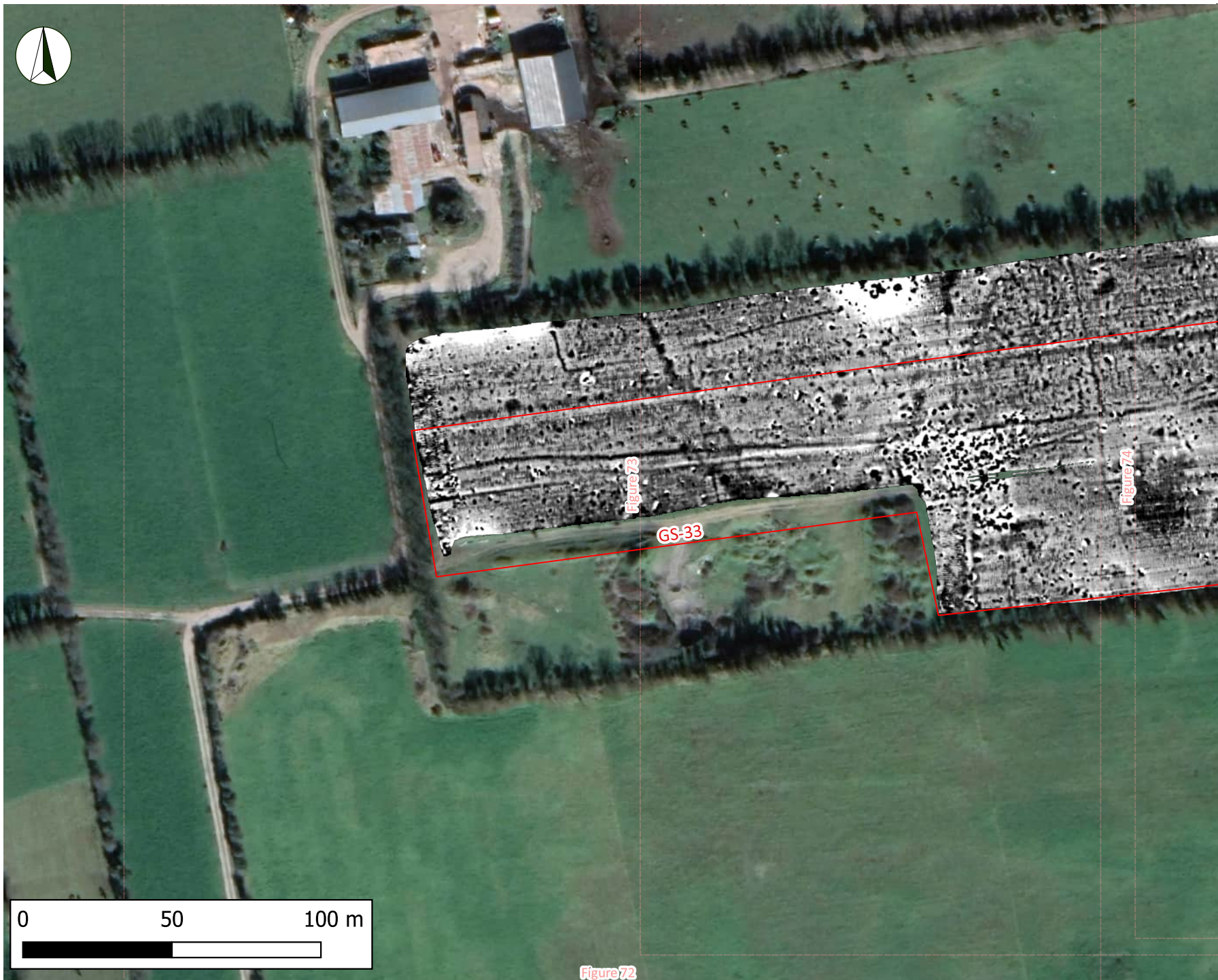


Figure 72 Magnetometry Data

For corresponding Interpretation see Figure 154

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

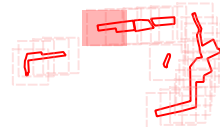
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)

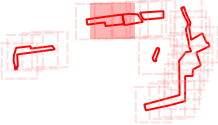


Figure 72



Figure 73 Magnetometry Data
For corresponding Interpretation see Figure 155
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)



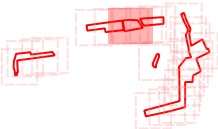


Figure 74 Magnetometry Data

For corresponding Interpretation see Figure 156

Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 75 Magnetometry Data
For corresponding Interpretation see Figure 157
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 76 Magnetometry Data

For corresponding Interpretation see Figure 158

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

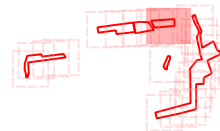
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 77 Magnetometry Data

For corresponding Interpretation see Figure 159

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

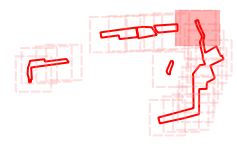
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 78 Magnetometry Data

For corresponding Interpretation see Figure 160

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

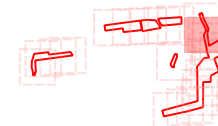
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 79 Magnetometry Data

For corresponding Interpretation see Figure 161

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

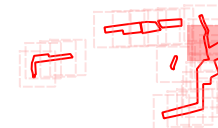
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 80 Magnetometry Data

For corresponding Interpretation see Figure 162

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

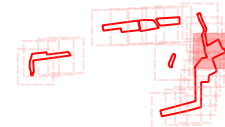
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)



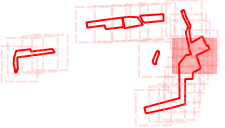


Figure 81 Magnetometry Data

For corresponding Interpretation see Figure 163

Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 82 Magnetometry Data

For corresponding Interpretation see Figure 164

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

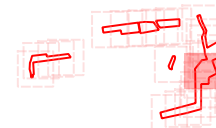
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 83 Magnetometry Data

For corresponding Interpretation see Figure 165

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

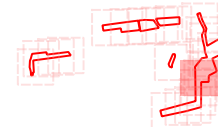
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

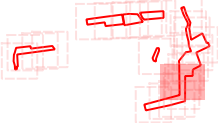
Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 84 Magnetometry Data
For corresponding Interpretation see Figure 166
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 85 Magnetometry Data

For corresponding Interpretation see Figure 167

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

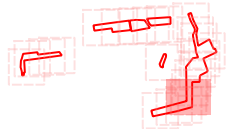
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 86 Magnetometry Data

For corresponding Interpretation see Figure 168

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

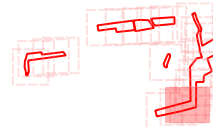
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 87 Magnetometry Data

For corresponding Interpretation see Figure 169

Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

Survey Area

Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)



Figure 88 Magnetometry Data

For corresponding Interpretation see Figure 170

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

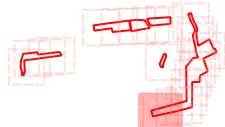
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





Figure 89 Magnetometry Data

For corresponding Interpretation see Figure 171

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

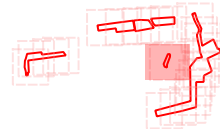
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite

Magnetometry Data
Dynamic Range: -3nT (white) to +3nT (black)





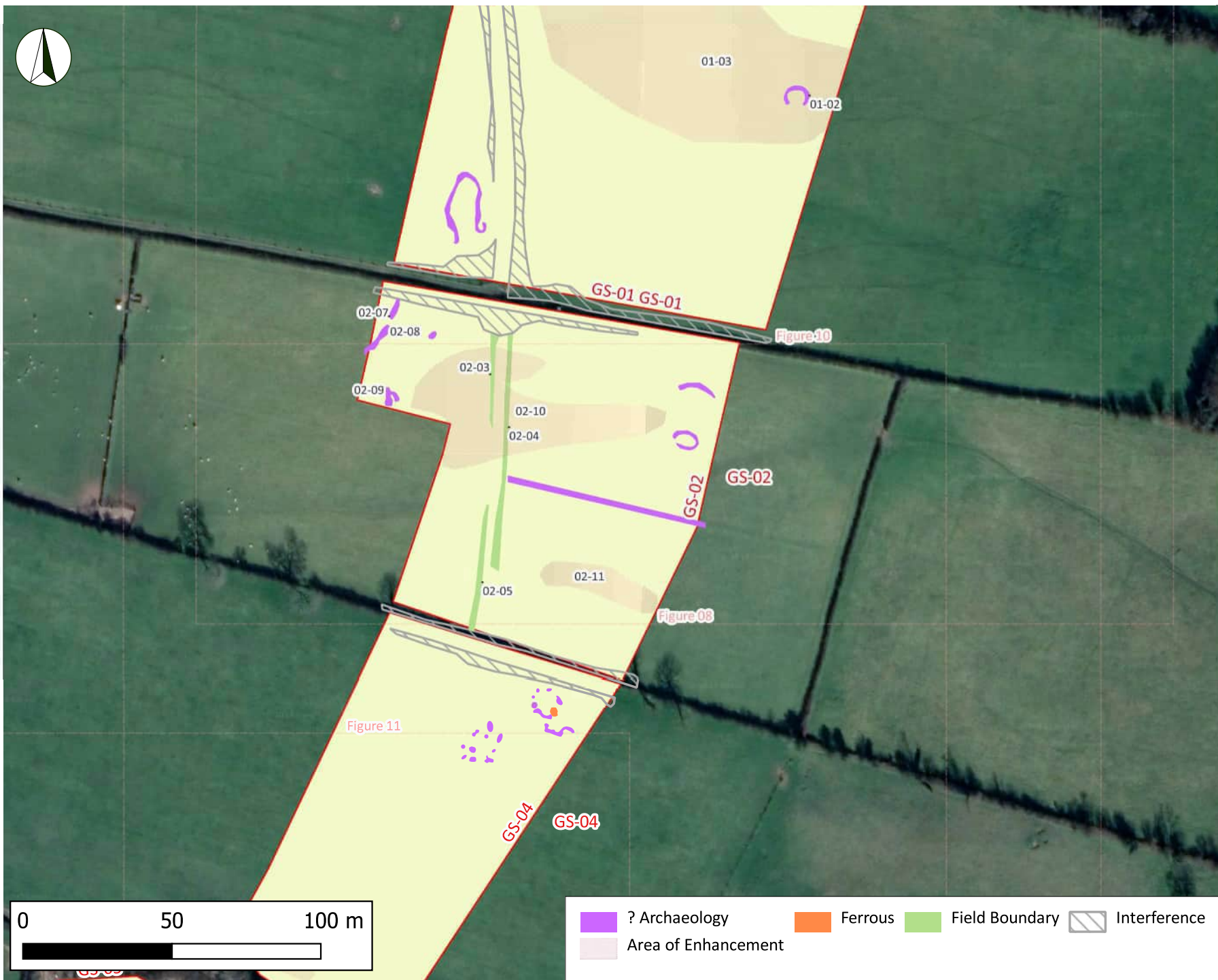


Figure 91 Magnetometry Interpretation

For corresponding Data see Figure 09

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.38

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

Survey Area



Notes: Google Satellite





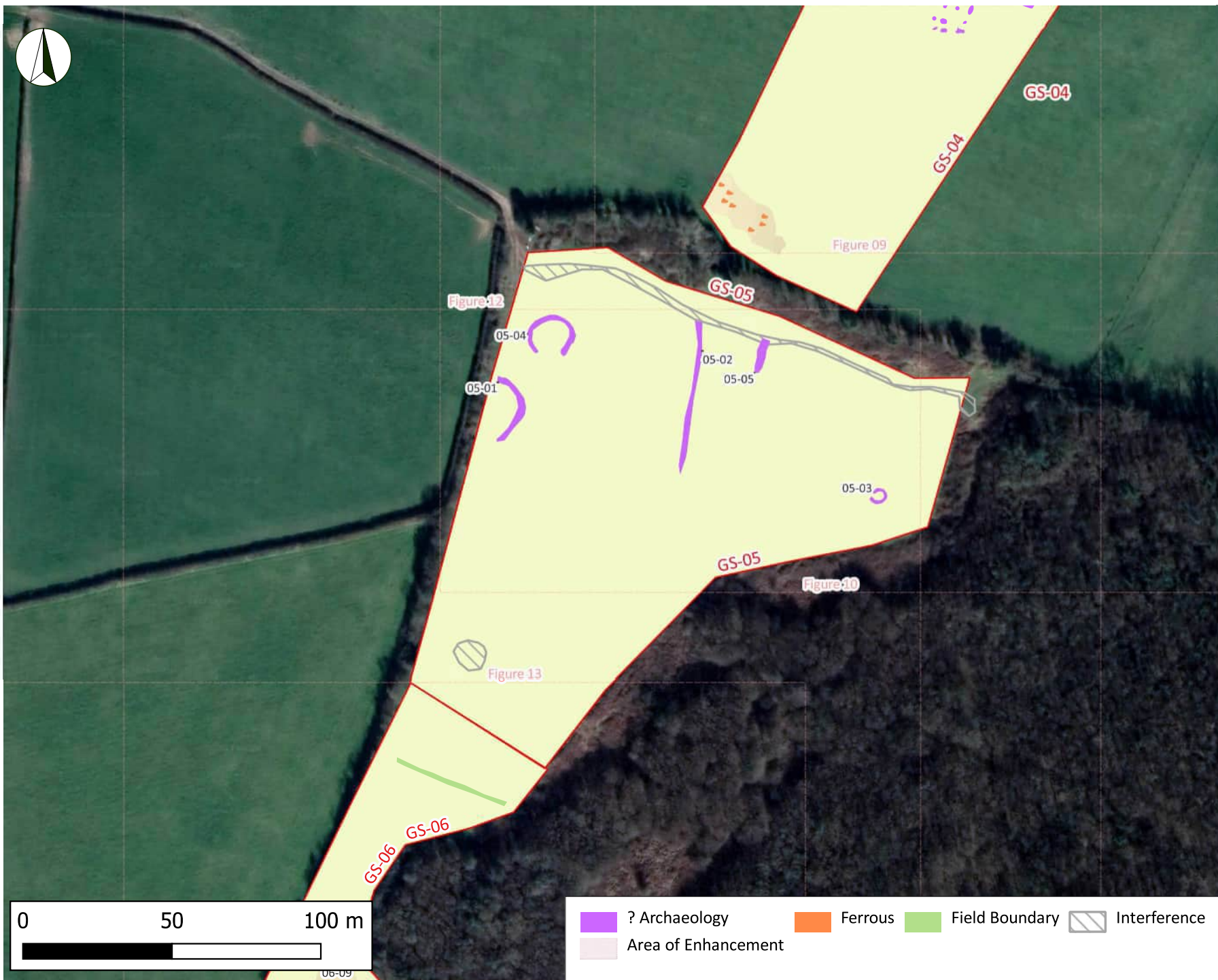


Figure 93 Magnetometry Interpretation

For corresponding Data see Figure 11

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite





Figure 94 Magnetometry Interpretation

For corresponding Data see Figure 12

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite



 ? Archaeology  Area of Enhancement  Field Boundary  Interference

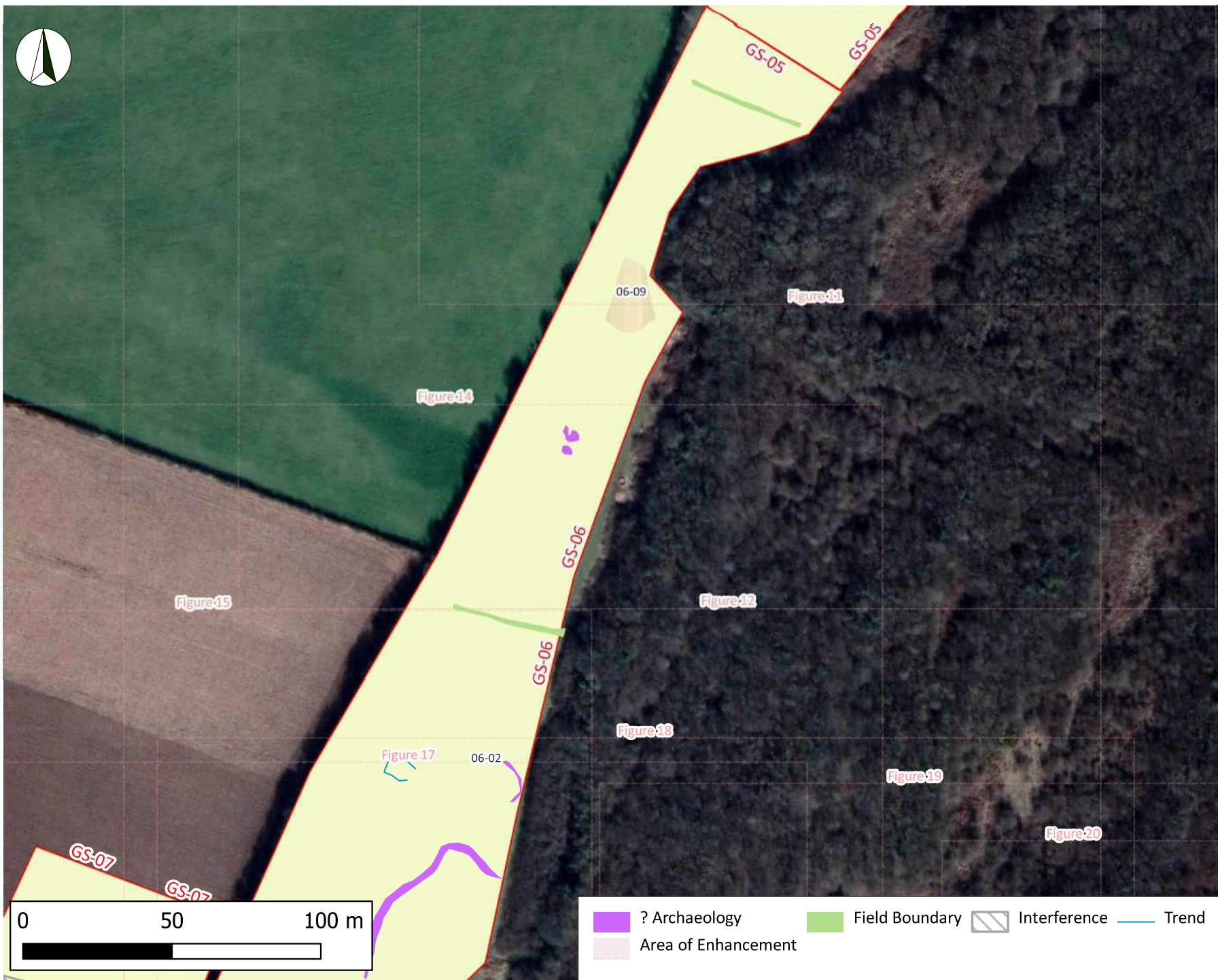


Figure 95 Magnetometry Interpretation

For corresponding Data see Figure 13

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite



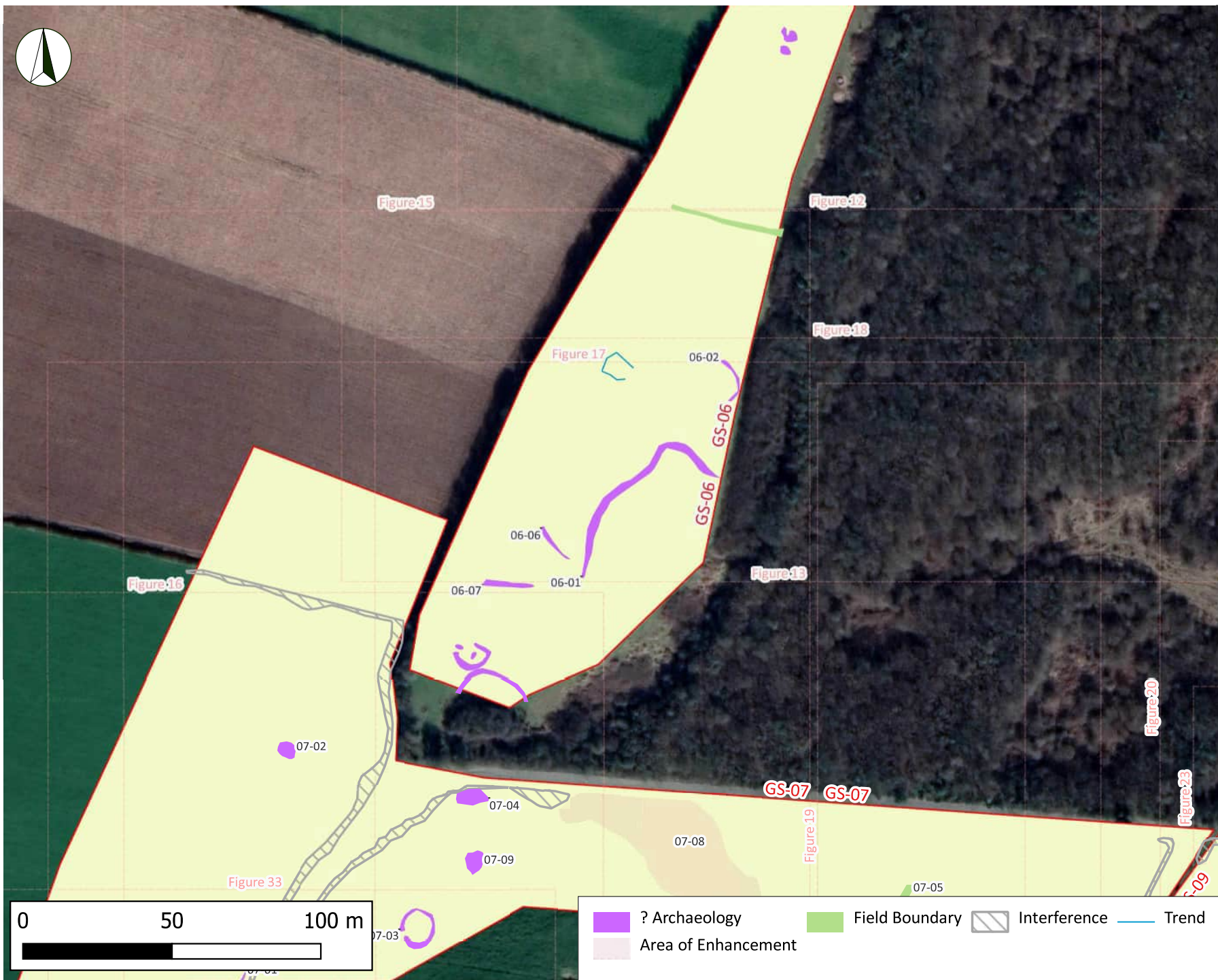




Figure 97 Magnetometry Interpretation

For corresponding Data see Figure 15

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area
 SMR Site
 SMR ZoN



Notes: Google Satellite





Figure 98 Magnetometry Interpretation

For corresponding Data see Figure 16

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

Survey Area
SMR Site
SMR ZoN



Notes: Google Satellite



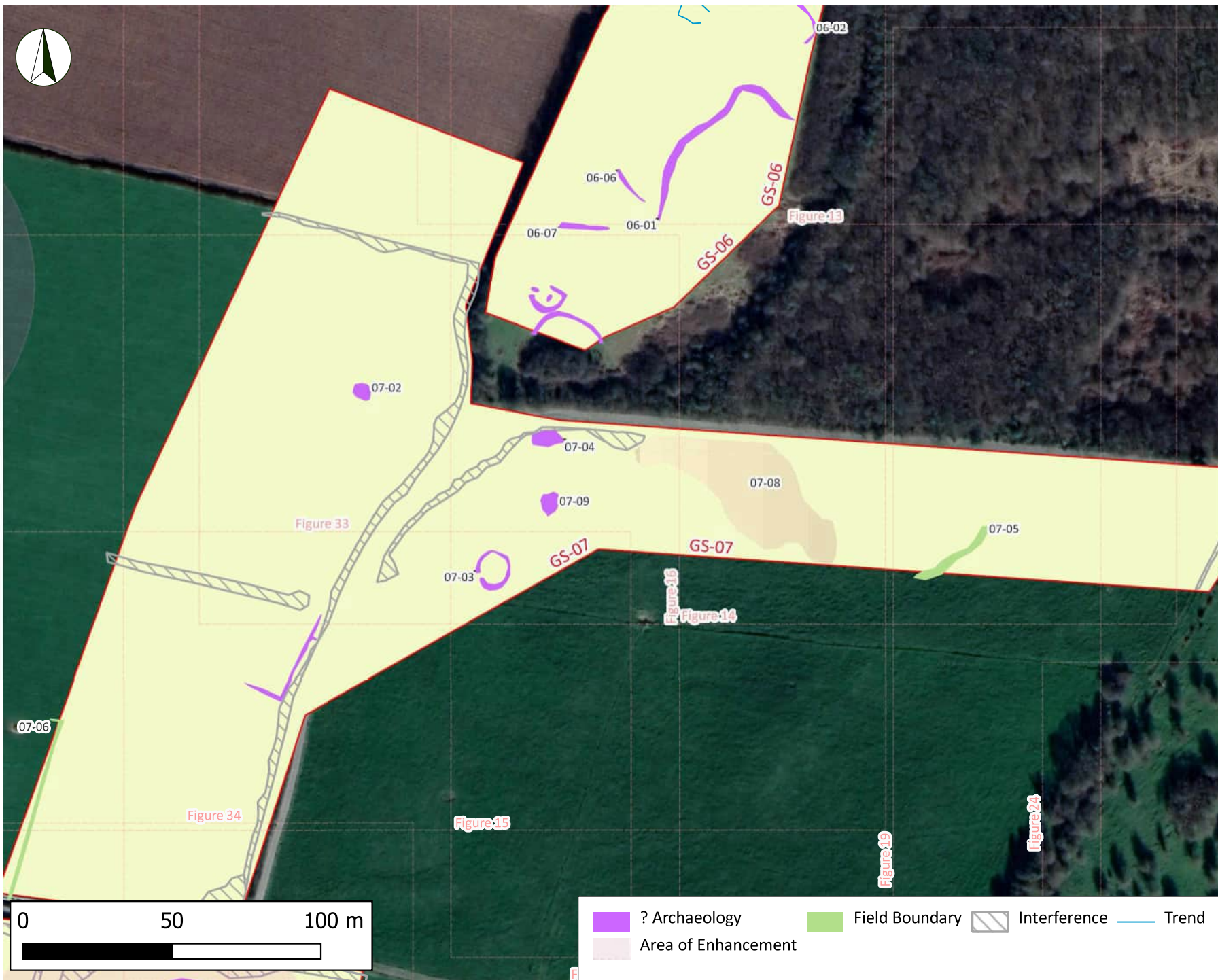


Figure 99 Magnetometry Interpretation

For corresponding Data see Figure 17

Project: Gathabawn Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

Survey Area
SMR ZoN



Notes: Google Satellite



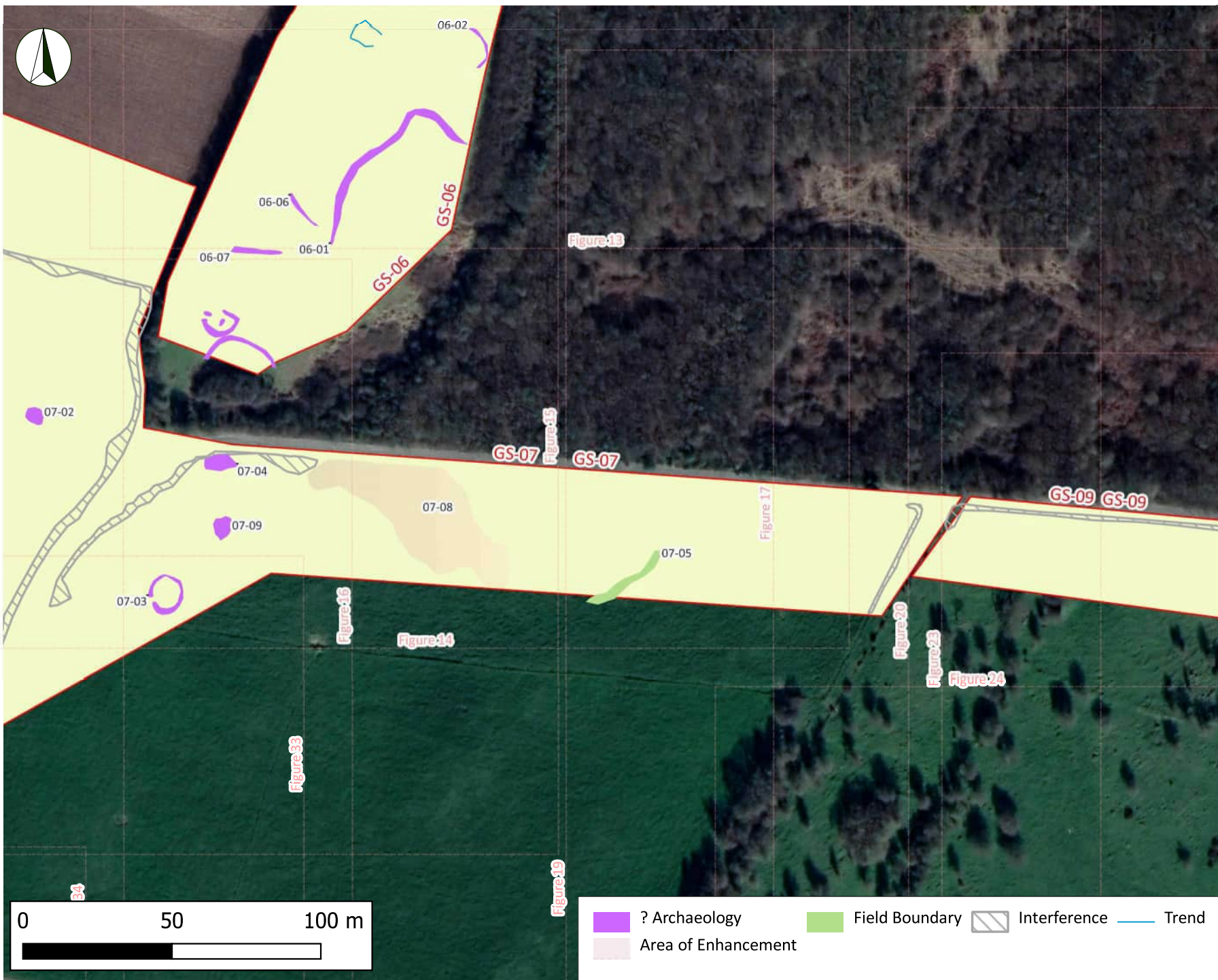




Figure 101
Magnetometry
Interpretation

For corresponding Data
see Figure 19

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite



 ? Archaeology  Area of Enhancement  Field Boundary  Interference



Figure 102
Magnetometry
Interpretation

For corresponding Data
see Figure 20

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite



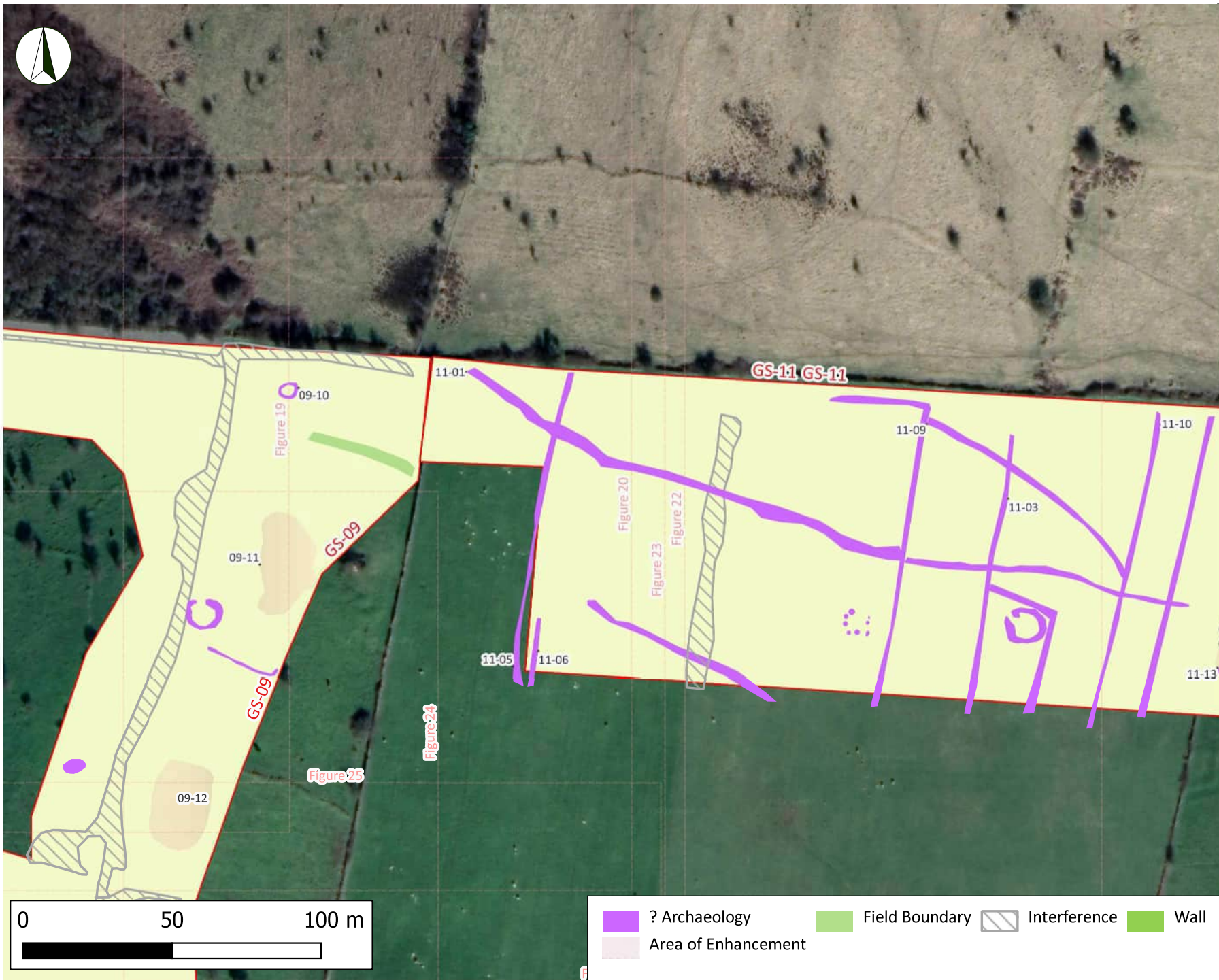


Figure 103
Magnetometry
Interpretation

For corresponding Data
see Figure 21

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite



0 50 100 m

 ? Archaeology  Field Boundary  Interference  Wall
 Area of Enhancement

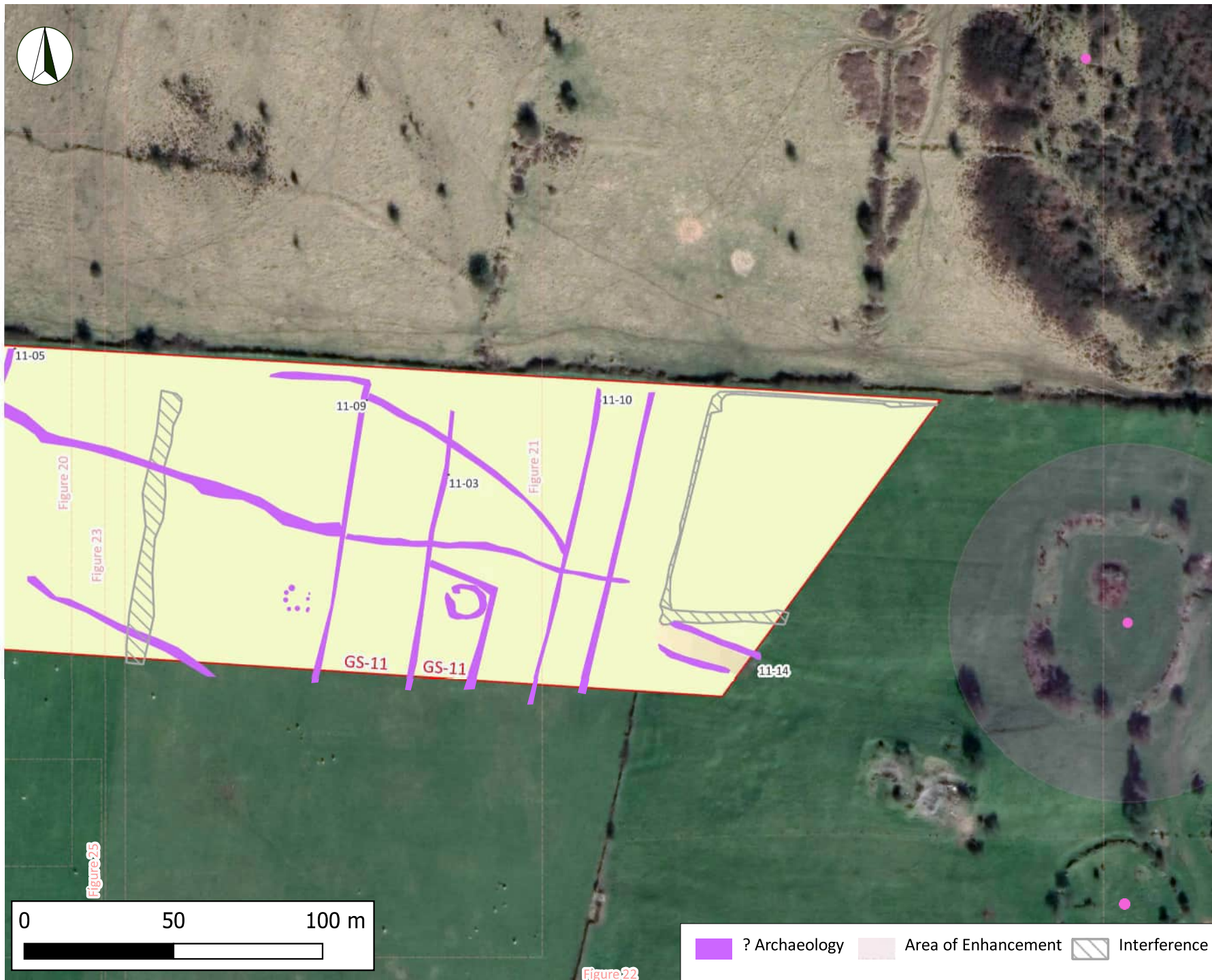


Figure 104
Magnetometry
Interpretation

For corresponding Data
see Figure 22

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area
 SMR Site
 SMR ZoN



Notes: Google Satellite



 ? Archaeology  Area of Enhancement  Interference



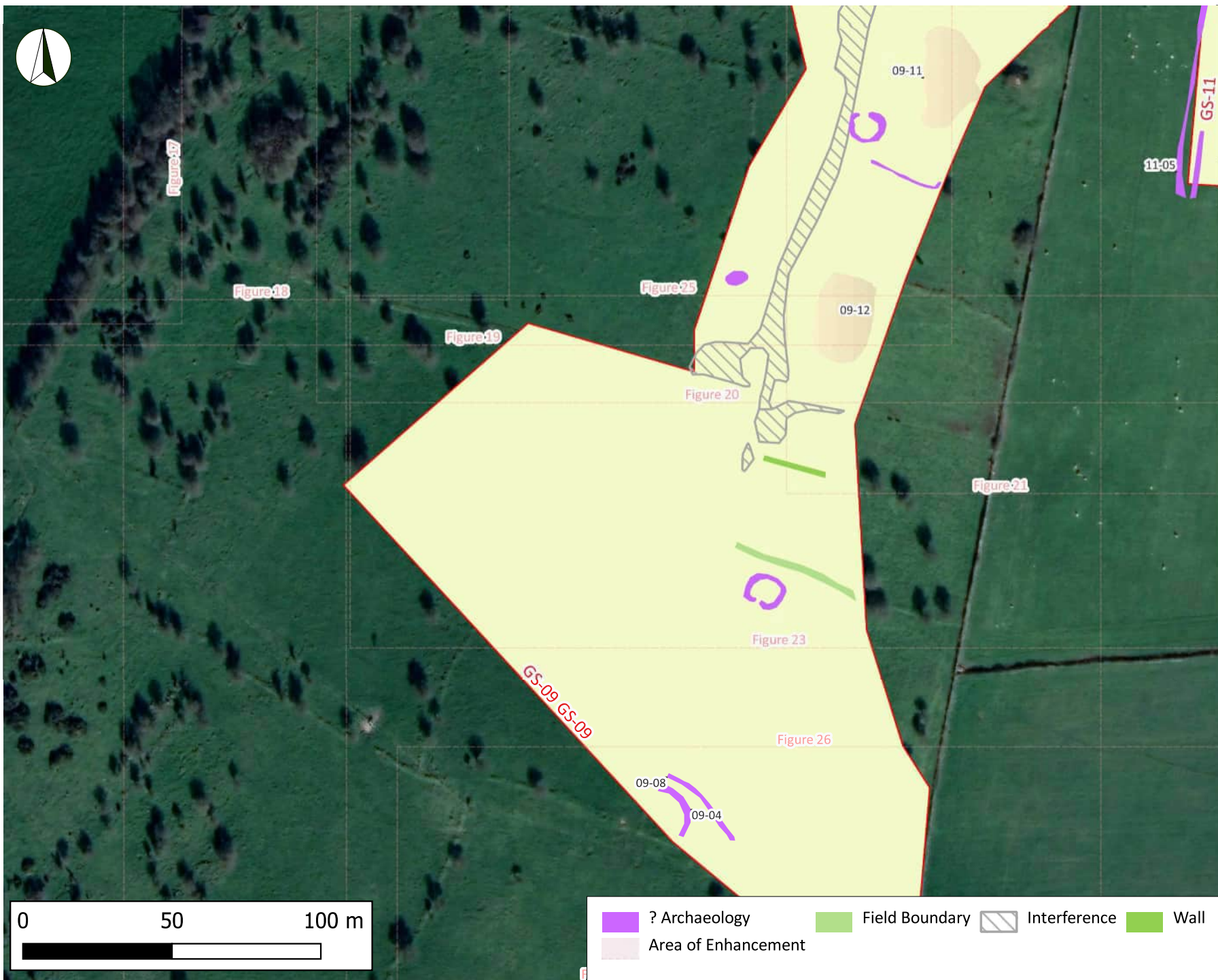


Figure 106
Magnetometry
Interpretation

For corresponding Data
see Figure 24

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite





Figure 107
Magnetometry
Interpretation

For corresponding Data
see Figure 25

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

Survey Area
SMR ZoN



Notes: Google Satellite





Figure 108
Magnetometry
Interpretation

For corresponding Data
see Figure 26

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

Survey Area
SMR ZoN



Notes: Google Satellite



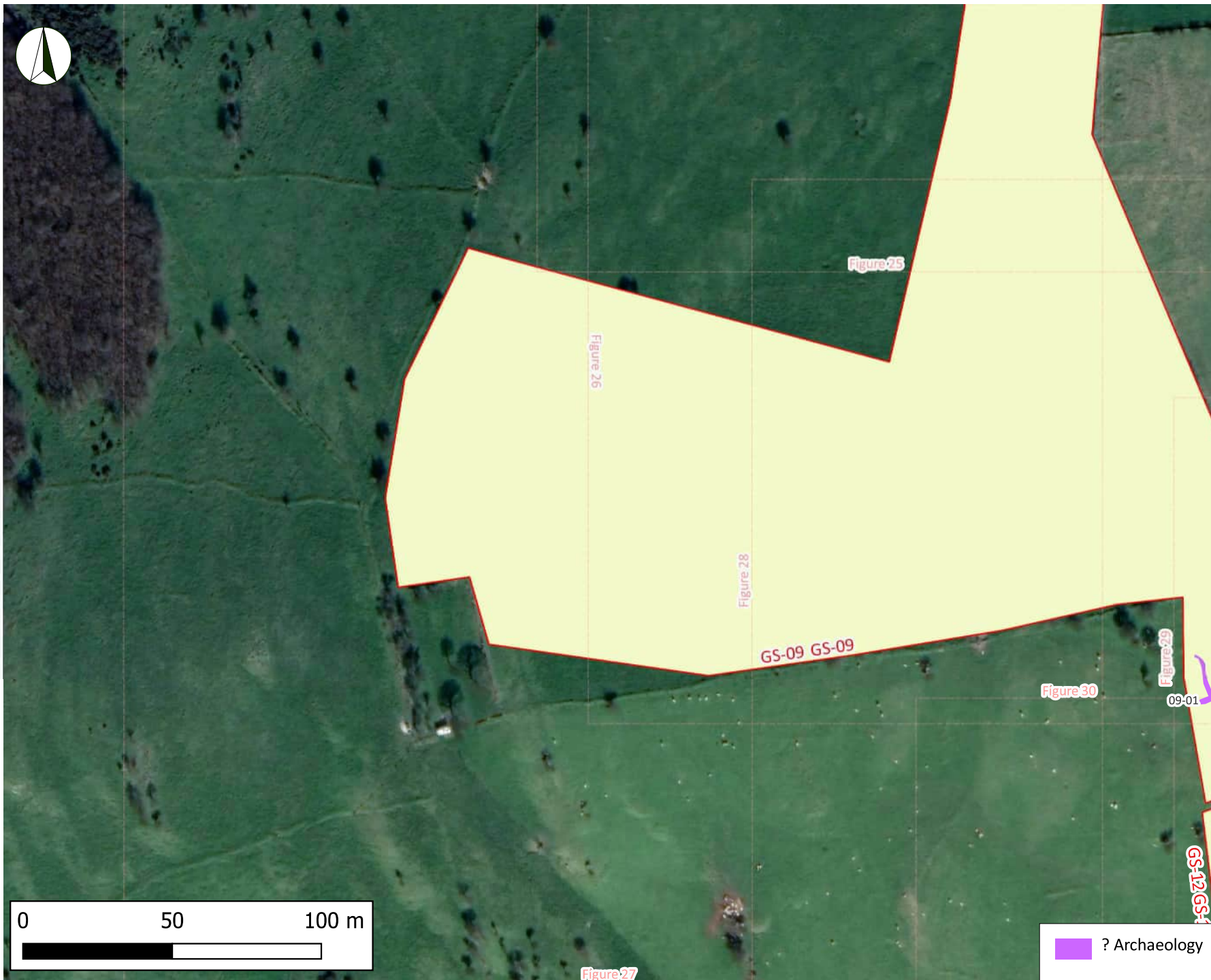


Figure 109
Magnetometry
Interpretation

For corresponding Data
see Figure 27

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite



 ? Archaeology



Figure 110
Magnetometry
Interpretation

For corresponding Data
see Figure 28

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

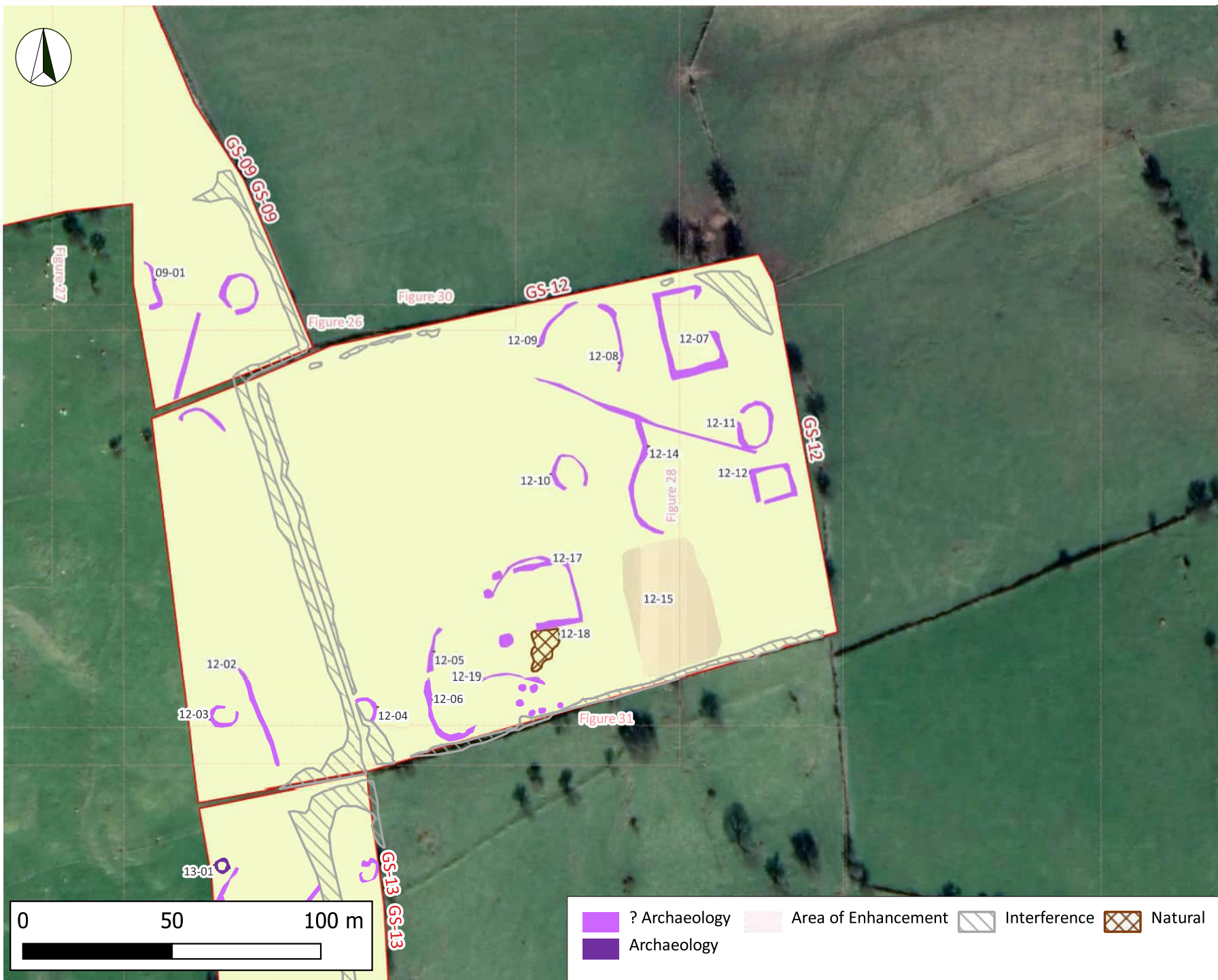
 Survey Area



Notes: Google Satellite



 ? Archaeology  Area of Enhancement  Interference  Natural



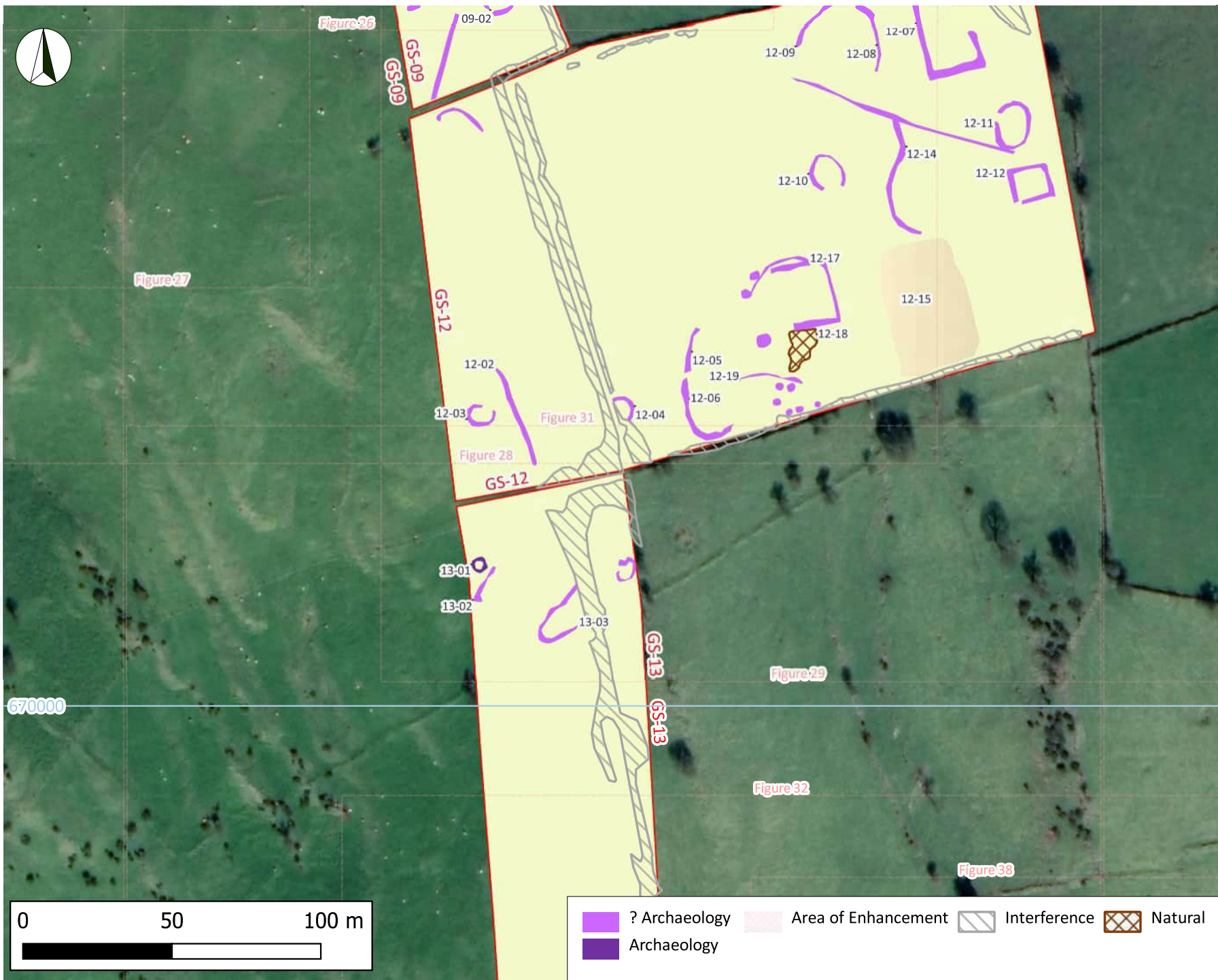


Figure 112
Magnetometry
Interpretation

For corresponding Data
see Figure 30

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite





Figure 113
Magnetometry
Interpretation

For corresponding Data
see Figure 31

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite





Figure 114
Magnetometry
Interpretation

For corresponding Data
see Figure 32

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

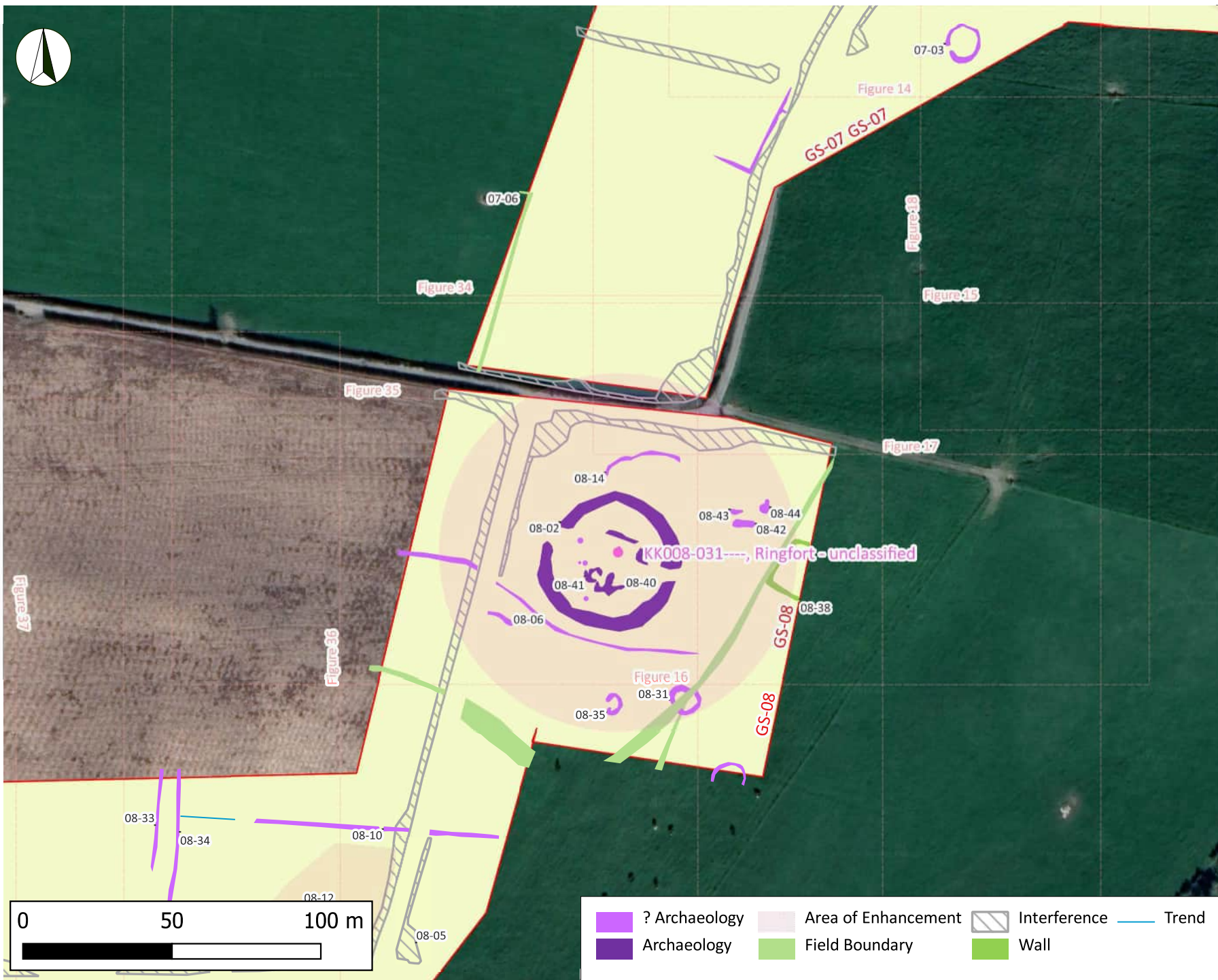
 Survey Area



Notes: Google Satellite



 ? Archaeology  Area of Enhancement  Interference





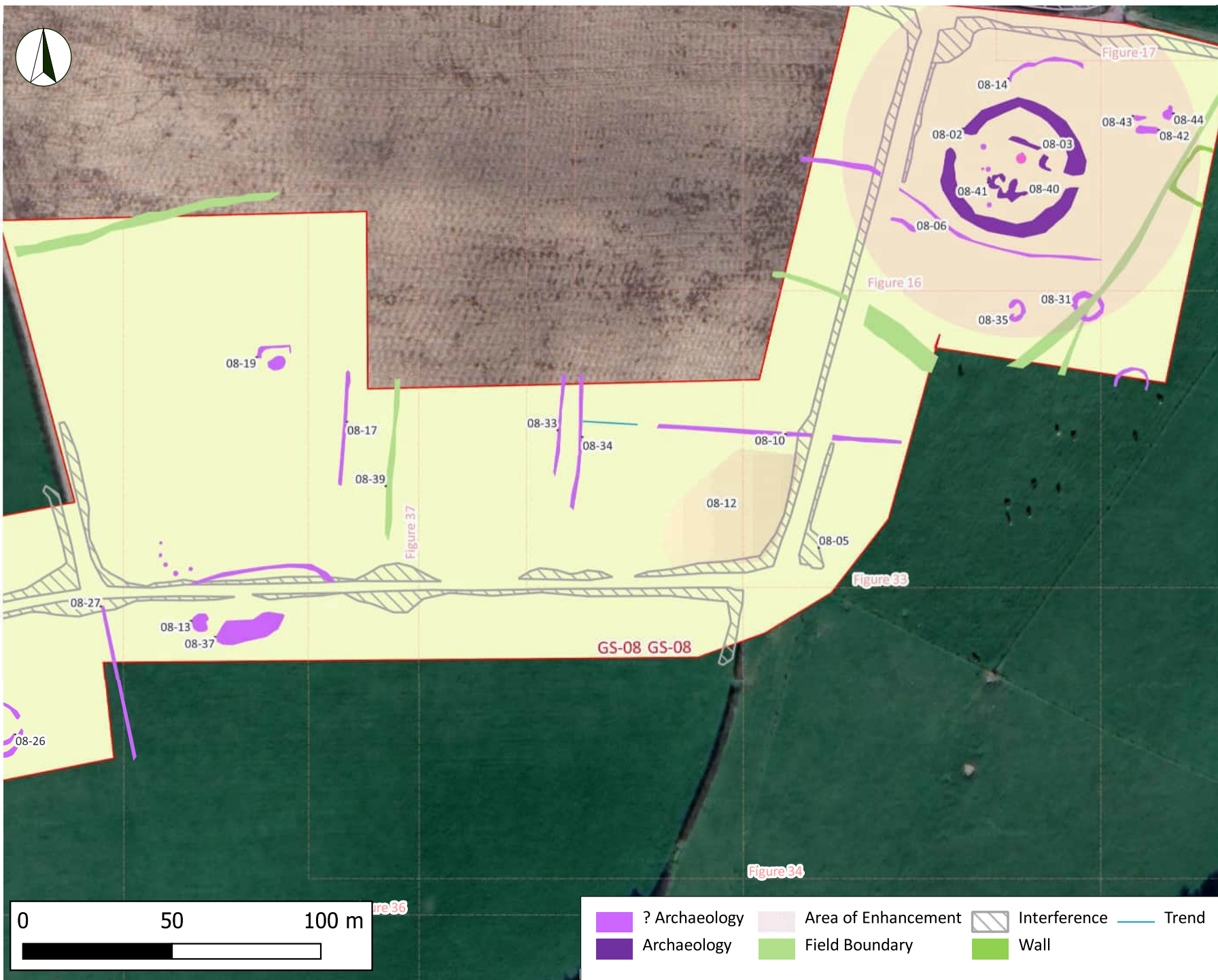






Figure 119
Magnetometry
Interpretation

For corresponding Data
see Figure 37

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite



 ? Archaeology  Field Boundary  Interference



Figure 120
Magnetometry
Interpretation

For corresponding Data
see Figure 38

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

- Survey Area
- SMR Site
- SMR ZoN



Notes: Google Satellite



- ? Archaeology
- Area of Enhancement
- Interference

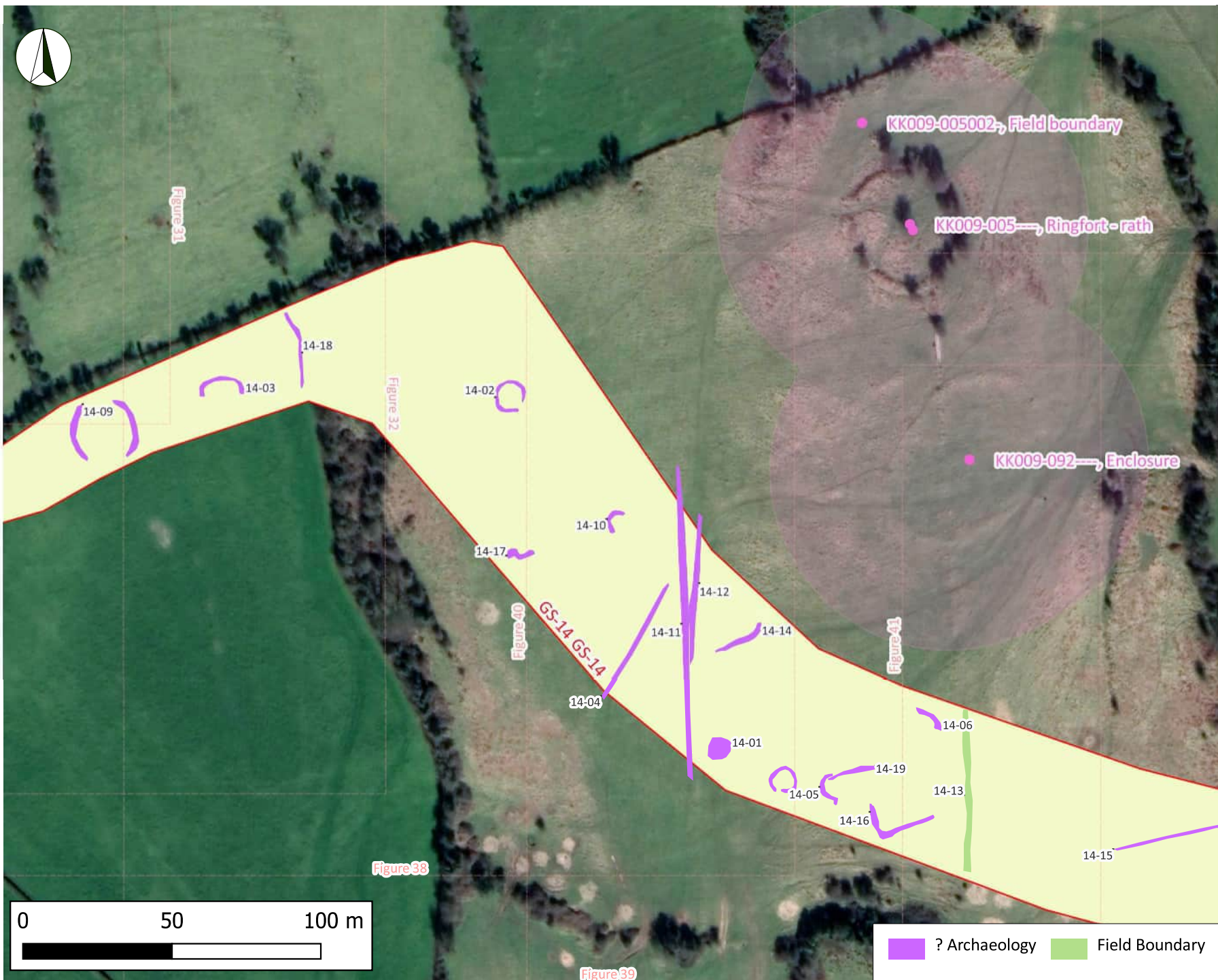


Figure 121
Magnetometry
Interpretation

For corresponding Data
see Figure 39

Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

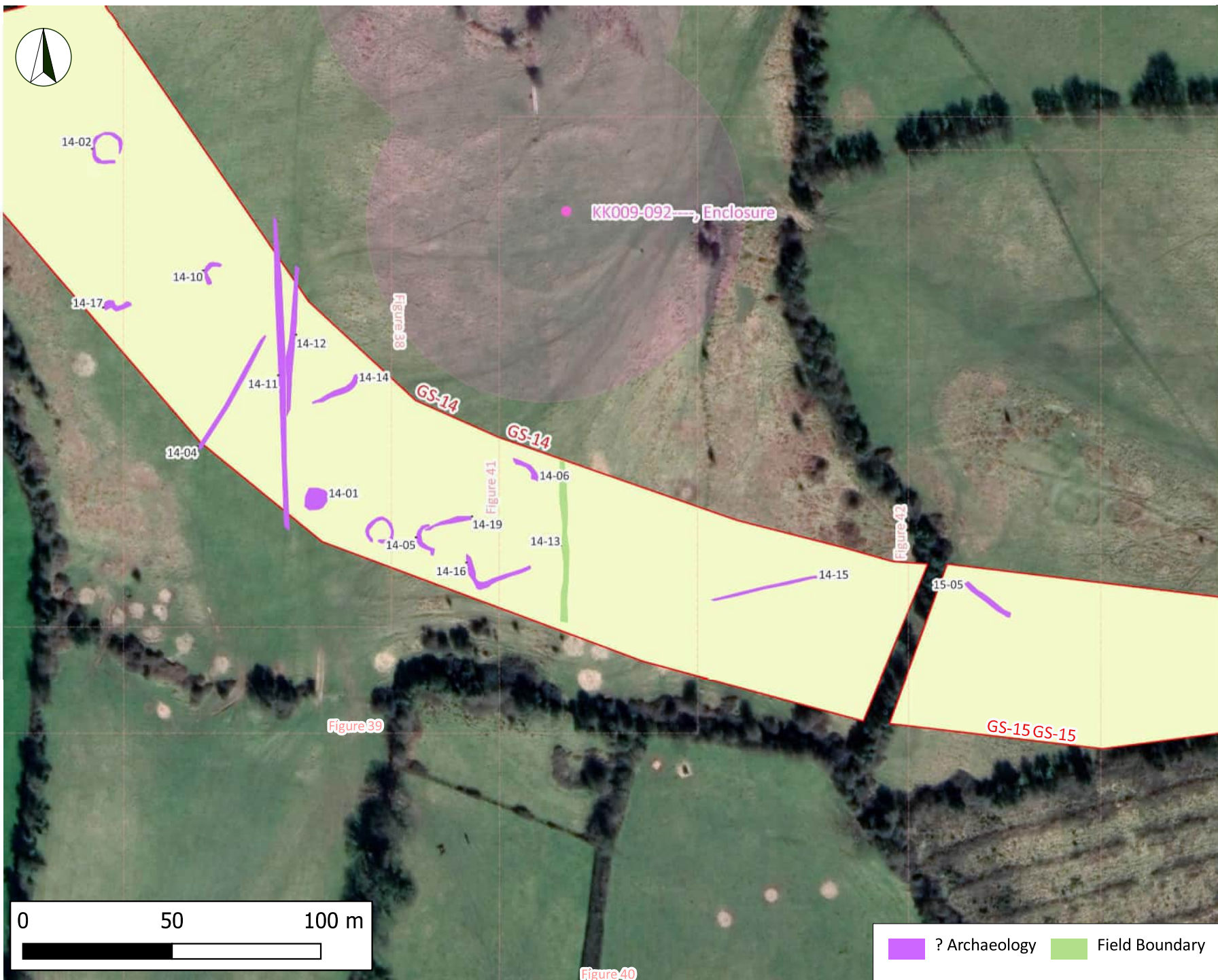
Survey Area
● SMR Site
 SMR ZoN



Notes: Google Satellite



? Archaeology
 Field Boundary





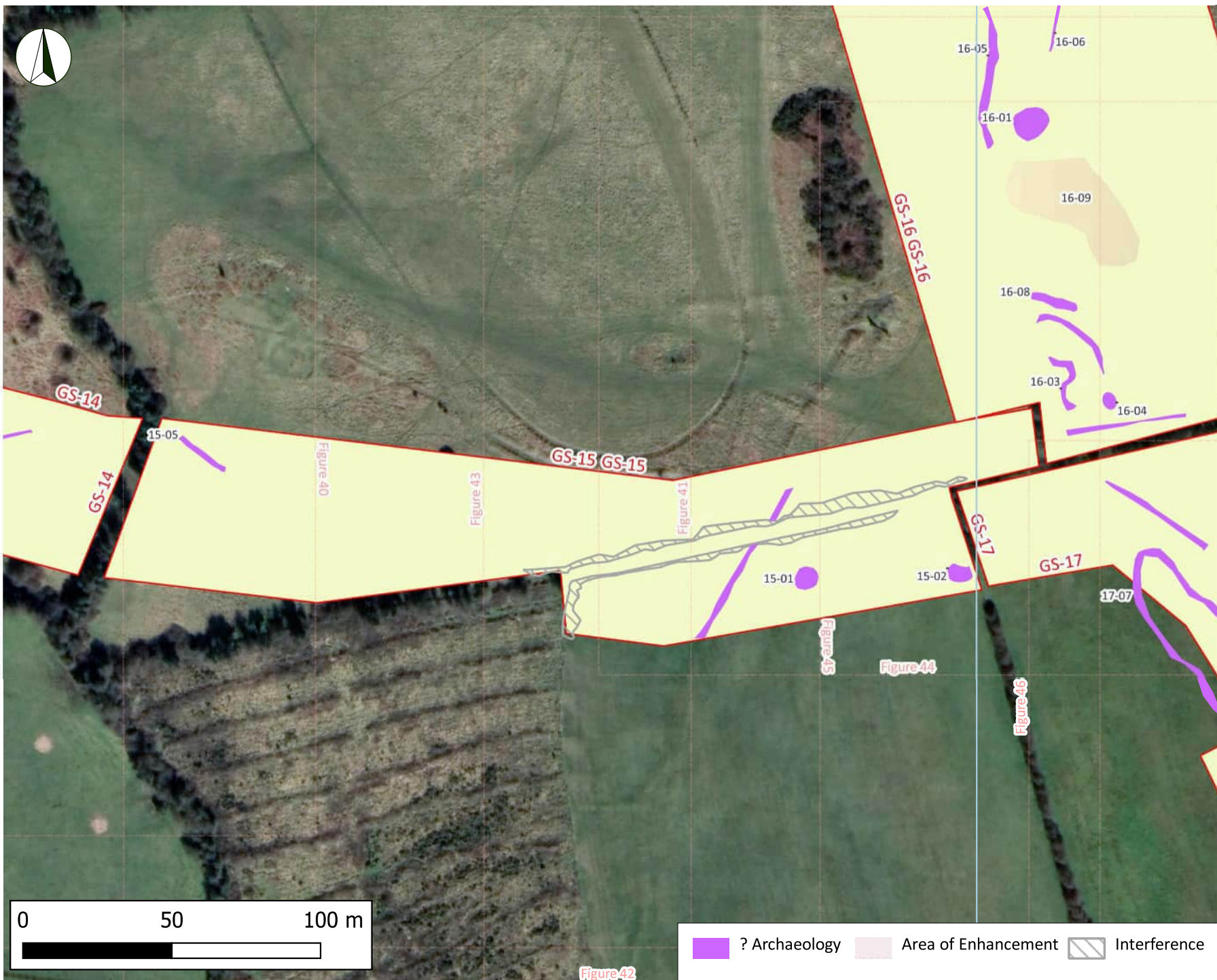


Figure 124
Magnetometry
Interpretation

For corresponding Data
see Figure 42

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

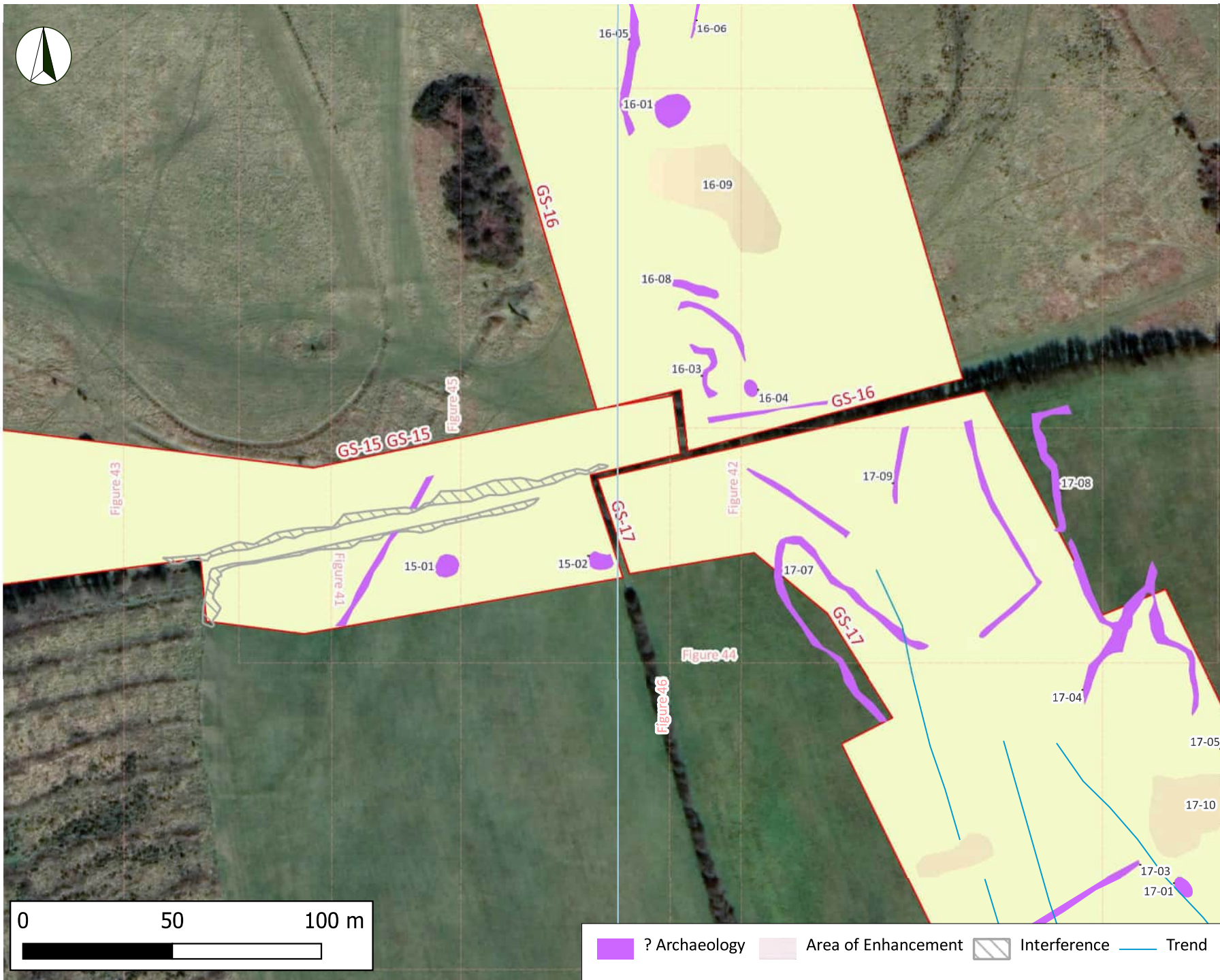
 Survey Area

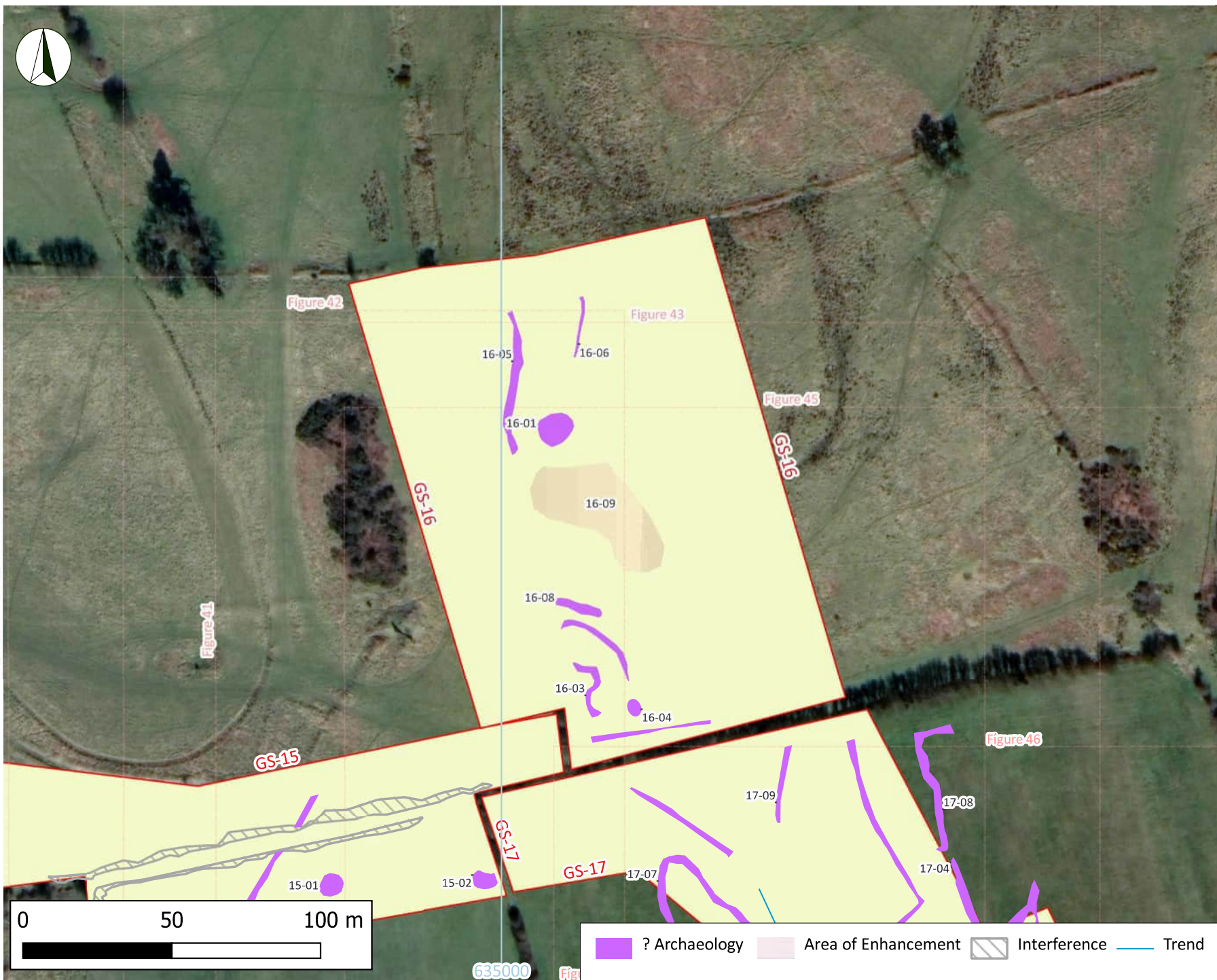


Notes: Google Satellite



 ? Archaeology  Area of Enhancement  Interference





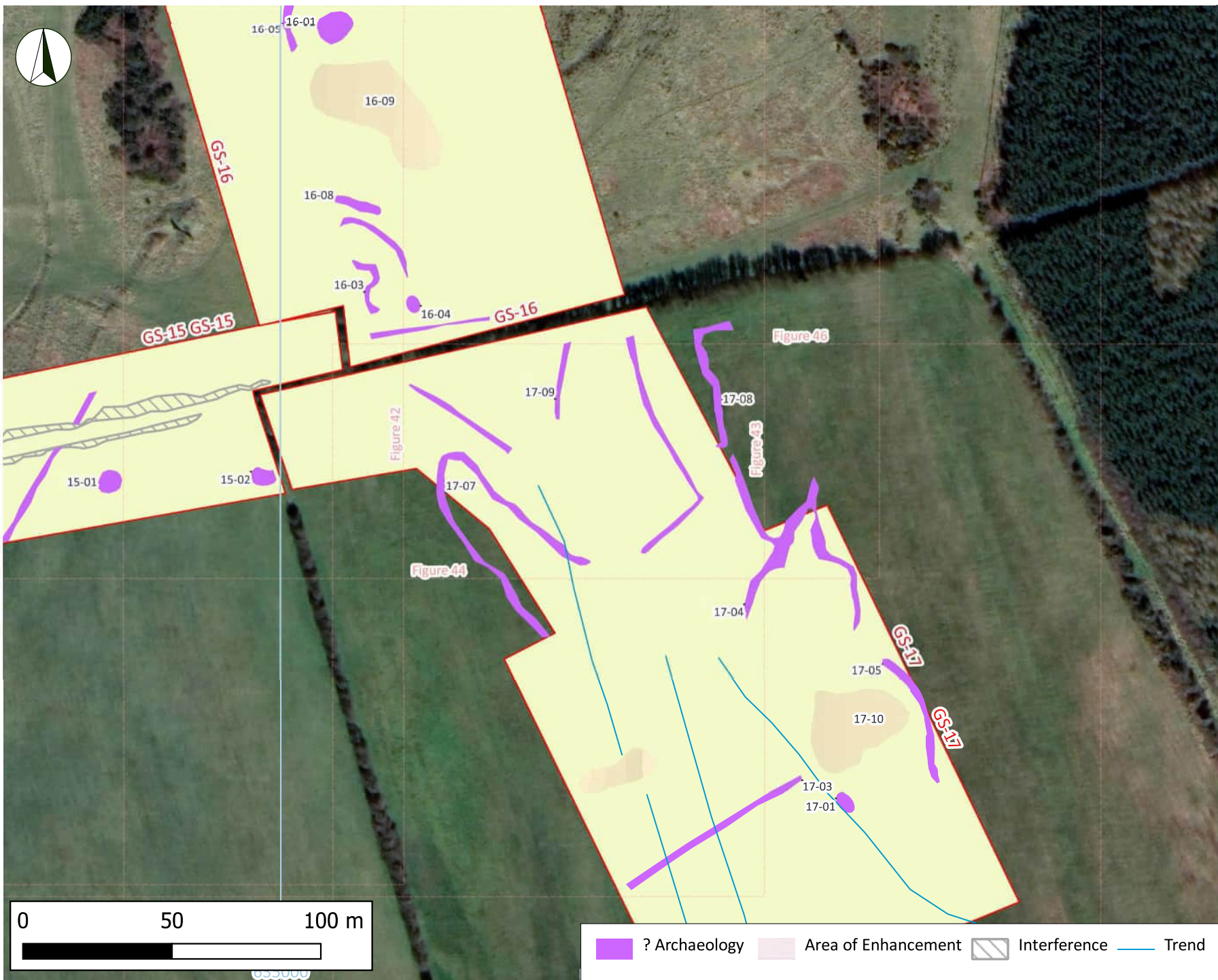








Figure 130
Magnetometry
Interpretation

For corresponding Data
see Figure 48

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite



 ? Archaeology  Field Boundary  Interference



Figure 131
Magnetometry
Interpretation

For corresponding Data
see Figure 49

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

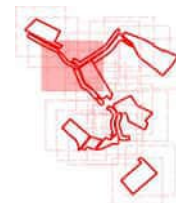
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area
 SMR ZoN



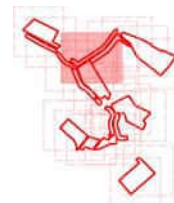
Notes: Google Satellite





Figure 132 Magnetometry Interpretation
For corresponding Data see Figure 50
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

- Survey Area
- SMR Site
- SMR ZoN



Notes: Google Satellite



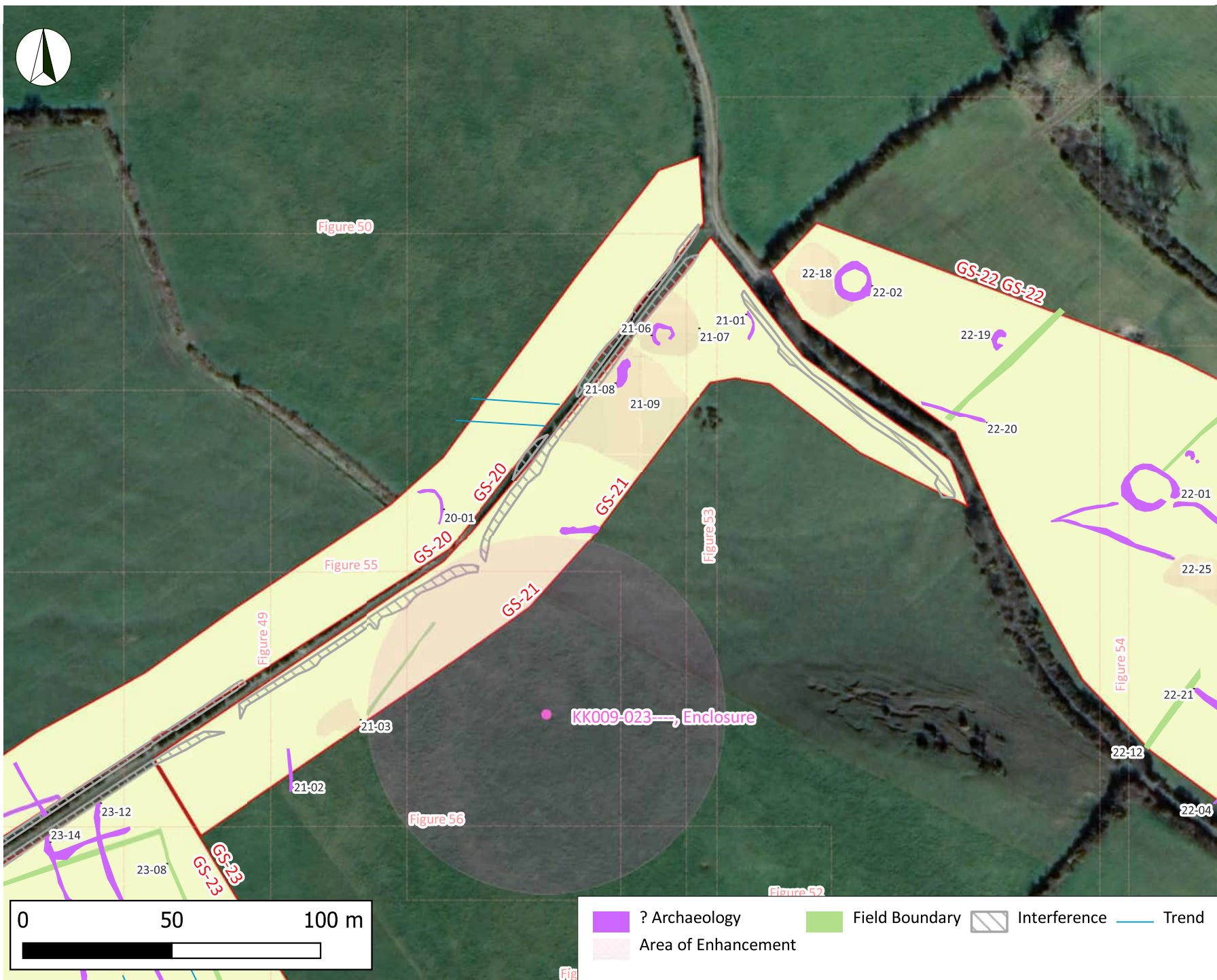


Figure 133
Magnetometry
Interpretation

For corresponding Data
see Figure 51

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

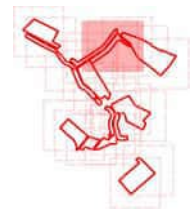
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Date: 28/09/2023

Drawn by: JB

Revision: 1.0

- Survey Area
- SMR Site
- SMR ZoN



Notes: Google Satellite



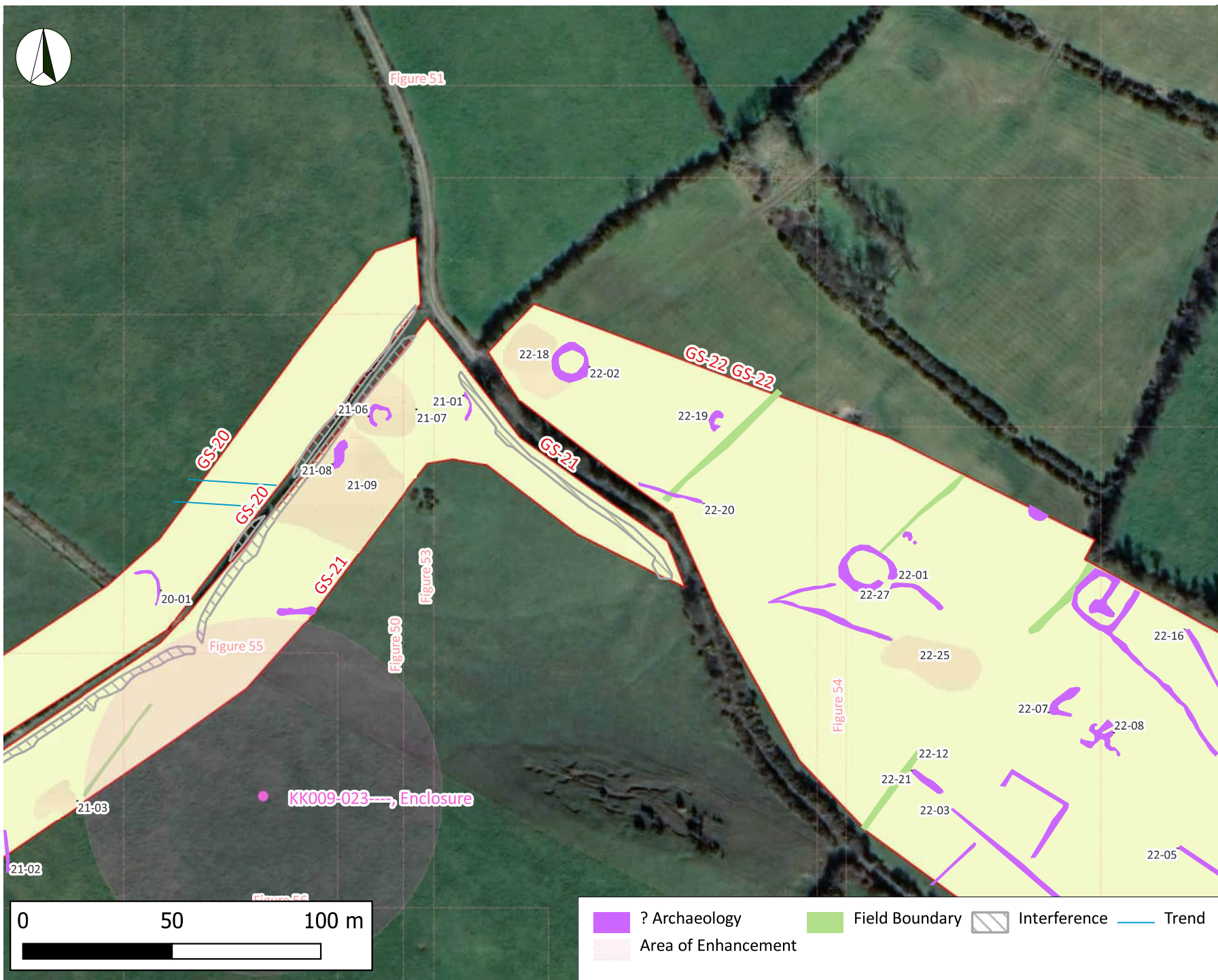


Figure 134
Magnetometry
Interpretation

For corresponding Data
see Figure 52

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

Survey Area
SMR Site
SMR ZoN

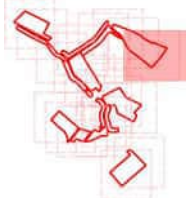


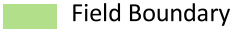
Notes: Google Satellite







Figure 136 Magnetometry Interpretation For corresponding Data see Figure 54	
Project: Gathabawn Windfarm	
Client: Ecopower Limited	
Job No: 3183	
Scale: 1:1,723.379873	
Date: 28/09/2023	
Drawn by: JB	
Revision: 1.0	
 Survey Area 	
Notes: Google Satellite 	

 ? Archaeology
  Area of Enhancement
  Field Boundary

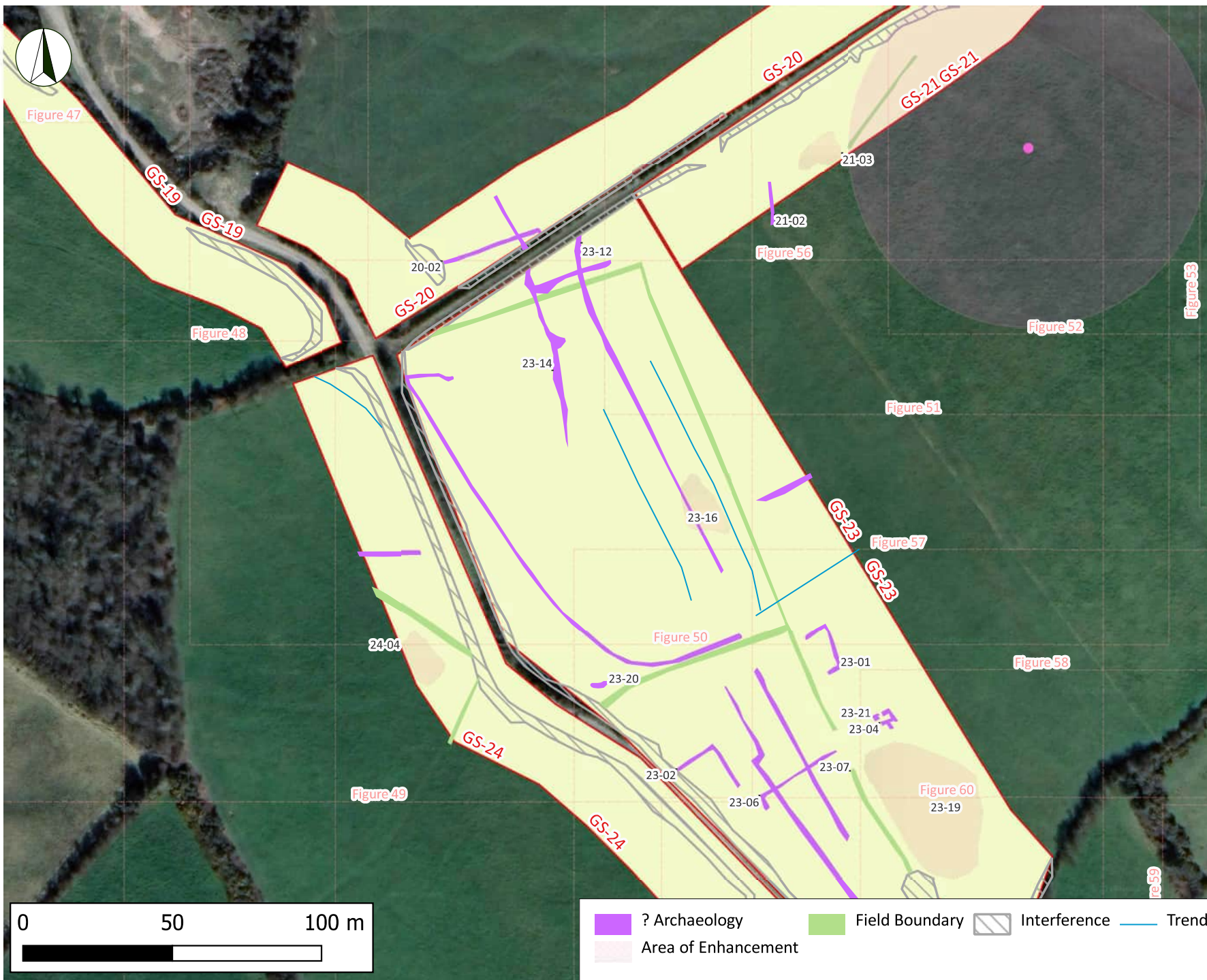




Figure 139
Magnetometry
Interpretation

For corresponding Data
see Figure 57

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

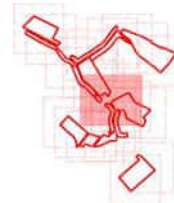
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Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite





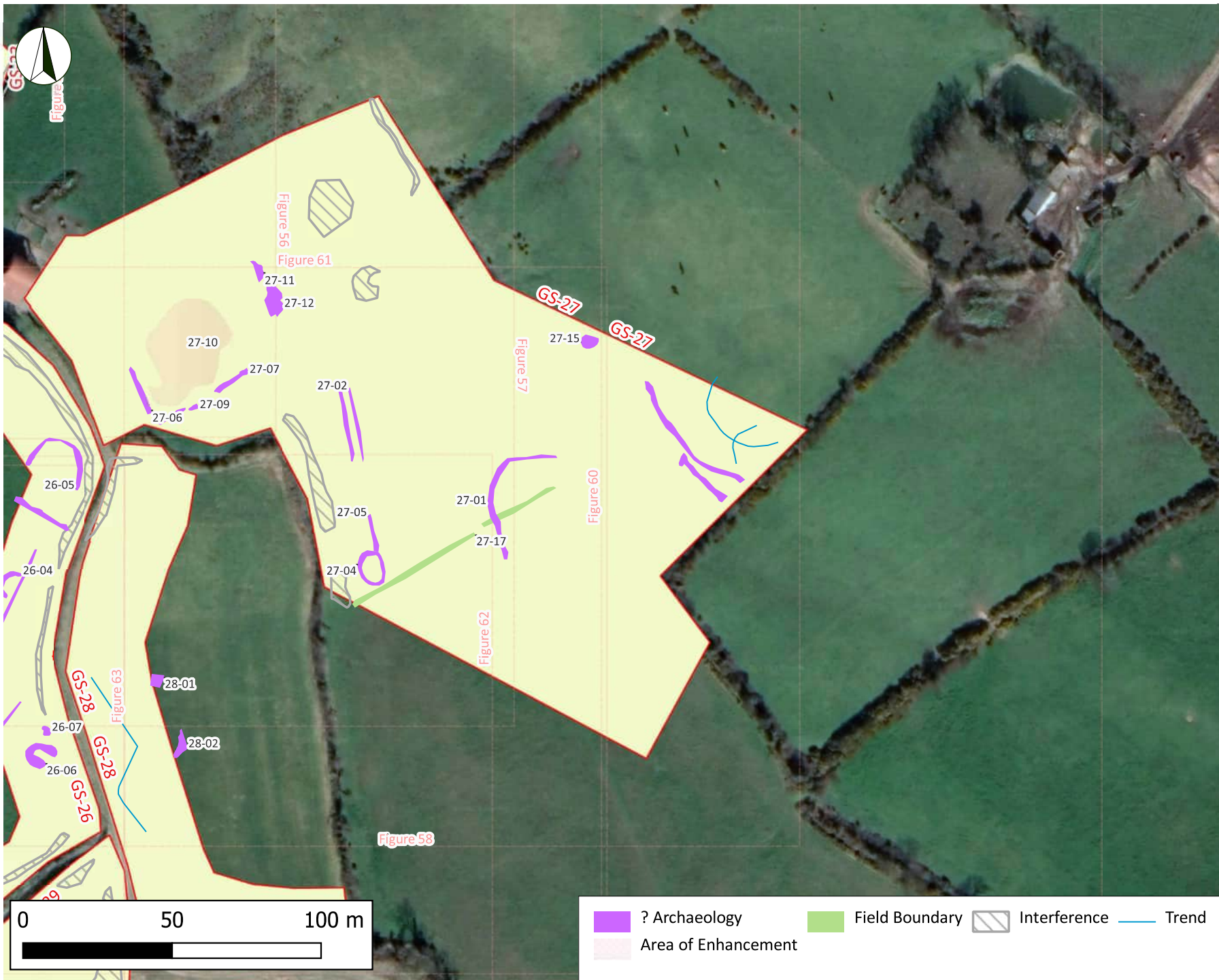
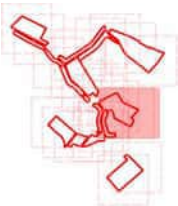


Figure 141
Magnetometry
Interpretation

For corresponding Data
see Figure 59

Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite





Figure 142
Magnetometry
Interpretation

For corresponding Data
see Figure 60

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

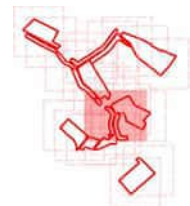
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Date: 28/09/2023

Drawn by: JB

Revision: 1.0

Survey Area



Notes: Google Satellite



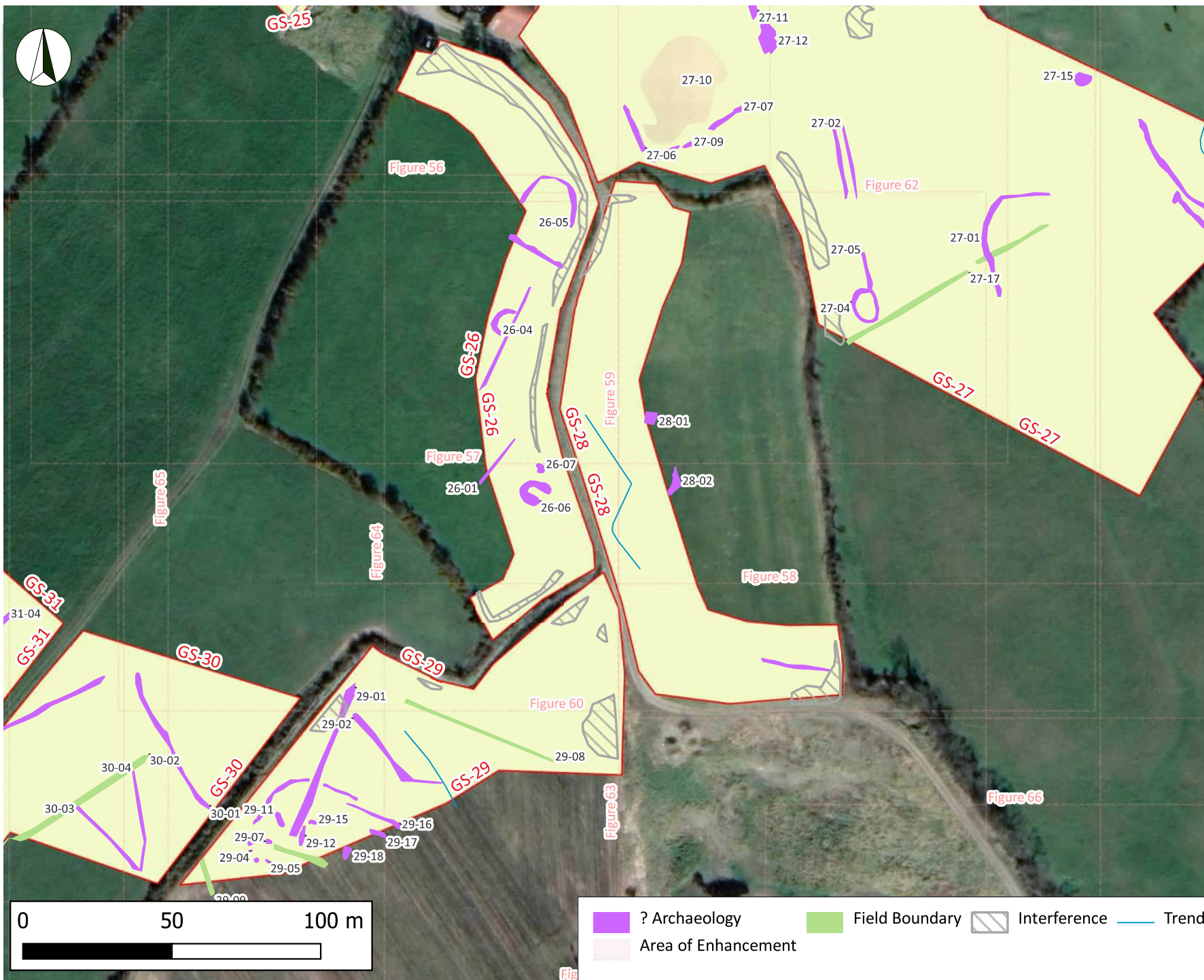


Figure 143
Magnetometry
Interpretation

For corresponding Data
see Figure 61

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite





Figure 144 Magnetometry Interpretation
For corresponding Data see Figure 62
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



Notes: Google Satellite



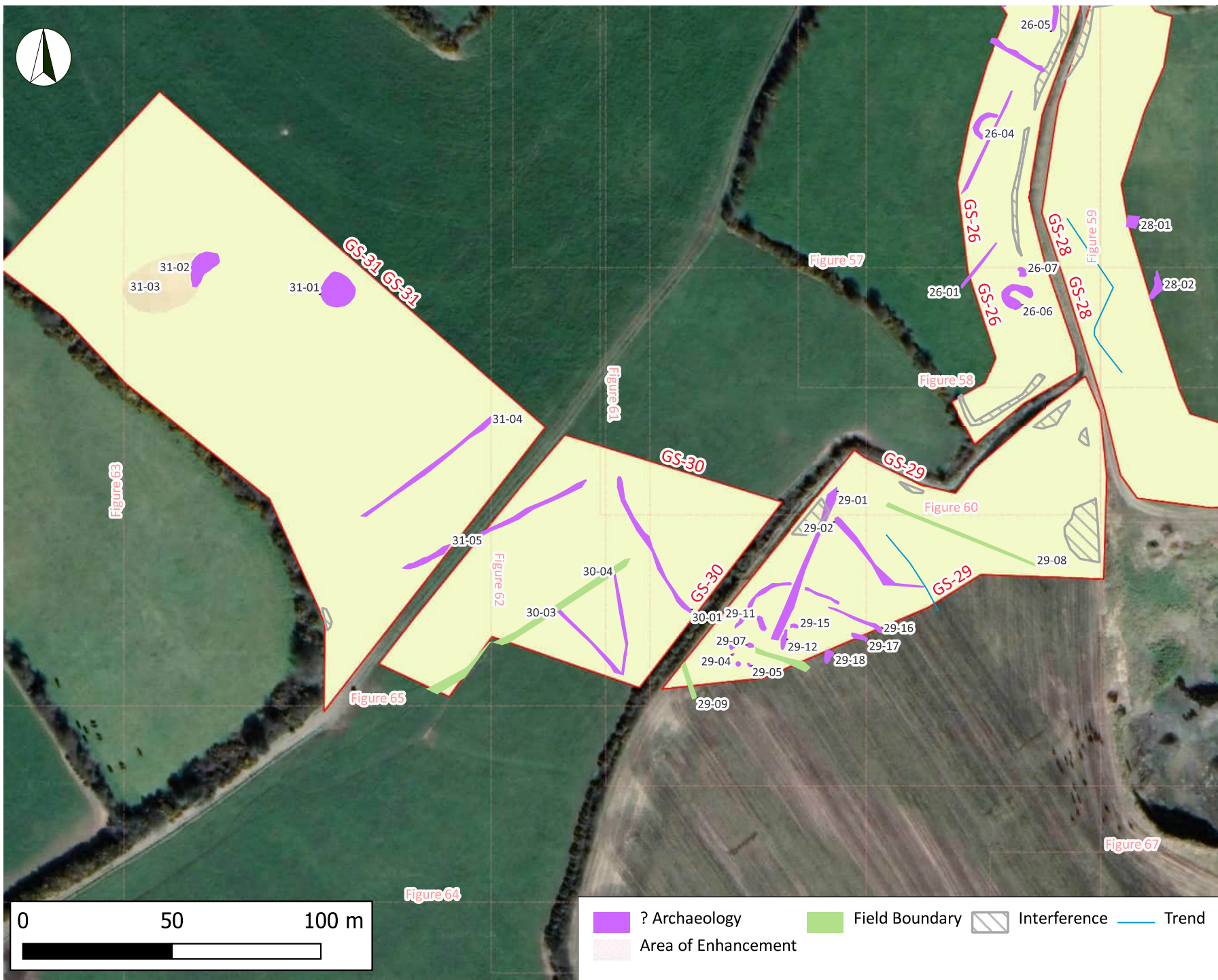


Figure 145 Magnetometry Interpretation
For corresponding Data see Figure 63
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area



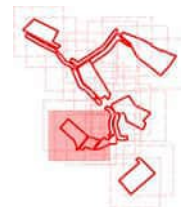
Notes: Google Satellite





Figure 146 Magnetometry Interpretation
For corresponding Data see Figure 64
Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

 Survey Area

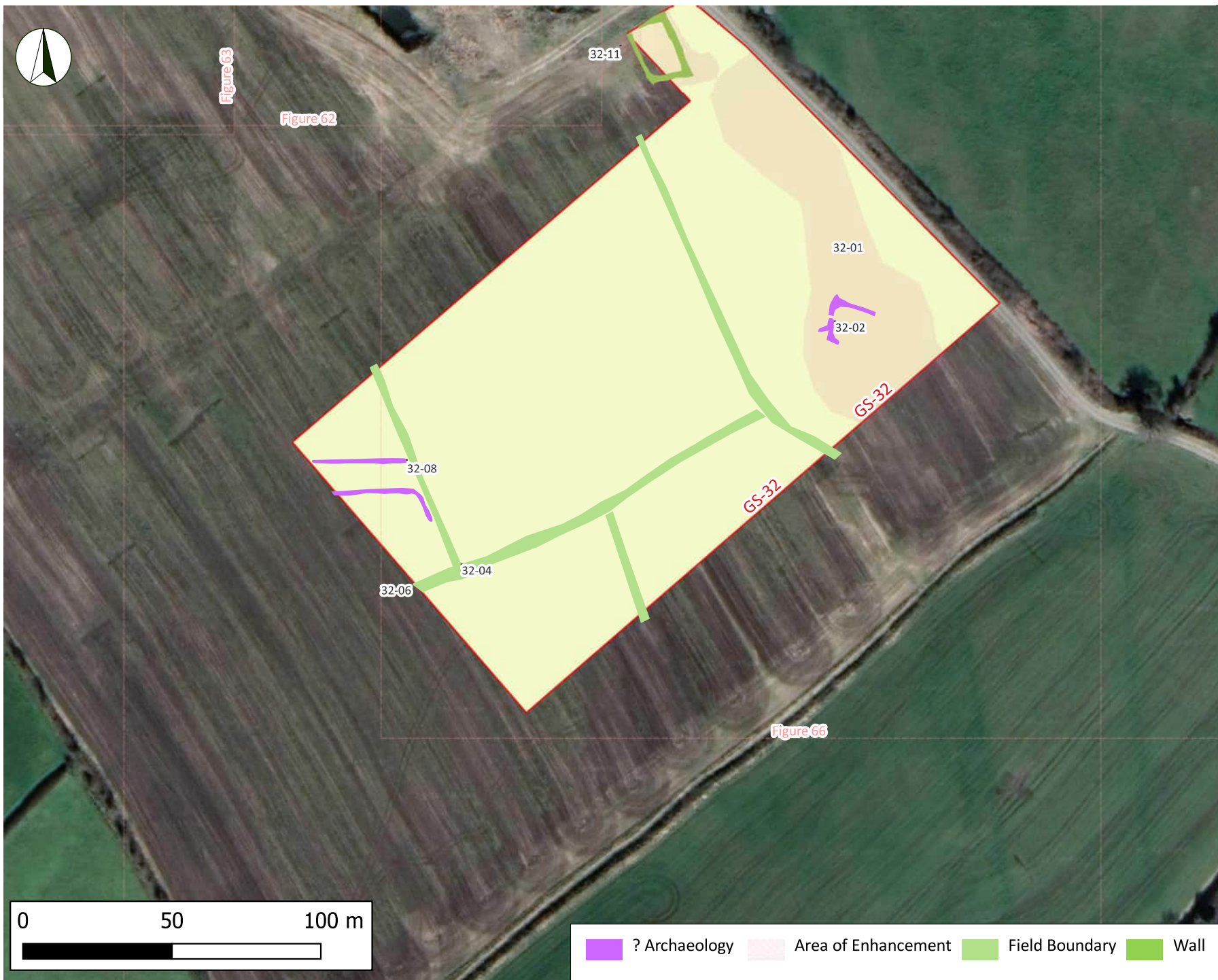


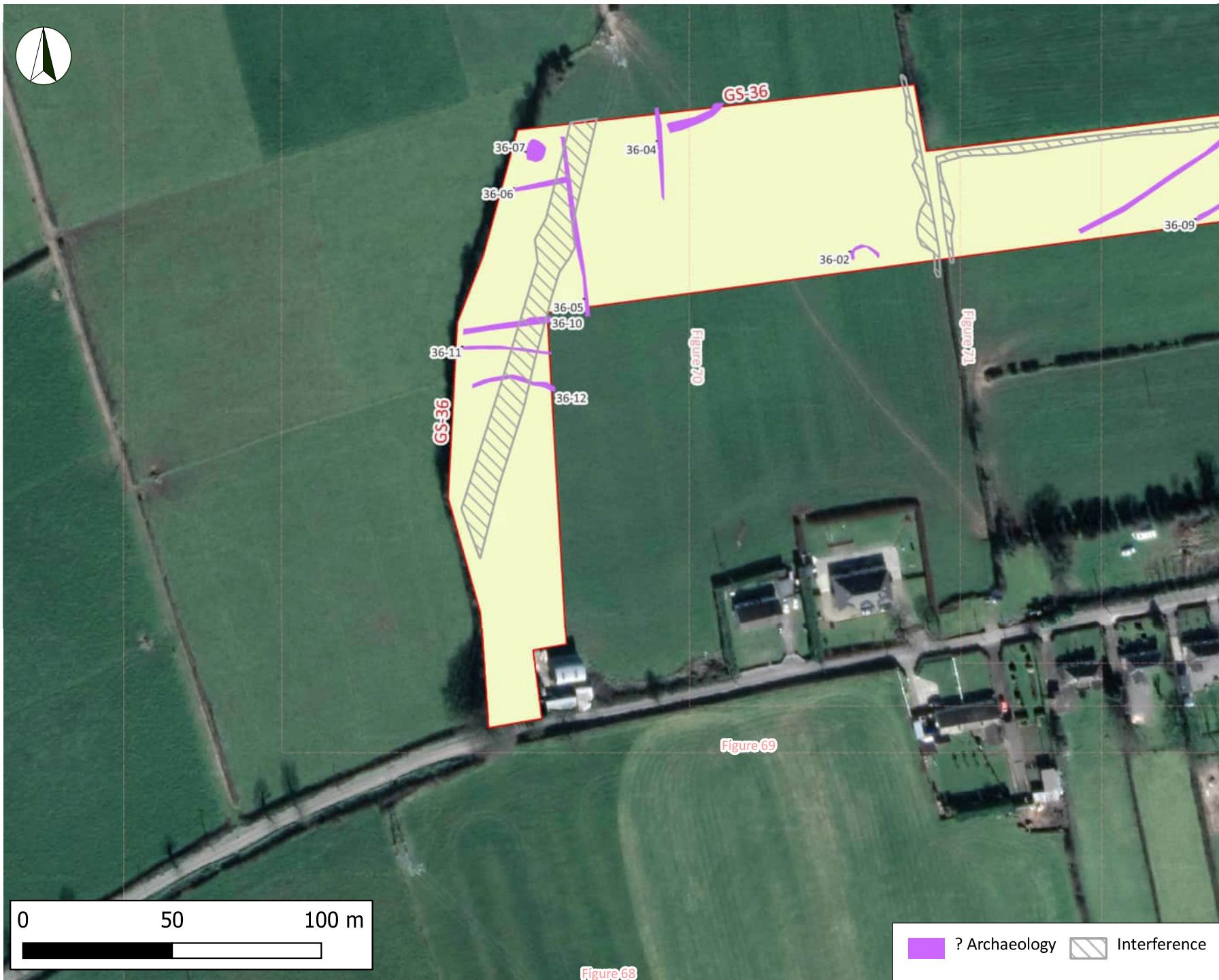
Notes: Google Satellite



 ? Archaeology
  Field Boundary
  Interference
  Trend
  Area of Enhancement







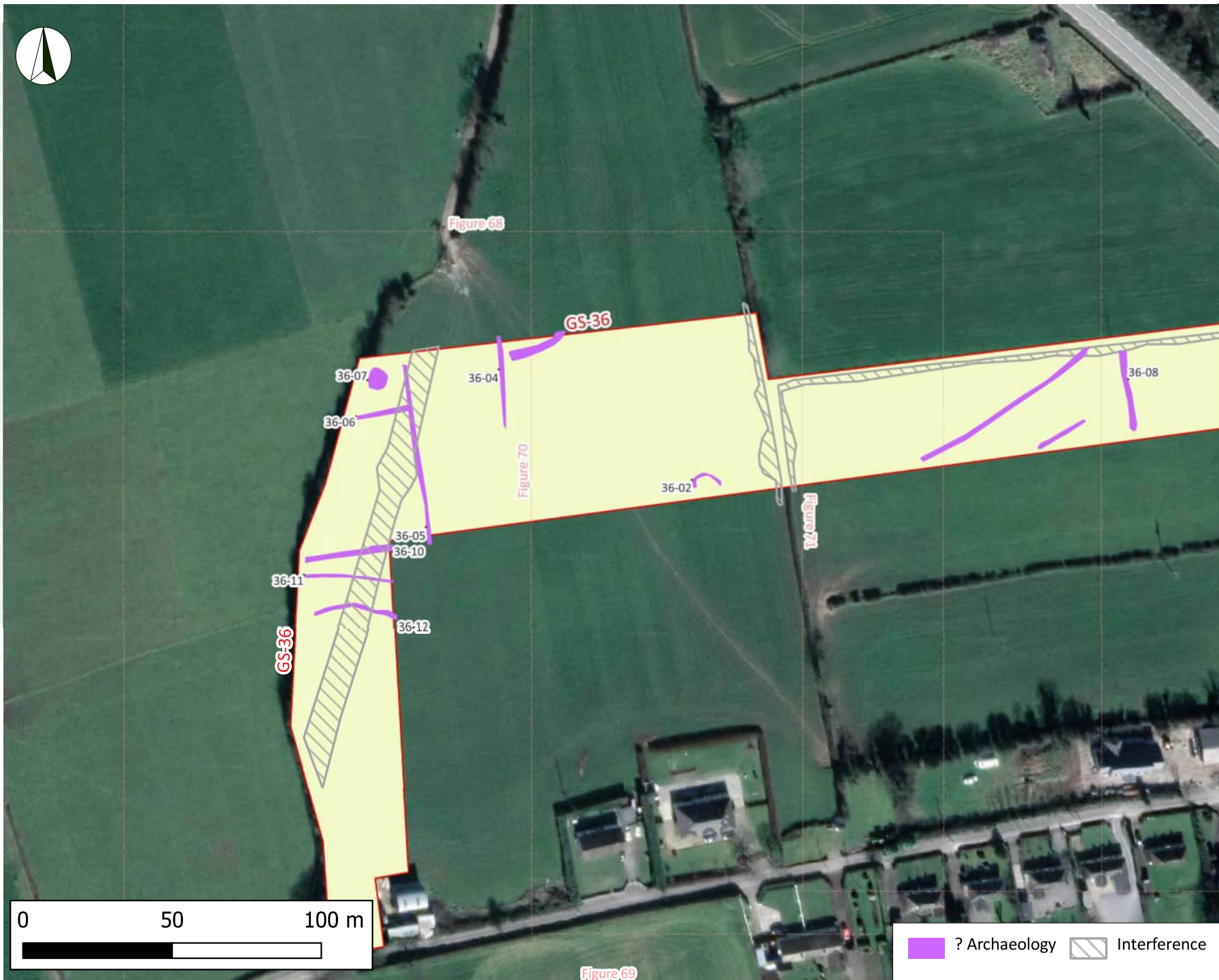


Figure 151
Magnetometry
Interpretation

For corresponding Data
see Figure 69

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

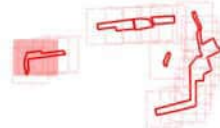
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Date: 28/09/2023

Drawn by: JB

Revision: 1.0

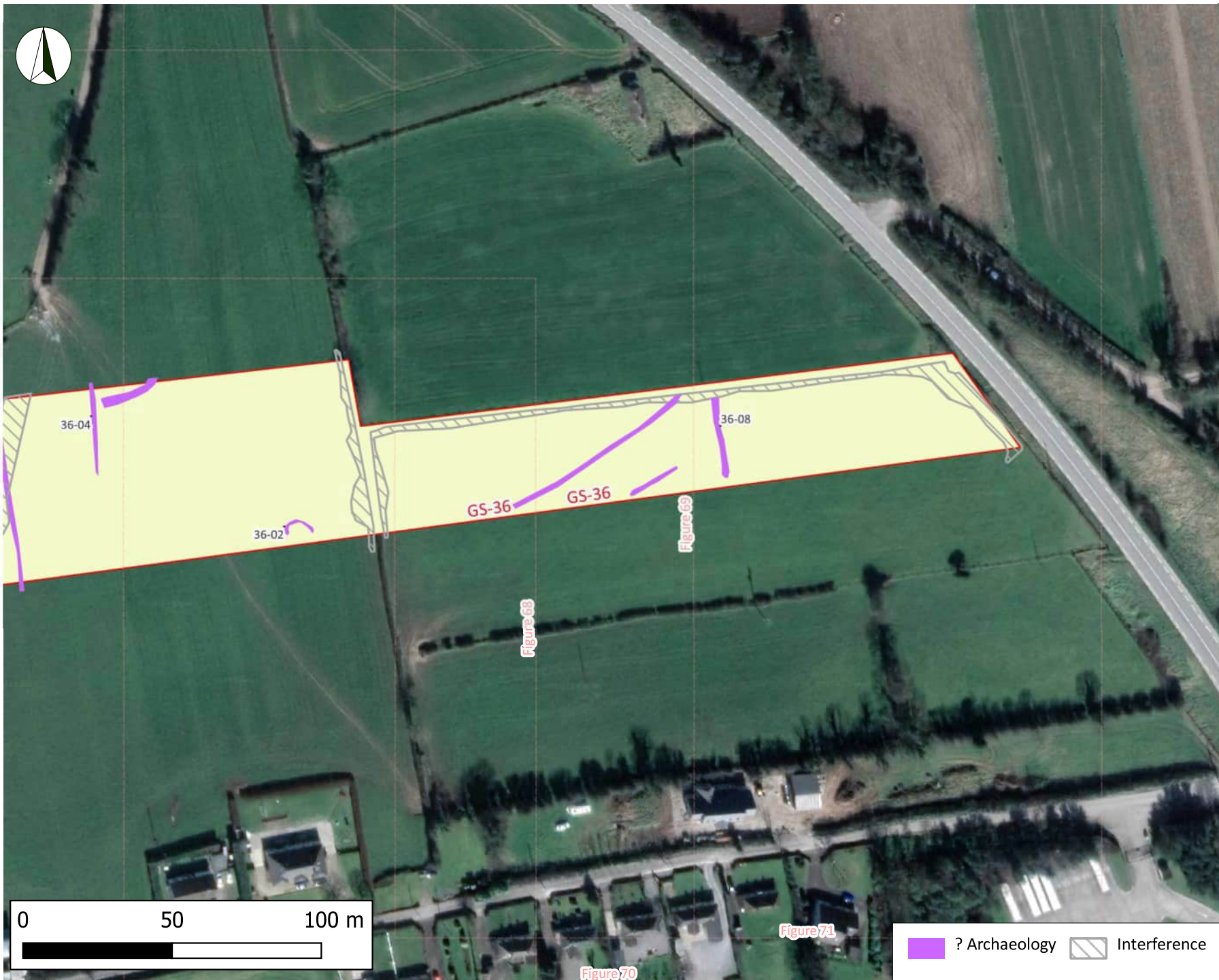
 Survey Area



Notes: Google Satellite



 ? Archaeology  Interference



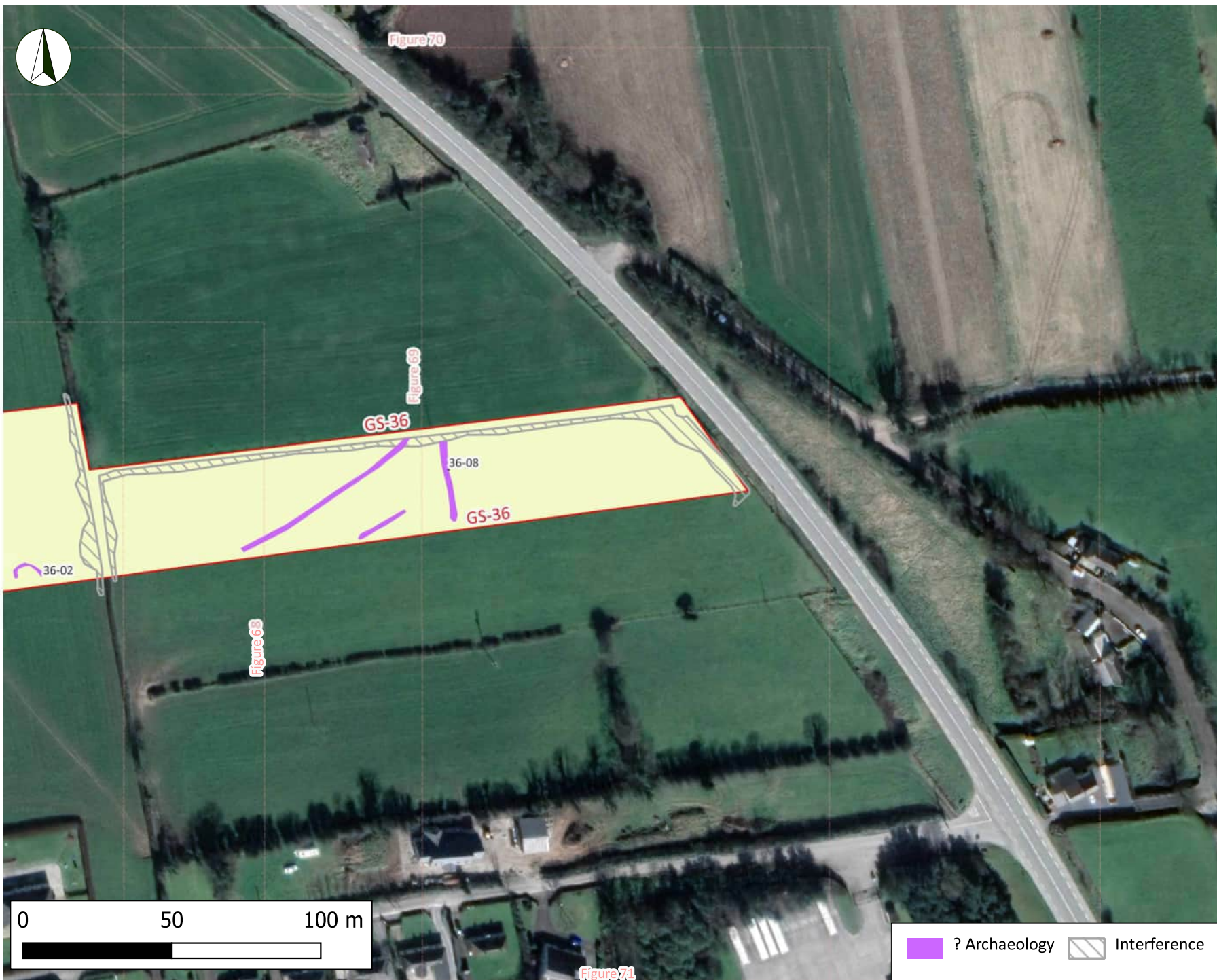


Figure 153
Magnetometry
Interpretation

For corresponding Data
see Figure 71

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

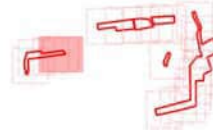
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Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite



 ? Archaeology  Interference

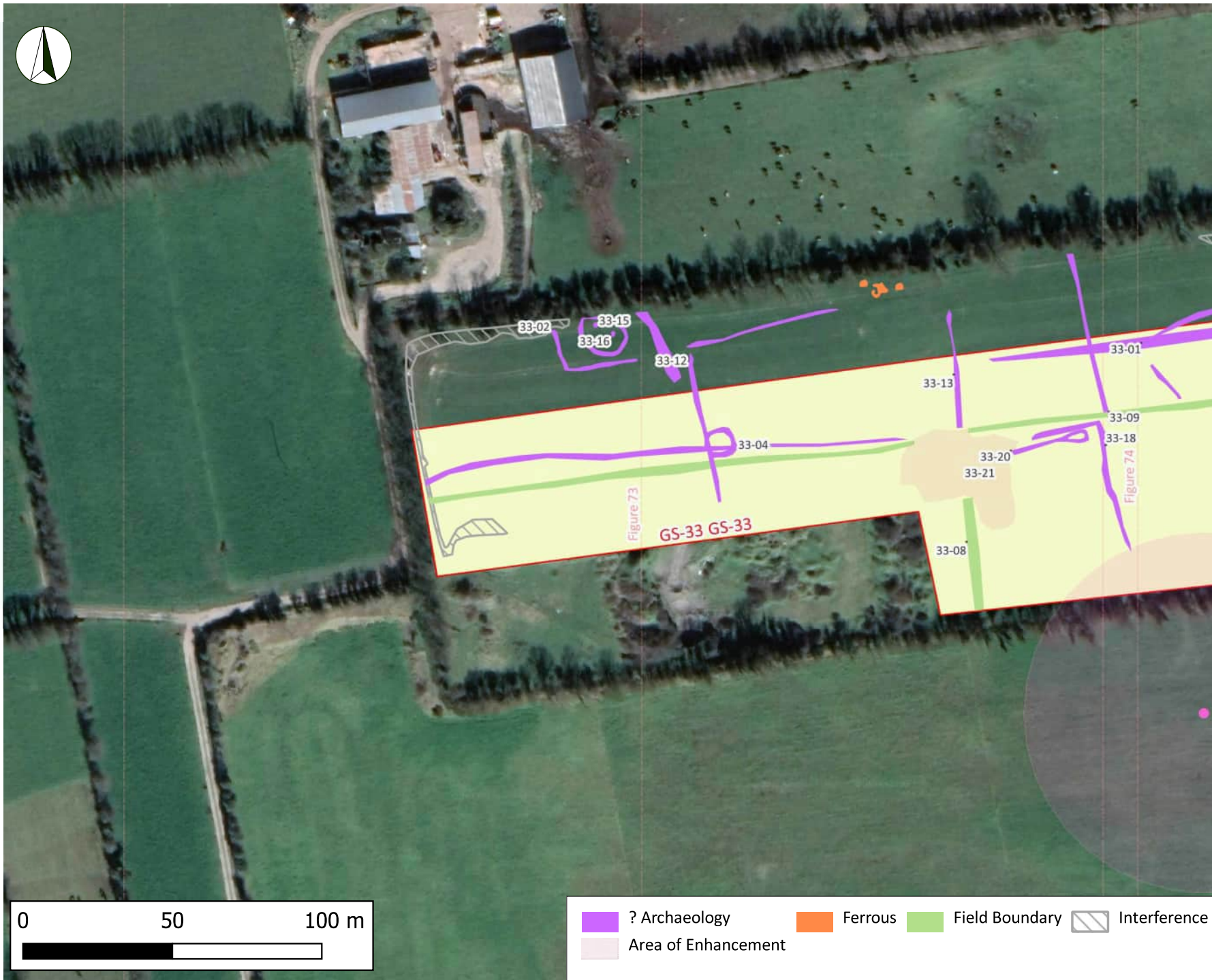
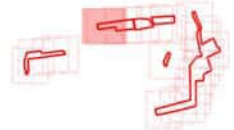


Figure 154
Magnetometry
Interpretation

For corresponding Data
see Figure 72

Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

- Survey Area
- SMR Site
- SMR ZoN



Notes: Google Satellite



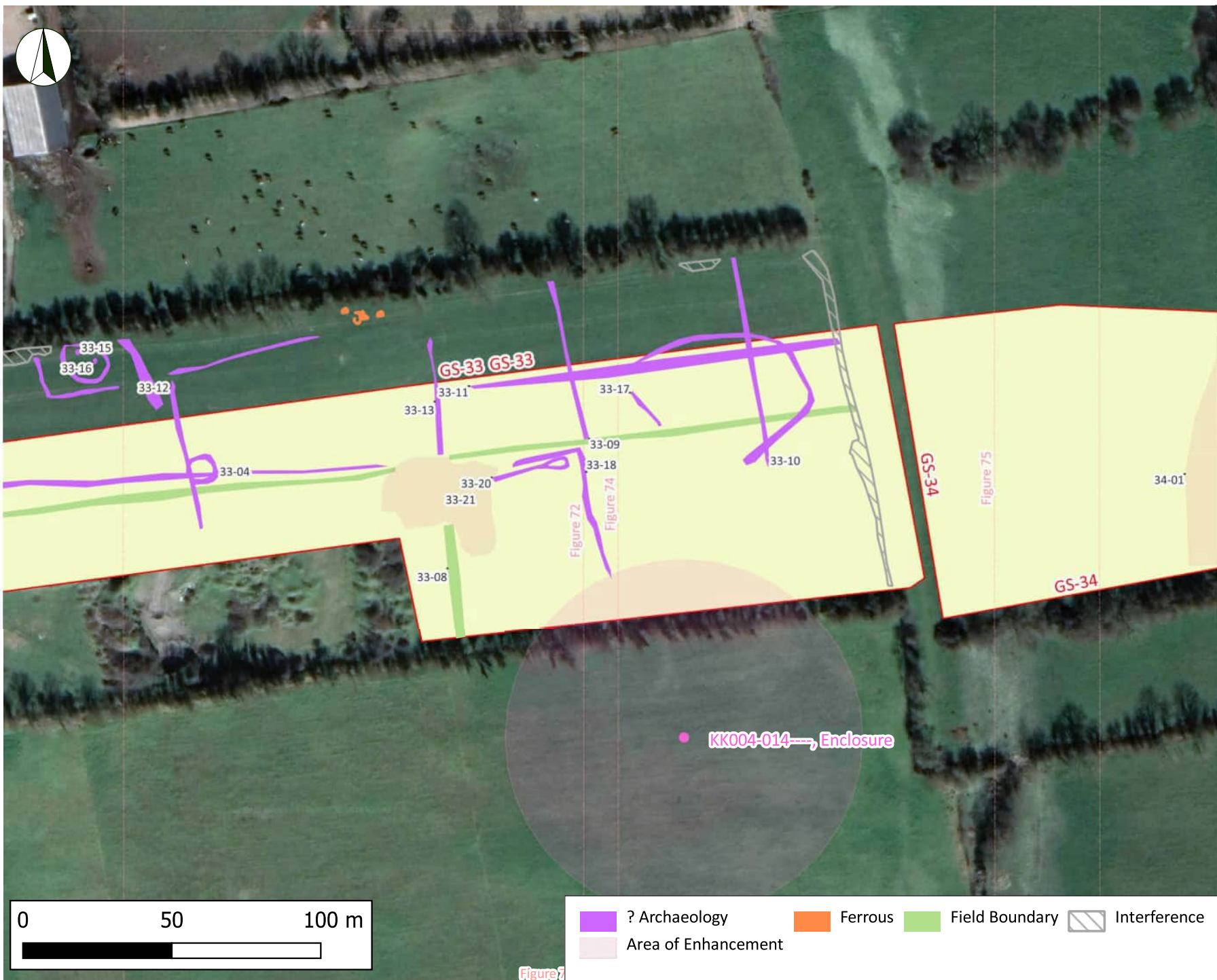


Figure 155
Magnetometry
Interpretation

For corresponding Data
see Figure 73

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

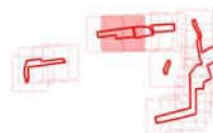
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

- Survey Area
- SMR Site
- SMR ZoN



Notes: Google Satellite



0 50 100 m

- ? Archaeology
- Ferrous
- Field Boundary
- Interference
- Area of Enhancement

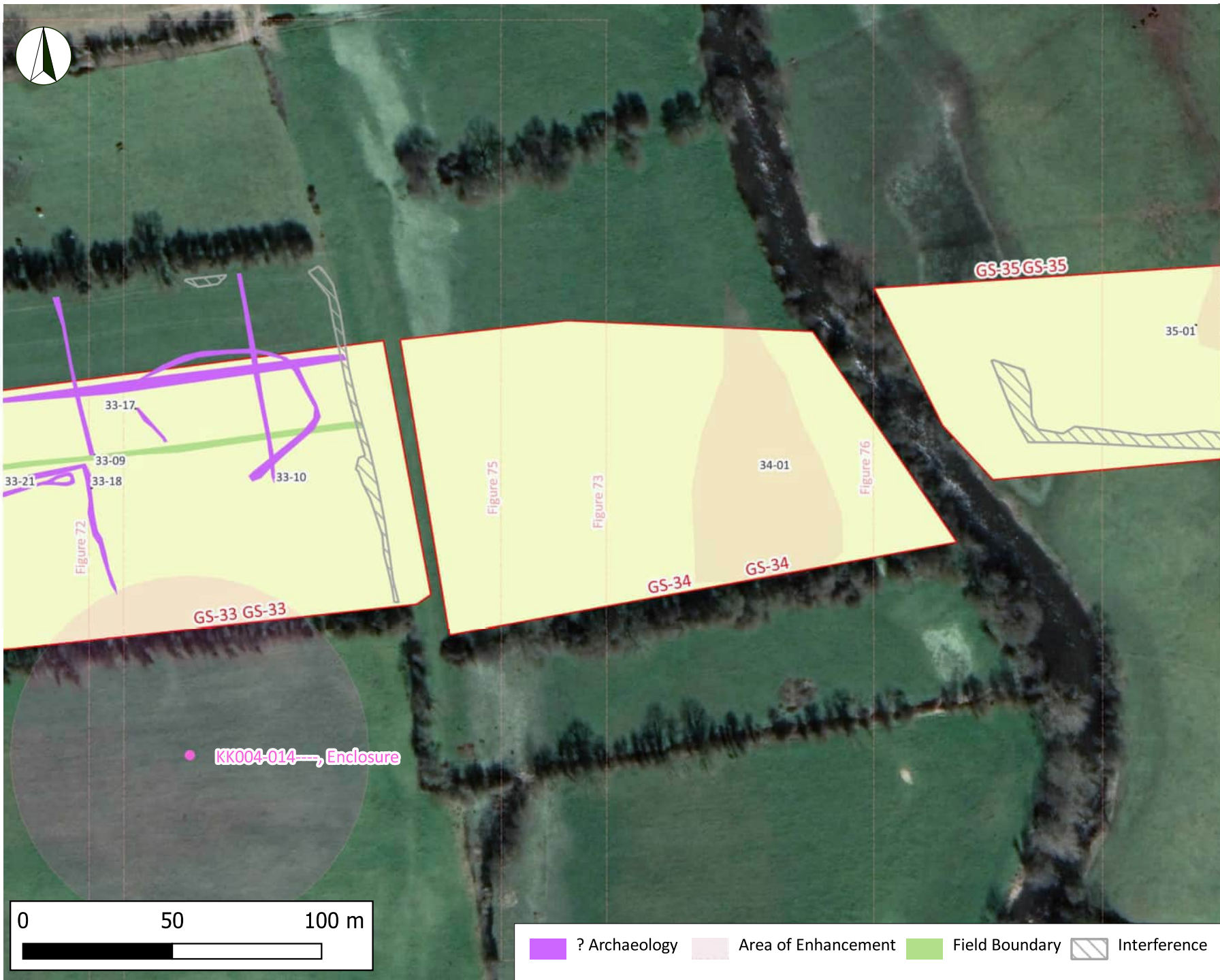




Figure 75

Figure 157
Magnetometry
Interpretation

For corresponding Data
see Figure 75

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

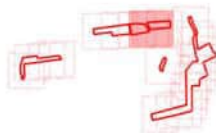
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Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite



 Area of Enhancement  Interference



Figure 158
Magnetometry
Interpretation

For corresponding Data
see Figure 76

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

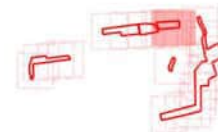
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite



 Area of Enhancement  Interference



Figure 159
Magnetometry
Interpretation

For corresponding Data
see Figure 77

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

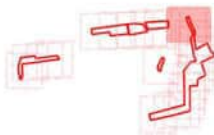
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite









Figure 162
Magnetometry
Interpretation

For corresponding Data
see Figure 80

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

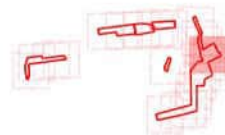
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area
 SMR Site
 SMR ZoN



Notes: Google Satellite





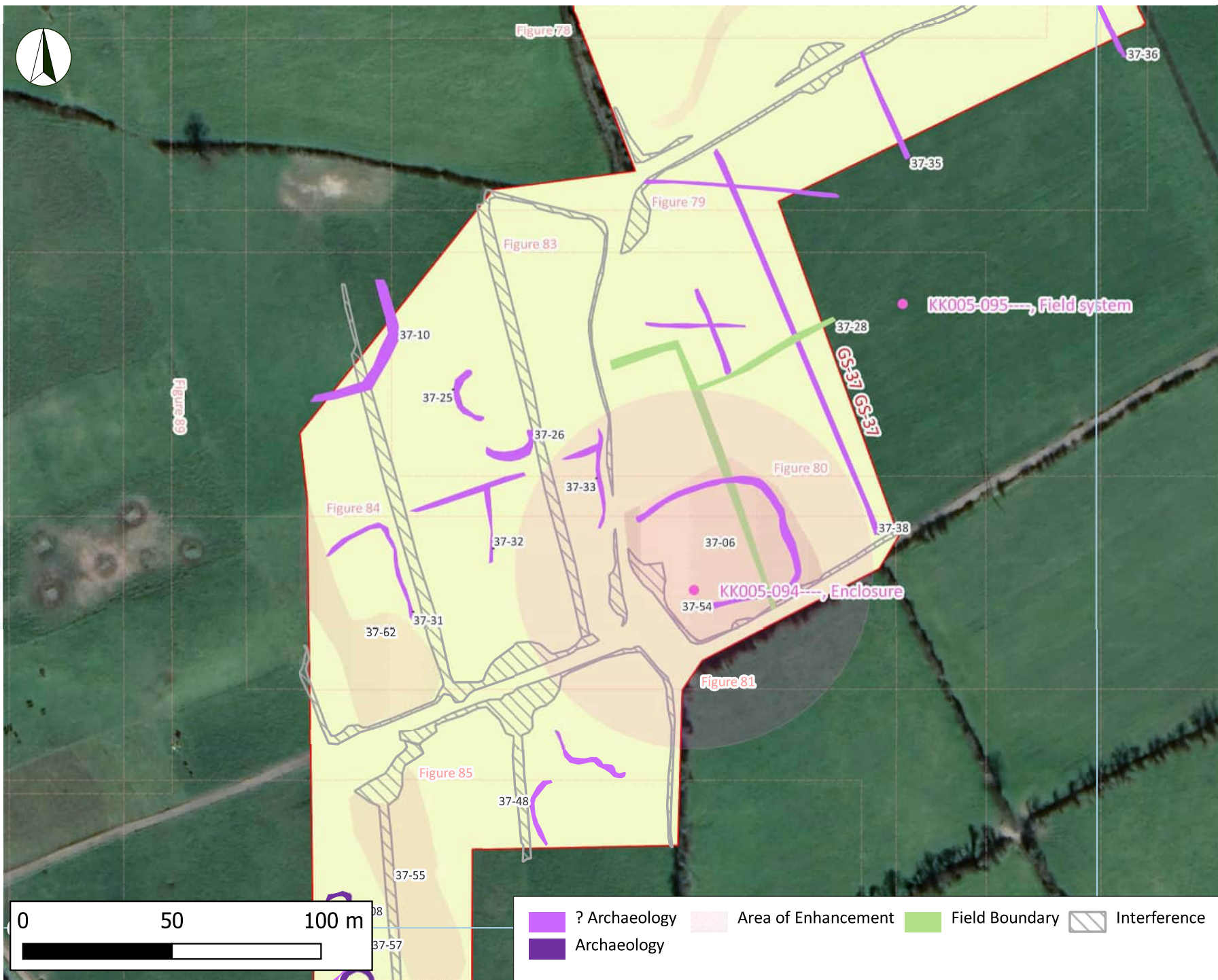


Figure 164
Magnetometry
Interpretation

For corresponding Data
see Figure 82

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

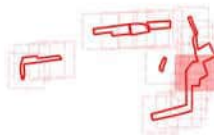
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

Survey Area
SMR Site
SMR ZoN



Notes: Google Satellite



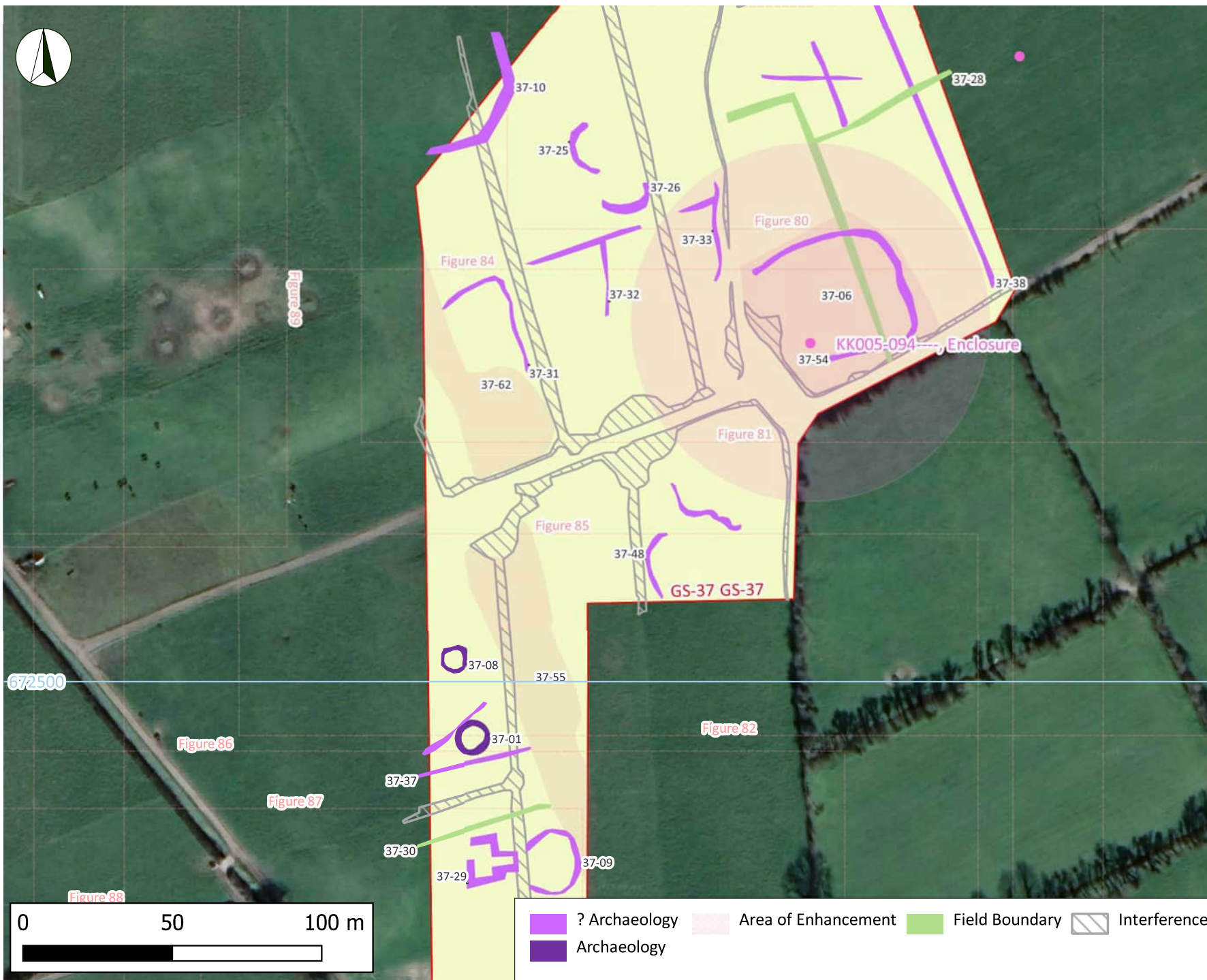
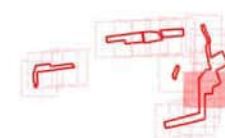


Figure 165
Magnetometry
Interpretation

For corresponding Data
see Figure 83

Project: Gathabawn Windfarm
Client: Ecopower Limited
Job No: 3183
Scale: 1:1,723.379873
Date: 28/09/2023
Drawn by: JB
Revision: 1.0

- Survey Area
- SMR Site
- SMR ZoN



Notes: Google Satellite



- ? Archaeology
- Archaeology
- Area of Enhancement
- Field Boundary
- Interference



Figure 166
Magnetometry
Interpretation

For corresponding Data
see Figure 84

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

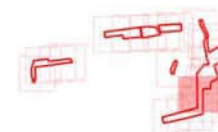
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Date: 28/09/2023

Drawn by: JB

Revision: 1.0

Survey Area
SMR Site
SMR ZoN



Notes: Google Satellite



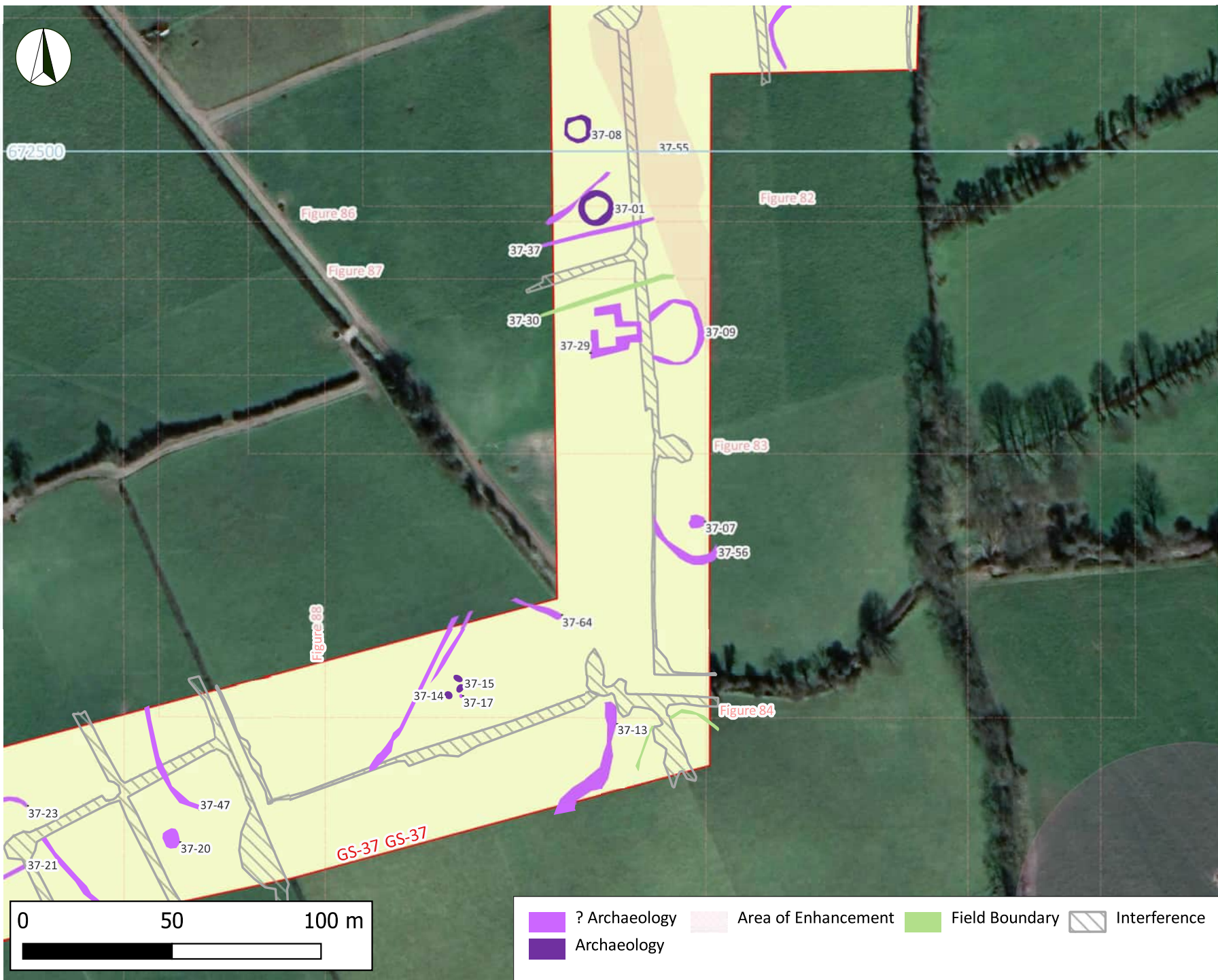


Figure 167
Magnetometry
Interpretation

For corresponding Data
see Figure 85

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

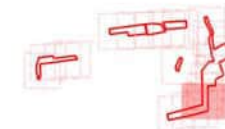
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area
 SMR Site
 SMR ZoN



Notes: Google Satellite





Figure 168
Magnetometry
Interpretation

For corresponding Data
see Figure 86

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

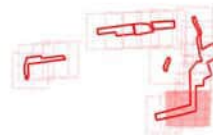
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

Survey Area
SMR ZoN



Notes: Google Satellite





Figure 169
Magnetometry
Interpretation

For corresponding Data
see Figure 87

Project: Gathabawn
Windfarm

Client: Ecopower Limited

Job No: 3183

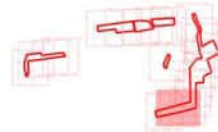
Scale: 1:1,723.379873

Date: 28/09/2023

Drawn by: JB

Revision: 1.0

 Survey Area



Notes: Google Satellite





Appendix to Chapter 15: Cultural Heritage

Appendix 15.4: Gathabawn LiDAR Survey Assessment

Contents

A15.4	Gathabawn LiDAR Survey Assessment.....	2
A15.4.1	Methodology.....	2
A15.4.2	Results.....	3
A15.4.3	Conclusion.....	48

A15.4 Gathabawn LiDAR Survey Assessment

A15.4.1 Methodology

LiDAR (Light Detection and Ranging) is a remote-sensing technique that generates accurate three-dimensional measurements through the use of laser light to determine distance to an object or surface (Historic Environment Scotland 2018). The resulting datasets produce highly detailed topographic models that can detect subtle archaeological features, including very indistinct earthworks, and can do so even beneath dense vegetation cover (Lambrick 2008). High-resolution LiDAR has therefore become an essential component of archaeological prospection and relief visualisation.

A15.4.1.1 Data Acquisition

High-resolution LiDAR for the Proposed Development was commissioned by Ecopower Developments Ltd and captured by Bluesky International Ltd, a Woolpert company, on 17th December 2025.

The data were collected at:

- 0.25m lateral (ground) resolution, suitable for detecting small-scale topographic features;
- ± 0.05 m vertical accuracy

Two elevation models were supplied:

- Digital Surface Model (DSM) – containing elevations of natural terrain plus above-ground features such as buildings and vegetation.
- Digital Terrain Model (DTM) – a bare-earth model representing only the underlying terrain.

These definitions follow standard descriptions, where DSMs model “objects on the surface” and DTMs represent “bare earth” (Kokalj & Hesse 2017).

All data were delivered in Irish Transverse Mercator (ITM).

A15.4.1.2 Data Preparation

All LiDAR datasets supplied as .tiff raster files were processed using Relief Visualisation Toolbox (RVT) methods accessed through the RVT QGIS plug-in, and subsequently imported into QGIS 3.40.6, an open-source GIS platform capable of handling high-resolution elevation models and specialist visualisation tools.

Each raster was checked for:

- Correct projection (ITM)
- Consistent pixel dimensions (0.25m)
- Absence of nodata gaps
- Consistency between DSM and DTM datasets

A15.4.1.3 Relief Visualisation and Analysis

RVT was developed specifically for interpreting high-resolution DEMs derived from airborne laser scanning (LiDAR) and includes techniques proven effective for identifying small-scale archaeological features.

The following visualisations were generated:

- Single-direction hillshades
 - A technique based on “the hypothetical illumination of a surface... to show subtle changes in topography” (Historic England 2018)

- Multiple azimuths were used to identify features only visible under certain lighting angles (e.g. linear earthworks)
- Multi-directional hillshade
 - A composite of numerous hillshades (32), reducing directional bias and improving visibility of subtle features, although some flattening may occur in over-exposed areas
- Simple Local Relief Model (LRM)
 - LRM “separates local small-scale features from large-scale landscape forms”, greatly enhancing the readability of minor topographic anomalies (Kokalj & Hesse 2017; Hesse 2010)
- Additional RVT Techniques
 - RVT supports several advanced visualisations used in archaeological LiDAR interpretation, including:
 - Sky-View Factor (SVF) – measures visible sky hemisphere; excellent for low-relief features
 - Positive & Negative Openness – highlights convex and concave forms
 - Local Dominance – identifies how strongly each pixel stands out relative to its surroundings

These complementary visualisations allow cross-comparison and help minimise false positives, as recommended in RVT good-practice literature.

A15.4.1.4 Interpretation and Feature Mapping

The visualisation outputs were systematically reviewed at multiple scales.

Potential archaeological features were:

- Digitised within QGIS
- Cross-checked between the DSM and DTM
- Compared against historic mapping, HER data and aerial photography
- Assessed within wider landscape context

A15.4.1.5 Limitations

- Some vegetated or waterlogged areas may exhibit classification noise
- Multi-directional visualisations may flatten certain features, requiring comparison across multiple RVT outputs
- Interpretation remains dependent on DEM quality and point-cloud ground classification accuracy.

A15.4.2 Results

Analysis of the results of the LiDAR survey carried out in 2025 recorded 239 previously unrecognised archaeological assets within the LiDAR Survey Area. These features have been given the prefix of ‘SLR’ in their labels in order to distinguish them from the assets recorded within the SMR, with the features from the geophysical survey referred to by GS-number, with the first two digits representing their survey area. The geophysical survey report and associated drawings can be found in Appendix 15.3. A key for the plates referenced in this appendix can be found in **Plate 1**.

The results of the LiDAR survey show that the Site preserves an extensive, multi-period archaeological landscape, with evidence ranging from prehistoric/medieval settlement enclosures to pre-Famine agricultural field systems.

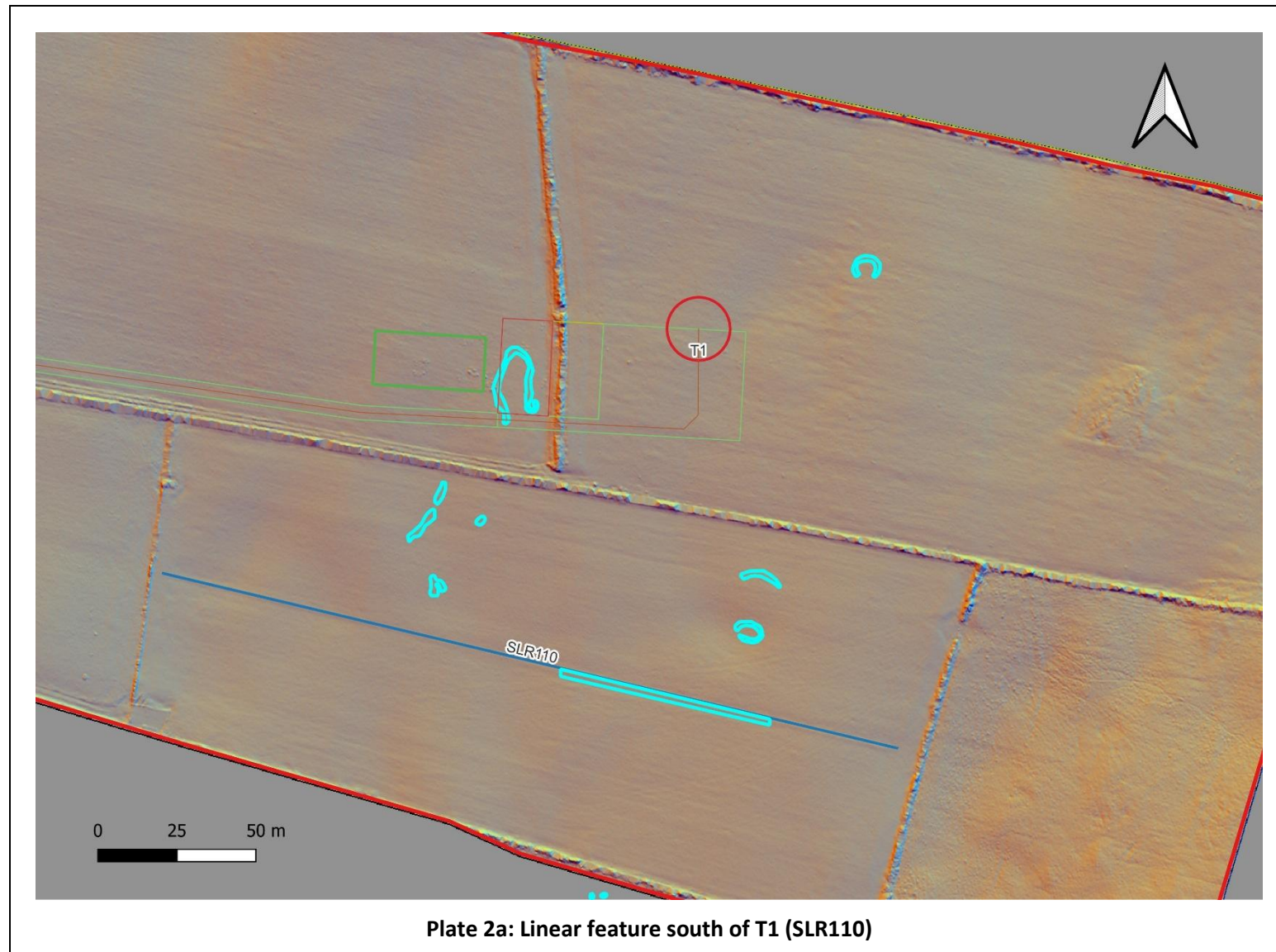
Analysis of the LiDAR dataset identified a total of 214 linear features across the LiDAR Survey Area, representing a substantial and well-preserved historic landscape. These features include former field boundaries, drainage elements, trackways, and miscellaneous earthworks, as well as boundaries associated with upland potato cultivation terraces. The distribution of these features is notably uneven, with the majority concentrated within eight extensive zones of earthworks interpreted as the remnants of medieval to early post-medieval agricultural activity. These zones dominate the landscape around the western sector of the Site (Ballylehaun Area) and occur in sizeable clusters to the east (Ballyring Area).

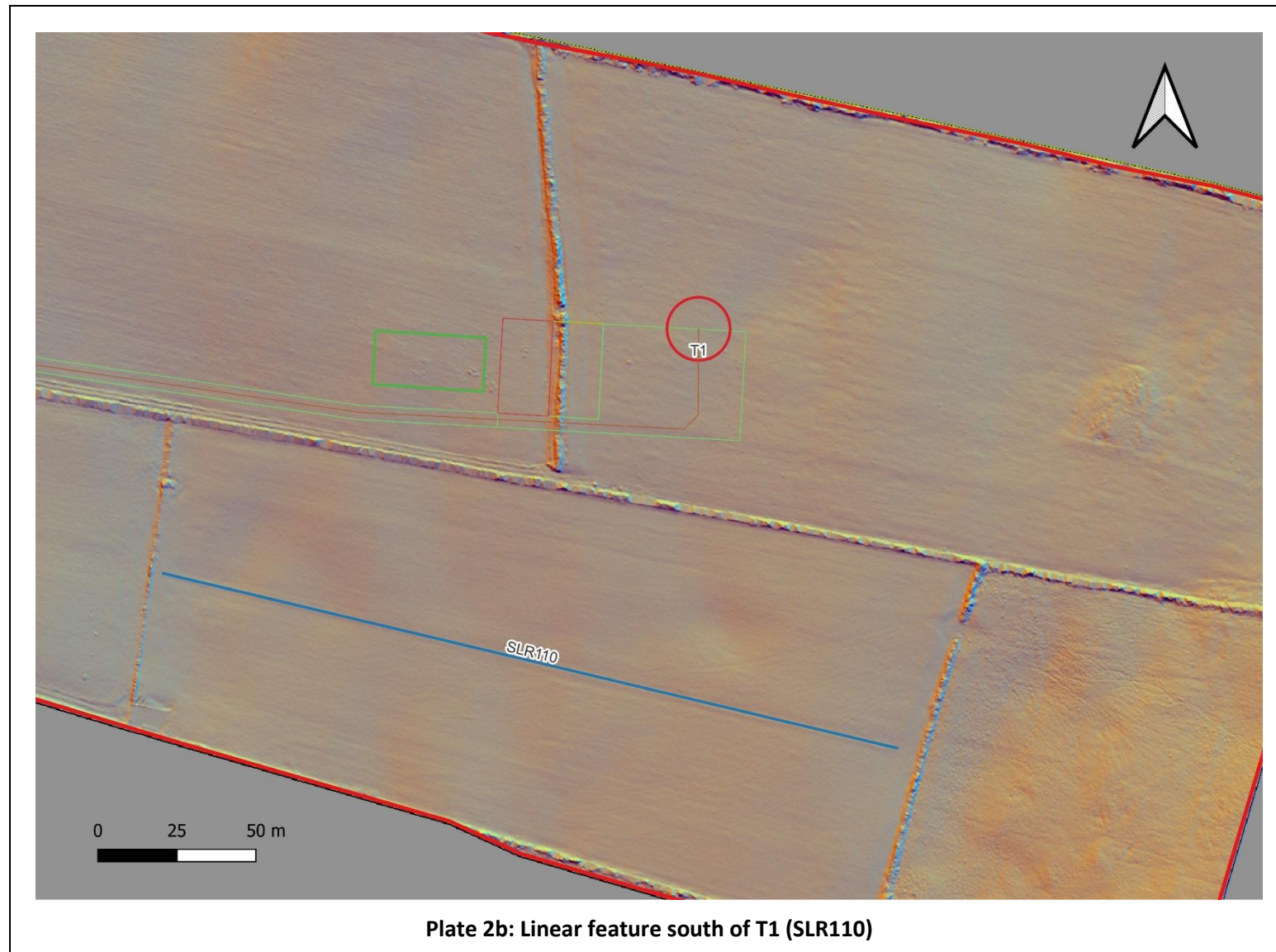
The morphology of the features, including irregular field divisions, small rectilinear plots, and sub-rectangular enclosures significantly smaller than those depicted on 19th century Ordnance Survey mapping, suggests an early agricultural landscape largely abandoned prior to the 1839–1842 OS Six-Inch survey with comparative analysis showing that the majority of boundaries identified in LiDAR were already out of use by the mid-19th century.

Other features recorded include circular and subcircular enclosing features varying in size from 40m to 5m diameter, which may represent a variety of archaeological remains, ranging from potential prehistoric enclosures, medieval ring forts, stock enclosures and the remains of corn drying kilns. The wide variety of features recorded as a result of the survey evidence an interpretation of the remains potentially dating across all periods, with the majority of late medieval or early post-medieval origins, likely representing a large relict pre-Famine agricultural landscape.



Plate 1: Plate key showing symbology for infrastructure and features





SLR110, located approximately 0.1 km southwest of T1 (**Plate 2a/b**), represents the first of the recorded features in this sector. A corresponding anomaly was identified during the geophysical survey within geophysical survey area **GS-02**, likely correlating with **02-06**, interpreted as a possible ditch. Although the geophysical report does not assign a formal identifier, the description closely matches the trajectory and form of **SLR110**.

SLR111, situated 0.39 km southwest of T1 (**Plate 3**), is similar in character and appears to bisect a modern field parcel. As it does not appear on the First Edition OS map, it is interpreted as an earlier boundary or drainage feature, predating the mid-19th century enclosure pattern.



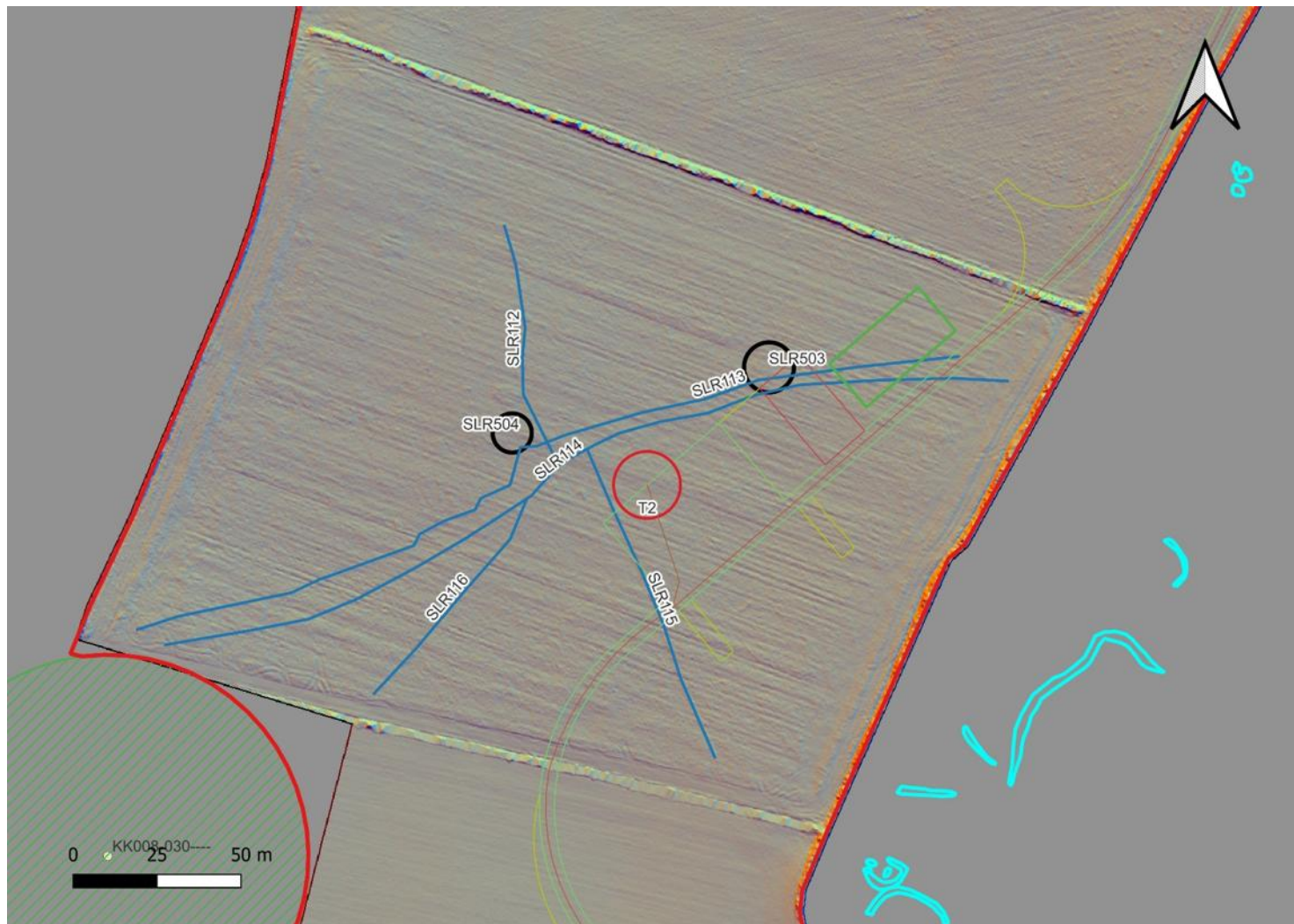
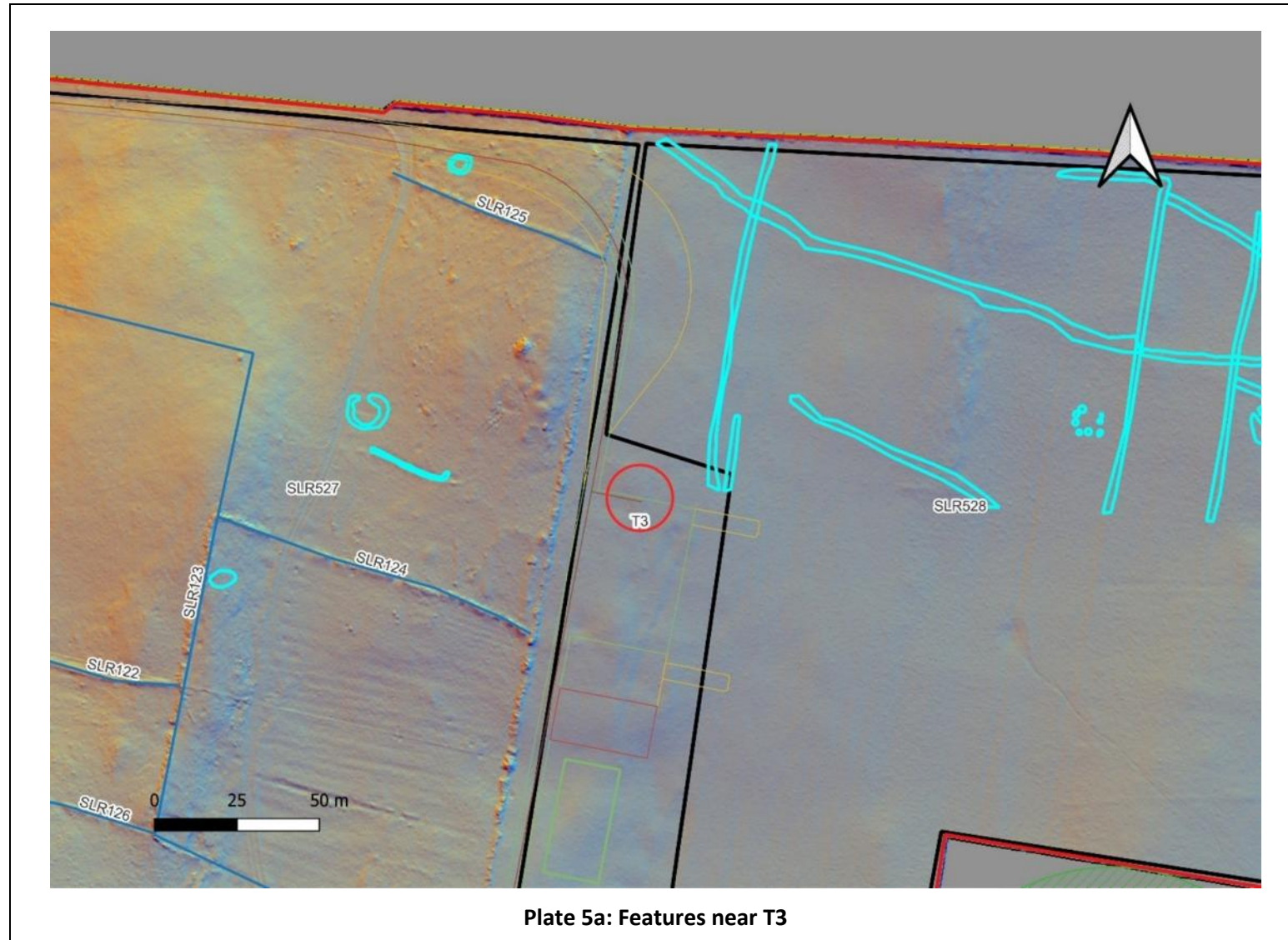
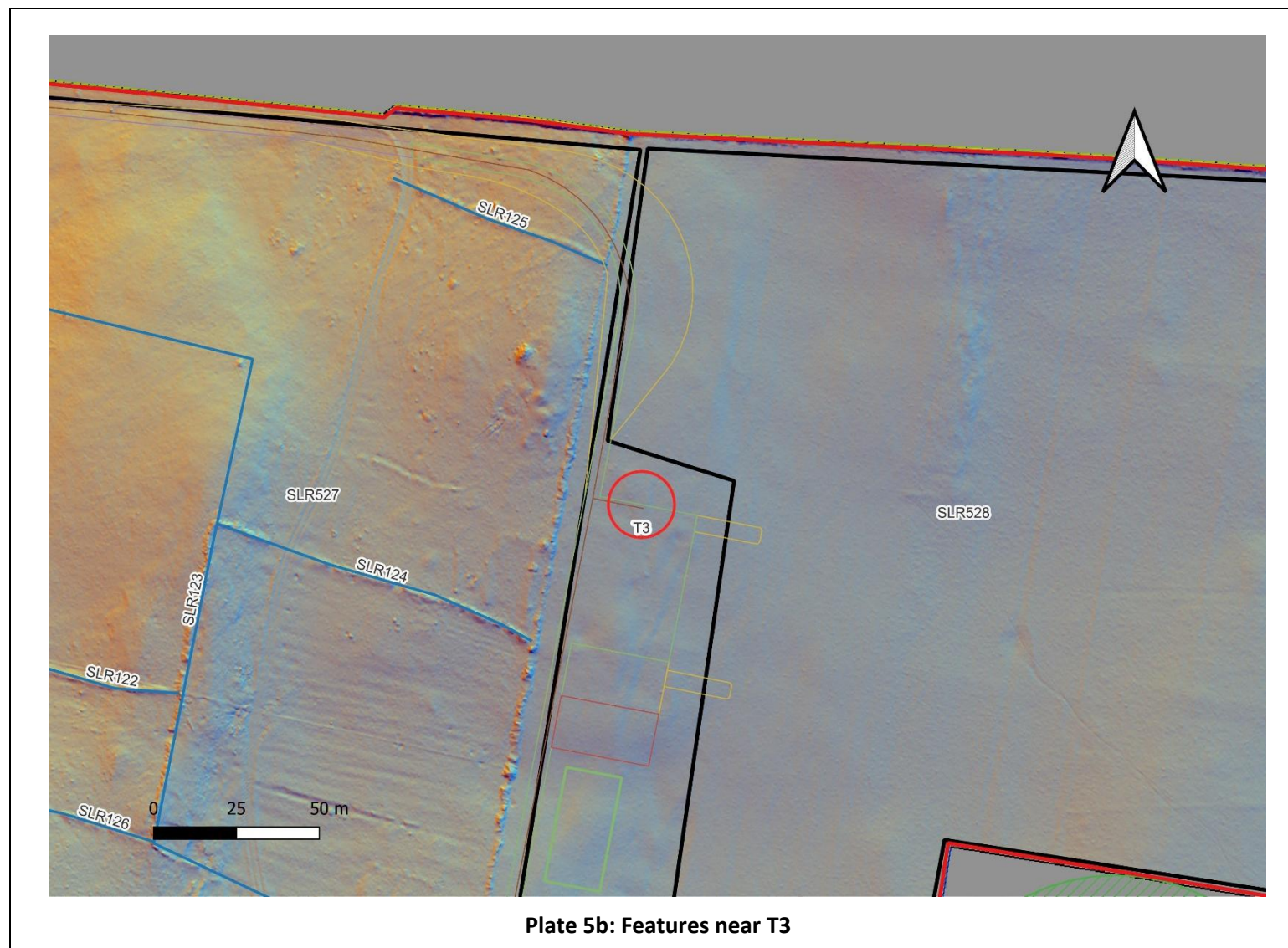


Plate 4: LiDAR features recorded near T2

A dense cluster of both linear/curvilinear (**SLR112, SLR113, SLR114, SLR115** and **SLR116**) and circular features (**SLR503** and **SLR504**) occur in the area surrounding T2 (**Plate 4**). **SLR503** and **SLR504** measure c.14m and c.12m in diameter respectively. None of these features correspond to historic mapping. The two principal perpendicular earthworks, **SLR113** and **SLR114**, appear to lead directly towards circular features **SLR503** and **SLR504**, suggesting the possibility of a trackway providing access to enclosures, potentially for the movement or management of cattle. The other linear features are likely to form pre-Famine field boundaries. Additional linear features recorded in geophysical survey area **GS-07**, southeast of T2, reinforce the interpretation that this area formed part of a pre-Famine field system, possibly operating at a small-plot or infield/outfield scale.

A further area (**SLR527**) with a high concentration of linear features is located in the vicinity of T3 (**Plate 5a/b, Plate 24**), indicating late medieval or early post-medieval agricultural activity. While many of these features correspond with field boundaries as seen on the Six-Inch 1st Edition OS map (**SLR120, SLR121, SLR122, SLR124, SLR125**), a D-shaped enclosure (**SLR505**), was also recorded, c.0.23km to the southwest of T3, which has no cartographic equivalent and may represent a non-domestic enclosure or livestock pen of uncertain date. Further linear features not present on historic mapping were recorded during the geophysical survey to the northeast of T3 (geophysical survey area **GS-11**), further suggesting this area forms part of a late medieval to early post-medieval agricultural landscape. Features recorded in the geophysical survey area **GS-09** include pronounced negative annular anomaly (09–10), approximately 6.5 m in diameter, located in the northeastern part of the survey area. Though not labelled, this is thought to be the circular feature located c.0.1km to the northwest of T3, seen in **Plate 5a/b**. This feature is interpreted as a possible hut site, its characteristics suggesting an infilled ditch or wall footing. This correlates with a circular feature visible 0.1 km northwest of T3. The presence of multiple circular anomalies raises the possibility of prehistoric occupation elements surviving within this landscape.





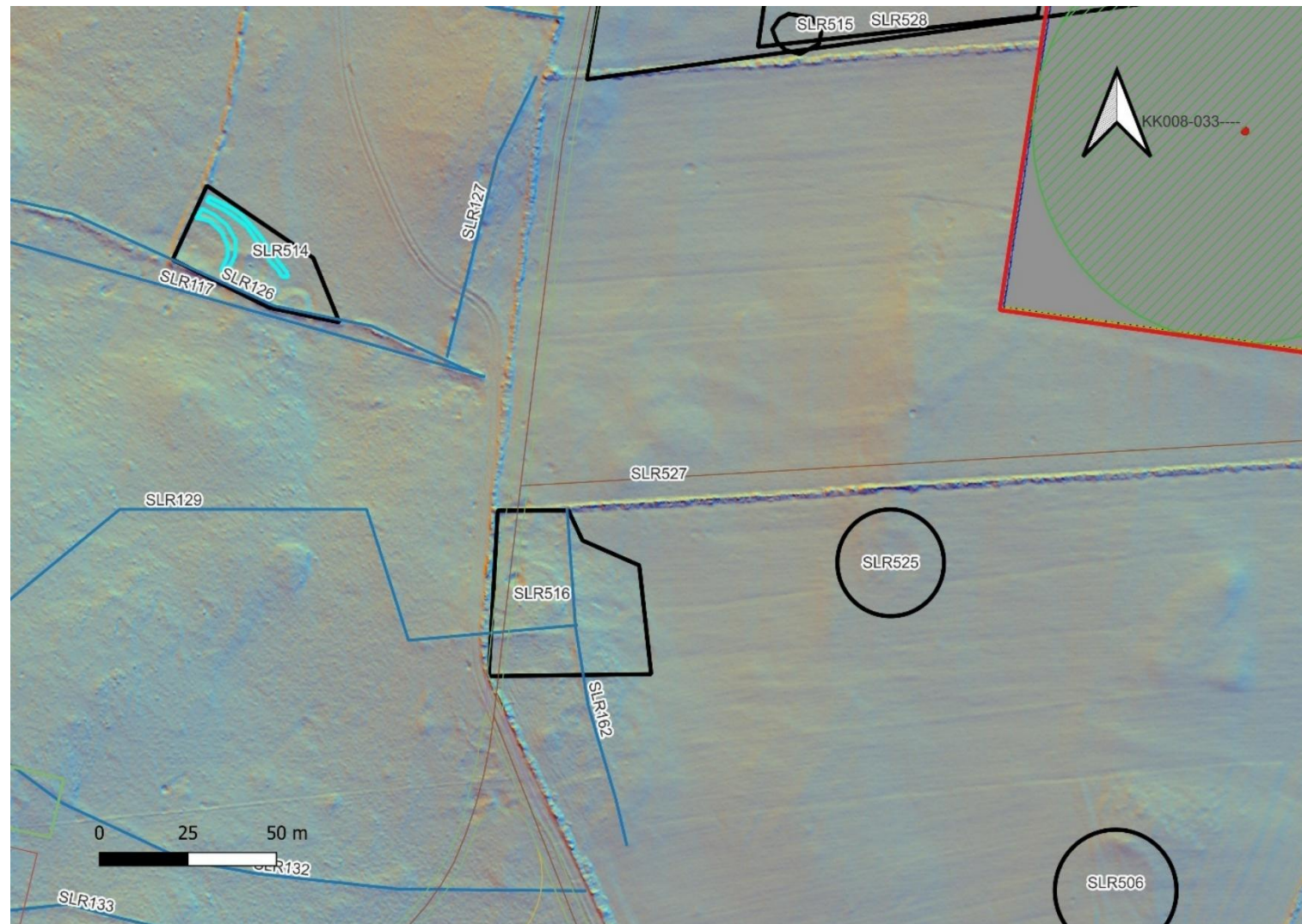
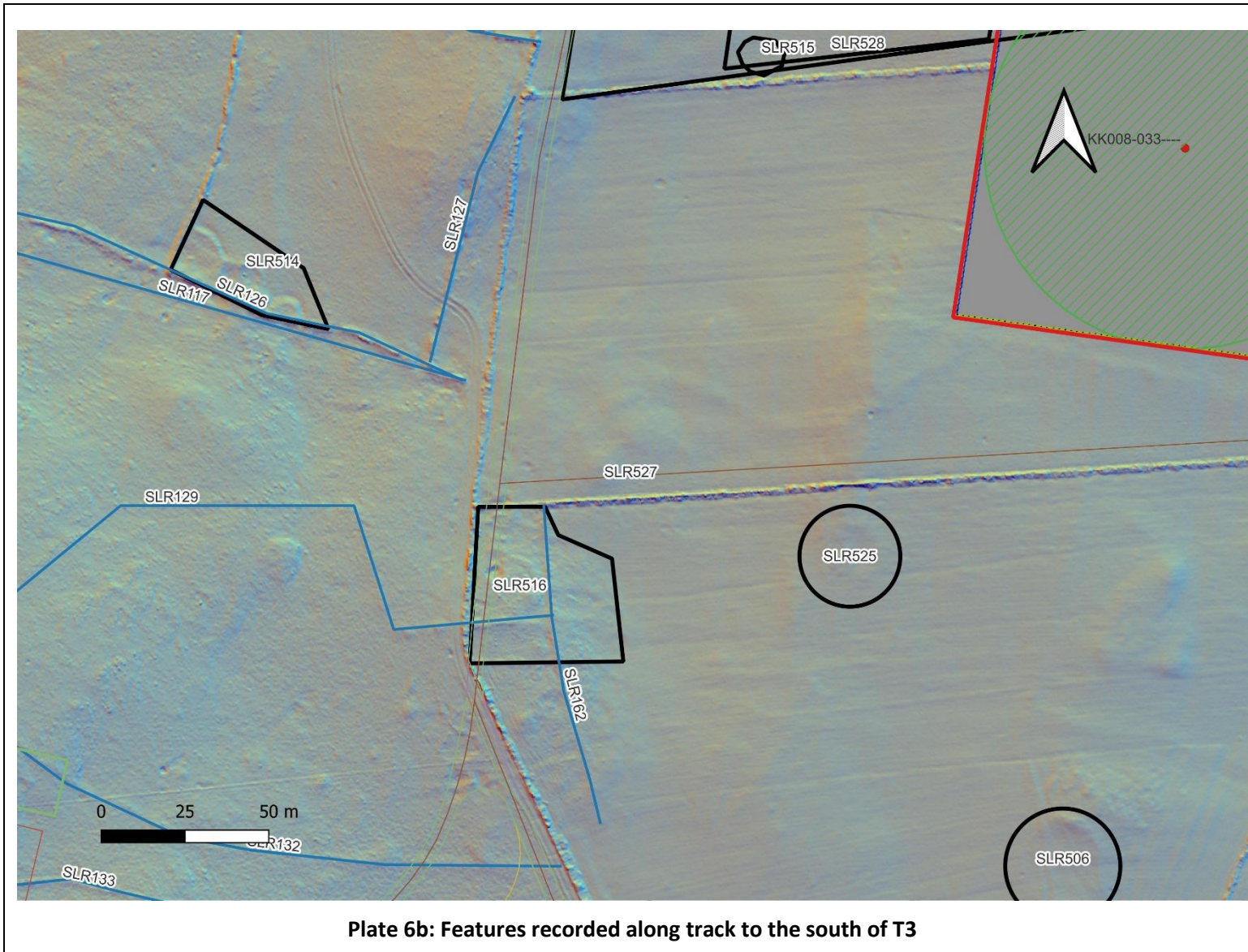


Plate 6a: Features recorded along track to the south of T3



Features representing potential enclosing features are located along the track to the south of T3 (**Plate 6a/b**). The first of these **SLR514**, appears to extend from a potential linear field boundary (**SLR126**). A further potential stone enclosure recorded during the geophysical survey (**09-04**), is contained within **SLR514**, and is suggested to extend beyond the field boundaries that limited the geophysical survey in this area. A negative curvilinear feature (**09-08**) appears to enclose **09-04**. A further small circular feature is seen within the southeast of **SLR514**. This feature was not recorded during the geophysical survey.

A number of perpendicular linear features may form an enclosing feature (**SLR162**, **SLR129** and **SLR516**). Given the irregular rectangular shape of the feature, this may form the remains of a small cattle enclosure. A small circular feature, c.6m in diameter is located on the eastern boundary of this feature. Two circular features (**SLR506** and **SLR525**) are also found in close proximity to these features, c.120m to the southeast and c.50m to the east respectively. These features both measure c.30m in diameter, and may be representative of ring forts or enclosures, dating to the medieval or prehistoric period.

The pattern of potential agricultural remains recorded within **SLR527** (**Plate 23**) continues westwards into the area around T4 (**Plate 7**), with a further concentration of linear features found in close proximity to T4 (**SLR131**, **SLR132**, **SLR133**, **SLR135**, **SLR141**, **SLR142** and **SLR144**). A rectangular enclosing element was also recorded as a result of the LiDAR analysis (**SLR531**), located c.160m to the south of T4. **SLR531** is featured on the Six Inch 1st-Edition OS map (Kilkenny Sheet 8, surveyed 1839). Of the linear features noted above, **SLR132**, **SLR133** and **SLR144** are not present on this map, nor on any later historic mapping, further suggesting these potential boundaries are of late medieval or early post-medieval date.

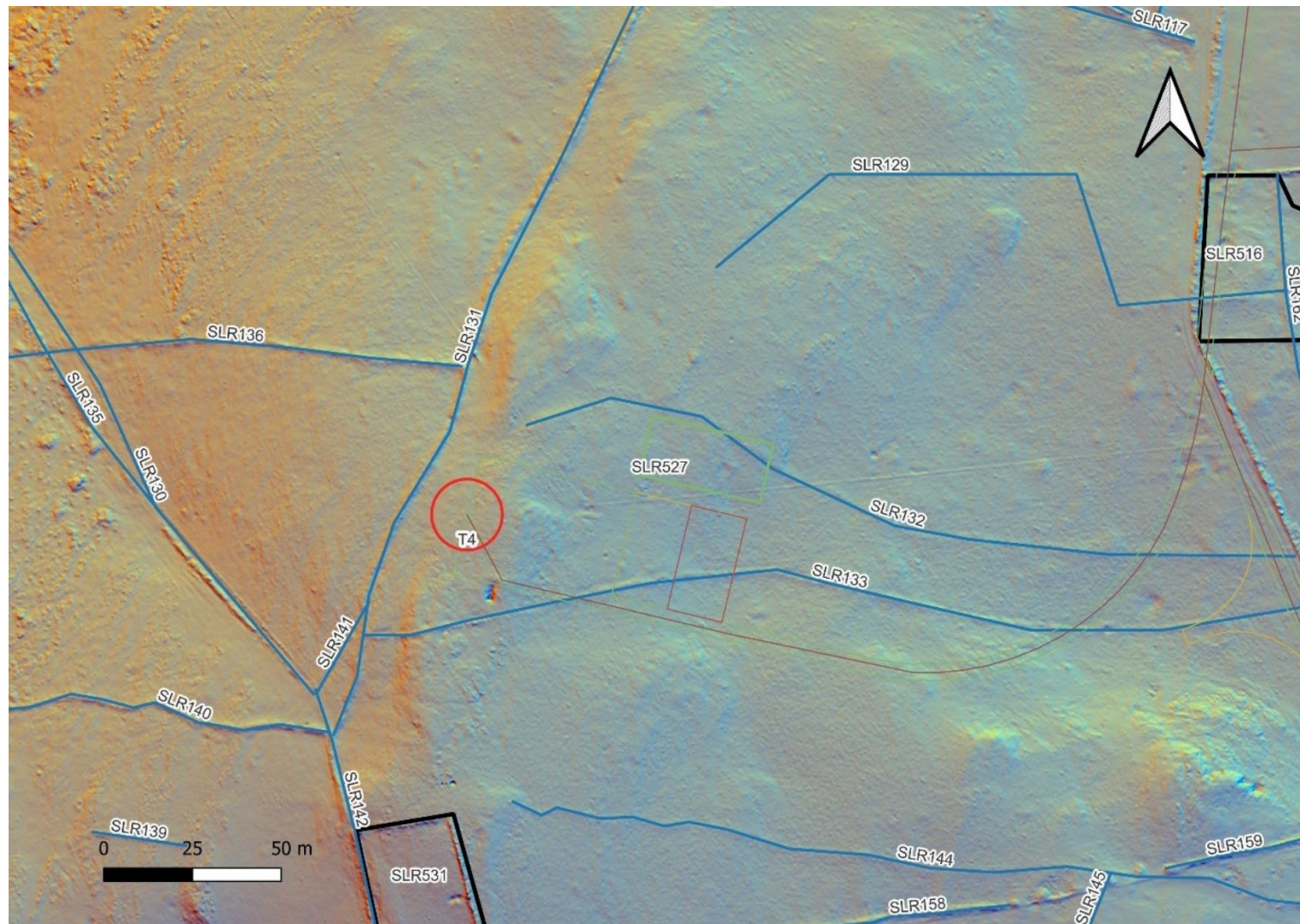
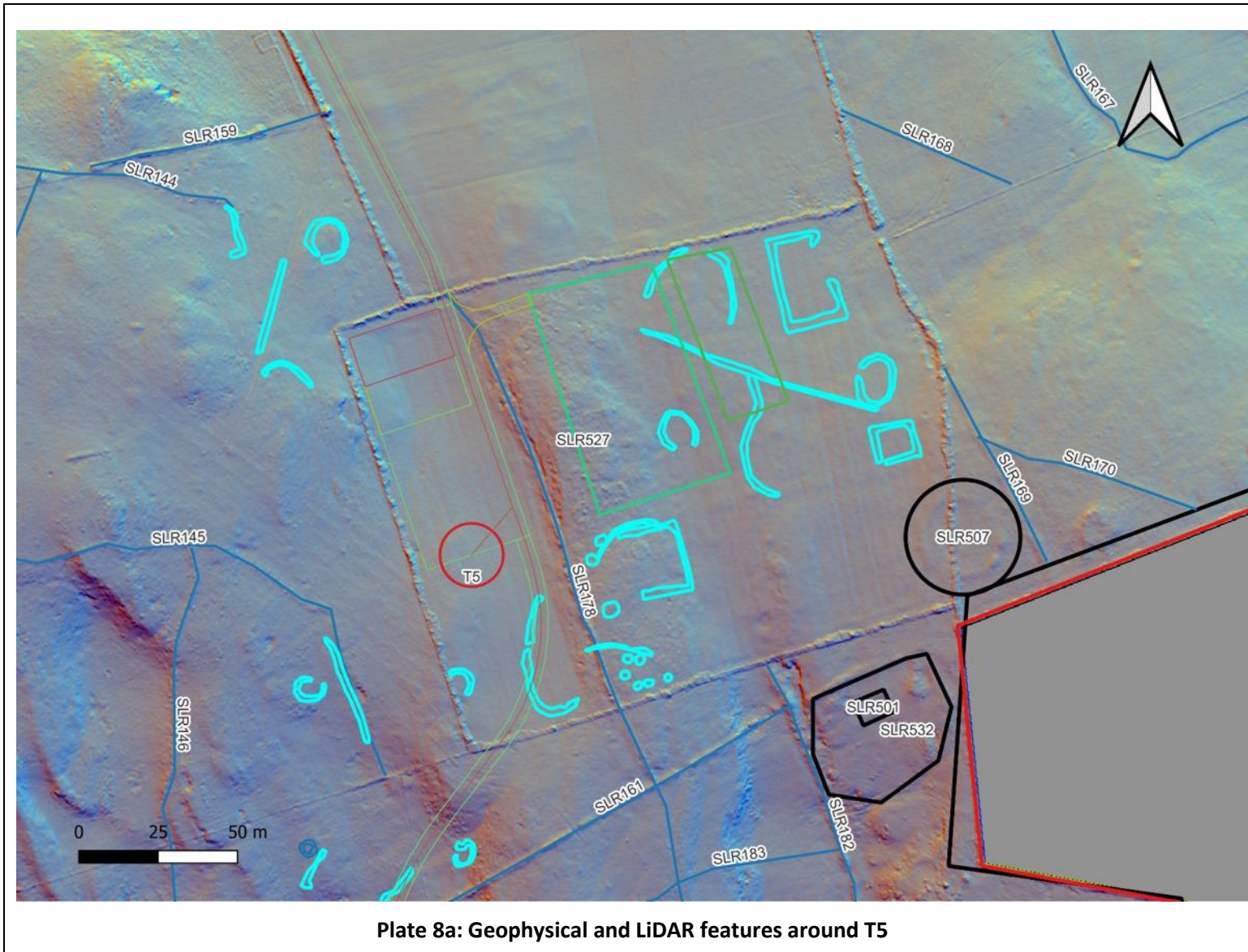


Plate 7: Features around T4



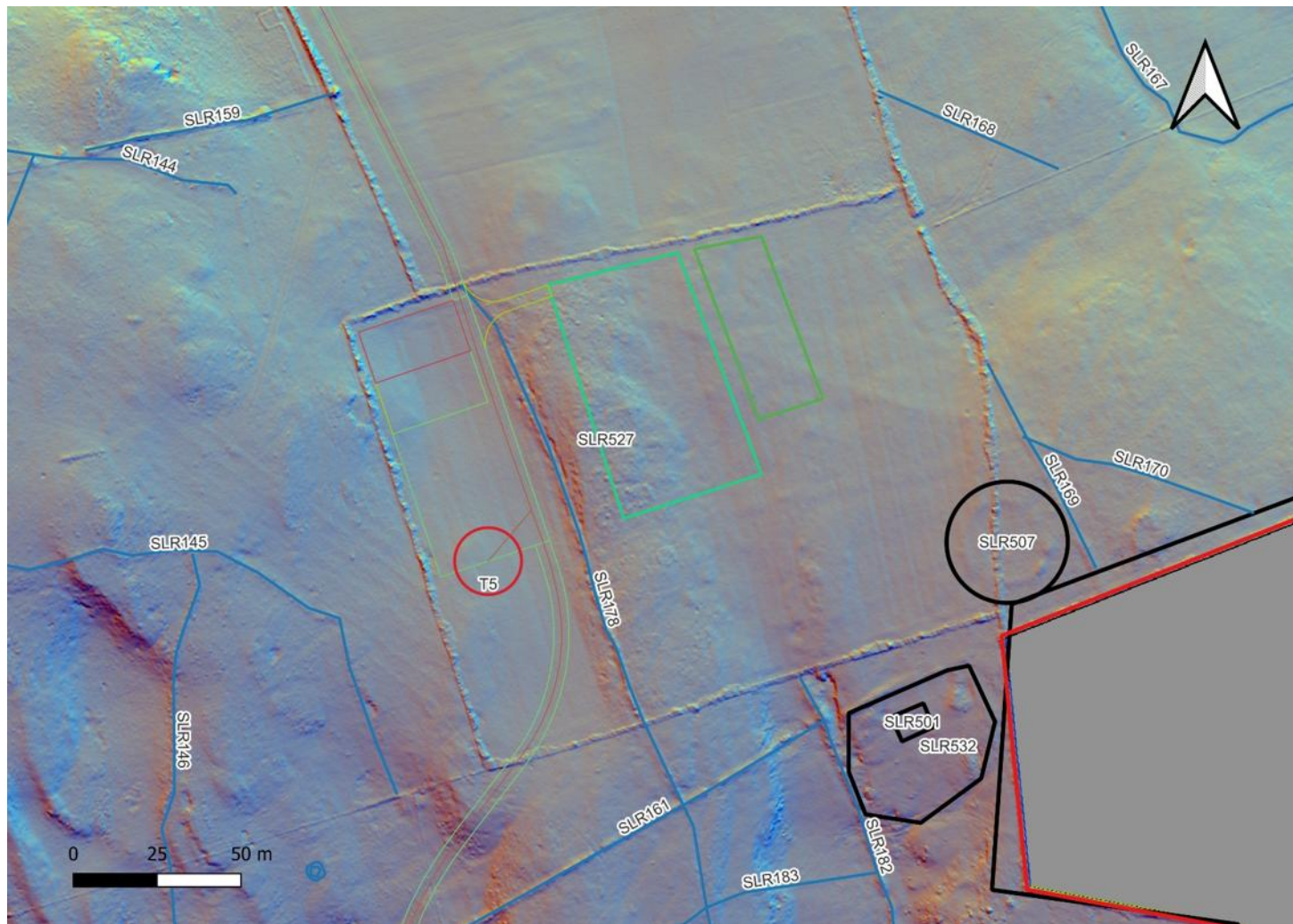


Plate 8b: LiDAR features around T5

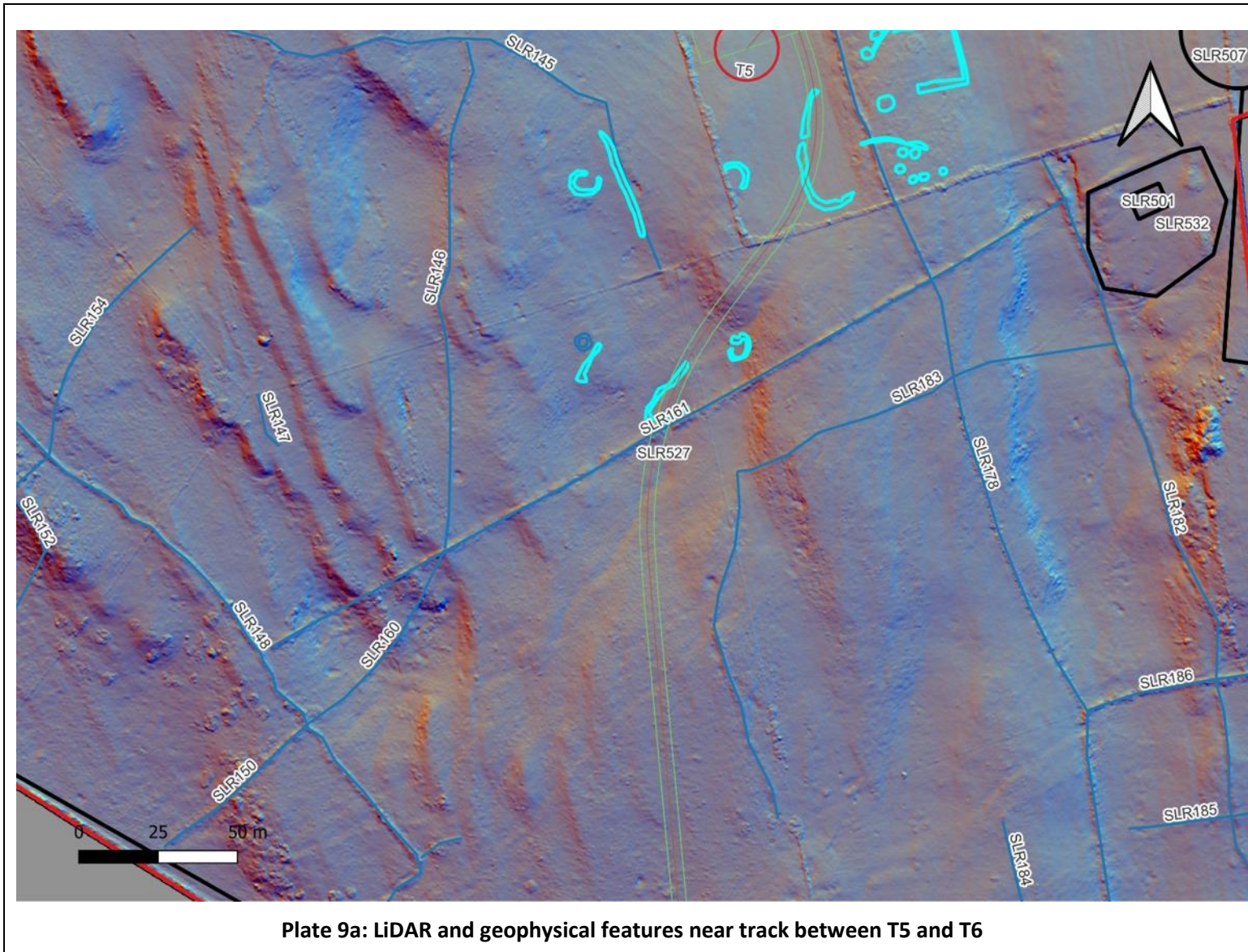
The area surrounding T5 (**Plate 8a/b**) presents one of the most complex areas identified within the LiDAR and geophysical datasets. This sector contains an extensive recording of linear, curvilinear, and enclosing elements, indicative of prolonged and multi-phase activity. In combination, the evidence suggests a well-utilised agricultural landscape with potential for earlier settlement or enclosure features underlying, or interspersed with, later post-medieval field systems.

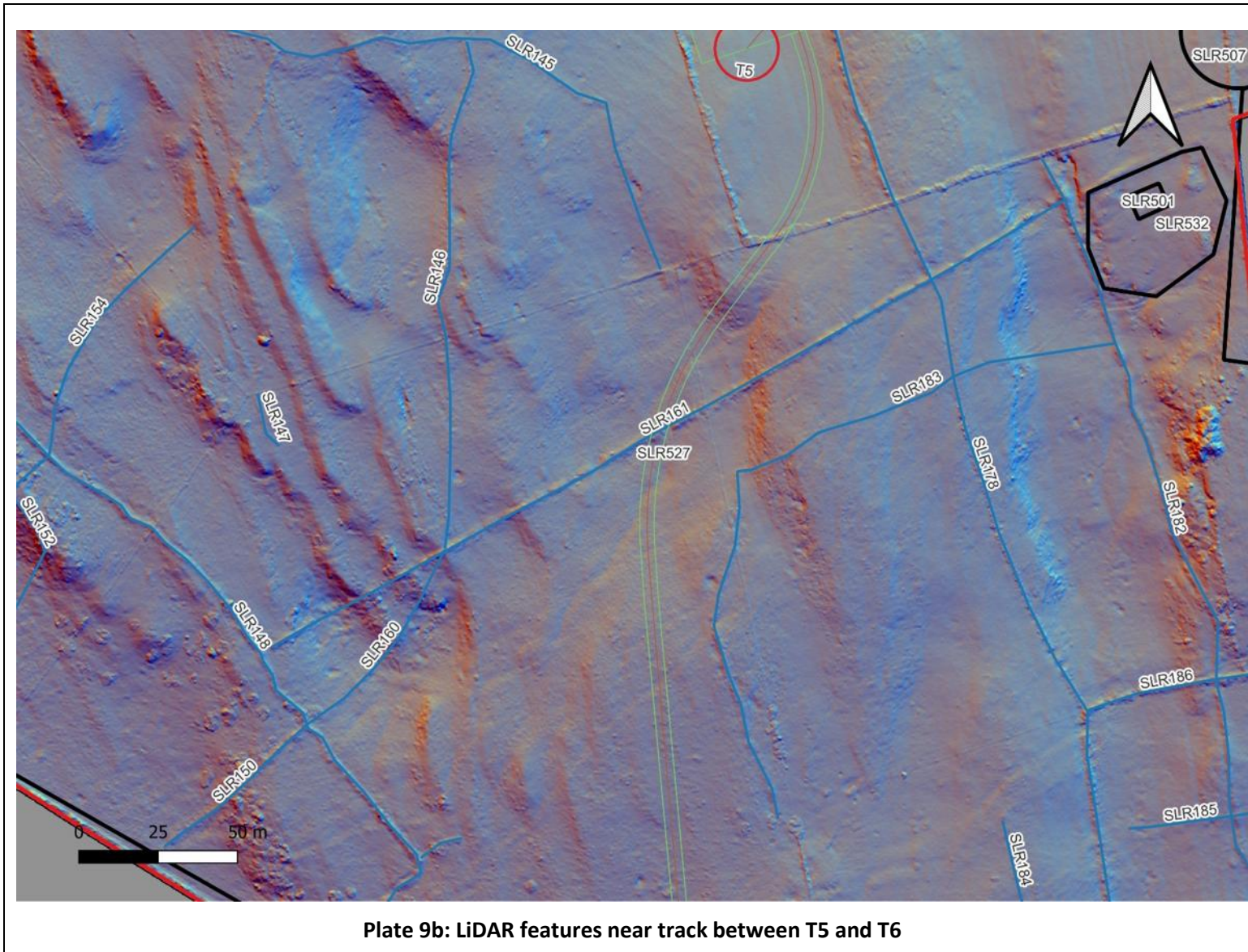
A significant concentration of linear features was recorded in this area by LiDAR analysis, many of which appear to continue the pattern of boundaries detected through the geophysical survey (in survey area **GS-12**). The features recorded in this area as a result of the geophysical survey are discussed in section **GS-12** of the Geophysical Survey report, and are suggested to represent enclosing elements or small field systems. These likely represent the remnants of late medieval to early post-medieval field organisation, characterised by small, irregularly shaped enclosures and narrow boundary divisions. The presence of such systems reflects an agricultural regime predating the rationalised enclosure shown on mid-19th century mapping.

Linear features recorded through analysis of LiDAR data which appear to be continuations of a number of these features, include **SLR170**, located c.0.15km to the northeast of T5, and **SLR145**, located c.47m to the west of T5. Of particular note within this area is a well-defined circular enclosure (**SLR507**), situated 0.11 km northeast of T5. Measuring approximately 25m in diameter, the enclosure displays a distinct southeast-facing entrance, a characteristic frequently associated with ringforts, a class of predominantly early medieval defended or domestic enclosures. This classification, based on its form, size, and entrance orientation strongly suggest that **SLR507** represents an earlier settlement component embedded within a later agricultural landscape.

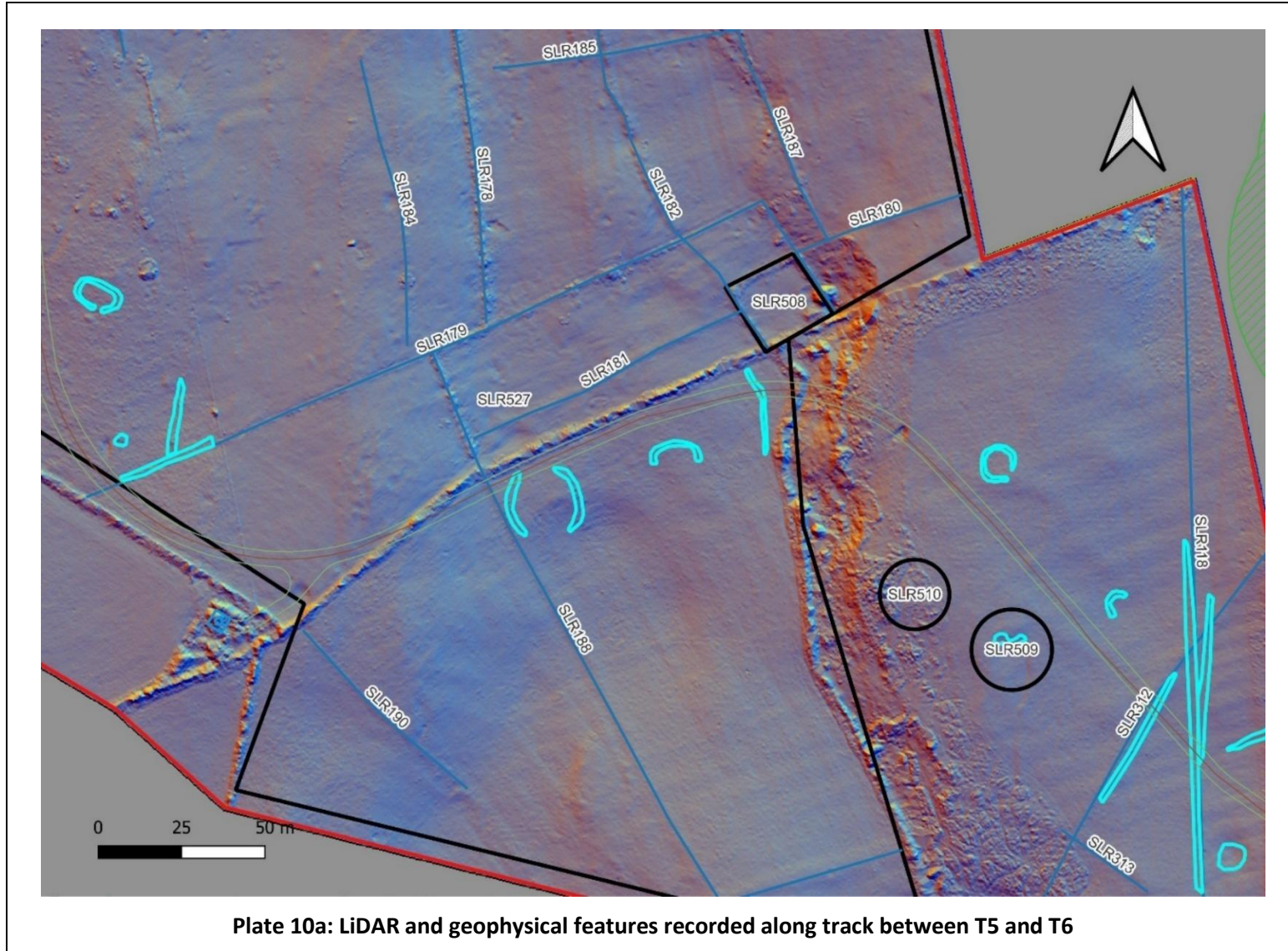
Further evidence of enclosure-type features is provided by **SLR532**, located c.86m southeast of T5. This rectangular feature measures approximately 40m in diameter, considerably larger than **SLR507**, and may represent a different category of settlement or livestock enclosure. Within this larger feature lies a smaller rectangular element, **SLR501**, measuring c.9m by 6m. The combination of a larger outer enclosure with a smaller internal compartment strongly suggests a livestock management structure, potentially a cattle enclosure containing a byre or pen, or an internal division related to stock segregation.

Notably, with the exception of **SLR161**, none of the features mapped around T5 are present on the First Edition OS Six-Inch survey (Kilkenny – Sheet 8, surveyed 1839). This absence supports the interpretation that the majority of these boundaries and enclosures had fallen out of use by the early 19th century and were not incorporated into the later, more formalised field layout. **SLR161**, which is recorded on the historic map, appears to define a more persistent boundary, extending southwest towards the Site's western perimeter (**Plate 9a/b**). Its survival into the mid-19th century suggests that it may have represented a more significant or longer-term boundary than the smaller divisions detected elsewhere in this zone.





A number of circular and curvilinear enclosing features were recorded both as a result of the geophysical survey (Survey Area **GS-14**) and the analysis of the data from the LiDAR survey further south along the route of the track between T5 and T6 (**Plate 10a/b**). **SLR509** and **SLR510** are recorded c.6m and c.19m to the southwest of the proposed track and cable route respectively. These enclosures, measuring approximately 15m and 14m in diameter, exhibit clear morphological characteristics suggestive of small, enclosed spaces, potentially representing hut sites, small ring-features, or ancillary structures associated with settlement or stock management. Circular features of this scale are often associated with early medieval habitation forms, or with later agricultural or pastoral activity; however, their regular shape and tight diameter range also leave open the possibility of prehistoric hut circles. An area of burning was recorded within the confines of **SLR509** during the geophysical study, which may represent a hearth, a fulacht fiadh, a furnace, a kiln, a burnt spread, a charcoal spread or any other combustion-related event, including modern or recent bonfires. Without excavation, differentiation between these possibilities is not possible; however, the presence of heat-altered material strongly suggests that this enclosure was associated with some form of activity rather than being a purely structural or agricultural feature. Burnt deposits in association with circular enclosures are frequently encountered in settlement contexts or in areas with repeated domestic or craft activity. Two linear features (**SLR118** and **SLR312**) bisect the proposed track and cable route in this area. **SLR191** (**Plate 11a/b**) also intersects with the proposed track and cable route c.0.1km to the east of these features. Based on analysis of available aerial imagery, this feature appears to run north through the SMR zone of **KK009-092----**, an enclosure, connecting to **KK009-005----**, a ring-fort. This feature may therefore be a continuation of **KK009-005002-**, which adjoins the fosse of the ring-fort to the north and south, and is recorded within the HER as being comprised of field walls utilising large blocks of exposed rock, potentially of ‘considerable antiquity’.



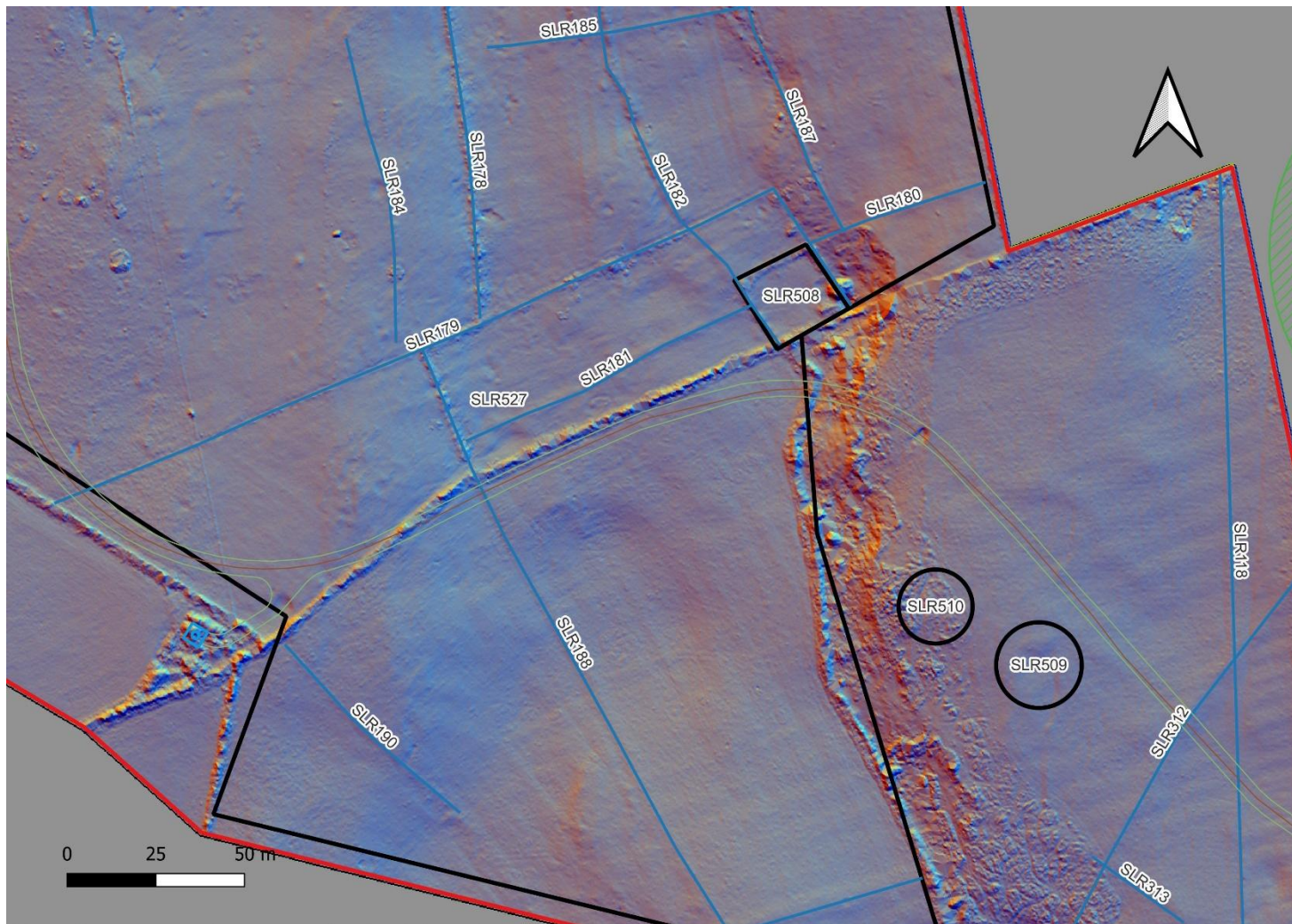
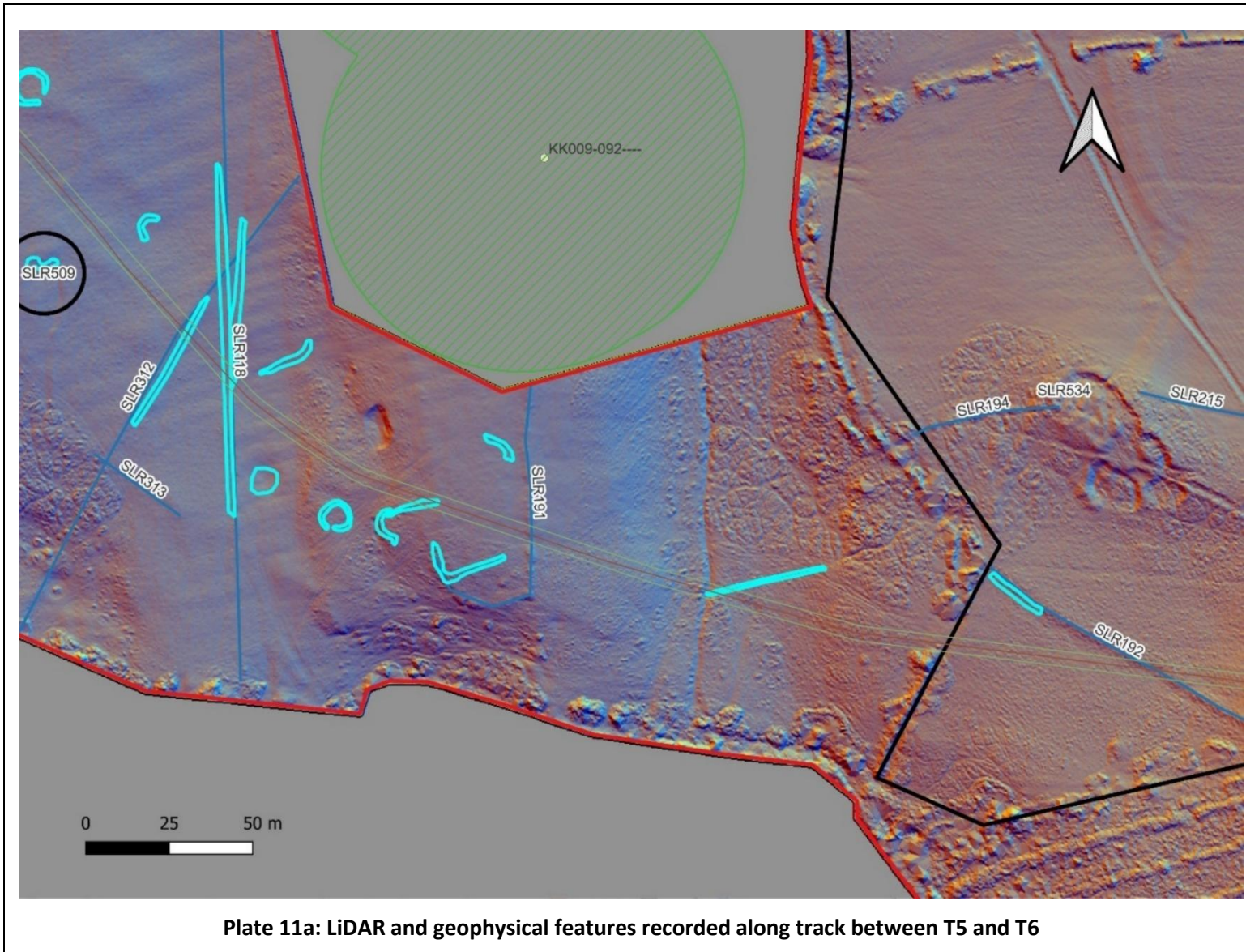
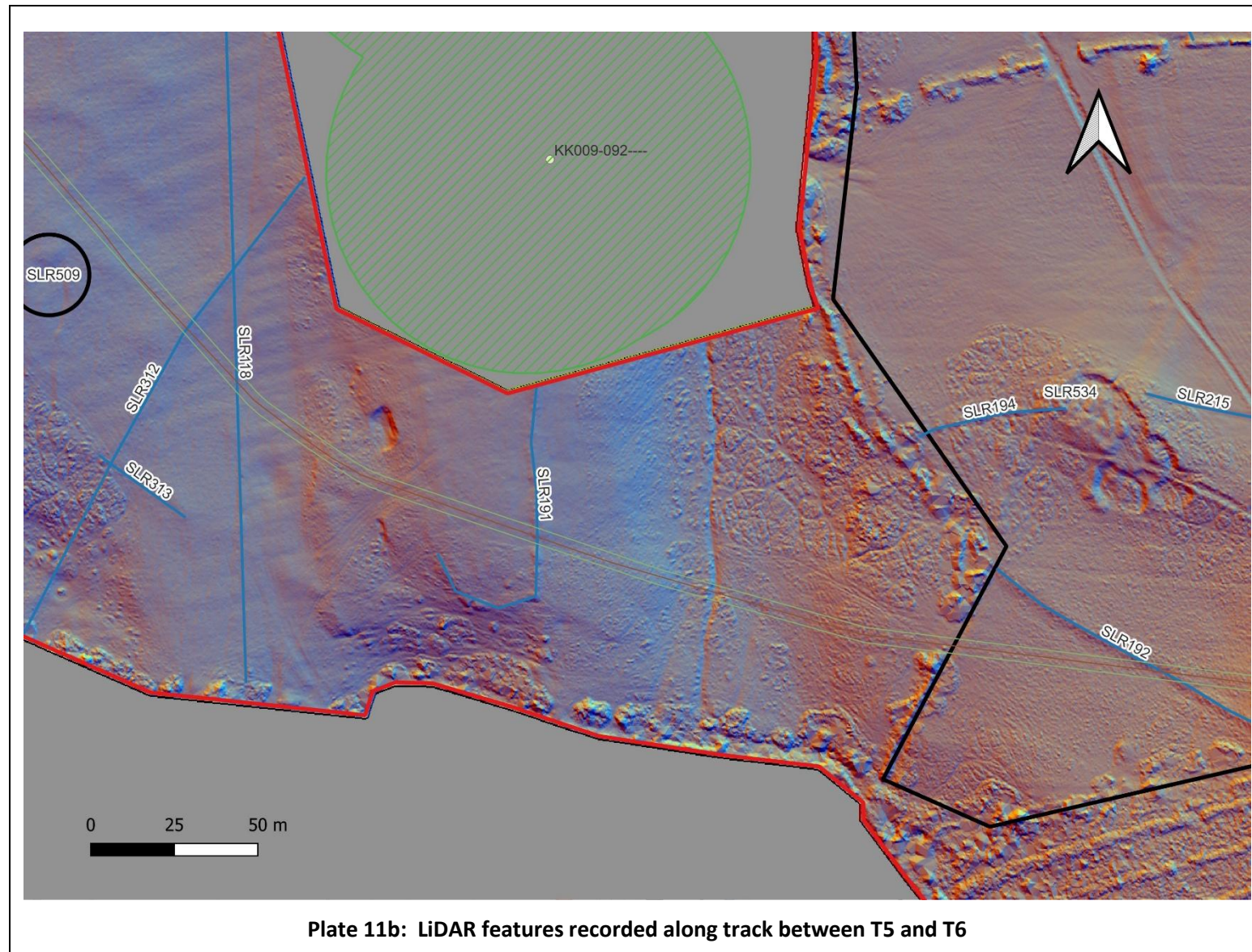


Plate 10b: LiDAR features recorded along track between T5 and T6



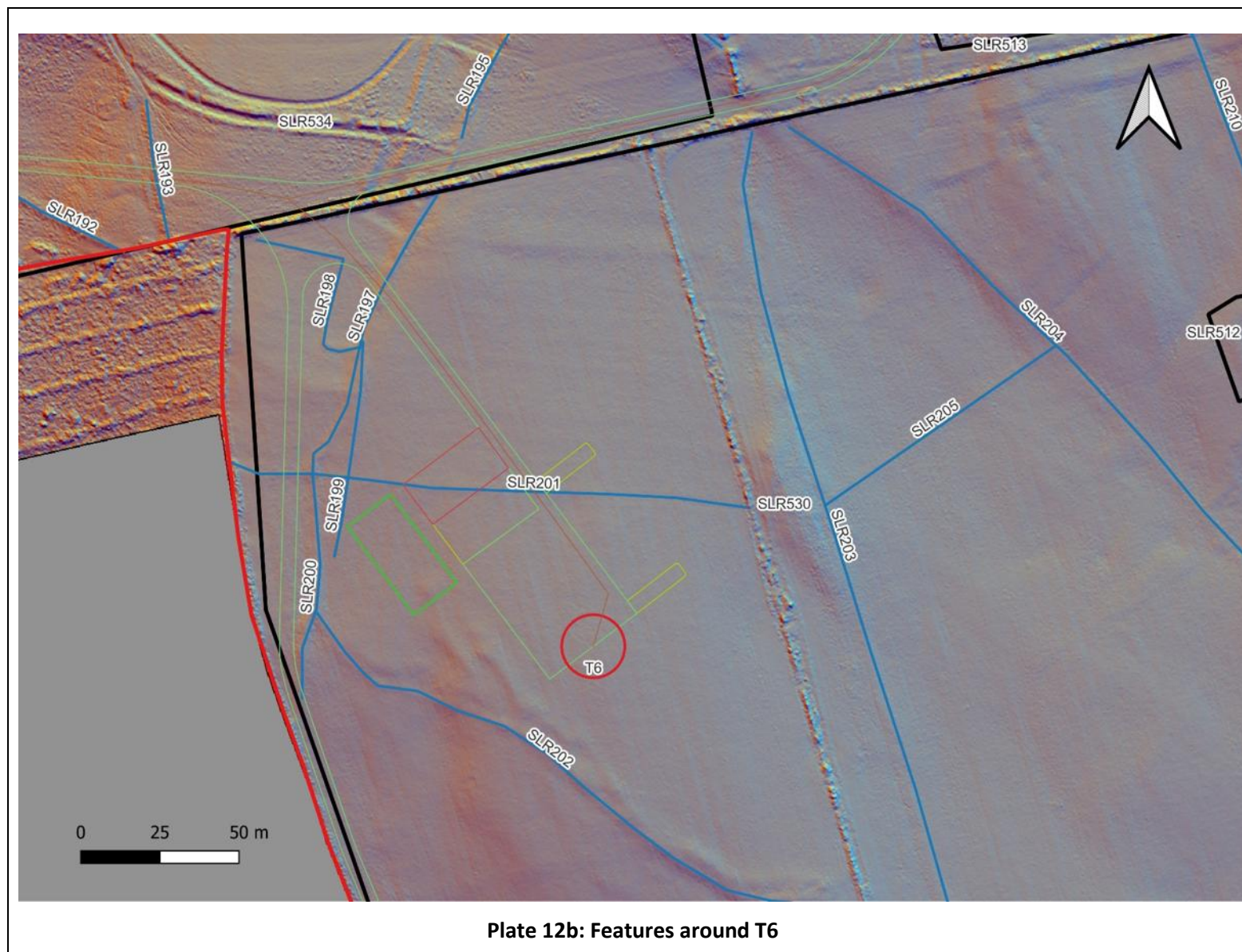


A further area of potential pre-Famine agricultural activity is located c.0.14km to the northwest of T6 (**SLR534**). **SLR530**, also an area with potential for pre-Famine agricultural activity, surrounds T6 (**Plate 12a/b**). Four linear features (**SLR192**, **SLR193**, **SLR197** and **SLR201**) were recorded in the path of the proposed track and cable route, located c.0.18km, c.0.18km, c.95m and c.0.38m northwest of T6 respectively. Sections of both **SLR192** and **SLR197** were partially recorded during the geophysical survey (**15-05** and **15-03/15-04**) and are described as possible ditches.

The corridor between T6 and T7 (**Plate 13a/b**) contains an area of likely pre-Famine agricultural remains, **SLR513**, measuring approximately 2.8 ha. Within this area, LiDAR analysis has identified a suite of short, irregular linear features interpreted as field boundaries and/or shallow drainage elements (**SLR210**, **SLR211**, **SLR212**, **SLR228**, and **SLR224**) together with a square enclosing feature (**SLR214**) located c.55 m west of T7. The density and arrangement of these features are characteristic of late medieval to early post-medieval land-use systems, representing a compartmentalised fieldscape that likely fell out of use prior to the mid-19th-century cartographic record. The geophysical survey noted no significant archaeological sites in the geophysical survey areas **GS-16** or **GS-17**, which cover this area.

When cross referenced with the First Edition OS Six-Inch mapping (surveyed 1839), the small-cell divisions and short linears characteristic of **SLR513** appear largely absent, supporting an interpretation that the system was abandoned by the time of survey. The irregular morphology and fine-grain subdivision are typical of late medieval/early post-medieval field organisation and pre-famine agricultural regimes, distinct from the larger, straight-sided parcels of the 19th-century rationalised enclosure landscape. While **SLR214**'s regular plan could reflect a slightly later improvement-period origin, its non-depiction on the early OS map suggests it, too, was short-lived or already redundant by 1839.





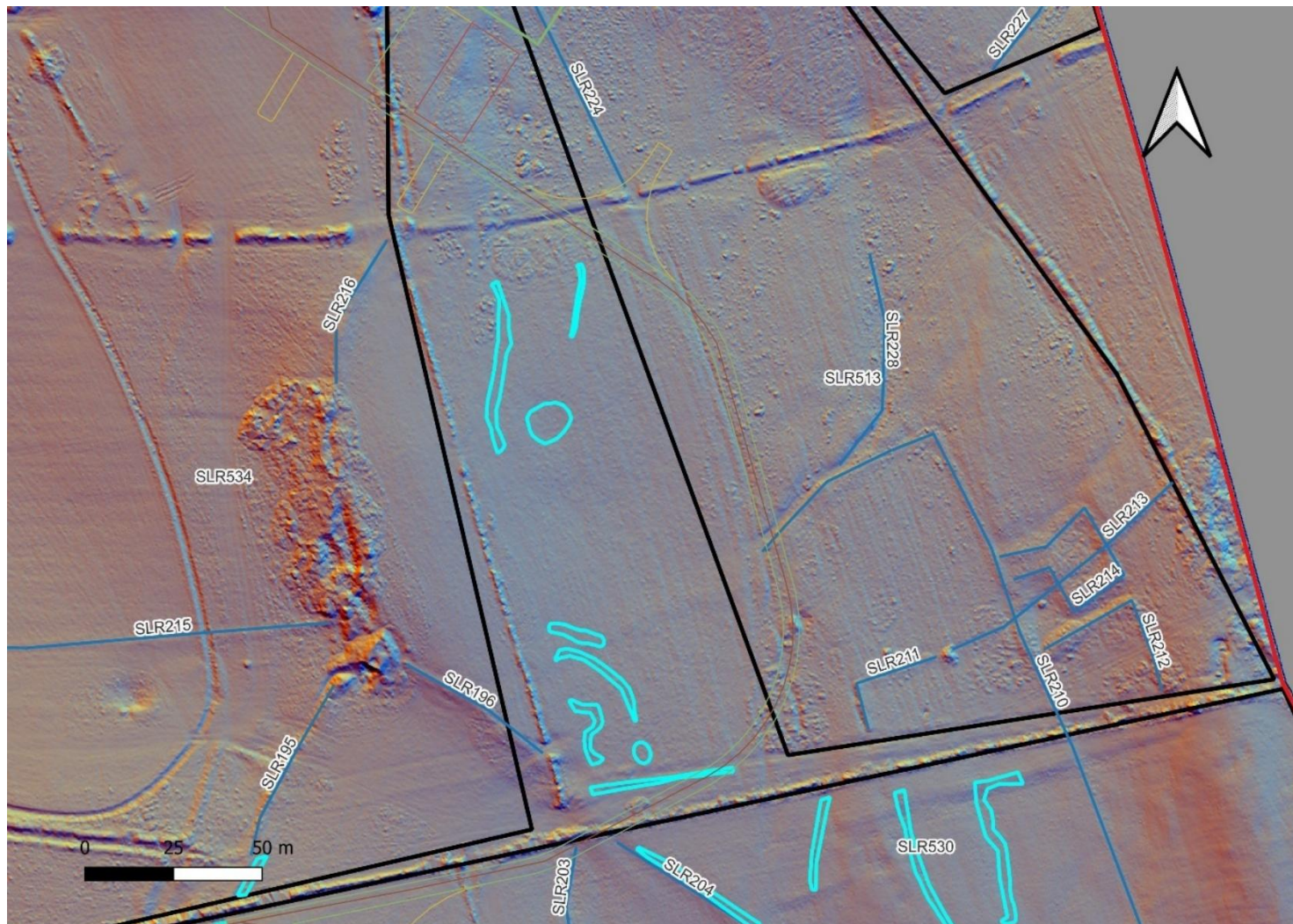


Plate 13a: Geophysical and LiDAR features between T6 and T7

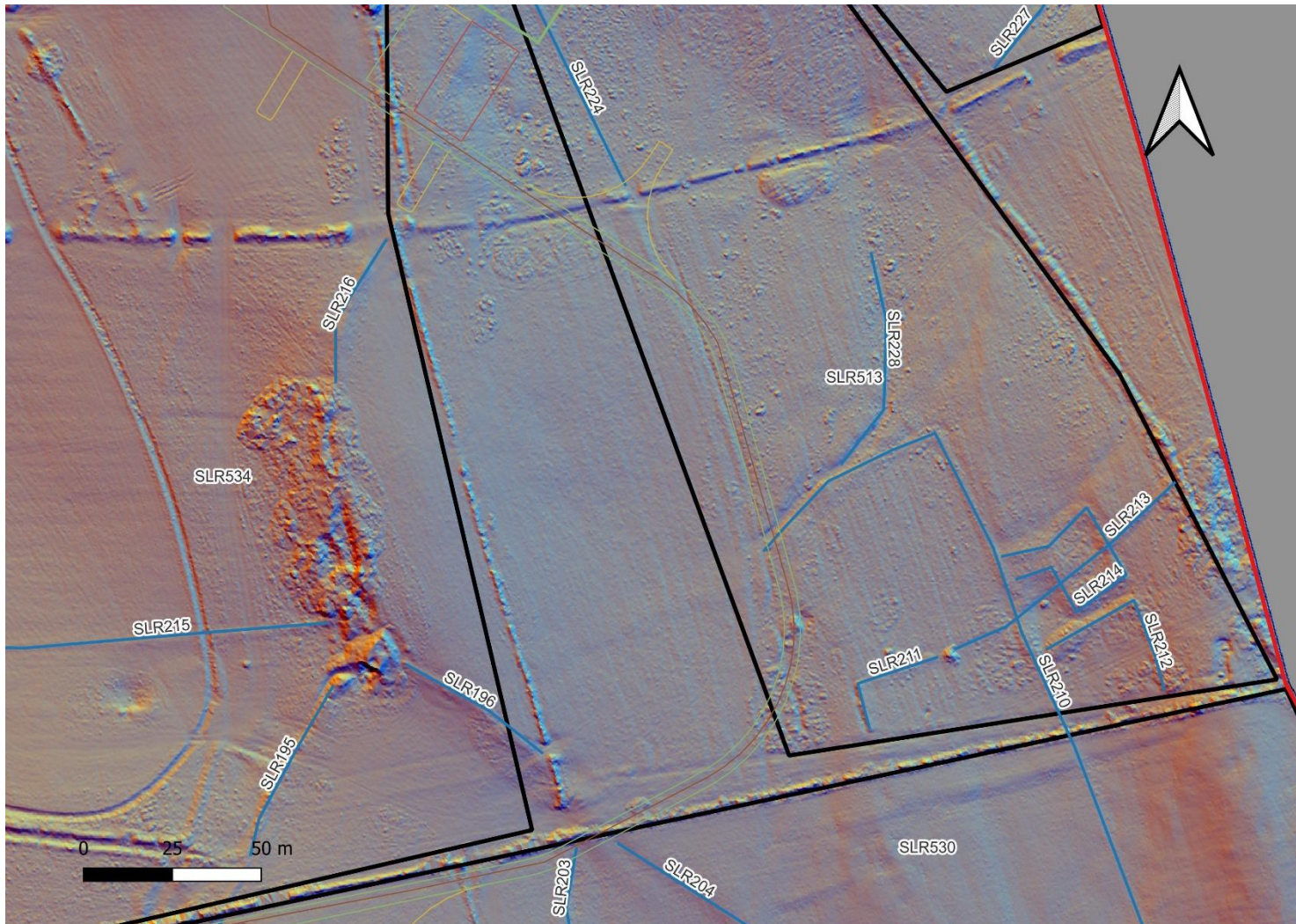
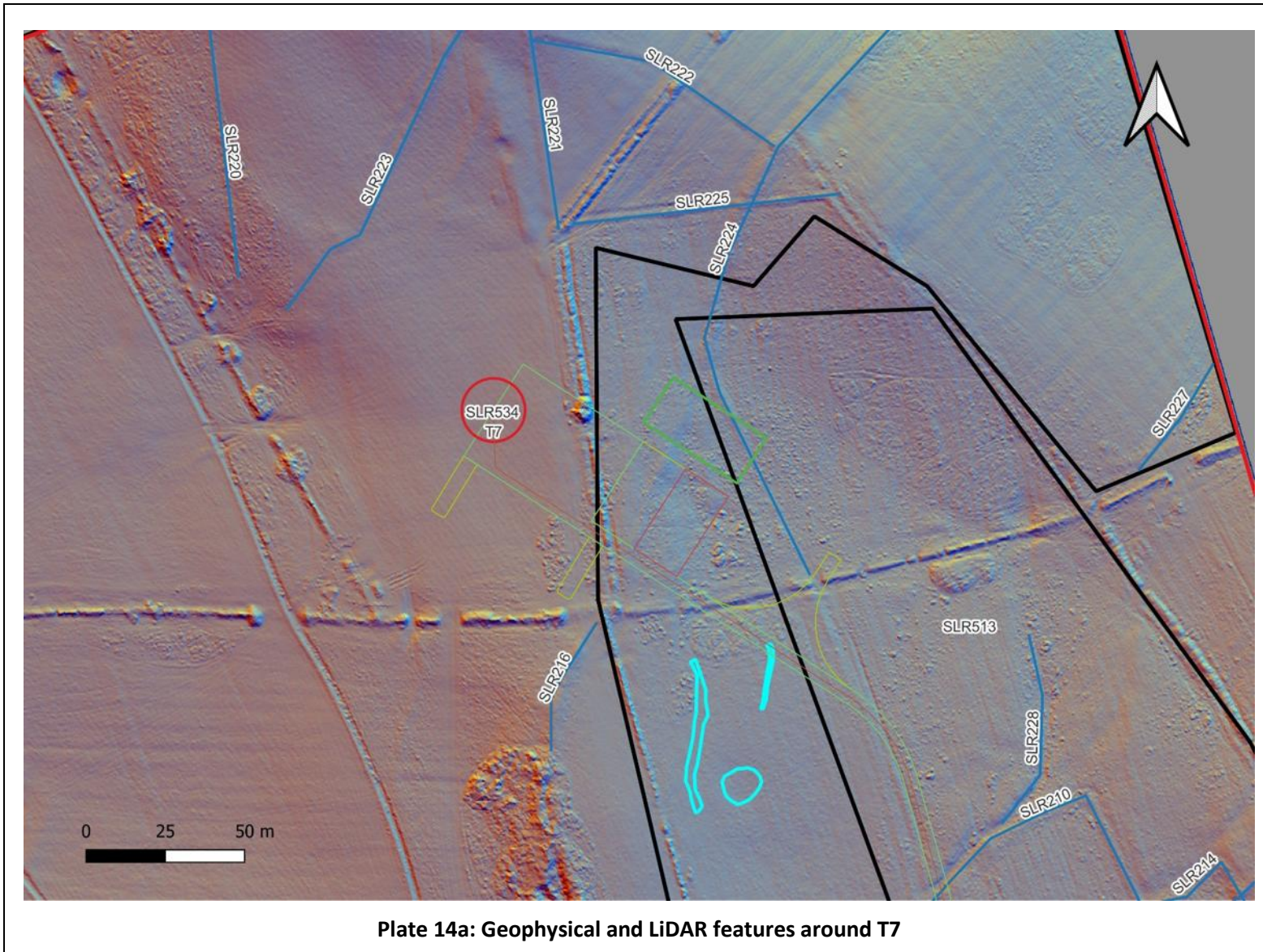
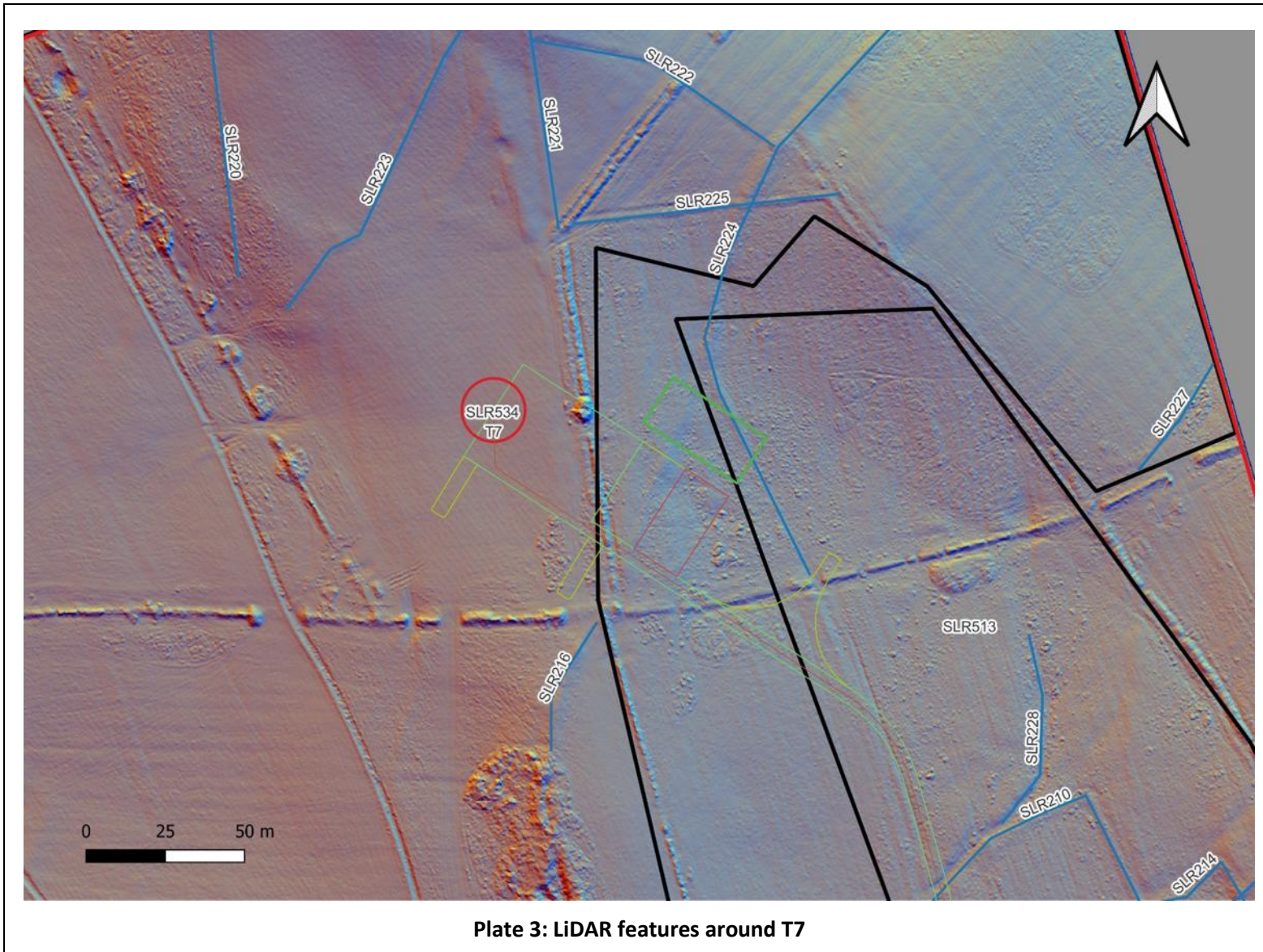


Plate 13b: LiDAR features between T6 and T7





Three areas of potential pre-Famine agricultural activity are located along the course of the proposed cable route to the control building, within the northeastern section of the western section of the Site boundary (**Plate 15**). **SLR527 (Plate 24)** is comprised of a large area of c.68ha, encompassing much of the western section of the Site, while **SLR529** and **SLR517** comprise smaller areas of c.0.2ha and c.0.3ha respectively.

LiDAR interpretation and corroborating geophysical data indicate a high density of linear features in the vicinity of the proposed control building (**Plate 15a/b**). Across the two fields immediately surrounding the footprint, a total of 18 linear elements were recorded. Of these, **SLR229, SLR230, SLR231, and SLR245** are depicted on the First Edition OS Six-Inch mapping (Queen's County – Sheet 34, surveyed 1839), evidencing their persistence into the mid-19th century landscape. The remaining linears exhibit regular spacing, consistent orientation, and parallelism, and are interpreted as drainage features associated with post-medieval/19th-century agricultural improvement. Geophysical survey identified a corresponding anomaly (**18-02**) aligned with **SLR232**, interpreted as a possible ditch, supporting the inference that a proportion of the linears comprise cut drains rather than purely banked boundaries.

The area surrounding T8 is of a similar nature, with a high level of linear features recorded both as a result of LiDAR analysis and geophysical survey (**Plate 16a/b**). Of these features, **SLR267, SLR269, SLR271 and SLR273** correspond to field boundaries recorded on the 1st OS mapping (Kilkenny – Sheet 9, surveyed 1839). The remaining features (**SLR270, SLR272, SLR274, SLR275, SLR276, and SLR279**) are indicative of likely ditch features, possibly field boundaries or systems pre-dating the historic maps.

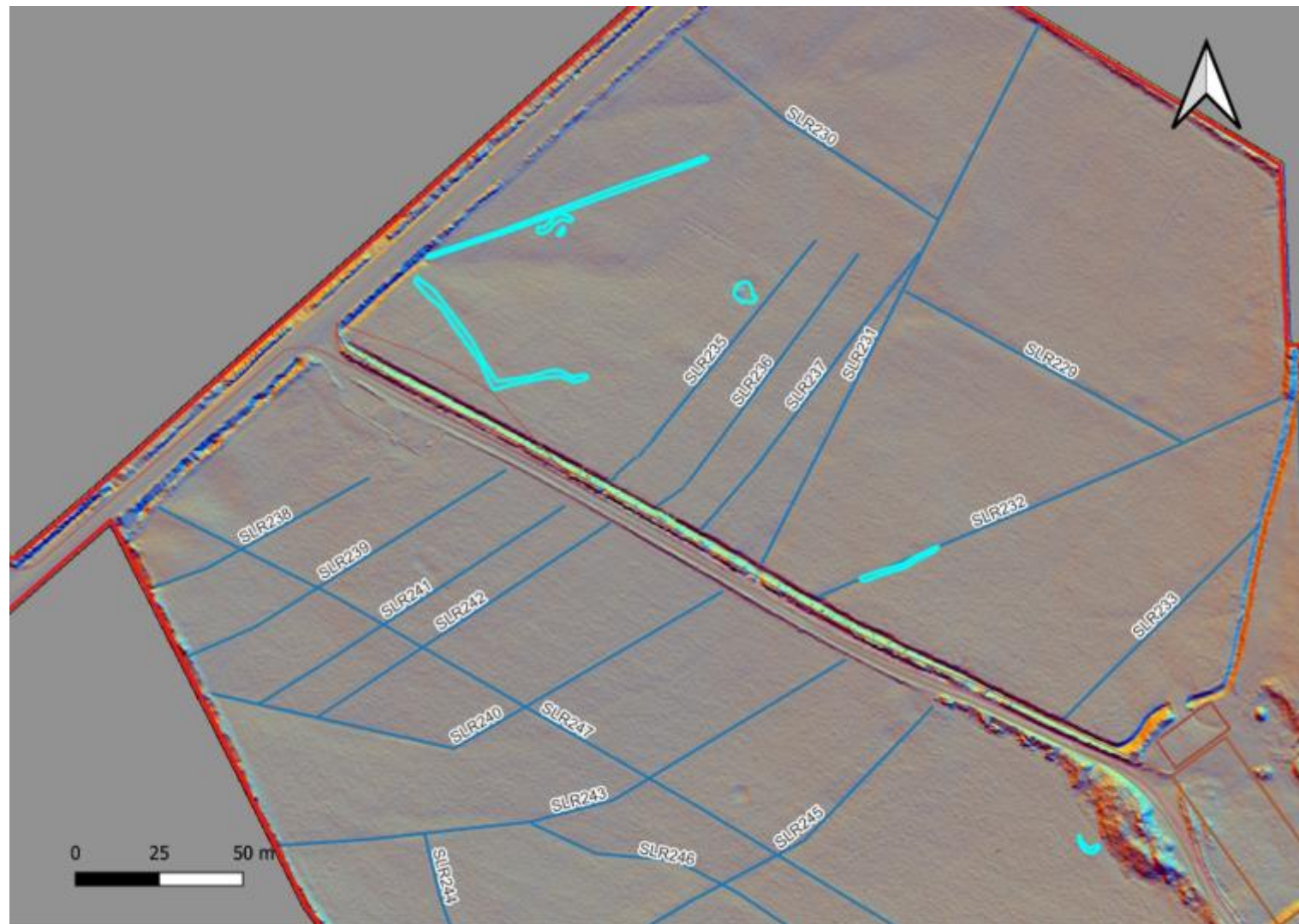


Plate 15a: Area around proposed control building

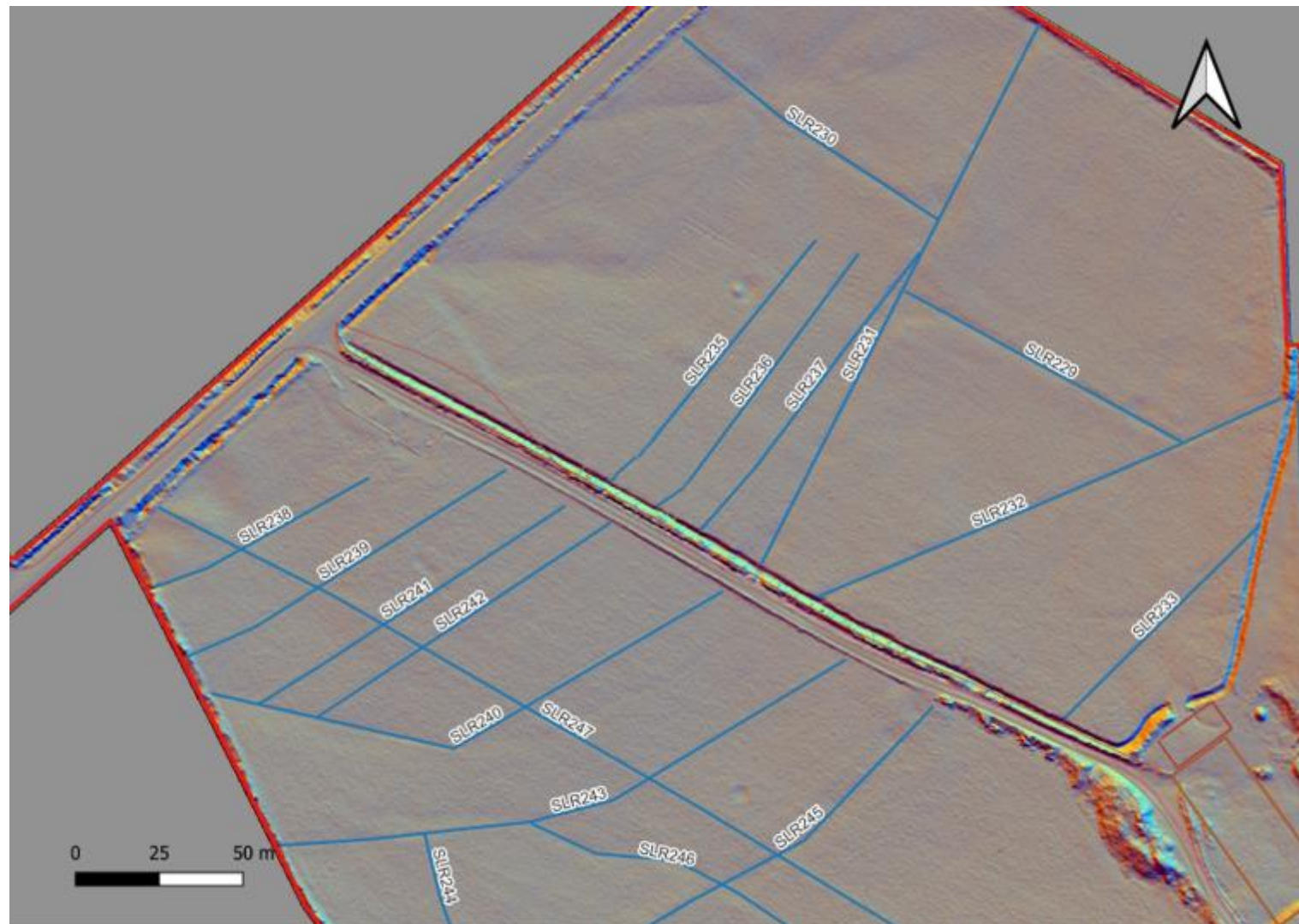
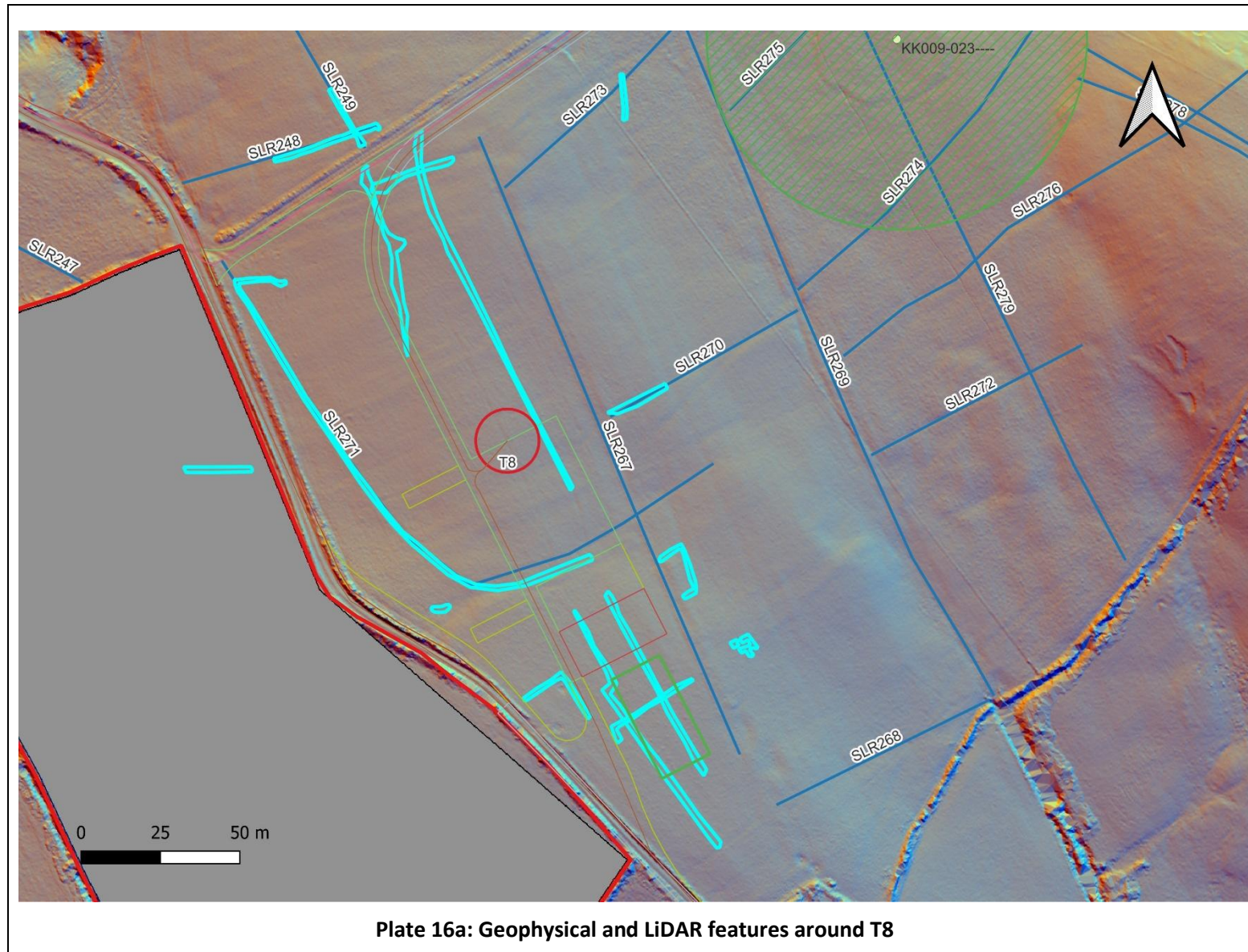
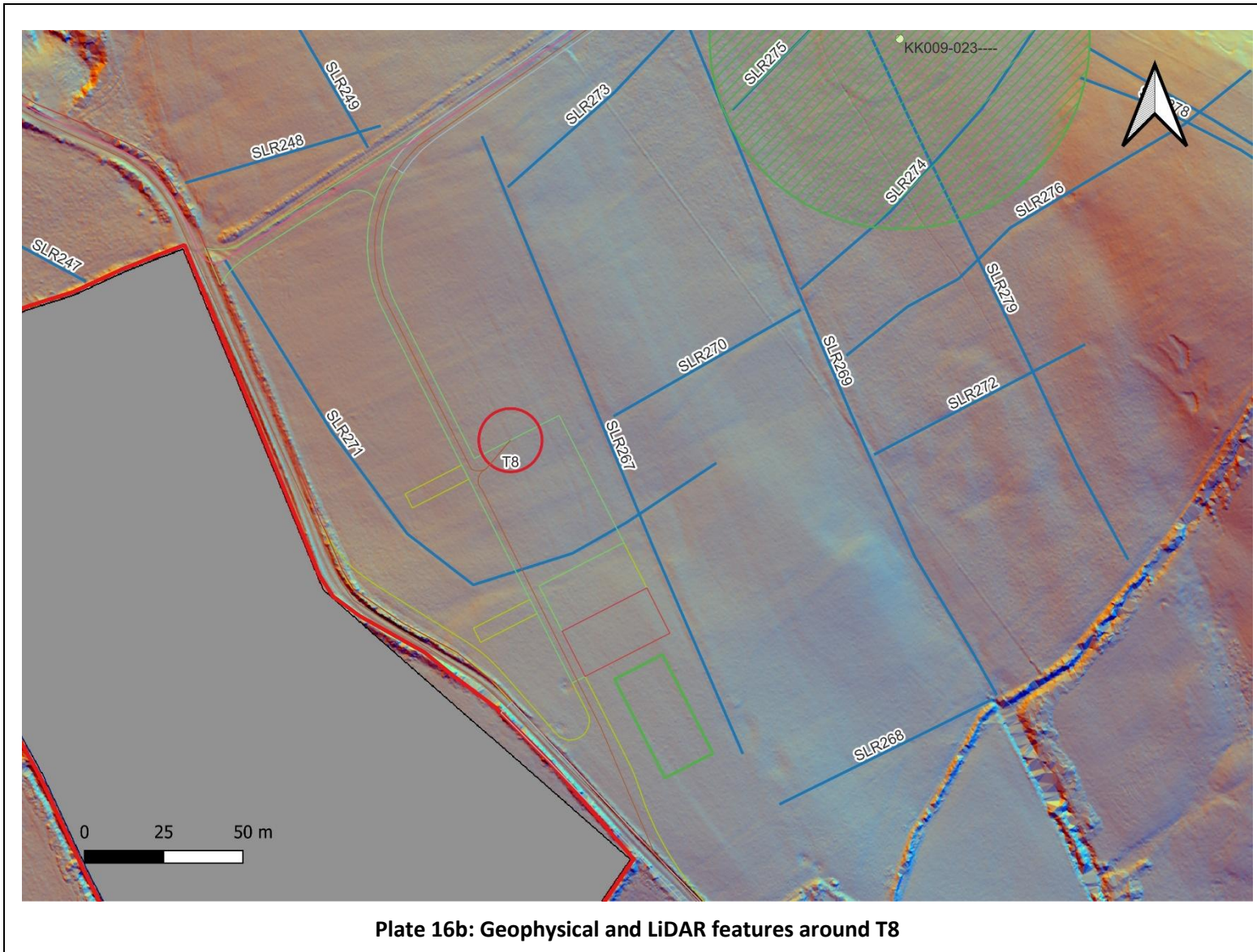


Plate 15b: Area around proposed control building





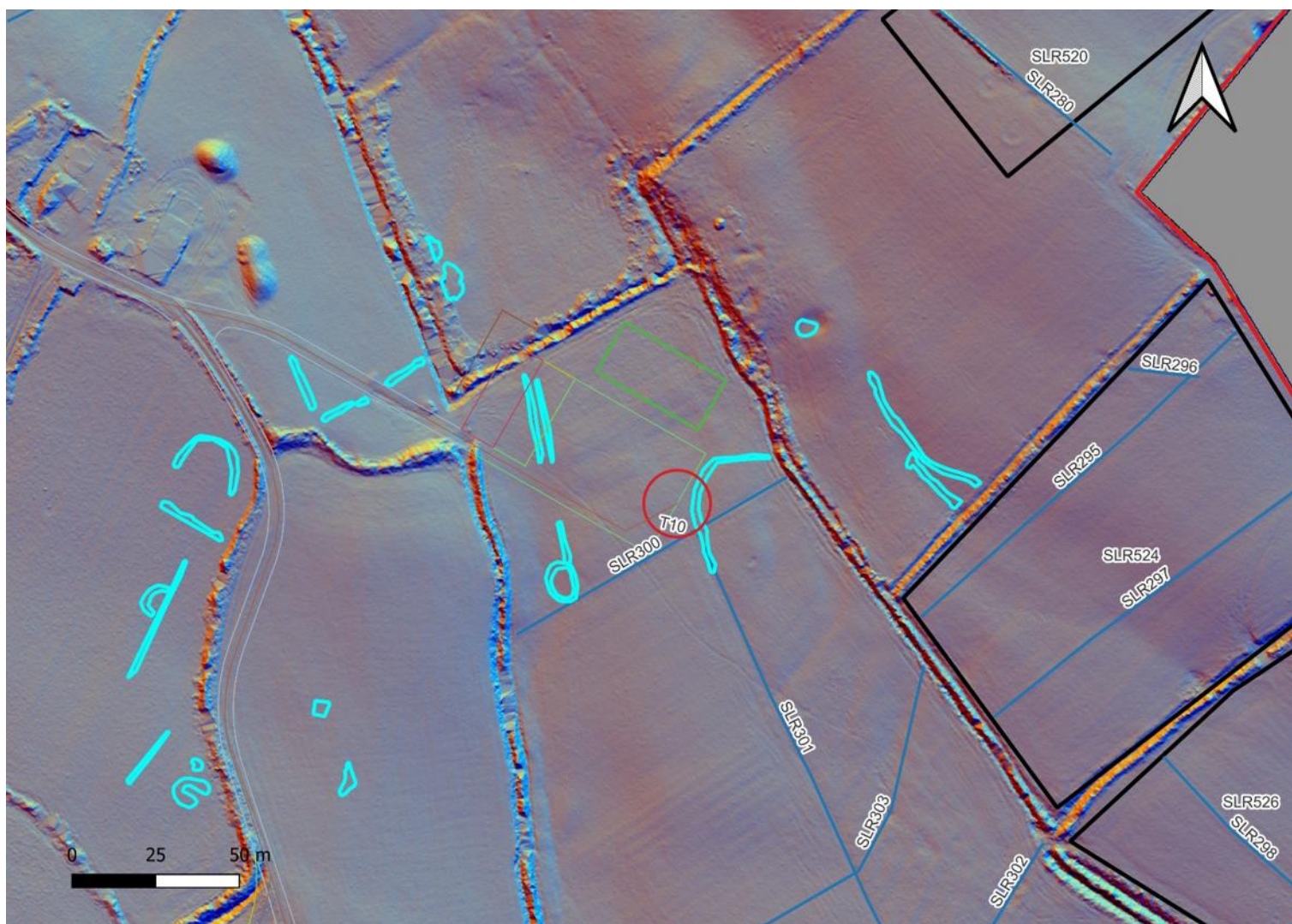


Plate 17a: Geophysical and LiDAR features around T10

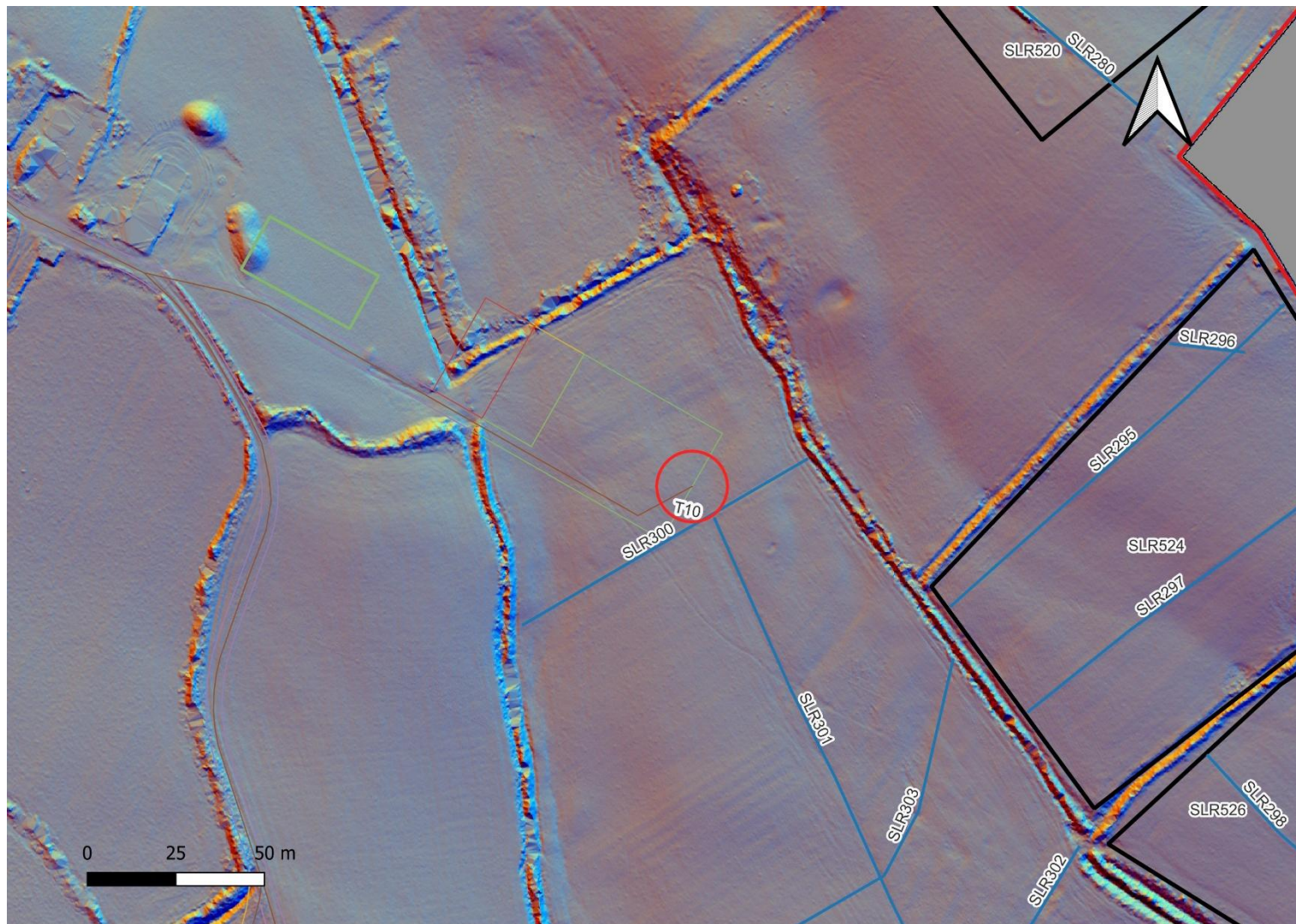


Plate 17b: LiDAR assets around T10

The two linear features recorded in close proximity to T10 (**Plate 17a/b**), **SLR300** and **SLR301**, both correspond with field boundaries seen on 1st Edition OS mapping. These features are located within the footprint of T10.

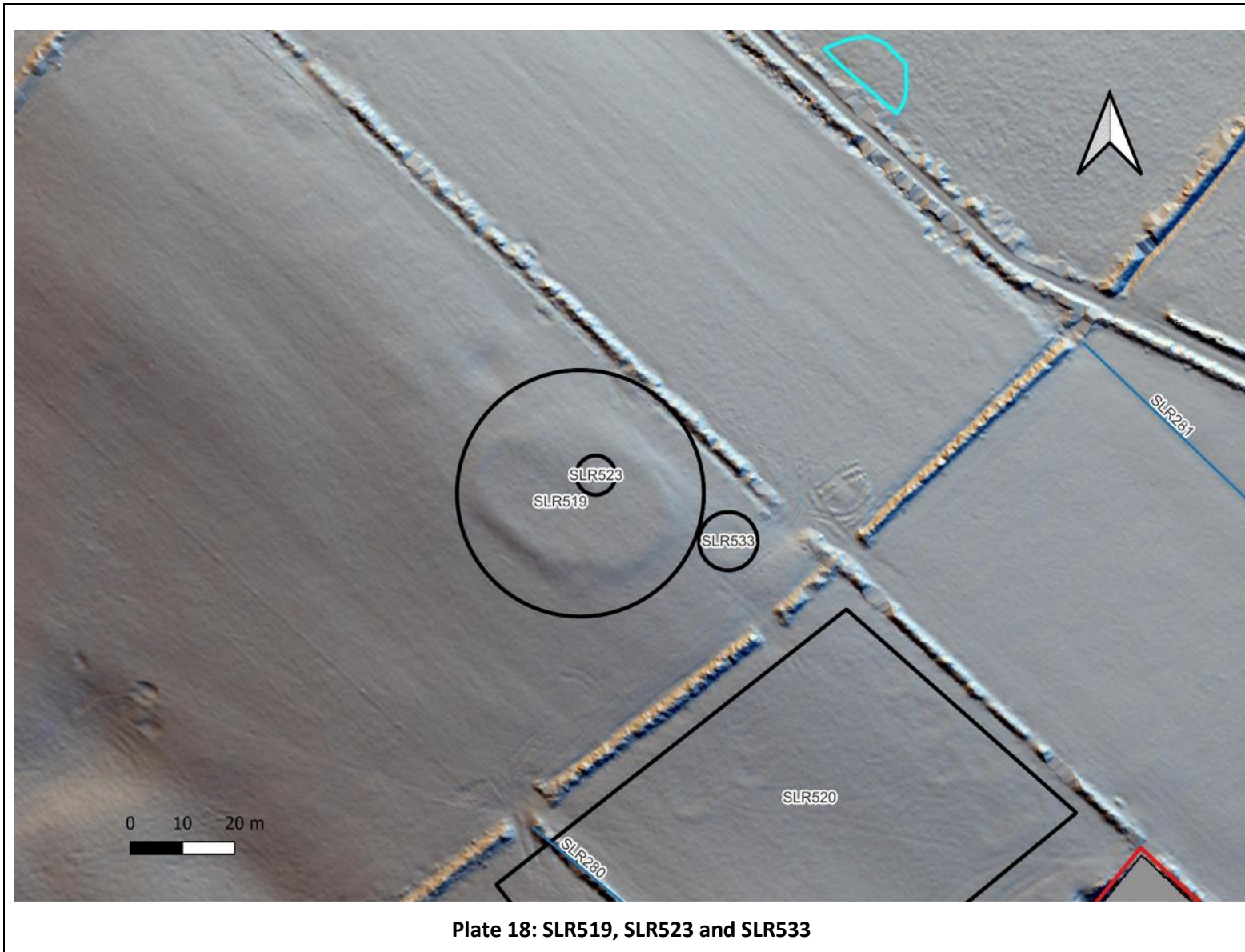
A15.4.2.1 Circular Enclosures and Settlement Features

The LiDAR analysis also identified 28 circular features ranging from c.3–40m in diameter. At least four larger examples, **SLR519 (Plate 18)**, **SLR506 (Plate 19)**, **SLR507 (Plate 20)** and **SLR525 (Plate 21)** are almost certainly prehistoric or medieval enclosures or ringforts, matching the size, form and defensive layout of known examples in the region.

SLR519 (Plate 18) (c.40m diameter) lies south of T9 and resembles a registered enclosure (**KK009-023----**) nearby. Clusters of small circular depressions occur immediately to the southwest, potentially representing kilns, pits, or other small-scale activity predating historic mapping.

SLR506, **SLR507** and **SLR525**, located at the Ballylehaun Section, form a group of ringfort-like enclosures between 27–30m in diameter, with **SLR507** showing a clear southeast-facing entrance. These features are located c.0.18km to the northeast, c.0.13km to the southeast and c.0.3km north of T5 respectively. Notably, a ringfort, **KK008-033----** is located in close proximity to these features, c.81m to the northeast of **SLR525**. Smaller circular features (3–10m diameter) are scattered across the Site, frequently in clusters. Their function is uncertain but may include the remains of corn-drying kilns, small stock enclosures, or prehistoric occupational features. The most concentrated area with these features is **SLR520 (Plate 22)**, c.0.17km south of T9. An alternative function for these small circular features is suggested to be as a stack stand, intended for the drying and temporary storage of fodder or other crop material. This interpretation is suggested by McNeary for a group of similar features associated with **ANT035:066**, an area of multi-period settlement and agricultural activity in Carncastle, Antrim, Northern Ireland¹.

¹ **McNeary, R.**, *The application of airborne LiDAR survey for archaeological prospection, interpretation and management: a case-study from the Antrim Uplands*, School of Geography & Environmental Sciences, 2020. Available at <https://pure.ulster.ac.uk/en/studentTheses/the-application-of-airborne-lidar-survey-for-archaeological-prosp/>



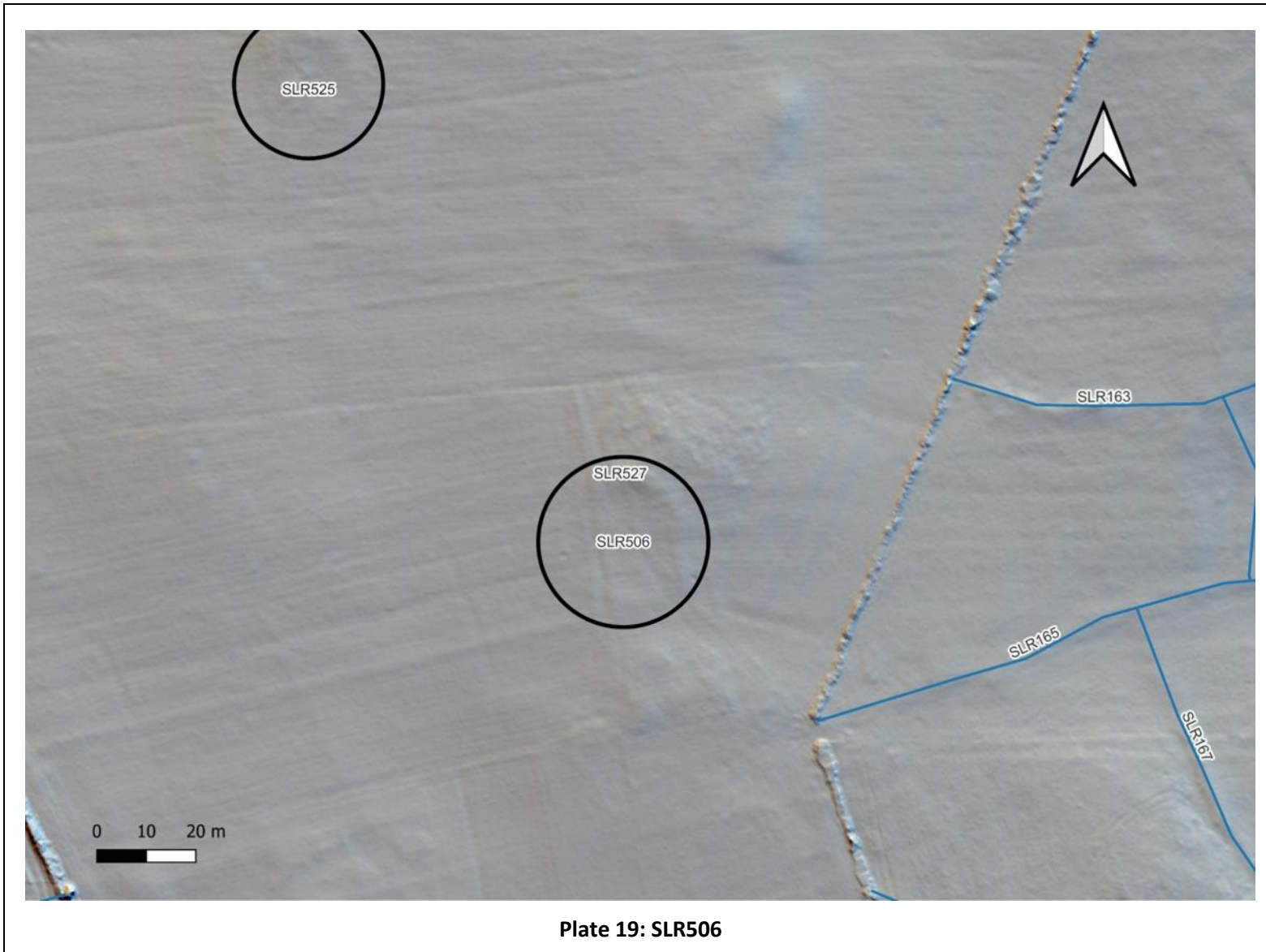
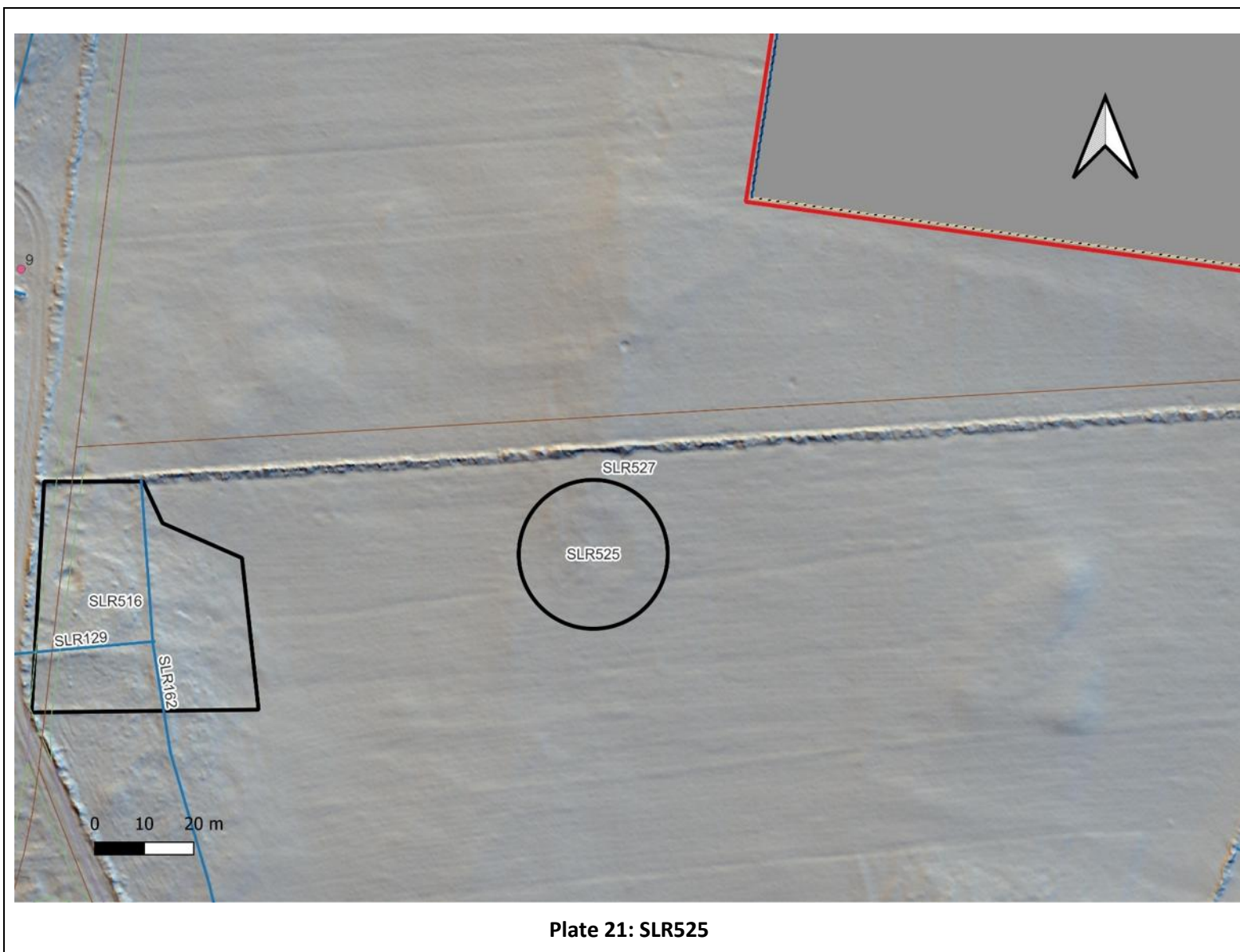




Plate 20: SLR507



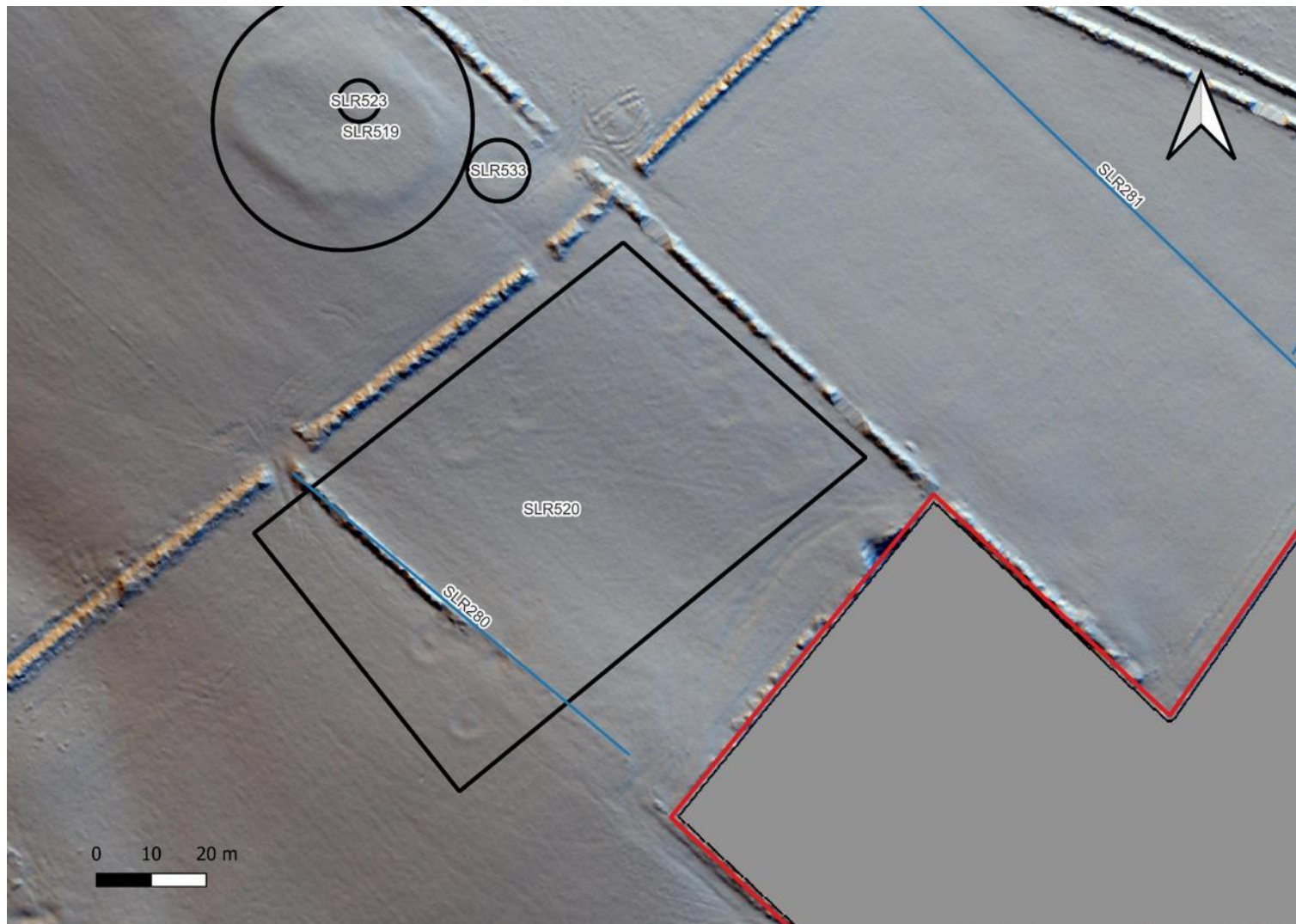
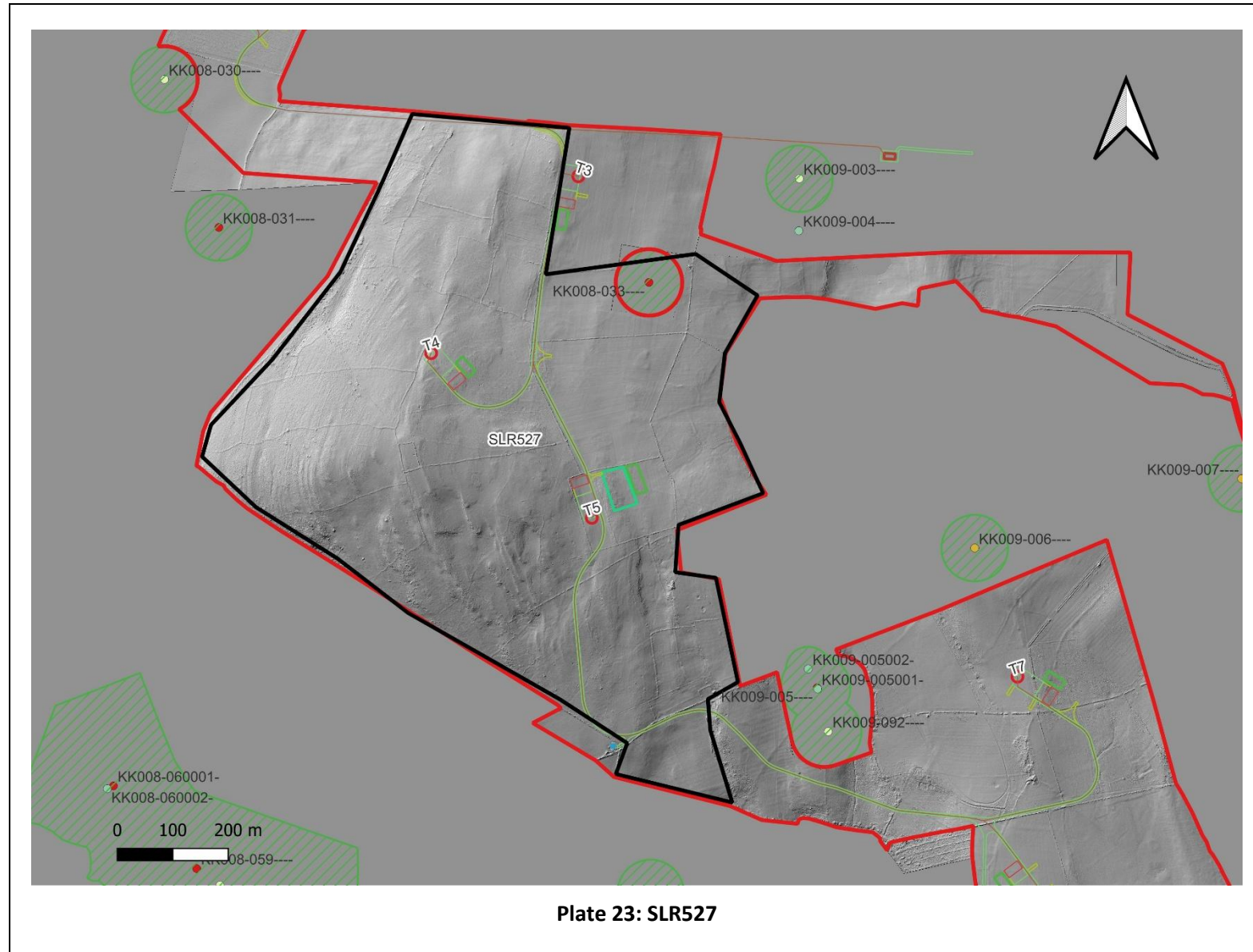


Plate 22: SLR520



A15.4.3 Conclusion

Overall, the LiDAR and geophysical analyses reveal a landscape of considerable archaeological complexity, characterised by multi-layered activity potentially extending from the prehistoric period through to the post-medieval era. The identification of at least 28 circular features, including several substantial enclosures (**SLR519, SLR506, SLR507, and SLR525**) that correspond closely to prehistoric enclosures or early medieval ringforts, demonstrates the presence of early settlement or defended farmsteads within the Site. These are accompanied by numerous smaller circular depressions, likely representing kilns, pits, hut sites, or other small-scale domestic or industrial features. Superimposed upon this earlier landscape is an extensive network of late medieval to early post-medieval agricultural field systems, comprising over 200 linear features that form dense clusters of small, irregular plots, field boundaries, ditches, drains, and enclosures, many of which had already fallen out of use prior to the First Edition OS mapping of 1839. Additional improvement-period drainage systems and rationalised boundaries reflect later reorganisation of the landscape in the 18th–19th centuries. Taken together, these results demonstrate prolonged and repeated phases of settlement, cultivation, enclosure, and land management, confirming a high potential for further buried or unrecorded archaeological remains throughout the Developable Area.

Appendix to Chapter 15: Cultural Heritage

Appendix 15.5: Summary of Archaeological Excavations in the Study Area

Contents

A15.5	Summary of Archaeological Excavations	2
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A15.5 Summary of Archaeological Excavations

Seven archaeological investigations have taken place within the study area, all located within the valley to the west of the Site and primarily related to the construction of the M7 Portlaoise–Castletown / M8 Portlaoise–Cullahill motorway scheme. Five investigations comprised archaeological excavations, one comprised archaeological monitoring and one comprised a geophysical survey. All lie beyond the Site boundary and do not extend within it.

Of these, five identified archaeological features, and are therefore discussed below

This covered approximately 14km of motorway extending from Aghaboe to south of Cullahill, traversing the townlands from Gortnaclea to Oldtown.

A geophysical survey (Licence 02R068), carried out by Margaret Gowen & Co. Ltd, identified three circular enclosures, a double-ditched enclosure, a possible additional enclosure, and associated field systems.

In response to these findings, topsoil stripping was conducted across the Testing Area. Despite the potential indicated by the geophysical survey, no further archaeological features were revealed during the stripping.

2005:900: In 2005 an assessment carried out by Archaeological Consultancy Services Ltd in advance of the proposed M7 Portlaoise–Castletown/M8 Portlaoise–Cullahill motorway scheme, c.0.54km to the northwest of the Site boundary, between February and June 2005. Five archaeological features were identified, comprising a spread, a pit, and three possible post-holes. The spread consisted of loose, dark grey silty clay containing abundant charcoal and heat-shattered stone. Circular in shape, it measured approximately 1m in diameter and reached a depth of 0.1m, resting directly on the natural subsoil.

Located just south of the spread within Trench 35, the pit was filled with compact dark brown to black silty clay, with a moderate quantity of heat-shattered sandstone. This deposit was contained within a shallow, oval-shaped cut measuring 3m by 0.5m and extending to a depth of 0.3m.

Three possible post-holes were recorded within Trench 38. Each was filled with compact black/brown silty clay, containing moderate amounts of heat-shattered sandstone and charcoal. No artefacts were recovered from any of these features.

Although no associated burnt mound was identified during the evaluation, it is considered likely that one exists in close proximity.

2006:1026: An excavation was carried out in August and September 2006 ahead of the M8/N8 Cullahill to Cashel Road scheme, following earlier assessment and test-trenching in 2005. A scatter of unworked stones, likely from field clearance, with a worked flint blade, was recovered from topsoil. Two burnt mounds were identified, both disturbed by agricultural activity, with underlying pits or troughs and evidence of burning. A third area contained a burnt spread on the southern side of Glashare Stream, also heavily disturbed. Two shallow hearth-like features and fragments of prehistoric pottery were also found.

2006:1182: This site was excavated in March 2006 as part of the archaeological resolution programme for the proposed M7 Portlaoise to Castletown / M8 Portlaoise to Cullahill motorway scheme, on behalf of Laois County Council and the National Roads Authority. The excavation, located c.0.74km to the northwest of the Site boundary, revealed two troughs and three associated pits. The troughs contained fills rich in charcoal and heat-shattered stone, with stake-holes present at their bases suggesting structural elements. The pits varied in shape and were similarly filled with silty or sandy clay containing charcoal and burnt stone, indicating activity consistent with burnt mound use.

2006:1026: An excavation was carried out in August to September 2006 in advance of the construction of the M8/N8 Cullahill to Cashel road improvement scheme. Prior assessment and centreline test-trenching was carried out in 2005 by Colm Moriarty (*Excavations 2005*, No. 790, A027/016). This site was located north of Johnstown in a level pasture field c. 200m from Glashare tower-house. The site was divided into three, based on the testing results.

AR55 was a collection of unworked stones, probably representing an area of field clearance in proximity to the field boundary. A worked flint blade was recovered from the topsoil within the vicinity.

AR56 was a burnt mound, badly disturbed by a series of plough furrows, drains and field boundaries, measuring 12.85m (east–west) by 11.6m and 0.42m in depth, composed of dark-black/brown sandy silt that contained large amounts of charcoal and burnt stone. Three shallow pits/troughs were revealed under the mound. The first was located in the south-west corner, was subrectangular in shape and measured 1.65m by 1.51m and 0.12m in depth. Three small stake-holes were also recorded in the corners. The second trough was also subrectangular, orientated north–south, and measured 1.66m by 1.12m and 0.14m in depth. The third possible pit/trough was truncated by a linear ditch on its southern side. It was subcircular in shape and measured 2.65m by 1.2m and 0.2m in depth.

A second burnt mound at AR56 measured 20m in length, 12m in width and 0.3m in depth and was composed of compact black sandy silt with frequent medium-sized angular burnt stones and charcoal. Beneath the mound was a subrectangular pit/trough measuring 3.7m by 1.4m and 0.25m in depth. This had been truncated on its eastern/western sides by drains.

A third area was a burnt spread located on the southern side of Glashare Stream and was very irregular, split into three areas as a result of being heavily disturbed by a series of plough furrows. It consisted of black/brown loosely compacted silty sand, with charcoal and frequent burnt stone that lay over the natural subsoil.

Excavation at Site AR57 also revealed two shallow possible hearths. The first was subrectangular in shape, was orientated east–west and measured 1.24m in length, 0.28m in width and 0.24m in depth. It had vertical sides and an undulating base and contained two fills, the upper one containing occasional lumps of charcoal. Around the rim of the feature the clay had turned red due to the intense heat that had been produced. Lying perpendicular to this was a second similar feature. It was orientated north–south and was irregular in shape. It measured 1.7m by 0.67m and 0.1m in depth. Lying on top of the natural in close proximity to these features were a number of badly deteriorated pieces of probable prehistoric pottery.

2017:551: As part of the planning process for a development an assessment including a geophysical survey and archaeological testing was required. The geophysical survey was undertaken by JM Leigh Surveys (Licence 17R0178). This uncovered lazy beds at the east of the development. These were visible as part of the testing. No other archaeological finds or features were uncovered.

2016:477: Investigation was undertaken in advance of development which comprised the construction of a one and a half storey dwelling house, domestic garage, entrance, foul effluent treatment system, percolation area and all associated site works. 13 trenches were planned and investigated.

Stratigraphy consisted of a subsoil comprised a mid reddish-brown sandy silt, with occasional small pockets of pale grey-brown sand and small sub-rounded stones. The alignment of all trenches was east-west.

The proposed development was situated in the immediate environs of ringfort KK008-063, which lies 39m to the north. The surface expression of an extensive relict field system (KK008-0159) is located on the northern side of the proposed development site, at a minimum distance of 173m. A further 11 recorded monuments are located within a 500m radius of the proposed development area, including the particularly impressive trivallate ringfort (KK008-060001) at Rathlogan.

Extensive test excavation across the proposed development site failed to identify any features or materials of archaeological significance.

1999:459: This site was revealed during archaeological monitoring of a Bord Gáis Éireann gas pipeline development (see No. 426 Excavations 1999). The site is in Parksgrove townland, 1.5km south-west of Ballyragget, within the western flood-plain of the River Nore. Excavation of the site within the wayleave corridor was carried out in August 1999 before development.

Natural, orange boulder clay was cut by three separate troughs, which clustered in the centre of this site. Trough A was a subcircular pit with a concave profile, 2.2m in diameter and 0.8m deep, containing a truncated lining of light grey putty clay, 0.8m thick, at the very base of the trough. The pit was deliberately backfilled with redeposited, sandy, natural clay and burnt mound material, and a single post-hole was found immediately south of the trough.

Trough B, 1m west of Trough A, was a subcircular pit with U-shaped profile, 1.7m in diameter and 0.9m deep. Four stake-holes were cut around the base of the trough, possibly representing the sails of a wicker lining. This trough was also deliberately backfilled by a single, uniform layer of burnt mound material and also had an associated post-hole immediately east of it.

Trough C, immediately north of Trough B, was a rectangular pit with square profile and rounded edges, measuring 2.8m by 1.6m by 0.5m deep. It contained a truncated lining of bright grey putty clay, 0.3m thick, in turn sealed by a deliberate backfill of burnt mound material. A small, tight cluster of shallow stake-holes and a further isolated stake-hole were found at the eastern edge of this trough. A small whetstone was retrieved from its lower backfill.

The troughs were sealed by a burnt mound, which was circular in plan with a concave profile. The mound consisted of fire-cracked stone (sandstone 95%/limestone 5%), charcoal lumps and black silt and covered an area of 21m north-south by over 11m, continuing to the west, and 0.25m in maximum truncated depth. An informal hearth area, south of the trough complex, was sealed within the burnt mound. Later ploughing of the site and modern drainage activity reduced the level of the top of the mound.

2024:723: Stage (iii) Excavations were undertaken at Ballyconra 7 as part of the N77 Ballyragget Village to Ballynaslee Road Improvement Scheme, Co. Kilkenny. Excavation took place between 27 May and 5 July 2024.

The site of Ballyconra 7 consisted of an annular ring-ditch, with external measurements of 15m north to south by 14m. An amber-coloured bead was recovered from the earliest construction phase. The ditch cut had been lined with clay, presumably shortly after its excavation to prevent the collapse of the ditch sides. Much of its base was cut by a stone-filled drainage gully lining, probably to aid drainage into the natural gravel. Seven boulders were present at the base of the ditch, six of which were positioned approximately equidistant within the eastern and south-western part of the ring-ditch. It is speculated that these originally stood on the interior of the ring-ditch. There were three distinctive fills, which appear to represent silting and possibly deliberate backfilling. A large cluster of semiarticulated animal bone was found at the base of the uppermost fill in one area. The fills of the ring-ditch produced, among other finds, several antler tines. A Nauheim derivative copper alloy fibula brooch, possibly of Late Iron Age date, was retrieved from one of the ditch fills.

At least two burials had been inserted into the final ring-ditch backfill. One was an extended east–west supine inhumation in a good state of preservation. The other appeared to have been of similar type but had been heavily truncated by later activity.

At a number of locations, the ring-ditch had been cut by later, possibly post-medieval pits or gullies. In addition, most of the ditch in the south-east quadrant and in the south had been heavily truncated by a post-medieval/early modern robbed-out mortared limestone wall that ran northeast/southwest through the site. The site was also the site of forestry plantation. Further modern truncation also occurred to the southern and

eastern extents of the site, potentially related to the earlier widening/landscaping of the western embankment of the N77.

2008:729: A series of test-trenches were excavated on the footprint of the proposed development of a dwelling house and associated siteworks at Moatpark, Ballyragget in compliance with the planning conditions, as the site lies at the edge of the constraint zone of KK005–023–01–03, a motte, castle and chapel site (possible). No features or finds of an archaeological nature were uncovered in any of the trenches opened.

