

Ballyfeeny Green Energy Project



Environmental Impact Assessment Report Volume III

Appendix 13.2 - Geophysical Survey Report September 2025

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Geophysical Survey Report

Ballyfeeny & Tully, Co. Roscommon

License No.: 25R0075

RMP/SMR: N/A

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ITM (centroid): 6598100, 781300 (Survey Area 1: Ballyfeeny);
598900, 782370 (Survey Area 2: Tully)



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March 2025

Summary

This report details the results of an archaeogeophysical survey (Licence No.: 25R0075) of lands at Ballyfeeny and Tully townlands, near Strokestown, Co. Roscommon. The survey, involving high resolution magnetic gradiometry, focused on two separate locations that encompass a combined area of approximately 5 hectares. The survey was conducted as part of a preliminary (pre-planning) archaeological investigation.

A few anomalies of archaeological potential were identified by the survey, which also produced with evidence for past land division, field drainage and cultivation.

Survey details

Site Name: Ballyfeeny & Tully
Townland: Ballyfeeny & Tully
County: Roscommon

Parish: Kilglass
Barony: Ballintubber North

RMP/SMR No.: N/A
ITM (centroid): 598100, 781300 (Survey Area 1: Ballyfeeny);
598900, 782370 (Survey Area 2: Tully)

Land use: Pasture
Geology: Blue-grey greywacke and black argillite (Finnalaghta Formation)
Soils: Fine loamy drift with limestones (Rathowen Series)

Detection License No.: 25R0075
Planning Reference No.: N/A

Survey Type & Instrument: Fluxgate Gradiometer – Five-channel magnetometer
Sample/Transverse Interval: 0.10m/0.5m

Area Surveyed: c.5 ha
Survey Date: 28 February & 01 March 2025

License Holder: Ger Dowling
Report Author: Ger Dowling
Report Date: 07 March 2025

Contents

1	Introduction	5
2	Site Location	6
3	Survey Background	7
4	Archaeological Background	8
4.1	Recorded/Known Archaeology.....	8
4.2	Previous Investigations.....	8
5	Survey Location and Aims.....	9
6	Survey Methodology and Instrumentation	10
7	Data Management, Processing and Interpretation	11
8	General Considerations and Complicating Factors.....	12
8.1	Access and Ground Conditions.....	12
8.2	Modern Interference	12
8.3	Former Land Use.....	12
9	Survey Results.....	13
10	Conclusion.....	15
10.1	<i>Statement of Indemnity</i>	15
11	Figures.....	16
12	Plates.....	31

List of Tables

Table 1. Survey areas

Table 2: Geophysical survey details

Table 3. Survey Area 1: survey results

Table 4. Survey Area 2: survey results

List of Figures

Figure 1. Site location map, showing survey area highlighted in red

Figure 2. Recorded archaeological sites in the vicinity of the survey area

Figure 3. Survey Area 1 (Ballyfeeny) overlaid on the first-edition six-inch Ordnance Survey Map (surveyed 1837; published 1838)

Figure 4. Survey Area 2 (Tully) overlaid on the first-edition six-inch Ordnance Survey Map (surveyed 1837; published 1838)

Figure 5. Survey Area 1 (Ballyfeeny) overlaid on the first-edition 25-inch Ordnance Survey Map (1888–1913)

Figure 6. Survey Area 2 (Tully) overlaid on the first-edition 25-inch Ordnance Survey Map (1888–1913)

Figure 7. Survey area 1 (Ballyfeeny)

Figure 8. Survey Area 2 (Tully)

Figure 9. Survey Areas 1 & 2: greyscale image of gradiometry results

Figure 10. Survey Area 1: greyscale image of gradiometry results

Figure 11. Survey Area 2: greyscale image of gradiometry results

Figure 12. Survey Areas 1 & 2: interpretative plan showing principal geophysical anomalies

Figure 13. Survey Area 1: interpretative plan showing principal geophysical anomalies

Figure 14. Survey Area 2: interpretative plan showing principal geophysical anomalies

List of Plates

Plate 1. Looking southeast across Survey Area 1

Plate 2. Survey Area 1, looking north, with modern farm shed to left of photo

Plate 3. Survey Area 2, west field, looking east

Plate 4. Survey Area 2, east field, looking west

Abbreviations

GPS	Global Positioning System
ITM	Irish Transverse Mercator
nT	nanoTesla (unit of magnetic measurement)
OS	Ordnance Survey
QGIS	Quantum Geographical Information Systems
RMP	Record of Monument and Places
RO	Roscommon
SMR	Sites and Monuments Record

Coordinate System

All GPS coordinates given in this report are in Irish Transverse Mercator (ITM)

1 Introduction

This report details the results of an archaeogeophysical survey (Licence No.: 25R0075) of lands at Ballyfeeny and Tully townlands, near Strokestown, Co. Roscommon. The survey, involving high resolution magnetic gradiometry, focused on two separate locations that encompass a combined area of approximately 5 hectares. The survey was conducted as part of a preliminary (pre-planning) archaeological investigation.

The site has not previously subjected to geophysical survey and it was hoped that the investigation would identify and map any subsurface archaeology that may be present.

2 Site Location

The survey is located in the townlands of Ballyfeeny and Tully, Co. Roscommon (Figure 1). The site, which lie about 5km northeast of Strokestown, is in the Civil Parish of Kilglass and the Barony of Ballintubber North.¹

¹ [Baile Uí Fhíne/Ballyfeeny | logainm.ie](#) & [Tully | logainm.ie](#): accessed on 31 January 2025.

3 Survey Background

The survey was conducted in respect of a pre-planning study (archaeological reconnaissance).

The proposed development site encompasses a maximum area of approximately 40 hectares, extending over for discrete tracts of upland terrain. These locations were subjected to a site walkover (on 18.12.24) by the author of the present report to assess their viability for potential geophysical survey. This showed that much of the potential target land is unsuitable for investigation due to confer plantation, as well as badly overgrown and waterlogged terrain. As such, survey was only possible at two small areas (c.5 ha in total) at the northern and southern ends of the development site; the survey of these areas is the focus of the present report.

4 Archaeological Background

4.1 Recorded/Known Archaeology

There are no recorded sites or monuments within the survey areas (Figure 2).² The nearest known monuments comprise ringforts-rath RO023-145, RO023-221 and RO024-015 to the north and northwest of the target lands.³

The survey area is shown as farmland on early historical maps (Figures 3–6). A vernacular building is recorded direct west of Survey Area 1 in Ballyfeeny townland on the first-edition six-inch Ordnance Survey Map (surveyed 1837; published 1838) (See Figure 3).

4.2 Previous Investigations

No recorded archaeological investigations have previously been conducted at the survey areas or within the surrounding environs.⁴

² [Historic Environment Viewer \(arcgis.com\)](https://historicenvironmentviewer.arcgis.com/): accessed on 31 January 2025.

³ Ibid.

⁴ <https://excavations.ie>: accessed 31 January 2025.

5 Survey Location and Aims

The investigation, comprising high resolution magnetic gradiometry, focused on two separate areas (designated as 'Survey Area 1' and 'Survey Area 2') that together encompass about 5 ha (Table 1; Figures 7 & 8). The areas occupy upland terrain in an environment of rough pasture and confer plantation.

Table 1: Survey areas

Area	Size (ha)
1	1.5
2	3.5

Survey Area 1 in Ballyfeeny townland encompasses portions of four fields of rough pasture extending southwards and eastwards from a modern farm shed and yard and surrounded on most sides by confer plantation (Plates 1 & 2).

Survey Area 2 in Tully townland comprises two fields of rough pasture located east and west of one another and separated by graveled trackway (Plates 3 & 4).

The underlying bedrock of the locality comprises blue-grey greywacke and black argillite (Finnalaghta Formation).⁵ The soils are dominated by fine loamy drift with limestones (Rathowen Series).⁶

The geophysical investigation aimed to:

- 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 of the above in a report to the Client

⁵ Geological Survey of Ireland Spatial Resources, Public Data Viewer Series:

<https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228>

[accessed on 31 January 2025].

⁶ Irish National Soils Map, 1:250,000k, V1b (2014): <http://gis.teagasc.ie/soils/map.php> [accessed on 31 January 2025].

6 Survey Methodology and Instrumentation

The survey involved high-resolution magnetic gradiometry survey (Table 2). This technique measures changes in the magnetic properties of the soil and is widely used in modern investigations due to its ability to detect a broad range of sub-surface archaeological remains, including ditches and pits, and ‘industrial’ features associated with metalworking and pottery production.

The magnetic survey was conducted using a five-channel fluxgate gradiometer system, combining a Sensys MAGNETO MXPDA and Sensys FGM650 probes, with cm-precision GPS (Trimble R12 antenna and TSC5 controller) georeferenced to Irish Transverse Mercator and Ordnance Datum. Mounted on a cart, the system records magnetometer and GPS data simultaneously into a single data file. The data capture strategy involved logging readings every 0.10m intervals along transects spaced 0.5m apart, with a maximum traverse width of 2.5m. The sampling strategy produces a high-resolution dataset, giving clarity to any archaeological features detected.

The highly accurate positioning of the survey data provides strong confidence when integrating the geophysical results with other datasets such as aerial imagery in GIS, and also ensures repeatability should further investigation of anomalies (e.g., test excavation) be required.

Table 2. Geophysical survey details

Technique	Instrumentation	Sensor spacing	Sample rate	Survey Area	Number of recorded data
Magnetic Gradiometry	Five-channel fluxgate gradiometer array	0.5m	100 Hz	c.5 ha	1,121,214 ⁷

⁷ Survey Area 1: 251,110 readings; & Survey Area 2: 870,104 readings.

7 Data Management, Processing and Interpretation

Gradiometry data was logged to a laptop computer and archived daily to an external hard drive. The collated data was processed using the following methodology:

- Real-time positioning of magnetometer data based on GPS measurements;
- Processing (track correction and equalisation) of collated magnetometer data; and
- Export of georeferenced greyscale images at optimum visual range

The magnetometry and GPS data were georeferenced through Sensys proprietary software (Geoserver 2.00-01 followed by DLMGPS 4.01-13) and processed in Sensys MAGNETO 3.01-17 software. The processed data was subsequently imported into QGIS for final image production (Figures 9–14). Final geophysical datasets have been formatted as raster data models/GeoTiffs (projected to ITM, EPSG:2157) to enable subsequent geospatial analysis. Fieldwork, data processing and reporting adhered to the most up-to-date guidelines for conducting archaeogeophysical surveys.⁸ All geophysical raster datasets will be digitally archived to best practice.⁹

⁸ Schmidt A., Linford P., Linford N., David, A., Gaffney C., Sarris A., and Fassbinder J. 2016. *EAC Guidelines for the Use of Geophysics in Archaeology: Questions to Ask and Points to Consider*. EAC Guidelines 2. [Online] Available from:

https://f64366e3-8f7d-4b63-9edf5000e2bef85b.filesusr.com/ugd/881a59_fdb1636e95f64813a65178895aea87cf.pdf

⁹ Niven, K. 2012. *Raster Images: A Guide to Good Practice*. Archaeology Data Service/Digital Antiquity, Guides to Good Practice. [Online] Available from: http://guides.archaeologydataservice.ac.uk/g2gp/RasterImg_Toc; & Schmidt, A. and Ernenwein, E. 2012. *Guide to Good Practice: Geophysical Data in Archaeology*. Oxford: Oxbow.

8 General Considerations and Complicating Factors

8.1 Access and Ground Conditions

The survey area comprises tracts of upland pasture. The southeast quadrant of Survey Area 1 was marked by soft rushes and waterlogged and (cattle) poached at the time of the investigation. This area was avoided by the survey. Similar ground conditions in parts of the western field of Survey Area 2 were likewise avoided by the survey.

8.2 Modern Interference

A low level of small-scale 'ferrous-type', dipolar (positive–negative) responses are evident in the results from the gradiometry survey. These are a common occurrence in magnetic data and in most cases represent modern metal debris and other magnetised material (e.g., fired brick) contained within the topsoil.

8.3 Former Land Use

Possible former field boundaries were identified by the investigation in both survey areas, in addition to former cultivation. Field drains were mapped in Survey Area 2.

9 Survey Results

Table 3. Survey Area 2: survey results

Site name	Ballyfeeny		
ITM (centroid)	598100, 781300		
Area surveyed	c.1.5 ha		
Figure Numbers	9–10, 12–13		
Anomaly number	Form/nature of anomaly	Possible sources(s) of anomaly	Interpretative discussion
1	Amorphous, strongly enhanced anomaly	Possible archaeology/ agricultural/modern	Possible spread of burnt/fired material (c.7.5m E–W by 8.5m E–W). Archaeological interpretation is tentative. May reflect buried modern debris. Perhaps associated with vernacular building indicated on first-edition six-inch Ordnance Survey Map (surveyed 1837; published 1838) about 12m to NW.
2	‘Pit-type’ response	Possible archaeology/ modern/natural	Potential small pit/deposit, about 1m in diameter.
3	Weak, slender positive sinuous anomaly	Possible agricultural/ natural	Possible former field boundary. Precise nature and significance uncertain. Natural soil response also conceivable. Not recorded on early historic maps.
	Multiple, closely-set, positive linears	Agricultural	Former cultivation.
	‘Ferrous-type’ responses	Modern	Ferrous debris and other weakly magnetised material.

Table 4. Survey Area 2: survey results

Site name	Tully		
ITM (centroid)	598900, 782370		
Area surveyed	c.3.5 ha		
Figure Numbers	9, 11–12, 14		
Anomaly number	Form/nature of anomaly	Possible sources(s) of anomaly	Interpretative discussion
1	Two, closely-set 'pit-type' responses	Possible archaeology/modern/natural	Potential small pits/deposits. Modern origin possible, perhaps associated with adjacent former field boundary.
2	Irregular area of moderately enhanced positive magnetism	Possible archaeology/natural	Potential spread of archaeological soils. Natural origin also possible.
3	Irregular area of magnetic enhancement	Possible archaeology/modern/natural	May reflect modern dumping and/or ground disturbance. An archaeological or natural origin cannot be discounted.
	Three positive linears	Agricultural	Probable relict field boundaries. Westernmost example in western field visible as a shallow ditch.
	Multiple, slender negative and positive–negative linears	Agricultural	Field drains. Examples mapped in eastern field may contain ceramic pipes.
	Multiple, closely-set, positive–negative linears	Agricultural	Former cultivation.
	'Ferrous-type' responses	Modern	Ferrous debris and other weakly magnetised material.

10 Conclusion

The geophysical investigation at Ballyfeeny (Survey Area 1) and Tully (Survey Area 2) townlands did not identify any anomalies of clear archaeological interest, though a few anomalies of archaeological potential were mapped.

A possible spread of burnt/fired material [1:1] and an adjacent 'pit-type' response [1:2] recorded by the investigation in Survey Area 1 may have an archaeological origin, though this is tentative and the possibility that they relate to modern agricultural and/or other activity cannot be discounted on present evidence. Several possible pits/spreads [2:1–3] mapped in Survey Area 2 may likewise be of archaeological interest but, once again, interpretation is cautious and they may relate modern (e.g., agricultural) activity and/or reflect natural soil variation.

Evidence for former land division [e.g., 1:3] was also revealed by the investigation in both survey areas, as was traces of former ploughing. A series of field drains are also discernible in the dataset from Survey Area 2.

10.1 Statement of Indemnity

The geophysical properties of sub-surface features must contrast sufficiently with the surrounding soils/background variation 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 are only barely visible, or not discernible, in geophysical imagery. A lack of geophysical anomalies cannot be taken to imply the absence of archaeological features.

The interpretations presented here are invariably provisional and further work (e.g., test trenching) is required to fully assess the nature and archaeological potential of the anomalies identified by the present investigation.

11 Figures

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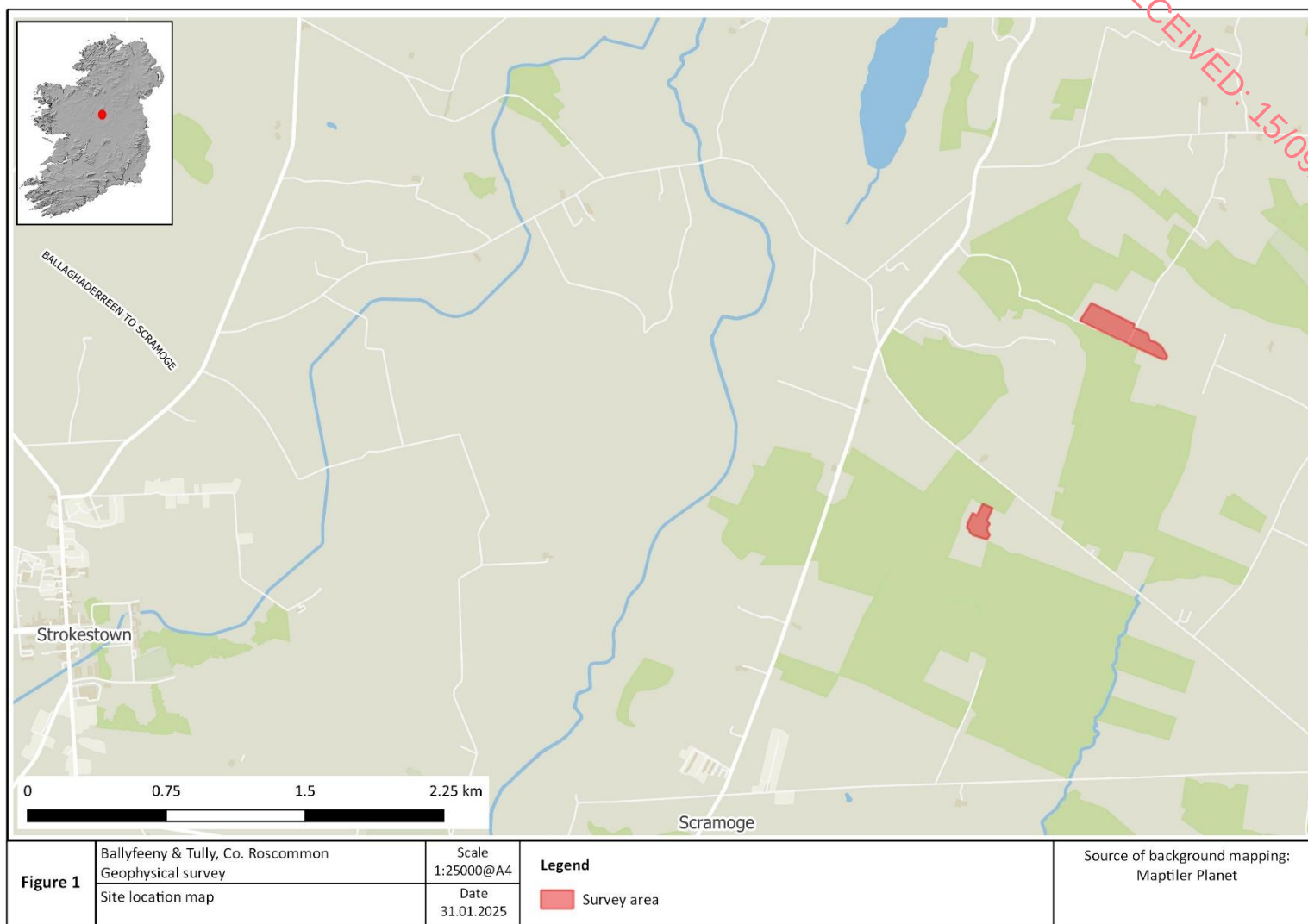


Figure 1. Site location map, showing survey area highlighted in red.

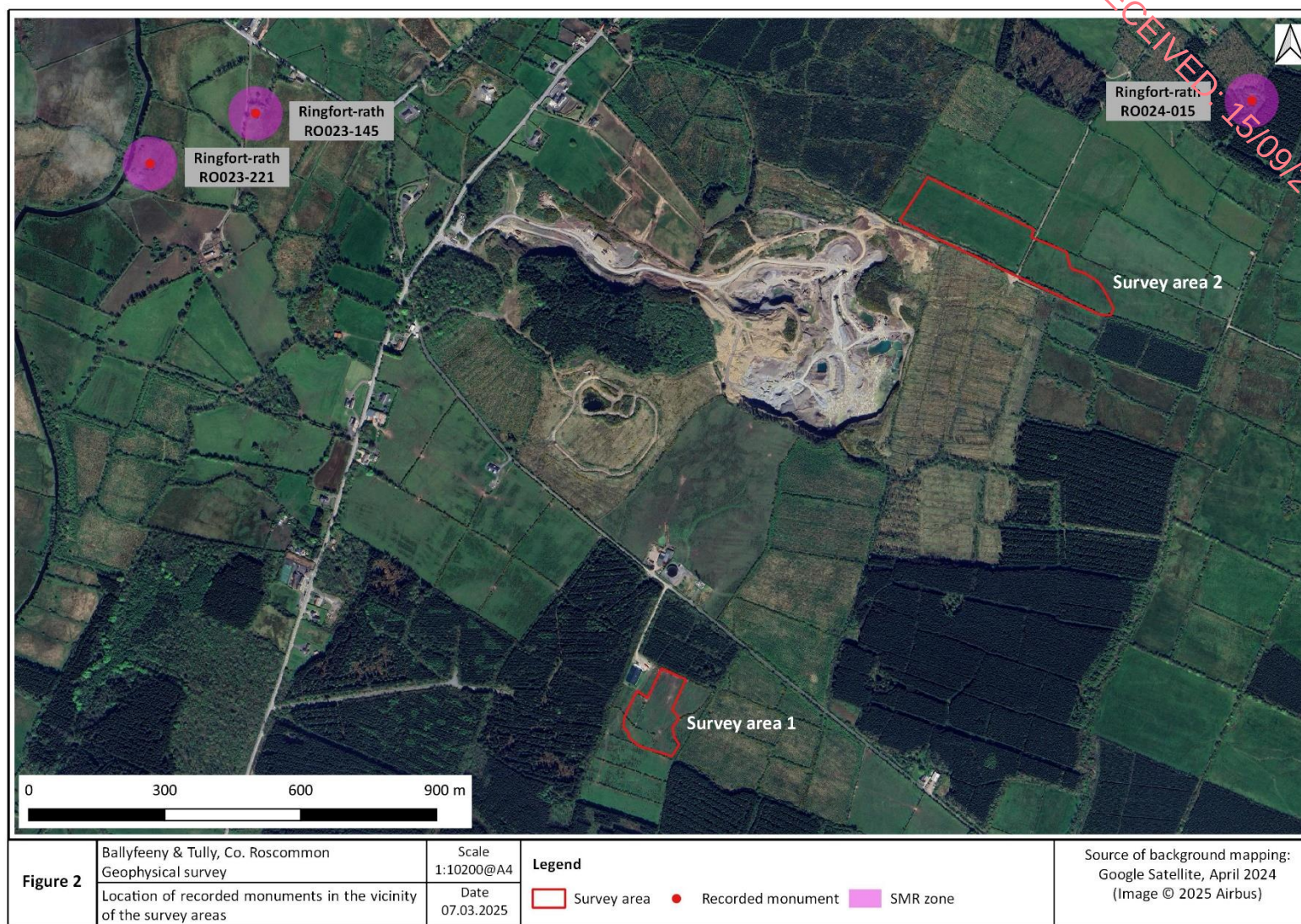


Figure 2. Location of recorded archaeological sites in the vicinity of the survey area.

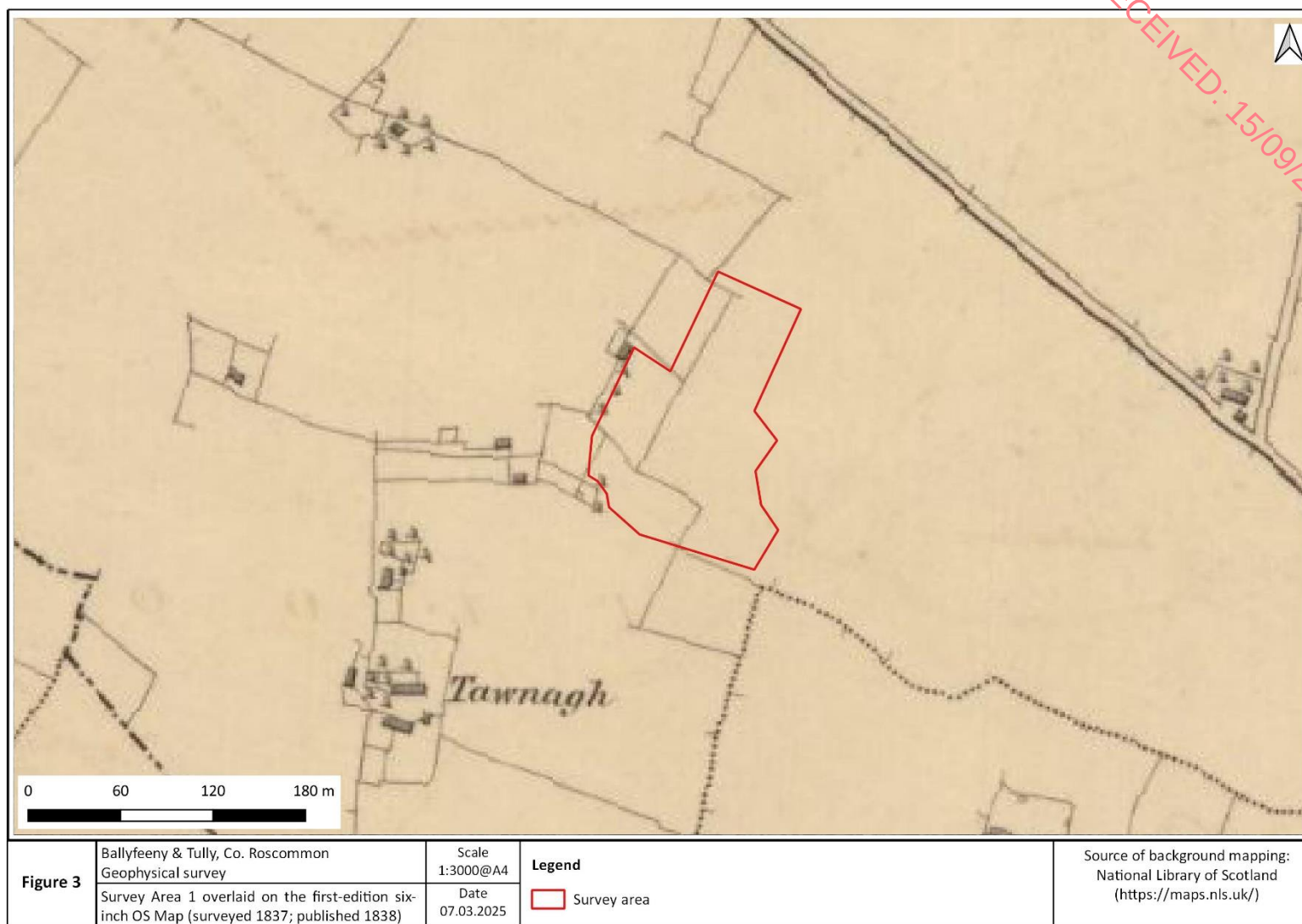


Figure 3. Survey area 1 (Ballyfeeny) overlaid on the first-edition six-inch Ordnance Survey Map (surveyed 1837; published 1838).

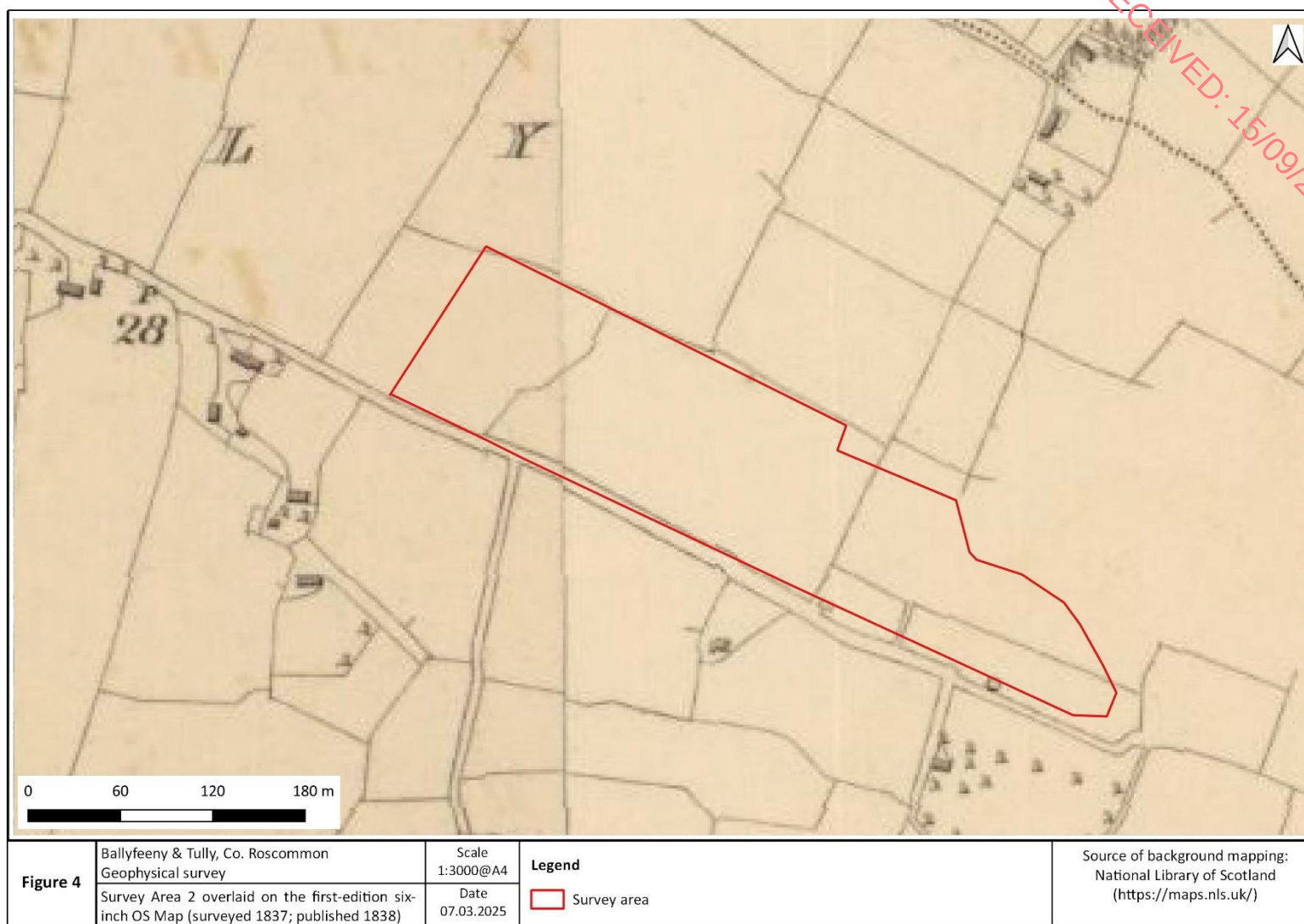


Figure 4. Survey area 2 (Tully) overlaid on the first-edition six-inch Ordnance Survey Map (surveyed 1837; published 1838).

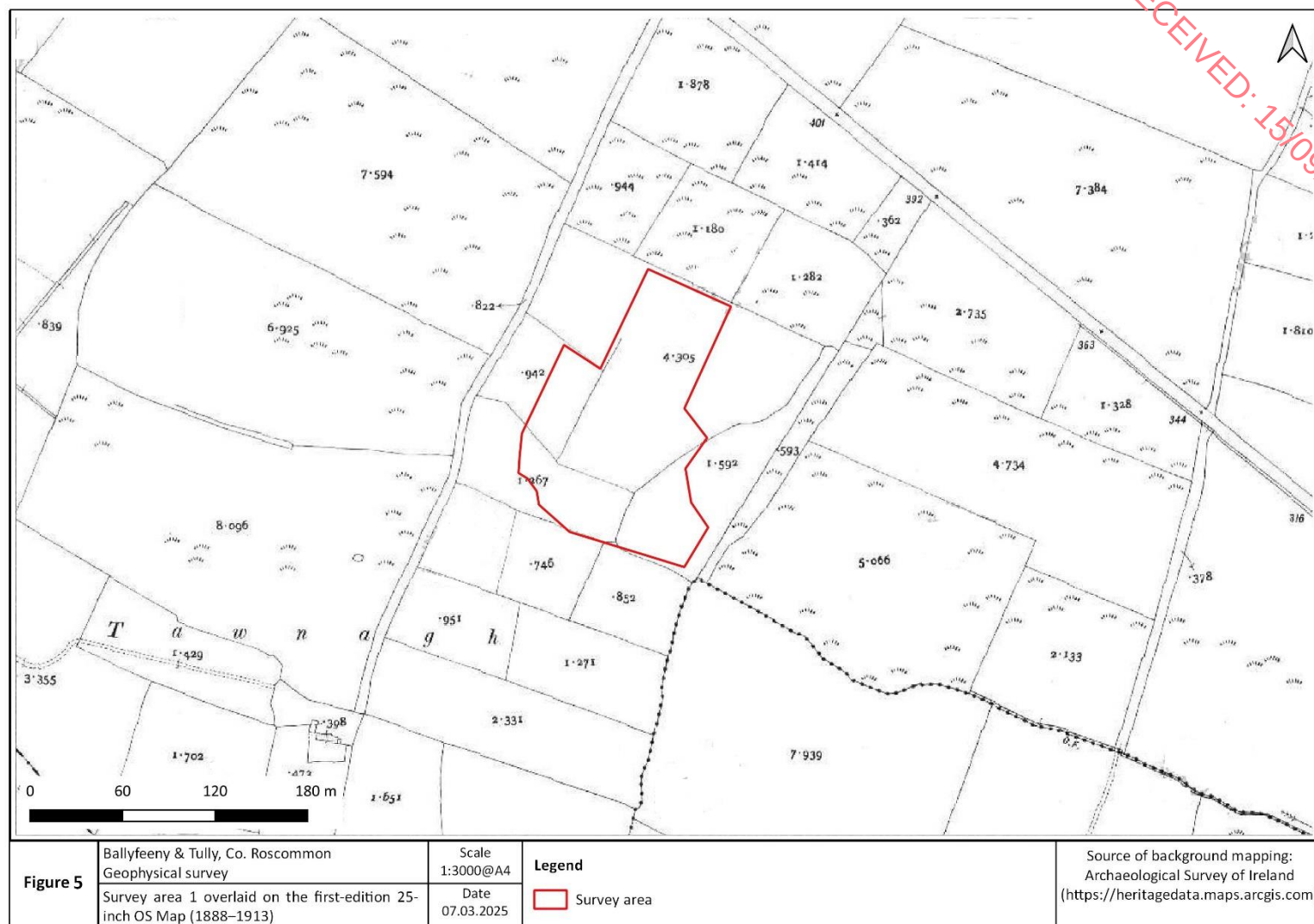


Figure 5. Survey area 1 (Ballyfeeny) overlaid on the first-edition 25-inch Ordnance Survey Map (1888–1913).

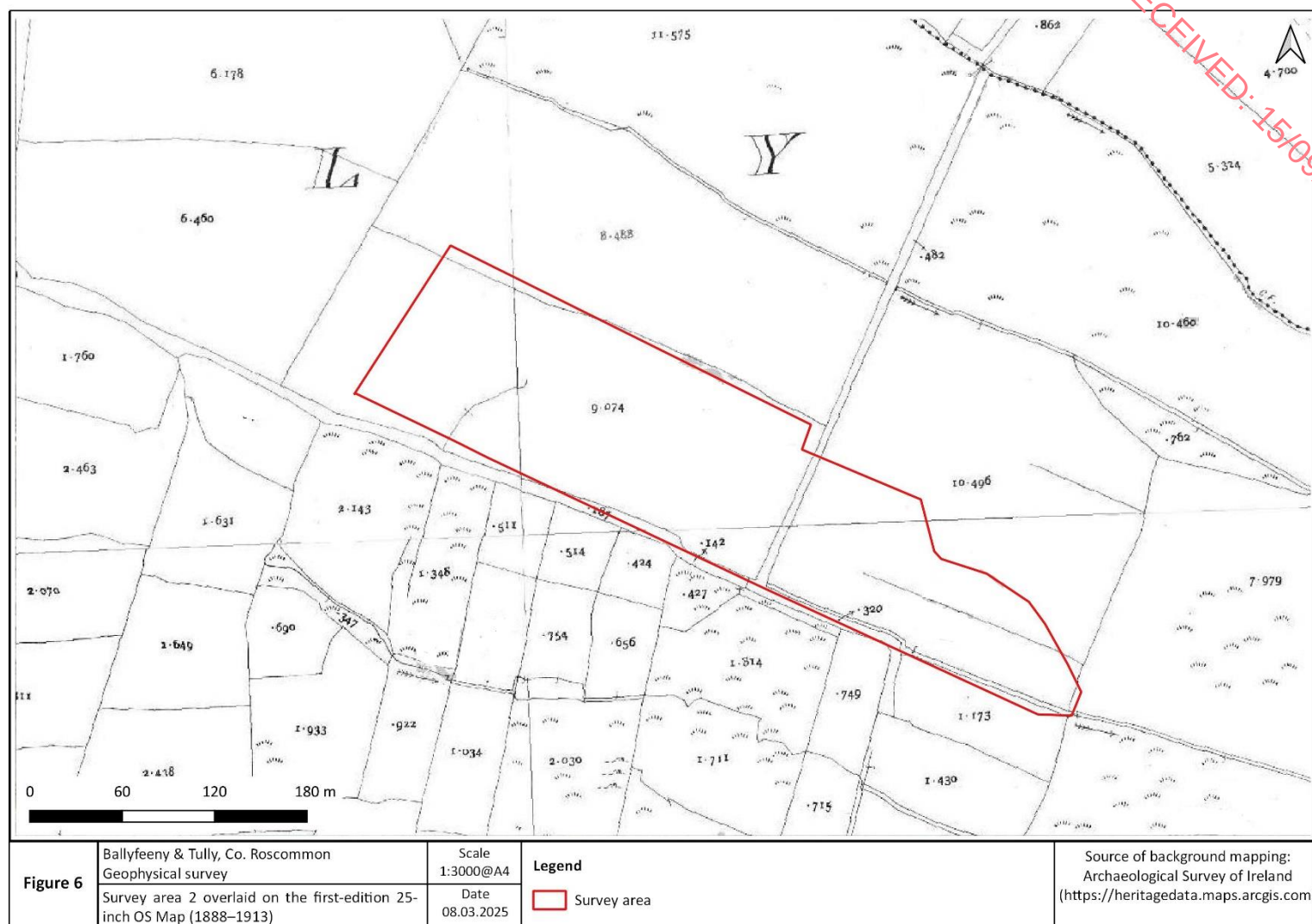


Figure 6. Survey area 2 (Tully) overlaid on the first-edition 25-inch Ordnance Survey Map (1888–1913).



Figure 7. Survey area 1 (Ballyfeeny).



Figure 8. Survey area 2 (Tully).



Figure 9. Greyscale image of gradiometry results.



Figure 10. Survey Area 1: greyscale image of gradiometry results.



Figure 11. Survey Area 2: greyscale image of gradiometry results.

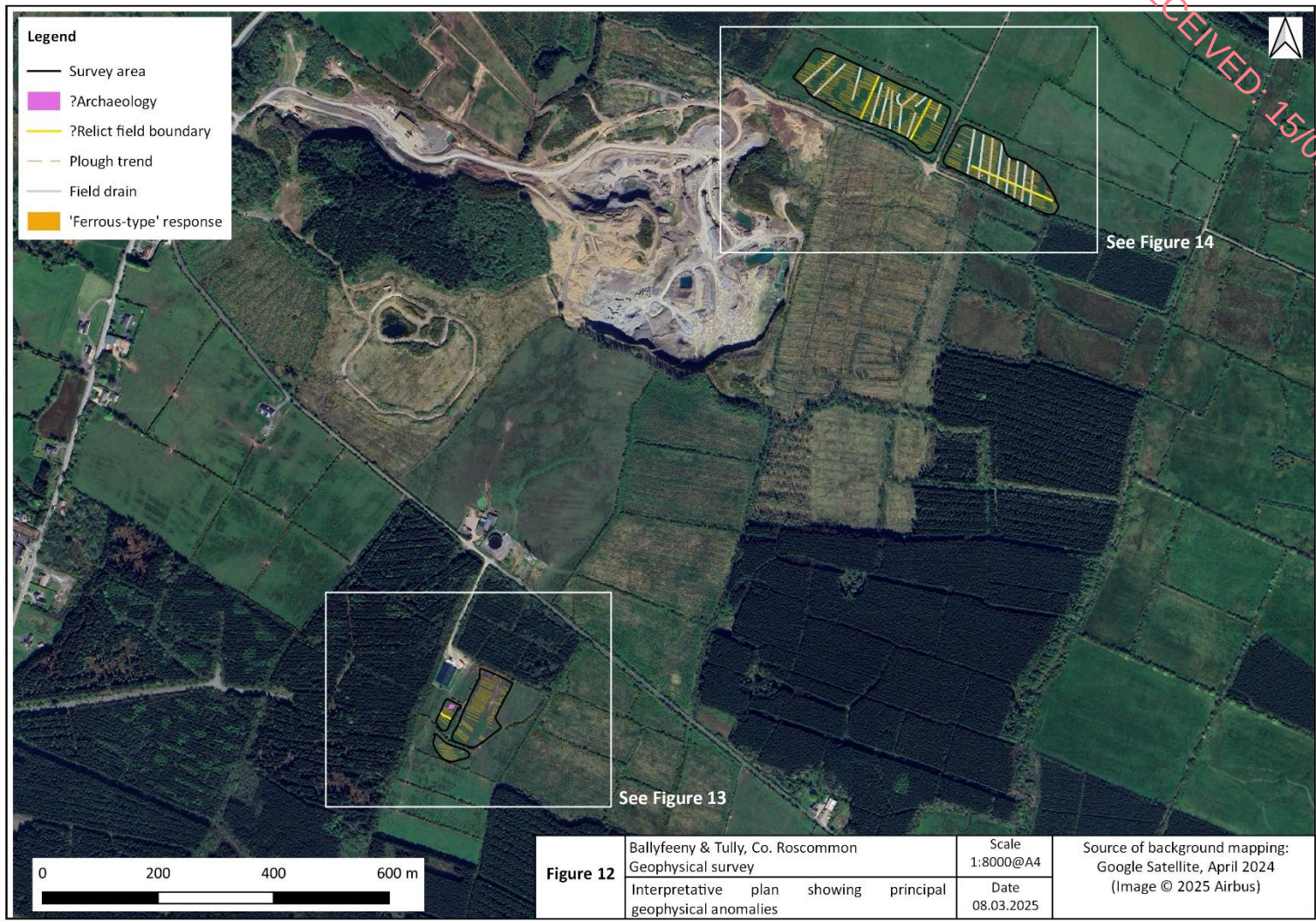


Figure 12. Survey Areas 1 & 2: interpretative plan showing principal geophysical anomalies.

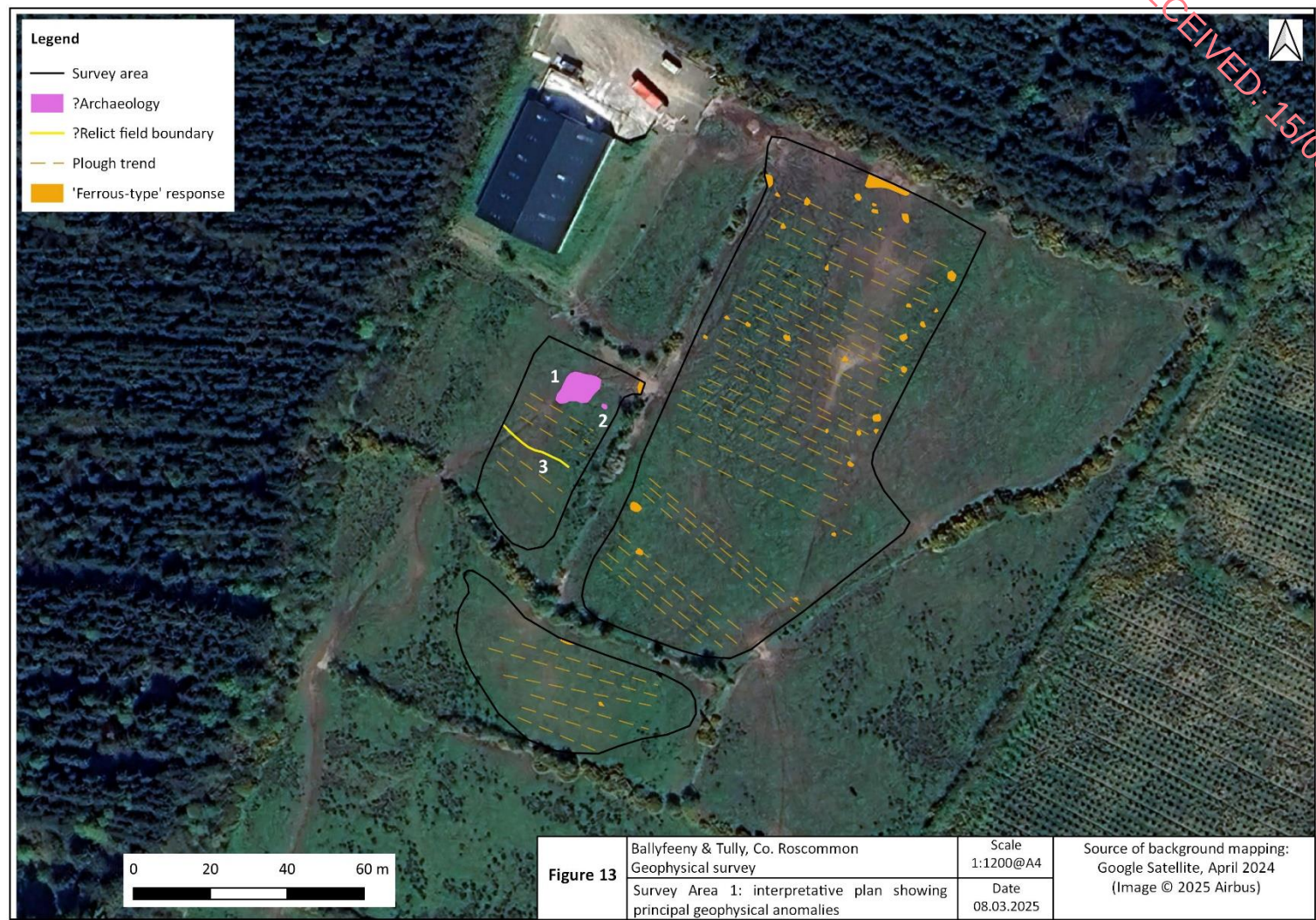


Figure 13. Survey Area 1: interpretative plan showing principal geophysical anomalies.



Figure 14. Survey Area 2: interpretative plan showing principal geophysical anomalies.

12 Plates

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Plate 1. Looking southeast across Survey Area 1.



Plate 2. Survey Area 1, looking north, with modern farm shed to left of photo.



Plate 3. Survey Area 2, west field, looking east.



Plate 4. Survey Area 2, east field, looking west.