

Archaeological Impact Assessment East Limerick Substation Development



Prepared by
Peter Looney
John Cronin & Associates
3a Westpoint Trade Centre
Ballincollig
County Cork

On behalf of
Harmony Solar East Limerick Limited.

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1. Introduction

John Cronin & Associates were commissioned by **Harmony Solar East Limerick Limited** to undertake an archaeological impact assessment of the known and potential archaeological heritage resource within, and immediately adjacent to, a Proposed Substation Development. The proposed substation is located within a greenfield location in the townlands of **Gotoon (Smallcounty By.), Coolscart and Kilfrush, Figures 1 & 2**. This **Gotoon** is in **Smallcounty Barony**, distinguishing it from another townland named Gotoon in County Limerick. Hereafter, all references to Gotoon are to that townland in Smallcounty Barony.

This report will be provided as supporting material for an application to An Coimisiún Pleanála.

The overview of the proposed development is as follows;

Harmony Solar East Limerick Limited is seeking planning permission for a substation development within the townlands of Gotoon, Coolscart, and Kilfrush in County Limerick.

The Proposed Substation Development description, as contained on the statutory notices for the planning application, reads as follows:

A 10-year planning permission for the construction of a 220kV Loop In Loop Out (LILO) substation and associated works within a site of 17.02 hectares which will include the following:

- *Transmission System Operator (TSO) compound with an area of approximately 14,158m², containing a two-storey 220kV GIS substation building with a footprint of approximately 1,844m², a total floor area of 3,550.8m², and a height of 20.7 m.*
- *Customer compound with an area of approximately 4,576m², containing a customer building with a footprint of approximately 346.2 m², a total floor area of 311.8m² and a height of 7.62m.*
- *220kV customer transformer positioned within bunded enclosures, with a height of 9.5m above finished ground level.*
- *220kV electrical infrastructure including transformers, switchgear, gantries, insulators, conductors, protection and control equipment, and all associated electrical plant and apparatus.*
- *A Battery Energy Storage System (BESS) located within a dedicated BESS compound and including:*
 - *55 no. containerised battery storage modules, each measuring 6.06 m long, 2.44 m wide and 2.9 m high.*
 - *28 no. containerised transformer and power conversion / conditioning units, each measuring 6.06 m long, 2.44 m wide and 2.9 m high.*
 - *Ancillary BESS infrastructure including inverters, transformers, switchgear, control equipment, thermal management systems, fire detection and suppression systems, acoustic screening, and associated electrical plant.*
- *Removal of 1 no. existing 25m high steel lattice tower, and the installation of 2 no. steel lattice towers of 26.5m high, foundations and associated insulators, hardware and conductor.*
- *4no. lightning protection masts, with a height of 18m.*
- *1 no. telecommunications mast, with a height of 37.52m.*
- *140m of underground electrical cable and associated ducting, including joint bays, cable sealing end compounds, marker posts and associated infrastructure.*
- *Internal access tracks.*

- A new access point from the L1509 public road.
- Removal of derelict farm building.
- Landscaping and biodiversity enhancement measures.
- Security gates, boundary fencing and all associated ancillary development, site works and services.

A Natura Impact Statement will be submitted with the application.

The Proposed Substation Development forms part of a wider “Overall Project”. The Overall Project comprises the following components:

- A new 220kV substation development, Battery Energy Storage System (BESS) and associated grid infrastructure (hereafter referred to as the Proposed Substation Development), for which planning consent will be sought from An Coimisiún Pleanála (ACP) as a Strategic Infrastructure Development (SID) under Section 182A of the Planning and Development Act 2000 (as amended).
- A solar farm and associated cable route (the Proposed Solar Farm Development), for which planning consent is sought from Limerick City and County Council under Section 34 of the Planning and Development Act 2000 (as amended).

The Red Line Boundary for the Proposed Substation Development overlaps with, and is located within, the Red Line Boundary for the Proposed Solar Farm Development and therefore forms part of the wider Overall Project lands. The Proposed Substation Development is required to facilitate the connection of the Proposed Solar Farm Development to the national electricity transmission network. However, separate consenting routes are required under the Planning and Development Act 2000, as amended.

The study area for this assessment comprises the area within the red-line boundary of the site, as well as lands within 500m of the site boundary. The assessment firstly outlines the methodology used in its compilation (**Section 2**) and then provides an archaeological and historical context for the study area, including a summary of the relevant legal and planning framework for the recorded and potential elements of the archaeological resource within its environs (**Section 3**). The results of a programme of geophysical survey and site inspection are described in **Section 4**. The results of a programme of test trenching are summarised in **Section 5**. An assessment of the impact of the proposed development is provided in **Section 6**, while conclusions and recommendations are outlined in **Section 7**.



Figure 1: General location of site to the south-southwest of Hospital, County Limerick

2. Methodology

This report is based on a programme of desktop research and desk-based assessment, a site inspection, a review of a geophysical survey and test trenching.

Desktop study

This assessment began with a desktop study, which identified all known heritage constraints within the study area. The study area comprises the subject site and extends for 1km from the boundary of the solar farm.

The Proposed Substation Development is within the townlands of **Gotoon (Smallcounty By.), Coolscart and Kilfrush (Figures 1 & 2)**. The Overall Development is within the townlands of Ballyhawkish, Millfarm, Coolscart, Coolalough, Gotoon (Smallcounty By.), Ballycahill, Kilfrush, Knocklong and Newtown (Smallcounty By., Hospital ED).

The principal sources reviewed for the desktop assessment of the known archaeological resource are the files and records of the Archaeological Survey of Ireland (ASI). Between 1984 and 1992, the ASI issued a series of county Sites and Monuments Records (SMRs). These county SMRs, revised in the light of further research and fieldwork, formed the basis for the statutory Record of Monuments and Places (RMP) (established under Section 12 of the National Monuments (Amendment) Act 1994). Similar in format to the SMRs (comprising a list and set of maps), the RMPs were issued for each county in the State between 1995 and 1998. Since the publication of the original county SMRs and RMPs, the ASI has continued to record and add entries to the Sites and Monuments Record. In addition, the ASI has developed an online database and web viewer known as 'Historic Environment Viewer'. This has been developed to "enhance the user's experience by facilitating access to the database of the National Monuments Service Sites and Monuments Record (SMR) and the National Inventory of Architectural Heritage (NIAH) in a seamless one-stop point of access for both data resources" (Source: www.archaeology.ie).

In addition, the following sources were consulted:

- *Cartographic Sources* - The detail on cartographic sources can indicate past settlement and land use patterns in recent centuries and can also highlight the impact of modern developments and agricultural practices. This information can aid in the identification of the location and extent of unrecorded, or partially levelled, features of archaeological or architectural heritage interest. The cartographic sources examined for the study areas include the First Edition of the 1:10,560 "6-inch" Ordnance Survey (OS) maps (this area published in 1843) and the 1:2500 "25-inch" OS map (this area published in 1902).
- *Aerial photography* - In parallel with the cartographic study, a review of publicly accessible aerial photographic sources from the Ordnance Survey, Google and Bing Maps was undertaken.
- *Database of Irish Excavation Reports* - The Database of Irish Excavation Reports contains summary accounts of all archaeological excavations carried out in Ireland (North and South) from the 1960s to present.
- *Placenames Database of Ireland* - The Placenames Branch (Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media) provides a comprehensive management system

for data, archival records and placenames research conducted by the State. Its primary function is to undertake research in order to establish the correct Irish language forms of the placenames of Ireland and to publish them on a public website (www.logainm.ie).

Field Survey

A survey of the Proposed Development lands was carried out in September 2025 by two suitably qualified archaeologists, Mr Peter Looney and Mr Colm Chambers. The site visit included the use of a drone for taking localised aerial photographs of the site.

The weather was dry and clear at the time of the survey, leading to excellent visibility. The study area was assessed in terms of historic landscape, land use, vegetation cover, presence, and potential for undetected archaeological and architectural heritage sites/features.

Geophysical Survey

A geophysical survey of the site area was undertaken by Mr John Nicholls of Target Archaeological Geophysics Limited under detection device licence number **25R0032**. This was part of a wider geophysical survey. A comprehensive report on this survey was produced by the surveyor, which accompanies the application. A summary of the results of the survey is outlined in **Section 4** of this report.

Test Trenching

A limited programme of test trenching was carried out in March to April 2026 to aid in the design of the Overall Development (under excavation licence number **25E1145**). Six of the test trenches excavated relate to the area of the Proposed Substation Development. A summary of the results of the test trenching is outlined in **Section 5** of this report.

3. Context

Location

The proposed development is within the townland of Gotoon, County Limerick, and is c.650m to the south-southeast of Hospital, County Limerick, **Figures 1 & 2**. The main site area spans seven fields and is accessed by the L1509 road to the south. The site red line includes a section of the L1509 and R513 roads to the east and a connection northwards to the N516. The existing 220kv overhead line traverses the site, and the Proposed Substation Development includes the LILO connection works required to connect to that line. The south-eastern boundary of the site is also a townland boundary, with Kilfrush. This is marked by a road, which was depicted on the 25-inch Ordnance Survey map of 1902, while a field boundary marked the townland boundary on the earlier 6-inch Ordnance Survey map of 1843.



Figure 2: Aerial image of Proposed Substation Development site, portion leading to the north from the north-eastern corner is a contingency transformer delivery route

The main area of the Proposed Substation Development is within seven agricultural fields in the townland of Gotoon. These are mostly flat but rise marginally to the north. The fields are generally bounded by hedgerows with low earthen banks. Aerial images taken with a drone are included in the **Appendix** to this document.

Access to east

A portion of the public road network, for a distance of c.425m, is within the site red line. This includes sections of the L1059 and R513. The portion of the R513 road was present on both editions of the historic Ordnance Survey maps, while the portion of the L1509 road was only depicted on the 25-inch edition Ordnance Survey map, though the road closely followed the townland boundary, which was depicted on the earlier first edition 6-inch map.

Access to north from northwest (contingency)

This is a *contingency transformer delivery route* and is included within the red line as an alternative delivery option should it be required. This connection runs for 590m northwards as far as the R516. This runs to the western side of the field boundary adjacent to an existing laneway, which was depicted on the historic Ordnance Survey maps. The area within the red line includes a crossing of the R516 and a small area in the field to the north of the road.

Legal & Policy Framework

The management and protection of cultural heritage in Ireland is achieved through a framework of national laws and policies which are in accordance with the provisions of the Valetta Treaty (1995) (formally the *European Convention on the Protection of the Archaeological Heritage*, 1992) ratified by Ireland in 1997; the *European Convention on the Protection of Architectural Heritage* (Granada Convention, 1985), ratified by Ireland in 1997; and the *UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage*, 2003, ratified by Ireland in 2015.

The locations of World Heritage Sites (Ireland) and the Tentative List of World Heritage Sites submitted by the Irish State to UNESCO were reviewed, and none are located within the wider area surrounding the study area.

On the 13th of October 2023, the Historic and Archaeological Heritage and Miscellaneous Provisions Bill 2023 was signed into law by President Michael D. Higgins. The new Act repeals existing legislation and institutes new provisions equipped to cater for the protection of historic heritage in a modern era. The Act repeals the National Monuments Acts 1930 to 2014 and replaces those Acts with provisions for the protection of historic heritage, provisions for the protection of archaeological heritage, provisions for the regulation of certain activities in the interests of such protection and provisions enabling the State to ratify or accede to certain international conventions which relate to such protection or regulation; to give effect to the EIA Directive and the Habitats Directive in relation to the carrying out of works at, on, in, under, to, or within the immediate surroundings of monuments; to give further effect to the Valetta Convention; to consequentially repeal or amend certain other enactments; to make miscellaneous amendments to the Foreshore Act 1933, the Lough Corrib Navigation Act 1945, the Planning and Development Act 2000, the Valuation Act 2001, the Local Government Act 2001, the Local Government Rates and other Matters Act 2019 and the Maritime Area Planning Act 2021; and to provide for related matters.

The Act introduces the following innovative measures:

- newly discovered archaeological sites are afforded immediate legal protection, mirroring the existing system for archaeological objects and historic wrecks that are automatically protected without a need for formal designation or registration;
- a statutory reporting scheme for finds of monuments;
- a new 'Register of Monuments' will be established, replacing several overlapping designation and registration systems hitherto in operation;
- "World Heritage Property" is defined for the first time in Irish legislation;
- subject to certain exceptions, archaeological objects with no known owner will automatically become the property of the State;
- the Act provides the necessary provisions to allow for the ratification of two important international treaties, the 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property, and the 1995 UNIDROIT Convention on Stolen or Illegally Exported Cultural Objects;
- the Act enables the State to ratify the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage;
- an integrated licensing system whereby one licence can authorise a range of activities will be introduced and, for the first time, a statutory appeals process will be established to review licensing decisions, and
- a new civil enforcement procedure can be used as an alternative to, or to supplement, criminal proceedings.

The Act defines archaeology as "the study of past human societies of all periods, either as a whole or of various aspects of them, through the material remains of all forms, moveable and immovable, left by those societies and the evidence of their environment, and includes the study of climatological, ecological, geological, geomorphological or pedological factors relevant to understanding the nature or context of those societies or the distribution or nature of their material remains, and "archaeological interest" shall be construed accordingly".

Section 14 of the Act provides for the establishment of a register to be known as the Register of Monuments. The Act sets out transitional provisions applicable to the Register of Historic Monuments, Record of Monuments and Places and National Monuments.

Limerick Development Plan 2022-2028

The *Limerick Development Plan 2022-2028* includes the following relevant objectives in relation to the protection of the archaeological resource:

Objective EH 036 Preservation of the Archaeological Heritage. *It is an objective of the Council to seek the preservation of all known sites and features of historical and archaeological interest. This is to include all the sites listed in the Record of Monuments and Places as established under Section 12 of the National Monuments (Amendment) Act 1994. The preferred option is preservation in situ, or at a minimum preservation by record.*

Objective EH 037 Preservation of unrecorded/newly discovered Archaeological Heritage. *It is an objective of the Council to protect and preserve the preservation in situ (or at a minimum by record) of all sites and features of historical and archaeological interest, discovered subsequent to the publication of the Record of Monuments and Places.*

Objective EH 039 Protection of the setting of Archaeological Monuments. It is an objective of the Council to ensure that no development shall have a negative impact on the character or setting of an archaeological monument.

Objective EH 040 Proper procedures during the planning process. It is an objective of the Council to:

a) Ensure early engagement at preplanning stage is undertaken with the Local Authority Archaeologist to promote the 'preservation in situ' of archaeological remains and settings in development.

b) Adopt a policy of archaeological monitoring of developments where the scale and nature of such developments may, in the opinion of the Planning Authority, have a negative impact on previously unknown archaeological features/ artefacts.

c) Require the preparation of an Archaeological Heritage Assessment in cases where it is deemed that Archaeological Heritage would be affected by a proposed development (due to their location, size or nature). The report shall be prepared by a suitably qualified archaeologist on the archaeological implications, if any, of the proposed development either prior to a decision on a planning application or prior to commencement of development on site.

Objective EH 048 Assessment and Recognition of Archaeological Landscapes. It is an objective of the Council to designate archaeological landscapes as part of an ongoing appraisal for Historic Landscape Characterisation of Limerick.

Archaeological background

There are no recorded archaeological sites within the red line boundary of the proposed substation area. There are fourteen recorded archaeological sites in the study area of 500m from the site boundary **Figure 3**. The Zone of Notification associated with one of these, a barrow – unclassified (LI040-200----), is partially within the red line area of the proposed development. There is, however, no development planned within this area.

The majority of the fourteen recorded archaeological sites within the study area are not extant above ground and were identified as cropmarks by the Bruff aerial photographic survey in the 1980s or by more recent satellite photographs.

Table 1: Recorded archaeological sites within c.500m of site red line

SMRS	TOWNLAND	MONUMENT CLASS	CONDITION
LI040-028----	Gotoon (Smallcounty By.)	Enclosure	Partially extant
LI040-029----	Coolscart	Enclosure	Partially extant
LI040-030----	Gotoon (Smallcounty By.)	Enclosure	Cropmark
LI040-031----	Gotoon (Smallcounty By.)	Standing stone	Unclear
LI040-142----	Rathanny	Earthwork	Cropmark
LI040-199001-	Gotoon (Smallcounty By.)	Barrow - unclassified	Cropmark
LI040-199002-	Gotoon (Smallcounty By.)	Barrow - unclassified	Cropmark
LI040-200----	Gotoon (Smallcounty By.)	Barrow - unclassified	Cropmark
LI040-201001-	Kilfrush	Barrow - unclassified	Cropmark
LI040-201002-	Kilfrush	Earthwork	Cropmark
LI040-233----	Coolscart	Barrow - ditch barrow	Cropmark

SMRS	TOWNLAND	MONUMENT CLASS	CONDITION
LI040-269----	Coolalough	Barrow - unclassified	Cropmark
LI040-285----	Ballycahill	Barrow - ditch barrow	Cropmark
LI040-291----	Gotoon (Smallcounty By.)	Barrow - mound barrow	Extant

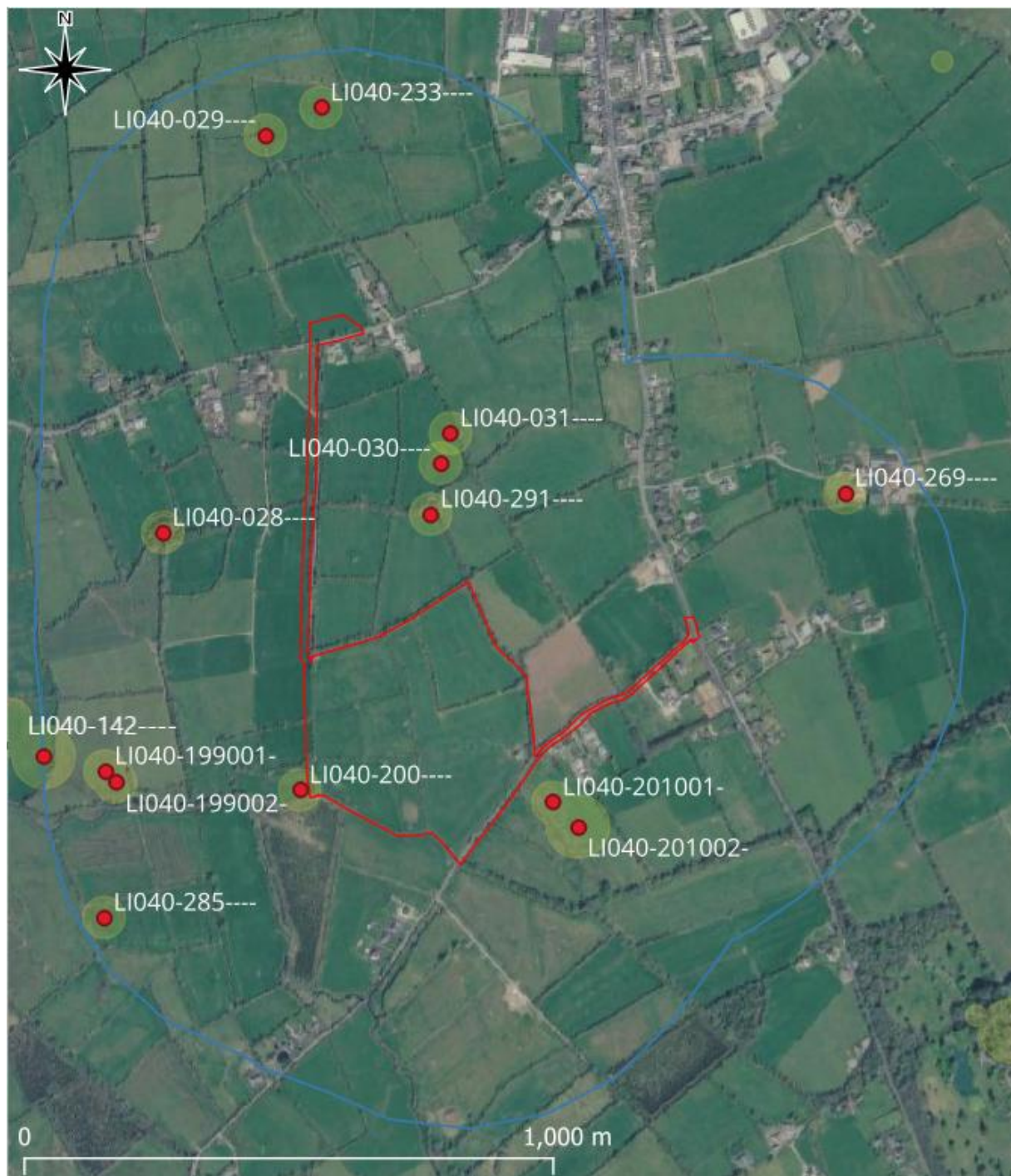


Figure 3: Proposed Substation Development area, showing recorded archaeological sites in surrounding 500m study area

The Excavations Database

The Excavation Database (www.excavations.ie) contains summary accounts of all licenced archaeological investigations carried out in Ireland (North and South) from 1969 onwards. The database was searched and does not contain any entries for excavations within the townlands of Gotoon (apart from that carried out by this author and discussed below) or Kilfrush. A single excavation was partially within the townland of Coolscart, and no archaeology was identified (18E0318).

Topographical Files

A review of the Topographical files held by the National Museum of Ireland was carried out in April 2026. There were no records related to the townlands of Gotoon, Coolscart or Kilfrush.

Cartographic Review

The detail on historic cartographic sources demonstrates the nature of past settlements and land use patterns in recent centuries and can also highlight the impacts of modern developments and agricultural practices. This information can aid in the identification of the location and extent of unrecorded or partially levelled features of archaeological or architectural heritage interest. The cartographic sources examined for the study areas include the First Edition of the 1:10,560 “6-inch” Ordnance Survey (OS) maps (this area published in 1843) and the 1:2500 “25-inch” OS map (this area published in 1902).

The substation area was depicted as enclosed farmland on the historic Ordnance Survey maps. On the first edition 6-inch map (**Figure 4**), the external boundaries of the land parcel were shown in their current form. The fields within the area were subdivided to a greater extent than they are now. A number of buildings were depicted in the northern part of the area, including where a derelict building remains; these buildings were accessed via a laneway from the north, the proposed access from the north follows to the west of that laneway. The road at the north of that (current R516) was depicted on that map. The current road (L1509) that is within the site red line to the east of the Proposed Substation area was not in place at the time, but there was a field (and townland) boundary in the same general location. The road at the eastern end (current R513) was depicted on the map. Nothing was depicted on that edition of the map that would indicate the presence of archaeological features at the site.

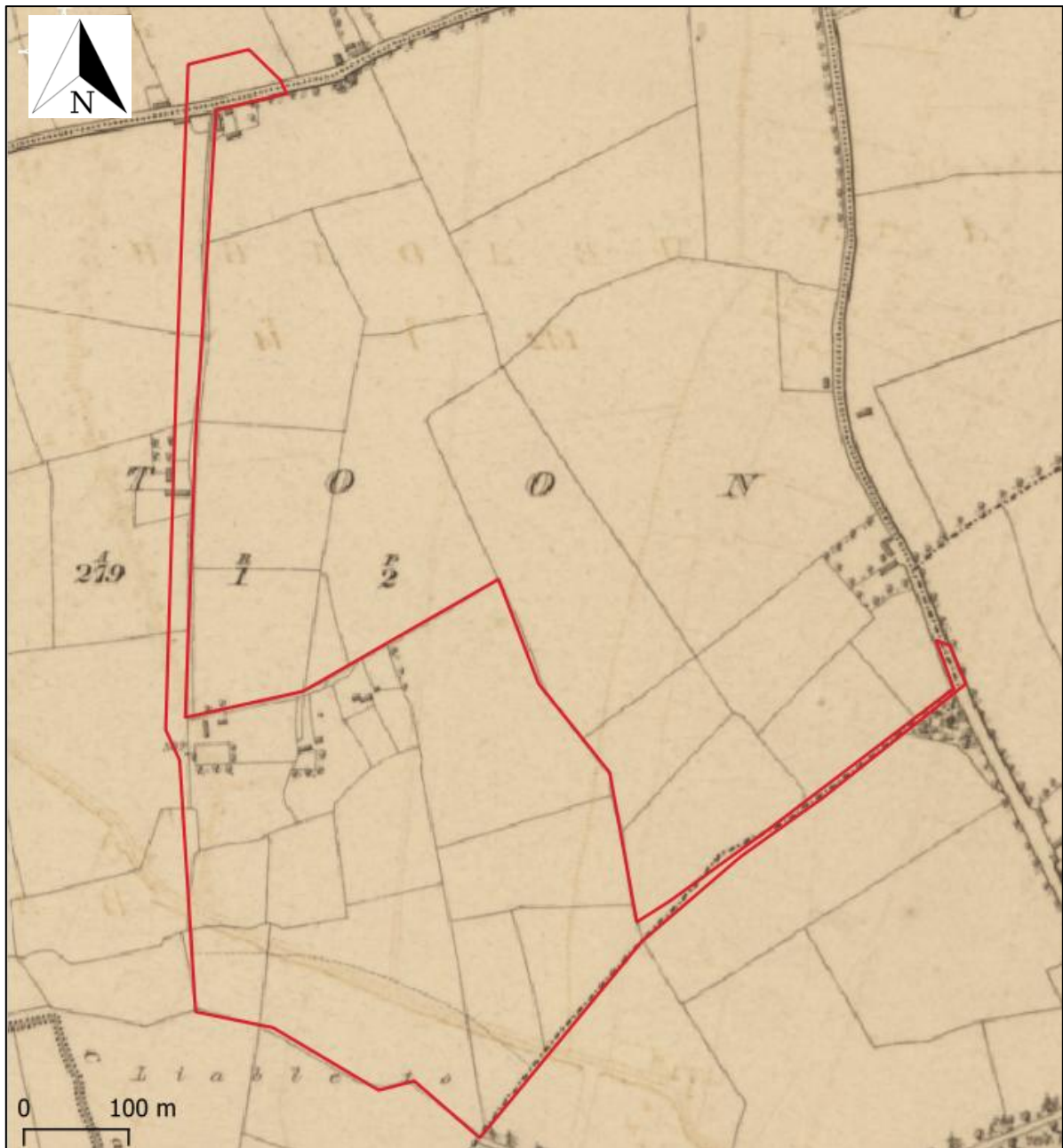
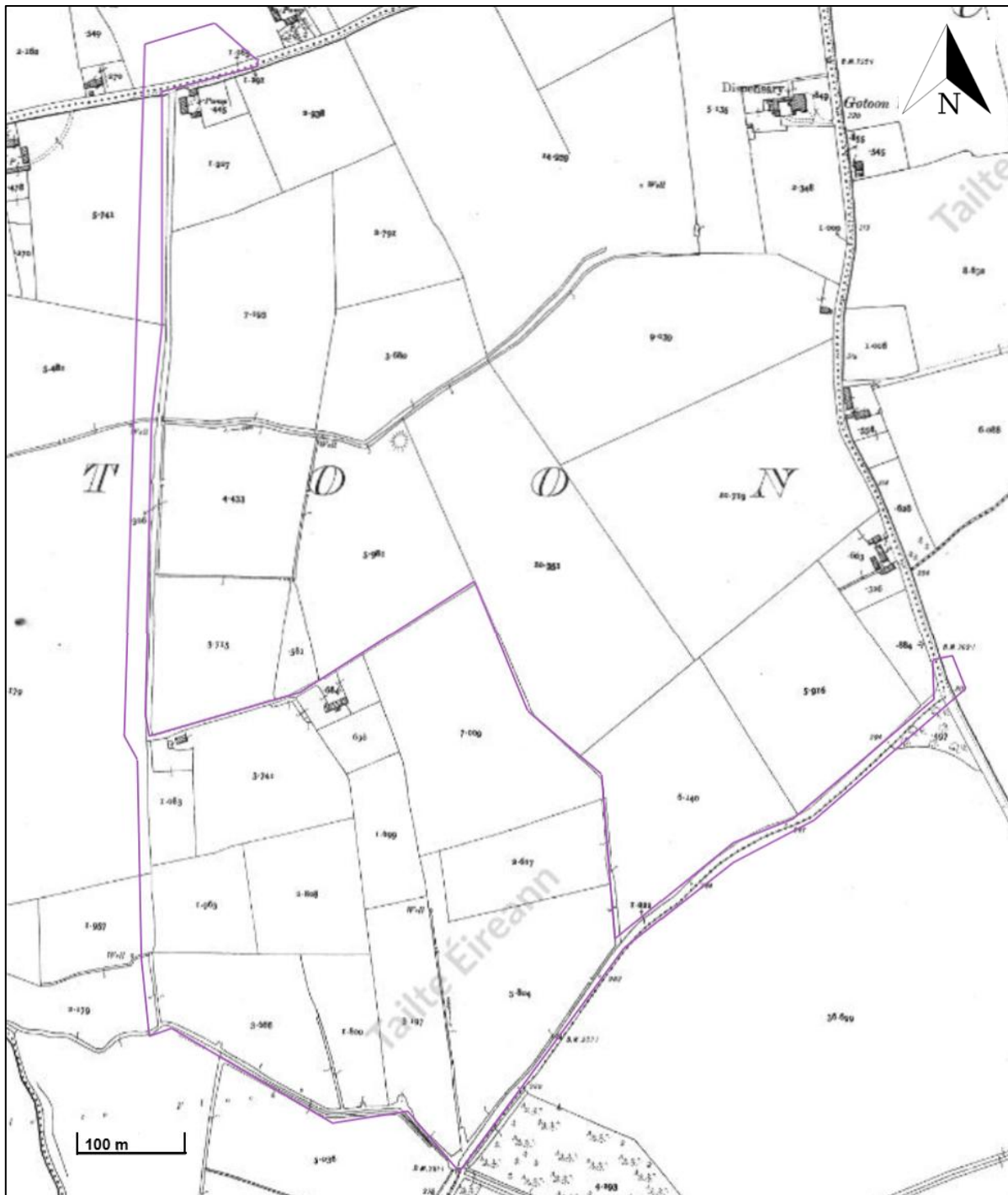


Figure 4: Approximate red line of Proposed Substation Development area overlay onto first edition 1:10,560 OS map (1843)

On the 1:2500 Ordnance Survey map of 1902 (**Figure 5**), the site was only marginally different to the earlier map. Minor changes were made to the internal field boundaries and some of the buildings that had been depicted on the earlier map were not shown. A well was depicted in the central part of the area, with a water channel running to the south. The well and water channel are no longer present, but the line of the former water channel can be seen on aerial images. As was the case with the earlier map, nothing was depicted that would indicate the presence of archaeological features at the site. The current road (L1509) that is within the site red line to the east of the Proposed Substation area was an addition on this map from the earlier addition.



Townland names

Townlands are the smallest unit of land division in the Irish landscape and many may preserve early Gaelic territorial boundaries that pre-date the Anglo-Norman conquest. The boundaries and nomenclature of the Irish townlands were recorded and standardised by the Ordnance Survey during the 19th century. The Irish origins of many townland names often refer to natural topographical features, but some name elements may also give an indication of the presence of past human activity within the townland, e.g. *lios* or *rath* indicate the presence of a ringfort while names containing elements such as *kill* or *temple* are often indicative of ecclesiastical activity.

The proposed substation is within the townlands of Gotoon, Coolscart and Kilfrush. The Irish language name of the townland is Geotún. Of these, only Kilfrush gives indication of an archaeological site (church) in the townland. There is a recorded church in the townland, but outside the Proposed Substation Development area

Table 2: Townland name translations and glossary (logainm.ie)

Townland	As Gaeilge	Meaning	Indication of Archaeology?
Coolscart	Cúil Scairte	<i>cúil</i> - corner, nook corner of (the) thicket	No
Gotoon (Smallcounty By.)	Geotún	Meaning unclear	No
Kilfrush	Cill Frois	cill - church the church of (the) shower	Recorded church in townland (LI040-035001-) but outside site

4. Geophysical Survey and Site Description

Geophysical Survey

A programme of geophysical survey was carried out over the available area in May 2025 by Target Archaeological Geophysics Ltd (Detection Device Licence 25R0032). This took place over a wider area but included the red line area of the Proposed Substation Development. Four probable archaeological features were identified within the proposed substation area (**Figures 6 & 7**).



Figure 6: Greyscale imagery from the geophysical survey (25R0032) of the fields within the central part of the Proposed Substation Development area (after Nicholls, 2025)

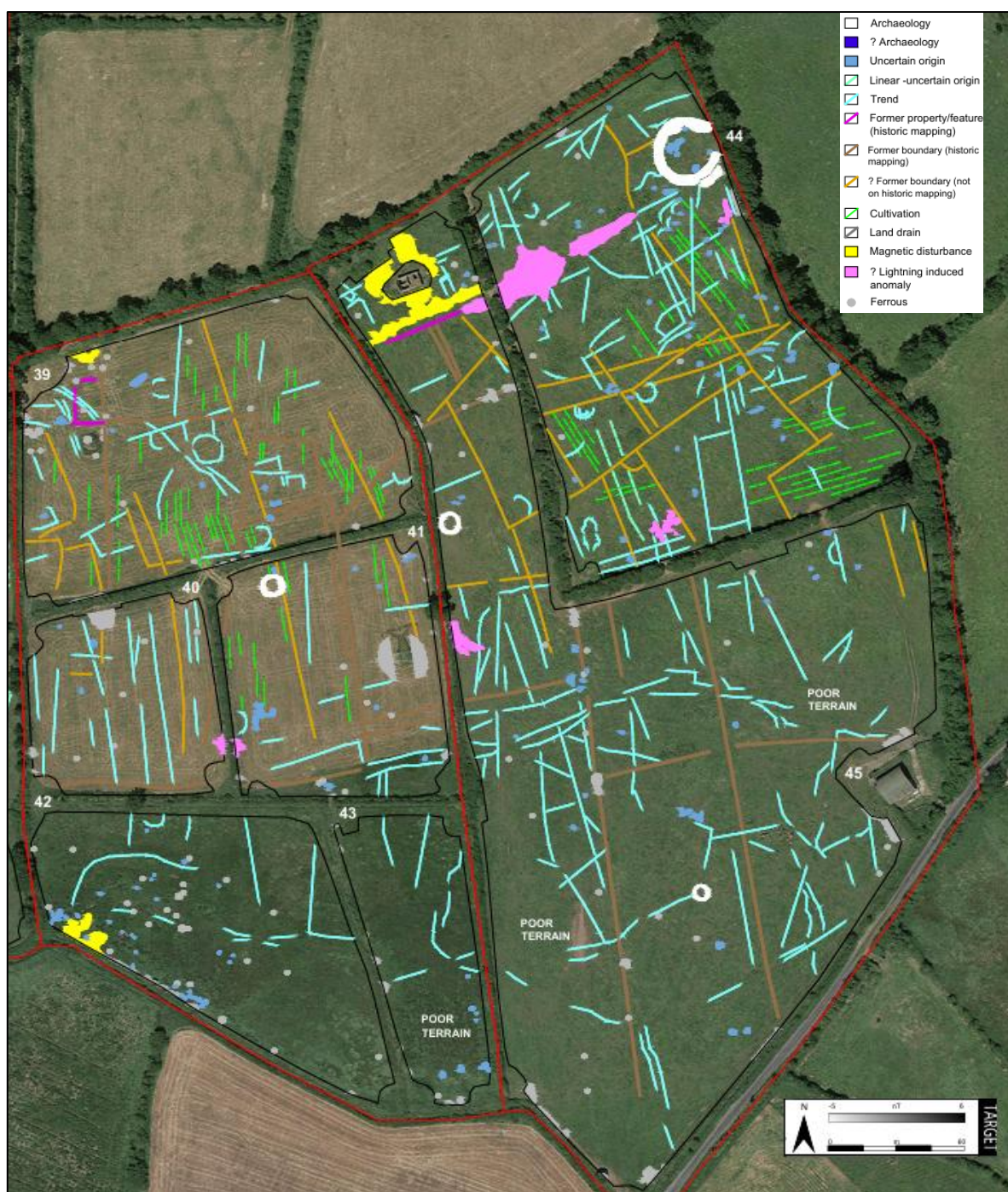


Figure 7: Interpretative image from the geophysical survey (25R0032) of the central part of the Proposed Substation Development (after Nicholls, 2025), see **Figure 9** for 'archaeology' features isolated

Contingency transformer delivery route

A small portion of a field in Coolscart is included within the red line as part of the *contingency transformer delivery route*. An archaeological feature was identified within this area during the geophysical survey (**Figure 8**). This is a ring-ditch type feature, with a diameter of c.10m, and is similar to those identified elsewhere in the site. Should this temporary contingency transformer delivery route be required, there will be consultation with the designers and NMS as to best mitigate against impact to the feature.

No archaeological features were identified from the geophysical survey in the remainder of the contingency transformer delivery route.



Figure 8: Anomaly identified from geophysical survey in Coolscart, in area of contingency transformer delivery route to north of remainder of site.

5. Test Trenching

A programme of test trenching was carried out in March to April 2026 under excavation licence number **25E1145**, as issued by the National Monuments Service. A detection device licence, **26R0082**, was also issued to allow for the use of a metal detector to aid in artefact retrieval. This was carried out for the Overall Project, but six trenches were within the Proposed Substation Development area. These investigated three anomalies of high archaeological potential that had been identified from the geophysical survey.

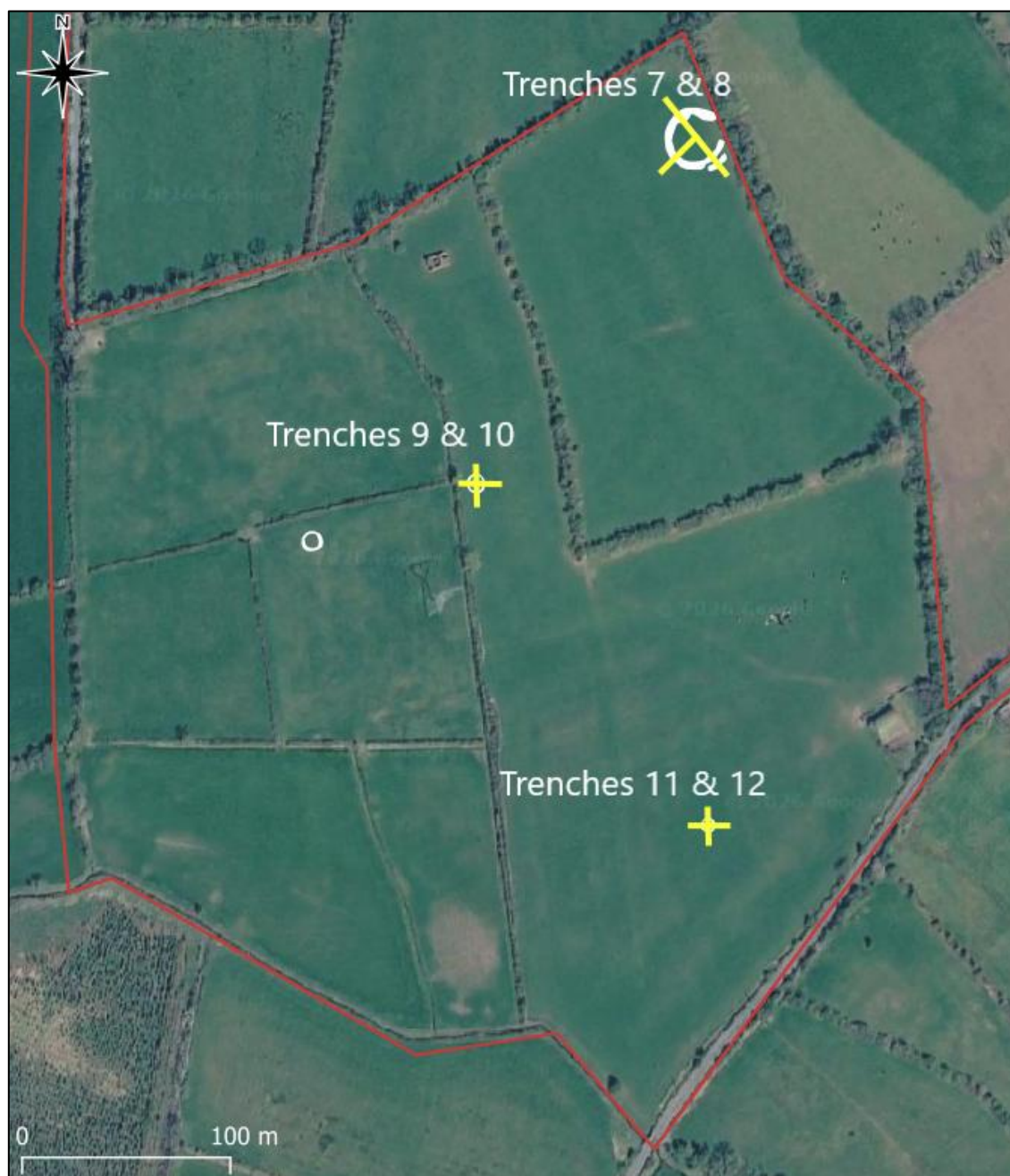


Figure 9: Anomalies identified from geophysical survey **25R0032**, with trenches (yellow) excavated **25E1145**

In summary, **two features that had been previously identified as anomalies from a geophysical survey were identified and confirmed as archaeological**; these consisted of a small ring-ditch feature (c.8m in diameter) and one larger enclosure (c.30.5m in diameter), **a third small ring-ditch feature (c.8m in diameter), as identified from the geophysical survey was partially identified but was very ephemeral.**

An additional ring-shaped anomaly is within the site red line area, to the west of those investigated during the programme of test trenching. This was not predicted to be disturbed by the construction of the substation at the time of the test trenching, so was not investigated as part of that programme.

Enclosure

An **enclosure**, likely an early medieval ringfort, was identified in Trenches 7 and 8 in the northeast of the area. Some internal features that may be contemporary to the enclosure were also identified. Within the enclosure in Trenches 7 & 8, large areas of disturbance and introduced material were identified, as well as a possible pit feature. Two small external, linear features were identified and investigated. These were not deemed to relate to archaeology.

The term for the larger feature identified in Trenches 7 and 8 used in this report is an *Enclosure*.

An area defined by an enclosing element (e.g. bank, wall, fosse, scarp), or indicated as such cartographically, and occurring in a variety of shapes and sizes, possessing no diagnostic features which would allow classification within another monument category. These may date to any period from prehistory onwards. Enclosures with a diameter greater than 70m should be classed as Large Enclosure.

Further investigations may confirm this as a ringfort, but no diagnostic material from the Early Medieval period was recovered from the test trenching programme during these investigations. This enclosure had an external diameter of c.30.5m and an internal diameter of c.22m, so would be a small ringfort if that is the correct classification. It may also be a form of barrow, though related burial material would be required for that to be established.

Trench ID	Tr7	Tr8
Length	45m	25m
Orientation	Northwest-southeast	Northeast-southwest
ITM co-ordinates	E 570349.1, 634749.3, N 570377.7, 634713.9	E 570363.5, 634731.5, N 570346.9, 634715.0
Townland	Gotoon	
Description	Due to the nature of the proposed substation development, which is a requirement of the proposed solar farm, a significant area will be required. An area with no recorded archaeological sites has been identified for this. Three anomalies deemed to be archaeological were identified from the geophysical survey in the area proposed for the substation, while no anomalies labelled 'archaeology?' are within this area. The construction of a substation will require significant groundwork. Therefore, a full understanding of the anomalies within that field was required. Trenches 7 and 8 targeted a circular anomaly, the description from the geophysical survey is as follows; <i>Circular enclosure, probable rath/ringfort, c.30m in diameter with linear trends and discrete positives of potential note.</i>	

	The soil profile of the area is fine loamy texture drift with limestones. The topsoil in these trenches was 0.3m to 0.5, with an average depth of 0.4m. A section of introduced material was investigated to a depth of c.0.8m. The topsoil overlay a mixed orangey-brown to grey subsoil, composed of loamy clay with occasional, small sub-angular stones. The ring-shaped anomaly that these trenches targeted was identified in all three locations where it was expected. This was identified most clearly in the southeast and southwest; there was an area of disturbance to the interior (southeast) of the ditch in the northwestern part of Trench 7. The ditch was c.4m wide in the southeast and c.3.5m wide in the southwest, and had an external diameter of c.30.5m (northwest to southeast). The south-eastern portion of the enclosing ditch was partially investigated with hand tools. From the exterior, the cut of the ditch was followed for c.1.1m, there it was at a depth of 0.78m. The cut had an angle of c.45 degrees for much of the investigated section but was more gradual at the top. At that rate of incline from both sites and with a rounded base, it is estimated that the ditch would have a depth of c. 1.2m below the surrounding natural subsoil level. An additional anomaly was identified to the southeast, outside the enclosure ditch; this was not identified within the trench. Three large areas of disturbance, with introduced stones and dark material, were identified within the enclosure in Trench 7, including that mentioned against the north-western part of the enclosing ditch. The machine removed part of this at the intersection of Trenches 7 and 8. This was c.0.2m below the surrounding natural subsoil level. This stone and other material may have been introduced to level the area for agriculture. A possible internal feature was identified in Trench 8, c.3.9m from the enclosing ditch. This was 0.9m northeast to southwest, it was identified for 0.5m southeast of the limit of the trench but continued beyond this to the northwest. As this appeared to be a potentially archaeological feature within what appeared to be an archaeological enclosure, it was not investigated further. Two small linear features were identified, each just outside the enclosing ditch, to the northwest and in the southwest. These were investigated with hand tools and found to, Southwest: had a gentle U-shaped cut with a depth of c.0.1m and a width of c.0.4m. Northwest: had a very gentle U-shaped cut with a depth of c.0.05m and a width of c.0.8m. Both had fills of material similar to the surrounding topsoil and were deemed to relate to agriculture, rather than the enclosure. No archaeological finds were recovered, but considerable amounts of modern porcelain, brick and two pieces of metal were identified (metal using the metal detector). Appendix: Plates 4-12.
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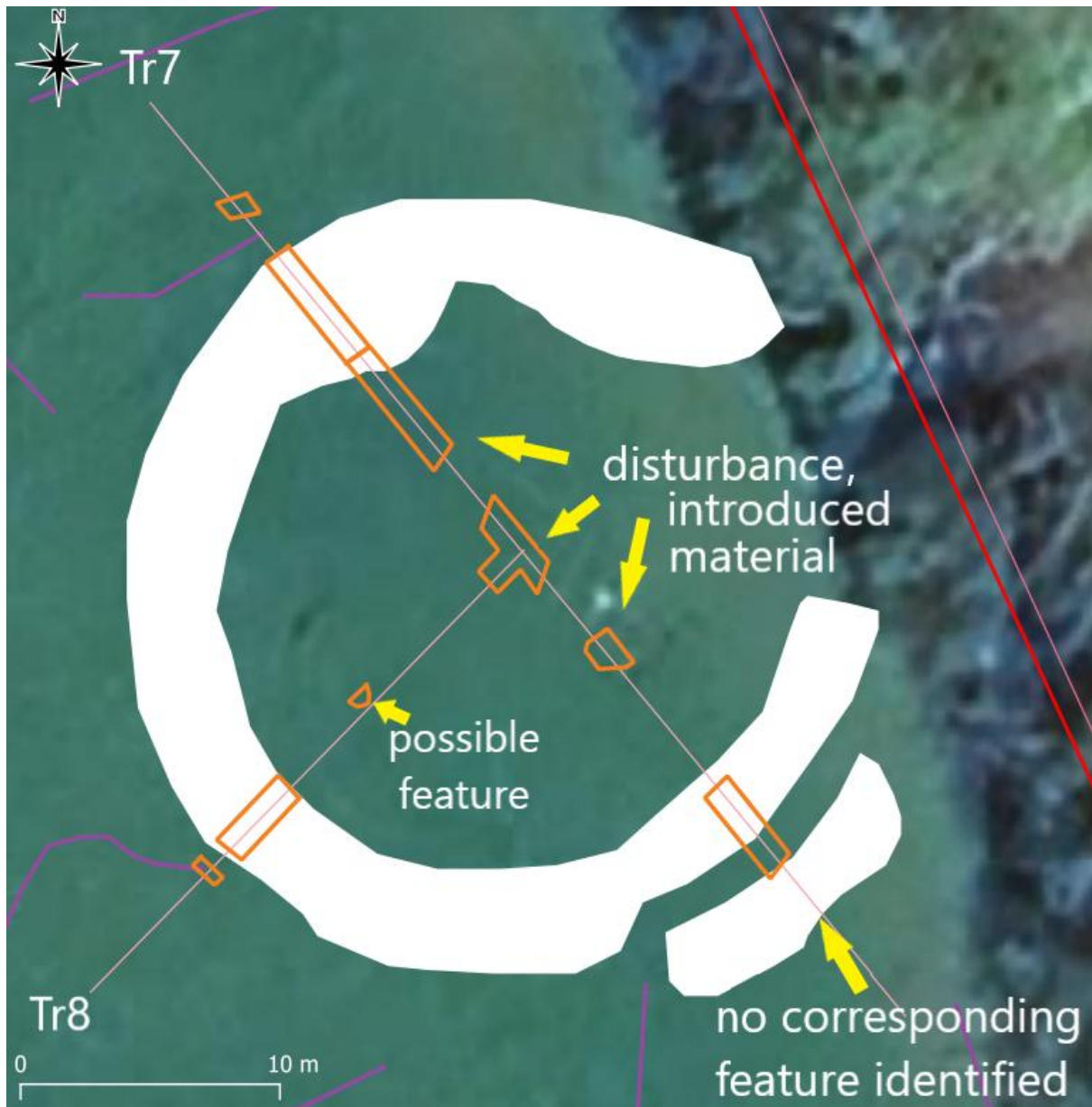


Figure 10: Centrelines of Trenches 7 and 8, showing where features were identified (orange lines) over anomaly identified from geophysical survey (white). Significant ditch identified in three places. Small outer linears identified in two places. Areas of disturbance and possible internal features were also noted.

Ring-ditches

A **ring-ditch** was partially exposed in **Trenches 9 and 10**. This was particularly ephemeral, and despite having trenches located to investigate it on four sides, it was only located on one side. Where it was located, it was particularly shallow into the subsoil, only 0.02m.

A second, more substantial **ring-ditch** was identified in the southern part of the field in **Trenches 11 and 12**. This was identified in four places and had a depth of up to 0.05m into the subsoil.

In this report, the use of the term ring-ditch is per the definition in the National Monuments Service's *Monument Class and Scope Notes*.

A circular or near circular fosse, usually less than 20m in diameter and visible as cropmarks/soilmarks on aerial photographs. The function of these monuments is unknown as ring-ditches may be the remains of ploughed out barrows, round houses or other modern features and, in consequence, may date to any period from prehistory onwards.

This definition does not ascribe a function or time period to the feature; it merely describes its form. The examples identified in this testing programme were particularly ephemeral, with the deepest section of any investigated being 0.06m. This at least rules out the features being foundations of structures of any magnitude.

It is of note that no pits were identified at the centre of any of these ring-ditch features. Should burials be connected to these features, they would be considered barrows, but no evidence for burials was identified during this testing programme. No archaeological artefacts were recovered in the area of any of these features.

Trench ID	Tr9	Tr10
Length	20m	20m
Orientation	North-south	East-west
ITM co-ordinates	E 570257.7, 634572.9, N 570258.1, 634554.8	E 570268.6, 634564.7, N 570250.5, 634565.0
Townland	Gotoon	
Description	Due to the nature of the substation, which is a requirement of the proposed solar farm, a significant area will be required. An area with no recorded archaeological sites has been identified for this. Three anomalies deemed to be archaeological were identified from the geophysical survey in the area proposed for the substation, while no anomalies labelled 'archaeology?' are within this area. The construction of a substation will require significant ground works. Hence, it is not anticipated that there would be an option to avoid these areas, and so a full understanding of the anomalies is required. <i>This is one of 2 small circular enclosures 8-10m in diameter situated on elevated and low-lying terrain respectively.</i> The soil profile of the area is fine loamy texture drift with limestones. The topsoil in these trenches was 0.3 to 0.35m deep. This overlay a mixed orangey-grey to brown subsoil, composed of clayey silt with occasional, small sub-angular stones. The anomaly that these trenches targeted was identified. This was a ring-shaped anomaly per the geophysical survey. This was, however, only identified in one place, the north. Where it was identified, it was particularly ephemeral, at a	

	maximum thickness of 0.02m. It measured c.0.45m across, which was smaller than the c.1m indicated by the geophysical survey. A possible portion of this feature was investigated in the western part and considered to be potentially part of the feature, but when overlaid on the imagery from the geophysics, it appears unlikely to be so. This may have instead just been a lower section of topsoil. The eastern and southern portions of the trenches were excavated very cautiously, and the continuation of the feature was not found. Per the geophysical survey, this feature had an external diameter of c.9m, though no diameter could be confirmed as the feature was only identified in one area. (It should be noted that this was the last of the three areas targeting ring-shaped anomalies to be excavated. Trenches 11 & 12 and Trenches 13 & 14 had been excavated by this time and it was expected that the feature might be ephemeral. With this knowledge, the excavation of Trenches 9 and 10 was done with particular care; nevertheless, the feature was only identified in one section of the trenches.) Appendix: Plates 13-18.
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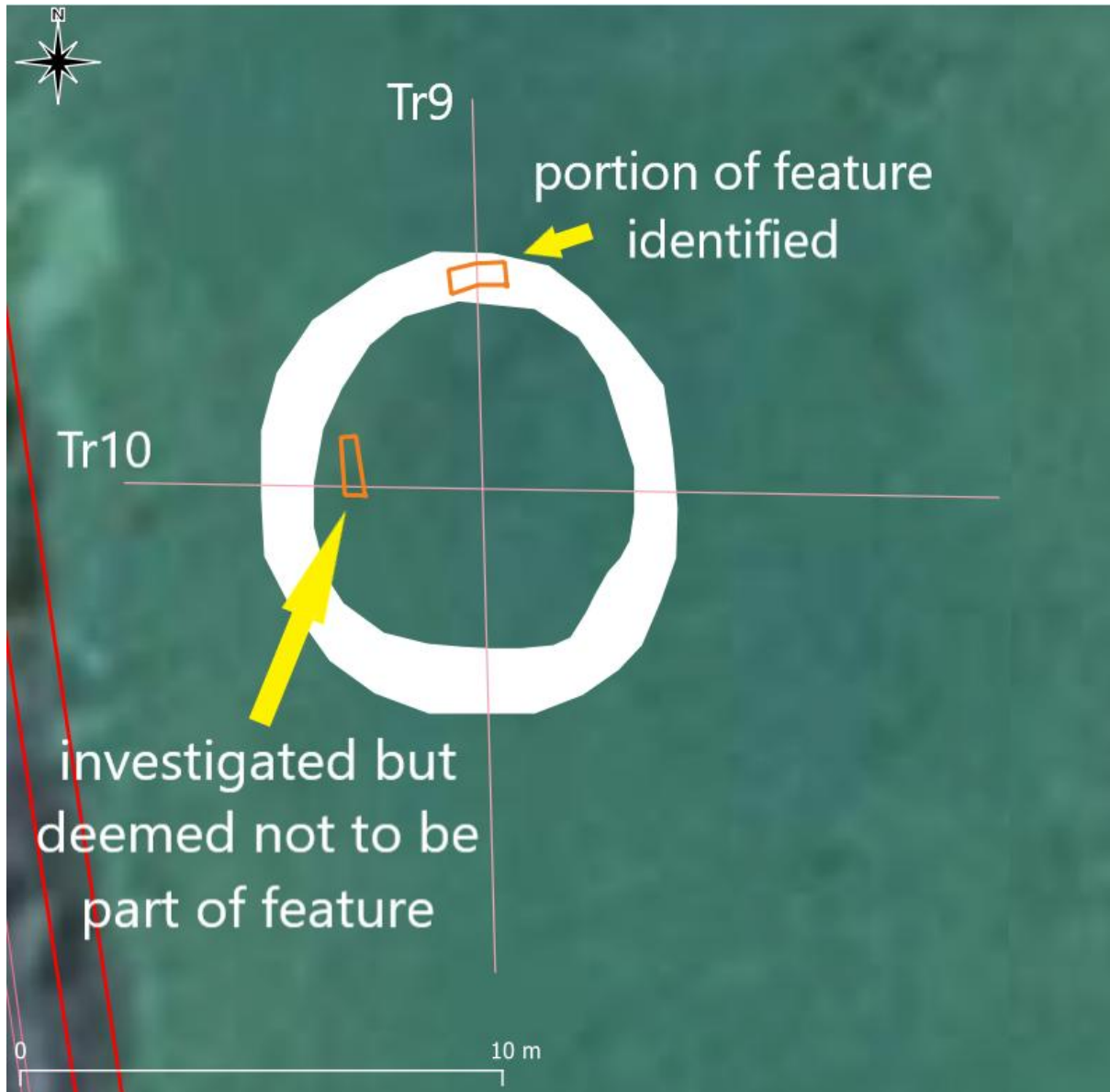


Figure 11: Centrelines of Trenches 9 and 10, showing where feature was identified (orange lines) over anomaly identified from geophysical survey (white). Section in west likely lower section of topsoil, section in north is only part where the anomaly was identified, this was only c.0.02m deep.

Trench ID	Tr11	Tr12
Length	20m	20m
Orientation	North-south	East-west
ITM co-ordinates	E 570368.8, 634408.3, N 570369.4 ,634392.4	E 570378.4, 634400.5, N 570360.9, 634400.5
Townland	Gotoon	
Description	Due to the nature of the substation, which is a requirement of the proposed solar farm, a significant area will be required. An area with no recorded archaeological sites has been identified for this. Three anomalies deemed to be archaeological were identified from the geophysical survey in the area proposed for the substation, while no anomalies labelled 'archaeology?' are within this area. The construction of a substation will require significant ground works. Hence, it is not anticipated that there would be an option to avoid these areas, and so a full understanding of the anomalies is required. <i>One of 2 small circular enclosures 8-10m in diameter situated on elevated and low-lying terrain, respectively.</i> With the knowledge of the anomaly in the location, and with the grass being short, a ring-shaped dip was perceptible in advance of the excavation of the trenches. There was longer grass when the site was previously inspected and this was not noticeable at that time. The soil profile of the area is river alluvium. The topsoil in these trenches was 0.3 to 0.4m deep. This overlay an orangey-brown subsoil, composed of clayey silt with occasional, small sub-angular stones. The anomaly that these trenches targeted was identified in each part of the test trenches, where it was expected. This had a width of c.1m (north), c. 0.95m (east), c.1m south and c.1.2m (west). The anomaly was investigated with hand tools in the south and west. This was shallow in each of these, 0.04m in the south and 0.05m in the west and had a very gentle U-shaped cut. The fill included small charcoal flecks. This feature had an external diameter of c.7.1 to 7.7m and an internal diameter of c.5.1 to 5.8m. A possible circular pit was identified towards the centre of the feature. This was investigated, but was not found to be a cut feature. Appendix: Plates 19-24.	

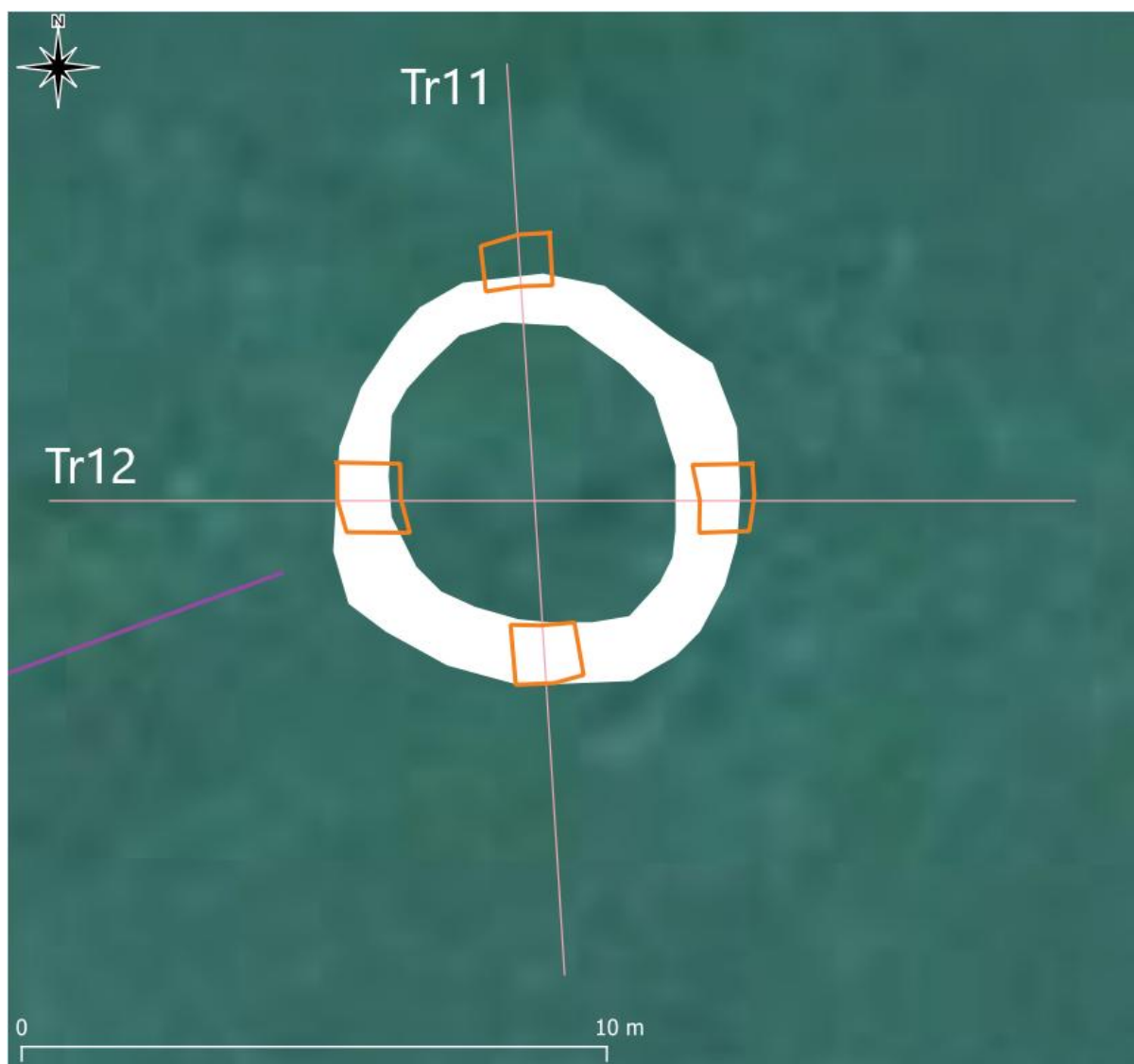


Figure 12: Centrelines of Trenches 11 and 12, showing where feature was identified (orange lines) over anomaly identified from geophysical survey (white)

6. Proposed Development and Assessment of Impact

The overview of the proposed development is as follows;

Harmony Solar East Limerick Limited is seeking planning permission for a substation development within the townlands of Gotoon, Coolscart, and Kilfrush in County Limerick.

The Proposed Substation Development description, as contained on the statutory notices for the planning application, reads as follows:

A 10-year planning permission for the construction of a 220kV Loop In Loop Out (LILO) substation and associated works within a site of 17.02 hectares which will include the following:

- *Transmission System Operator (TSO) compound with an area of approximately 14,158m², containing a two-storey 220kV GIS substation building with a footprint of approximately 1,844m², a total floor area of 3,550.8m², and a height of 20.7 m.*
- *Customer compound with an area of approximately 4,576m², containing a customer building with a footprint of approximately 346.2 m², a total floor area of 311.8m² and a height of 7.62m.*
- *220kV customer transformer positioned within bunded enclosures, with a height of 9.5m above finished ground level.*
- *220kV electrical infrastructure including transformers, switchgear, gantries, insulators, conductors, protection and control equipment, and all associated electrical plant and apparatus.*
- *A Battery Energy Storage System (BESS) located within a dedicated BESS compound and including:*
 - *55 no. containerised battery storage modules, each measuring 6.06 m long, 2.44 m wide and 2.9 m high.*
 - *28 no. containerised transformer and power conversion / conditioning units, each measuring 6.06 m long, 2.44 m wide and 2.9 m high.*
 - *Ancillary BESS infrastructure including inverters, transformers, switchgear, control equipment, thermal management systems, fire detection and suppression systems, acoustic screening, and associated electrical plant.*
- *Removal of 1 no. existing 25m high steel lattice tower, and the installation of 2 no. steel lattice towers of 26.5m high, foundations and associated insulators, hardware and conductor.*
- *4no. lightning protection masts, with a height of 18m.*
- *1 no. telecommunications mast, with a height of 37.52m.*
- *140m of underground electrical cable and associated ducting, including joint bays, cable sealing end compounds, marker posts and associated infrastructure.*
- *Internal access tracks.*
- *A new access point from the L1509 public road.*
- *Removal of derelict farm building.*
- *Landscaping and biodiversity enhancement measures.*
- *Security gates, boundary fencing and all associated ancillary development, site works and services.*

A Natura Impact Statement will be submitted with the application.

The Proposed Substation Development forms part of a wider “Overall Project”. The Overall Project comprises the following components:

- *A new 220kV substation development, Battery Energy Storage System (BESS) and associated grid infrastructure (hereafter referred to as the Proposed Substation Development), for which planning consent will be sought from An Coimisiún Pleanála (ACP) as a Strategic Infrastructure Development (SID) under Section 182A of the Planning and Development Act 2000 (as amended).*
- *A solar farm and associated cable route (the Proposed Solar Farm Development), for which planning consent is sought from Limerick City and County Council under Section 34 of the Planning and Development Act 2000 (as amended).*

The Red Line Boundary for the Proposed Substation Development overlaps with, and is located within, the Red Line Boundary for the Proposed Solar Farm Development and therefore forms part of the wider Overall Project lands. The Proposed Substation Development is required to facilitate the connection of the Proposed Solar Farm Development to the national electricity transmission network. However, separate consenting routes are required under the Planning and Development Act 2000, as amended.

Assessment of Impact

Recorded Archaeology

The desktop review of the site established that there are no recorded archaeological sites within the proposed development area, meaning that there would be **no direct impact on the recorded archaeological resource** should the development proceed.

There are eleven recorded archaeological sites located within a study area of 500m of the site. The majority of these sites have been levelled and only recognised from aerial photographs. There is **no predicted impact** from the proposed development on the recorded archaeological sites within the study area. The Zone of Notification associated with one of these, a barrow – unclassified (LI040-200---), extends partially within the red line area of the proposed development. There is, however, no development planned within this area; see **Figure 13**.

Discovered Archaeology

There was no indication from the consulted historic maps of the presence of previously unrecorded archaeological sites. The first licensed archaeological mitigation at the site was the undertaking of a geophysical survey. The geophysical survey of the site identified four probable archaeological features within the main area of the Proposed Substation Development area, in addition to a number of anomalies of uncertain origin.

Three of these probable archaeological features were investigated by a targeted programme of archaeological test trenching. Two of these were identified as credible archaeological features, an enclosure and a ring-ditch. A third feature, a ring-ditch, identified from the geophysical survey, was partially identified during the test trenching programme (trenches 9 and 10), but only in one place and with a maximum depth of 0.02m.

It was possible to avoid the area of the discovered enclosure (**Figure 10**) and the more substantial of the ring-ditch features in the design of the substation development. This will result in these features being preserved *in situ*, see **Figure 13**.

Two of the three ring-ditches that were identified from the geophysical survey are located in areas where it was not possible to design in such a way as to avoid them. The two ring-ditch features that were investigated during testing were found to be very shallow and no associated features were identified, including at the centre of the features. The most substantial of these (identified in trenches 10 and 11) can be preserved *in situ*.

The two features should be excavated and preserved by record in advance of the construction of the substation development. There will be a direct and negative impact on these features, but this will be ameliorated by their excavation and recording. These are features that were unknown before the mitigation measures taken in advance of this project and will be better understood, following their excavation. A method statement will be prepared and submitted to the National Monuments Service along with an excavation licence application in advance of this work.

As-yet undiscovered archaeology

There is a possibility of other archaeological features remaining within the site area, including what may be indicated by some of the anomalies identified from the geophysical survey. The geophysical survey has proven to be extremely accurate, to the point of identifying a ring-ditch that was barely perceptible in test trenching.

Any possible additional archaeological features within areas of the site that would be disturbed would be negatively impacted should the proposed development proceed. There should therefore be additional archaeological test trenching carried out across the portions of areas of the site that are to be disturbed to identify any such features in advance of any construction. This will include trenches to target anomalies of unknown origin that were identified from the geophysical survey.

Contingency transformer delivery route

A small portion of a field in Coolscart is included within the red line as part of the *contingency transformer delivery route*. An archaeological feature was identified within this area during the geophysical survey (**Figure 8**). This is a ring-ditch type feature, with a diameter of c.10m, and is similar to those identified elsewhere in the site. Should this contingency transformer delivery route be required, there is a potential for a negative impact to that feature.

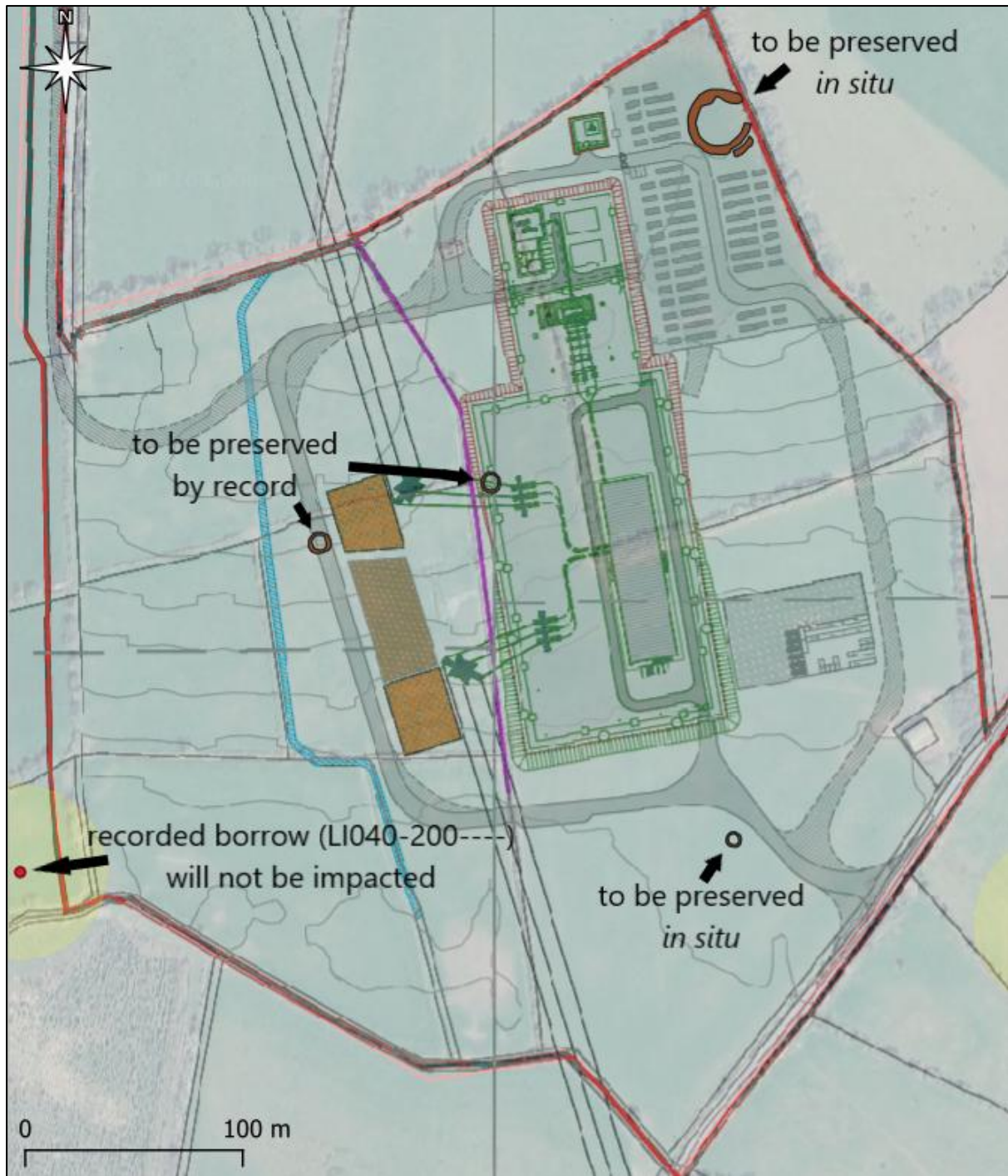


Figure 13: Site layout plan with imagery of identified archaeology, showing recommended mitigation

7. Conclusions

This archaeological impact assessment was undertaken in order to assess the potential impacts to both the known and potential archaeological heritage resource within, and adjacent to, the boundary of a proposed substation development at Gotoon, County Limerick.

A desktop study was carried out, and this was supplemented by fieldwork which consisted of a site inspection and a programme of geophysical survey (carried out by Target Archaeological Geophysics Ltd.) and a limited and targeted programme of test trenching.

The desktop review of the site established that there are no recorded archaeological sites within the proposed development area, meaning that there would be **no direct impact on the recorded archaeological resource** should the development proceed. The zone of notification associated with a recorded barrow extends partially into the site, but this is in an area that will not be developed.

Recommendations

Four archaeological features were identified within the main, central part of the site in the programme of geophysical survey. Three of these were investigated in a programme of test trenching, which confirmed at least two as archaeological, with a third being very ephemeral and only partially identified. The fourth anomaly was not included in the test trenching, but it was very similar to the other ring-shaped features on the geophysical survey and is likely similar.

The largest of these features, an enclosure, as well as one of the ring-ditch features, can be preserved *in situ*, within the design of the proposed development (**Figure 13**). These areas should be fenced off from the remainder of the site in advance of construction in order to protect them from damage due to construction traffic.

Two of the discovered ring-ditch features are in areas where avoidance was not possible. These features should be excavated and preserved by record under licence by the National Monuments Service.

An additional programme of archaeological test trenching should be carried out at the proposed substation location in advance of construction. This can be done with regard to the site plans and limited to areas that will be disturbed during construction, and include trenches that will target all anomalies of *archaeological potential* within the relevant area. Should additional archaeological material be identified, this may require preservation by record (excavation) or avoidance by redesign where possible.

Should the *contingency transformer delivery route* be required, there is potential for the feature that was identified in that area (**Figure 8**) to be negatively impacted. Should that delivery route be required, there will be consultation with the designers and NMS as to best mitigate against impact to the feature.

It should be noted that the above recommendations are subject to the approval of the National Monuments Service, Limerick City and County Council and An Coimisiún Pleanála.

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Appendix: Extract from photographic record

Drone Photographs



Plate 1: Central area, facing north



Plate 2: Northern part of central area, facing north



Plate 3: Facing south from north of central area of site

Test trenching 25E1145



Plate 4: Trench 7 facing northwest



Plate 5: Trench 7 facing southeast



Plate 6: Trench 8 facing southwest across enclosure



Plate 7: Trench 8 facing northeast across linear feature and enclosure



Plate 8: Investigative slot into enclosure ditch, in southeast of feature, Trench 7, facing northeast



Plate 9: Potential internal feature in enclosure, in right-hand side of image, continuing beyond limit of trench. Trench 8, facing southwest



Plate 10: Introduced stone-filled material, at intersection of Trenches 7 and 8, 0.2m deep. Facing southeast.



Plate 11: Linear feature outside enclosure ditch to southwest. Facing northwest.



Plate 12: Linear feature outside enclosure ditch to northwest. Facing northeast.



Plate 13: Trench 9 facing south



Plate 14: Trench 9 facing north



Plate 15: Section of ring-shaped feature in northern part of Trench 9, facing north



Plate 16: Section of ring-shaped feature in northern part of Trench 9, facing southwest



Plate 17: Trench 10 facing west



Plate 18: Trench 10 facing east



Plate 19: Trench 11 facing south



Plate 20: Trench 11 facing north



Plate 21: Section of ring-shaped feature in southern part of Trench 11, facing northeast



Plate 22: Trench 12 facing east



Plate 23: Trench 12 facing west



Plate 24: Section of ring-shaped feature in western part of Trench 12, facing south