

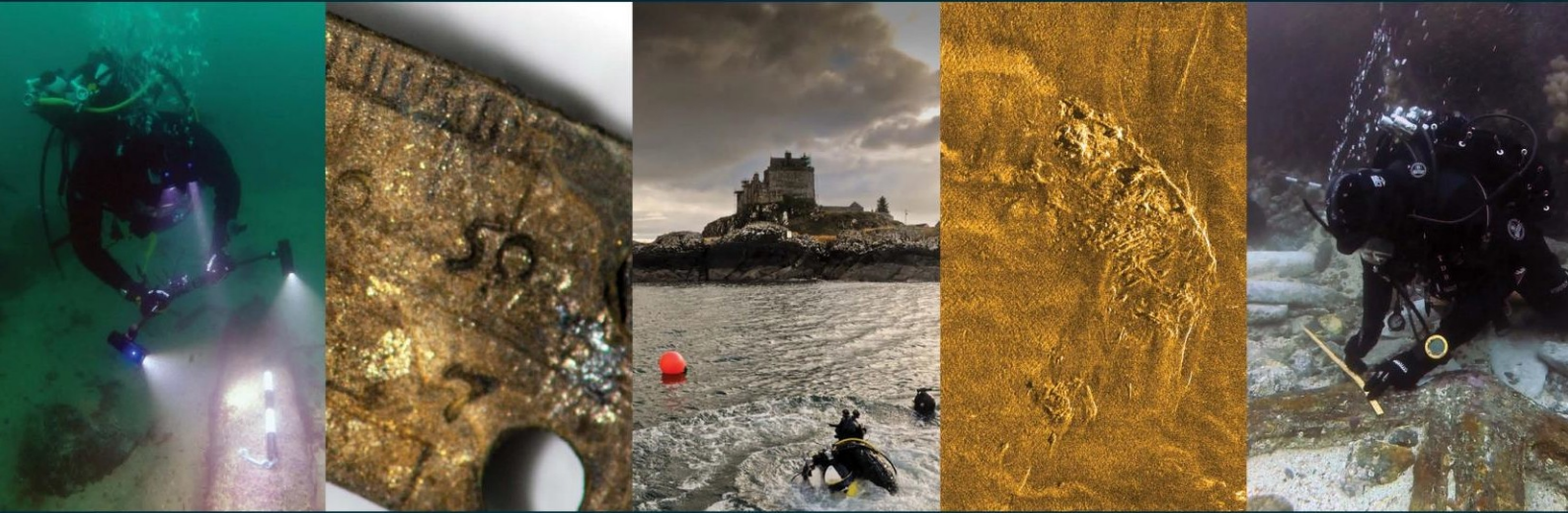


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Cotswold
Archaeology
marine

Celtic Interconnector Project

*Marine archaeological impact assessment for proposed
ground investigation surveys*



for
EirGrid plc

CA Project: 770617

CA Report: 18056

March 2018



Andover Cirencester Exeter Milton Keynes

Celtic Interconnector Project

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CA project: 770617

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1. INTRODUCTION

- 1.1. Cotswold Archaeology was commissioned by EirGrid plc to undertake archaeological assessments at three potential landfall sites for the Celtic Interconnector project on the south coast of Ireland.
- 1.2. The assessments included a desk-based assessment (Cotswold Archaeology 2017), non-intrusive marine and foreshore surveys to the west of Youghal, Co. Cork in two new locations, Claycastle and Redbarn beaches, and a re-assessment of a previously assessed site at Ballinwilling Strand (Cotswold Archaeology 2018). The aim was to assess and to map the extent of archaeological remains at these three potential landfall locations.
- 1.3. The foreshore assessments included walkover, hand-held metal detector, and geophysical (electrical conductivity) surveys at two new locations (Claycastle & Redbarn), and a walkover survey on the previously assessed beach (Ballinwilling Strand). The marine archaeological assessment comprised a review of offshore geophysical survey data collected over the proposed route corridors in Irish territorial waters by Next Geosolutions Group, out to the 12 nautical mile (nm) territorial limit. The proposed cable routes beyond the territorial limit remain unchanged from the previous assessments.
- 1.4. These assessments have been undertaken by Cotswold Archaeology in collaboration with our colleagues at Coastal and Offshore Archaeological Research Services (COARS), University of Southampton, who undertook the offshore geophysical analysis, and Headland Archaeology Ltd who undertook the foreshore geophysical survey and assessment.
- 1.5. The purpose of these archaeological assessments was to identify known and potential sites and features of archaeological interest in the cable survey corridor that might be impacted by the project. The aim of this impact assessment is to assess the impact of the project on those sites which will then be limited through the adoption of appropriate mitigation measures as set out below.

2. METHODOLOGY

Approach

2.1. This impact assessment has been undertaken in the following stages:

- Assessment of potential development effects: description of change to the historic asset and the effect on the significance of the historic asset;
- Identification of mitigation measures; and
- Assessment of residual effects, taking into account the proposed mitigation.

Scope of proposed ground investigation (GI) works

2.2. The exact locations of the geotechnical sampling sites within the survey corridors will be determined following the completion of the interpretation of the data from the completed geophysical marine survey.

Foreshore / intertidal zone

2.3. It is currently estimated that approximately ten bore holes and / or trial pits will be drilled / dug in order to determine soil conditions in the intertidal zone. The maximum depth below surface for boreholes and trial pits will be up to 20m and 3m respectively. The dimensions of the trial pits will typically be 3m x 1m whilst boreholes will be approximately 10cm in diameter. The trial pits will be backfilled using only native materials while the boreholes will be backfilled using pellet bentonite (compactonite).

2.4. The equipment to be used will include the following or similar:

- Borehole – PSM-8G Hydraulic Drilling Rig / Pagani TG 63-200 Penetrometer
- Trial Pit - Backhoe loader, JCB 3CX or 4CX

2.5. The Backhoe loader and PSM-8G hydraulic drilling rig measure approximately 5.5m x 2.25m and 2.75m x 1.9m respectively. The drilling of boreholes may be complemented at certain locations by the Pagani TG 63-200 penetrometer which is approximately 2.3m x 1.1m. If different equipment is used it is expected to be of similar dimensions. All equipment will be wheeled or tracked and will be driven onto the beach via public access points.

2.6. Subject to site and tidal conditions, some of the boreholes in the intertidal zone may be drilled from a jack-up self-elevating platform barge with a typical platform of approximately 18.3m x 18.3m, a depth of 1.53m and a leg length of 27m.

Shallow water (nearshore) survey area (LWM to 10m LAT)

2.7. An estimated seven vibrocores and / or Cone Penetrometer Tests (CPTs) will be acquired at a spacing of 1km between each sample. The standard vibrocore will have a 5m depth capability and a 75mm nominal core diameter. The CPT will have a maximum depth penetration of 5m below seabed. The acquisition of vibrocore and CPTs in the shallow water area may be substituted by use of a drilling rig from a jack-up barge. This would likely be the same drilling rig and jack-up barge as may be used in the intertidal zone.

2.8. The equipment to be used from the nearshore survey vessel or aforementioned jack-up barge, in the nearshore zone, may include some or all of the following or similar:

- Roson 100 CPT
- Geo-Vibro Corer 3000
- Borehole – PSM-8G Hydraulic Drilling Rig

Offshore survey area (10m LAT to 12nm limit)

2.9. An estimated 39 co-located vibrocores and CPTs will be conducted every 1.5km in Irish waters to a maximum depth of 5m. The footprint of the CPT unit is < 3m x 3m. The downward force of the, typically 5cm², cone will be up to a maximum of 100 kN.

2.10. If further qualification is required, ground-truthing may be undertaken using still photography or by grab sampling, using a Van Veen grab and a drop camera. If required, the number of grab samples is likely to be low and will typically involve a sample of 25 litres or less, taken from the seabed. Samples will be bagged and sent to the laboratory (EirGrid 2017).

Potential impacts

2.11. The wheels or tracks of the vehicles driven onto the beach and the four (typically 762mm diameter) legs of the jack-up barge have the potential to impact archaeological assets. The jack-up barge will be used without anchors and will be

positioned by the attending tug. Mitigation has been identified below to address these potential impacts.

Assessment of potential effects

2.12. The methods used for the assessment of development effects begins with an assessment of the significance of each historic asset, assessed on a scale ranging from very high to very low. Significance can be defined as the sum of cultural heritage values, such as evidential, historical, aesthetic, and communal values. The following assessment of significance is based on the professional judgement of the assessor informed by these values and by the criteria presented in Table 1.

Table 1 Significance of the historic asset

Historic asset significance	Description / reason
Very high	<ul style="list-style-type: none"> Historic assets of international importance
High	<ul style="list-style-type: none"> Designated wrecks and scheduled monuments Historic assets of national importance Maritime losses where the position is known and has been positively identified Targets of high archaeological potential identified in the geophysical survey
Medium	<ul style="list-style-type: none"> Historic assets of regional importance Targets identified in the geophysical survey of medium archaeological potential Obstructions that could be indicative of wreckage or submerged features
Low	<ul style="list-style-type: none"> Targets of low potential identified in the geophysical survey Stray archaeological find spots
Very low	<ul style="list-style-type: none"> Targets identified through the assessment of geophysical survey data as likely to represent a natural feature

Magnitude of change

2.13. Unlike terrestrial assessments, the method to determine the magnitude of impact in the context of marine archaeology is limited to the severity of impact. For the purpose of this assessment severity is considered to be synonymous with magnitude.

2.14. The magnitude of change is a measure of the scale or extent of change in baseline conditions, irrespective of the value of the heritage assets affected. The

criteria used to inform the assessment of the magnitude of change are set out in Table 2.

Table 2 Magnitude of impact

Magnitude	Definition
Very high	Total loss or major alteration of the historic asset removing the asset's value
High	Loss of one or more key elements of the historic asset substantially reducing the asset's value
Medium	Slight physical alteration of the historic asset not affecting key elements, slightly reducing the asset's value
Low	Very slight or negligible alteration of the historic asset
Very Low	Almost no alteration of the historic asset

Significance of effect

2.15. The assessment of the significance of an effect was undertaken using professional judgement, guided where necessary by the matrix shown in Table 3. The assessment of significance is influenced by the value of a receptor and the magnitude of the predicted change from the baseline condition.

Table 3 Significance of potential impacts

	Magnitude of impact					
		Very High	High	Medium	Low	Very Low
Receptor significance	Very High	Major	Major	Moderate	Minor	Minor
	High	Major	Moderate	Minor	Minor	Negligible
	Medium	Moderate	Minor	Minor	Negligible	Negligible
	Low	Minor	Minor	Negligible	Negligible	Negligible
	Very Low	Minor	Negligible	Negligible	Negligible	Negligible

Note: Red shaded cells are defined as significant impacts.

3. EXISTING ENVIRONMENT

Assessment of significance

3.1. The key results of the DBA (Cotswold Archaeology 2017), the foreshore surveys and archaeological assessment of marine geophysical survey data (Cotswold Archaeology 2018) are as follows:

- 24 previously recorded marine assets or potential marine assets. These comprise:
 - 16 wrecks, four of which are known (**CA2-5**) and 11 which remain unidentified (**CA1 & CA6-16**); unidentified wrecks are automatically protected under Irish legislation until they have been further assessed. Of these 16 assets, the significance of 15 has been assessed to be high, while the significance of the remaining one (**CA6**) is assessed as medium. **CA6** is recorded as a 'dead' wreck which suggests that subsequent surveys have failed to find anything in the recorded location;
 - 5 unidentified obstructions (**CA17-21**) are assessed as of medium significance; and
 - 3 unknown sites (**CA22-4**) are assessed as of low significance.
- One previously recorded terrestrial site (**CA25**) comprising a flint blade dating from c. 3000BC, found in association with a *fulacht fiadh* on the edge of Ballycrenane beach, has been assessed as of high significance (see Table 4);
- One probable wreck (**CA1001**), which corresponds to a previously recorded site (**CA8**) is of high significance, nine magnetic anomalies (**CA1002-9 & CA1011**) are assessed as of medium significance while two (**CA1010 & CA1012**) are considered of low significance (see Table 5).
- A review of the sub-bottom seismic survey data identified 21 areas (**CA2001-21**) where features with archaeological palaeo-environmental potential are present. Previous assessments suggest that these deposits are pre-Holocene

and therefore of low archaeological potential so they will not be considered further (see Table 6).

3.2. In addition, the foreshore geophysical, metal detecting, and walkover surveys at the three potential landfall locations identified the following (see Table 7):

Claycastle beach

- An eroded and heavily encrusted circular object, possibly a pot (**CA3001**) lying half exposed in the intertidal zone. This have been assessed to be of high significance;
- Extensive areas of exposed peat (**CA3002-11**) with associated remains of tree trunks and roots, which the geophysical survey seems to have detected extending under the beach sand both landward and seaward. This has been assessed to be of high significance;
- The dilapidated remains of eight timber groynes (**CA3012-9**), which emerged in the intertidal zone, have been assessed as of medium significance; and
- 22 individual metal finds (**CA3020-41**), which appear to represent casual losses, are of very low archaeological significance.

Redbarn beach

- A line of upstanding stones (**CA3042**), running E-W and standing up to 0.4m high, which appear to be the remains of earlier sea defences. These have been assessed as of medium significance;
- 24 individual metal finds (**CA3043-61** & **CA3119-23**) which appear to represent casual losses are of very low archaeological significance; and
- 57 readings on the metal detector (**CA3062-118**) which appear to be aligned in three rows on a NE-SW alignment over an area of c 60m x 300m. These magnetic anomalies seem to correlate with a sub-surface depression identified in the geophysical survey. These have been assessed as of medium significance.

Ballinwilling Strand

- Very few heritage assets were observed within the survey areas from the walkover survey on Ballinwilling Strand. The remains of sea defences, concrete breakwaters and groynes along the edge of Ballinwilling Strand comprise low value heritage assets. In addition, the 51 responses from the metal detector survey on Ballinwilling Strand appear to relate to casual losses of objects on the beach and are not considered of any heritage significance. They will not therefore be considered further.

Assessment of magnitude and significance of effect

- 3.3. The assessment of magnitude and significance of effect are presented in Tables 4-7) along with any mitigation proposed and assessment of the significance of residual effects.
- 3.4. The magnitude of impact on the assets listed in Tables 4 (**CA1-25**) and 5 (**CA1001-12**) is assessed as either low or very low. This is because none of the current proposed offshore coring locations are within 50m of the known / potential assets or geophysical anomalies identified as having archaeological potential. The closest coring location to a geophysical anomaly with archaeological potential is located c. 70m north of **CA1004**. Consequently, the significance of potential effects on them is considered negligible as their distance from the proposed survey locations negates any potential impact. Should the locations of the proposed GI works change considerably, greater than >30m for example, then the new locations should be reassessed. **CA25** is the only asset with a low assessment; this is the location of the possible *fulacht fiadh* from which a flint blade was recovered, but it is unclear what, if anything, of archaeological potential survives in this location.
- 3.5. This assessment has identified potential for impacts on a number of assets recorded during the foreshore surveys (**CA3001-123**; see Table 7) including:
- **CA3001** a possible pot adjacent to one of the groynes in the inter-tidal zone;
 - **CA3002-11** the exposed palaeo-environmental remains;
 - **CA3042** the line of upright stones that may be the remains of sea defences; and
 - **CA3062-118** the triple alignment of metal anomalies

The magnitude of impact on these assets has been assessed as medium, so the significance of potential effects is minor and mitigation is therefore required.

3.6. Although the magnitude of impact on the stone sea defences on Redbarn beach has been assessed as medium, the magnitude on the timber sea defences on Ballinwilling Strand and the timber groynes on Claycastle beach have been assessed as very low and low respectively, for a number of reasons. Chiefly, unlike the upstanding stones, the timber sea defences on Ballinwilling Strand and on Claycastle beach are clearly sea defences and are therefore less likely to be damaged. Second, the Ballinwilling Strand defences appear considerably more modern than the other installations.

3.7. Other than the foreshore/intertidal areas, terrestrial historic assets have not been assessed as the significance of potential effects on them is considered negligible as impacts on their settings from the proposed marine ground investigations would be minimal and transitory.

4. PROPOSED MITIGATION

4.1. As stated, there is potential for impact on the following identified assets:

- **CA3001** a possible pot adjacent to one of the groynes in the inter-tidal zone;
- **CA3002-11** the exposed palaeo-environmental remains;
- **CA3042** the line of upright stones that may be the remains of sea defences;
and
- **CA3062-118** the triple alignment of metal anomalies

4.2. The potential impact is primarily from vehicles and machinery moving around the beach. To mitigate this impact an archaeological exclusion zone of 10m around the edge of these assets will be observed by all vehicles, machinery and operatives (see Figures 1 & 2). After mitigation the effect on these historic assets has been assessed to be negligible.

4.3. In addition, there is potential for an impact on buried palaeo-environmental deposits from the ground investigations. This impact, however, is potentially a minor benefit as coastal and inter-tidal Mesolithic deposits are a relatively under-studied resource

so this survey could contribute to our knowledge and understanding of these deposits.

- 4.4. The investigations are very small scale compared to the potential size of the deposit and the recovered samples will undergo full environmental assessment and, if required, analysis. To mitigate this impact it is proposed that the results of the GI are made available for inclusion in any future palaeo-environmental or geo-archaeological studies of the area. After mitigation the effect on this historic asset has been assessed to be negligible.
- 4.5. The provision and implementation of a reporting protocol for archaeological discoveries is also recommended. The protocol would simply:
- outline what actions would need to be undertaken in the event that anything potentially archaeological should be encountered;
 - the likely nature of any potential archaeological discoveries;
 - the roles and responsibilities of the survey teams; and
 - contact details for the archaeological consultant (who would then liaise with the UAU).
- 4.6. A reporting protocol is intended to mitigate risks to potential unidentified marine archaeology and cultural heritage that may result from the ground investigation works. This would entail the engagement of an archaeological consultant throughout the period of the surveys who would be available to provide advice and guidance to the survey teams.
- 4.7. The potential to encounter unknown archaeology or archaeological remains during the course of these works is considered very low owing to the sparsity of known archaeology within the study areas.

Table 4 Recorded historic assets within the study area

CA report reference	Site name	Type	Significance	Magnitude of impact	Significance of potential effects	Proposed mitigation	Residual effect
CA1	Unidentified	Wreck	High	Very low	Negligible	None	Negligible
CA2	SS Gracia	Wreck	High	Very low	Negligible	None	Negligible
CA3	SV William Martyn	Wreck	High	Very low	Negligible	None	Negligible
CA4	FV Kindred Star (LT 399)	Wreck	High	Very low	Negligible	None	Negligible
CA5	Joseph Mitchell	Wreck	High	Very low	Negligible	None	Negligible
CA6	Unidentified	Wreck	Medium	Very low	Negligible	None	Negligible
CA7	Unidentified	Wreck	High	Very low	Negligible	None	Negligible
CA8	Unidentified = CA1001	Wreck	High	Very low	Negligible	None	Negligible
CA9	Unidentified	Wreck	High	Very low	Negligible	None	Negligible
CA10	Unidentified	Wreck	High	Very low	Negligible	None	Negligible
CA11	Unidentified	Wreck	High	Very low	Negligible	None	Negligible
CA12	Unidentified	Wreck	High	Very low	Negligible	None	Negligible
CA13	Unidentified	Wreck	High	Very low	Negligible	None	Negligible
CA14	Unidentified	Wreck	High	Very low	Negligible	None	Negligible
CA15	Unidentified	Wreck	High	Very low	Negligible	None	Negligible
CA16	Unidentified	Wreck	High	Very low	Negligible	None	Negligible
CA17	Foul	Obstruction	Medium	Very low	Negligible	None	Negligible
CA18	Foul	Obstruction	Medium	Very low	Negligible	None	Negligible
CA19	Foul	Obstruction	Medium	Very low	Negligible	None	Negligible
CA20	Foul	Obstruction	Medium	Very low	Negligible	None	Negligible
CA21	Foul	Obstruction	Medium	Very low	Negligible	None	Negligible
CA22	Unknown	Unknown	Low	Very low	Negligible	None	Negligible
CA23	Unknown	Unknown	Low	Very low	Negligible	None	Negligible
CA24	Unknown	Unknown	Low	Very low	Negligible	None	Negligible
CA25	<i>Fulacht fiadh</i>	Flint blade	High	Low	Negligible	None	Negligible

Table 5 Identified marine geophysical anomalies within the study area

CA report reference	Site description	Significance	Magnitude of impact	Significance of potential impacts	Proposed mitigation	Residual effect
CA1001	Geophysical anomaly - probable wreck = CA8	High	Very low	Negligible	None	Negligible
CA1002	Geophysical anomaly - metal debris (?)	Medium	Very low	Negligible	None	Negligible
CA1003	Geophysical anomaly - magnetic	Medium	Very low	Negligible	None	Negligible
CA1004	Geophysical anomaly - magnetic	Medium	Very low	Negligible	None	Negligible
CA1005	Geophysical anomaly - bathy/mag	Medium	Very low	Negligible	None	Negligible
CA1006	Geophysical anomaly - magnetic cluster	Medium	Very low	Negligible	None	Negligible
CA1007	Geophysical anomaly - magnetic	Medium	Very low	Negligible	None	Negligible
CA1008	Geophysical anomaly - magnetic	Medium	Very low	Negligible	None	Negligible
CA1009	Geophysical anomaly - magnetic	Medium	Very low	Negligible	None	Negligible
CA1010	Geophysical anomaly - magnetic cluster	Low	Very low	Negligible	None	Negligible
CA1011	Geophysical anomaly - magnetic	Medium	Very low	Negligible	None	Negligible
CA1012	Geophysical anomaly - magnetic	Low	Very low	Negligible	None	Negligible

Table 6 Identified marine geophysical anomalies within the study area







CA report reference	Site description	Type	Significance	Magnitude of impact	Significance of potential effects	Proposed mitigation	Residual effect
CA2001	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2002	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2003	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2004	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2005	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2006	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2007	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2008	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2009	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2010	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2011	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2012	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2013	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2014	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2015	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2016	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2017	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2018	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2019	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2020	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible
CA2021	Palaeo-landscape	Sub-bottom feature	Low	Low	Negligible	None	Negligible

Table 7 Potential archaeological remains identified during the metal detecting and walkover surveys at Claycastle beach, Redbarn beach and Ballinwilling Strand

Location	CA report reference	Site description	Type	Significance	Magnitude of impact	Significance of potential effects	Proposed mitigation	Residual effect
Claycastle	CA3001	Possible pot	Metal	High	Medium	Minor	AEZ of 10m	Negligible
	CA3002-11	Palaeo-environmental remains	Peat, timber	High	Medium	Minor	AEZ of 10m	Negligible
	CA3012-9	Beach defences - groynes	Timber	Medium	Low	Negligible	None	Negligible
	CA3020-41	Metal detections - casual losses	Metal	Very low	Very low	Negligible	None	Negligible
Redbarn	CA3042	Sea defences	Stone	Medium	Medium	Minor	AEZ of 10m	Negligible
	CA3043-61	Metal detections - casual losses	Metal	Very low	Very low	Negligible	None	Negligible
	CA3062-118	Metal detections - possible alignment	Metal	Medium	Medium	Minor	AEZ of 10m	Negligible
	CA3119-23	Metal detections - casual losses	Metal	Very low	Very low	Negligible	None	Negligible
Ballinwilling Strand	HA 101*	Cutwater	Concrete	Very low	Very low	Negligible	None	Negligible
	HA 102*	Sea defences	Wood	Very low	Very low	Negligible	None	Negligible
	HA 103*	Slipway	Concrete	Very low	Very low	Negligible	None	Negligible

* Headland Archaeology 2015



-  Cable Route
-  Survey Area
-  Archaeological Exclusion Zone
-  Exposed Peat
-  Borehole
-  Trial Pit



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



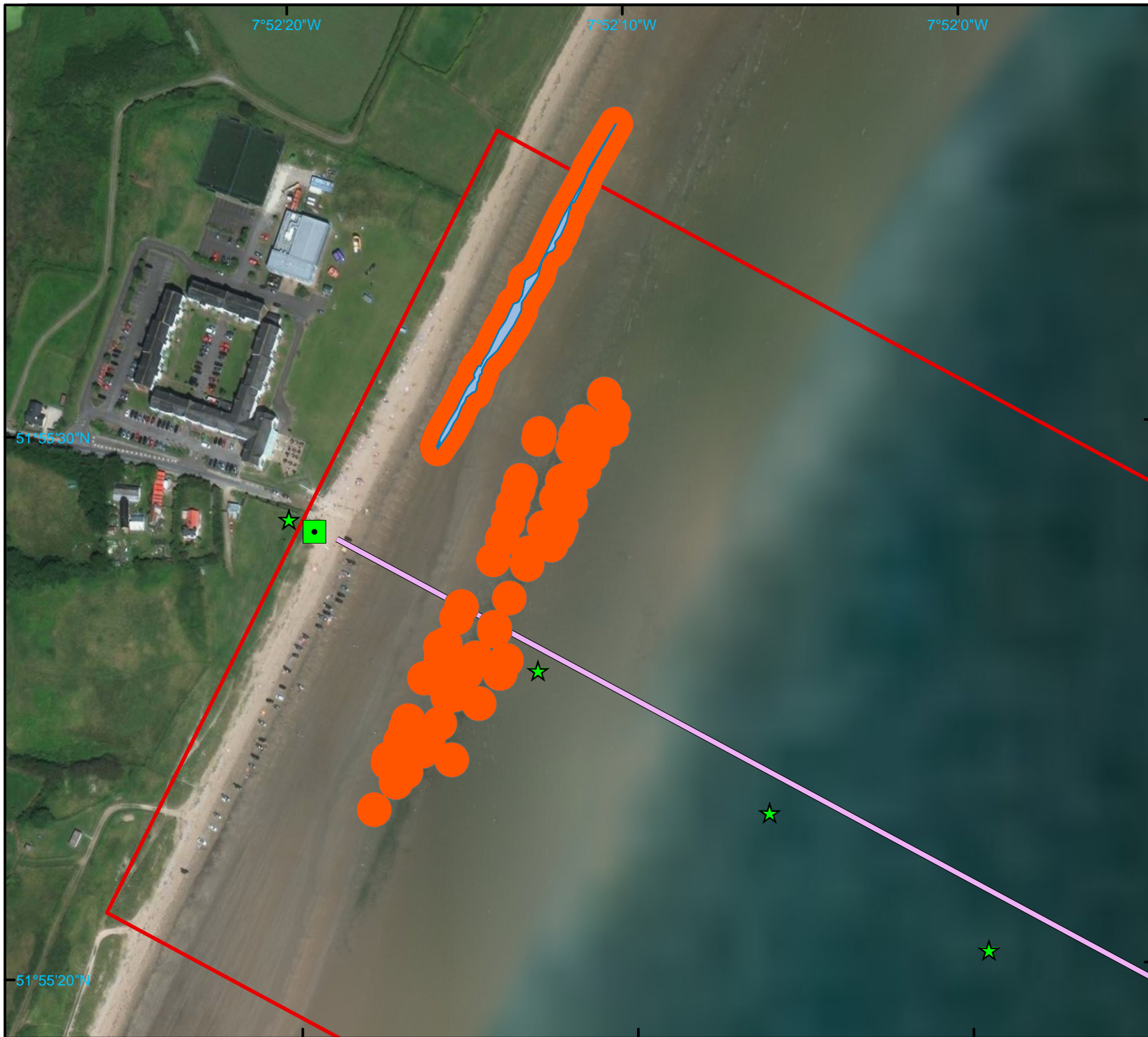
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PROJECT TITLE
Celtic Interconnector

FIGURE TITLE
Proposed exclusion zones on Claycastle beach

DRAWN BY	KD	PROJECT NO	770617	FIGURE NO.
CHECKED BY	MW	DATE	26/03/2018	1
APPROVED BY	MW	SCALE@A4	1:3,000	



- Cable Route
- Survey Area
- Archaeological Exclusion Zone
- Beach Defences
- Borehole
- Trial Pit



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PROJECT TITLE
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FIGURE TITLE
Proposed exclusion zones on Redbarn beach

DRAWN BY	KD	PROJECT NO	770617	FIGURE NO.
CHECKED BY	MW	DATE	23/03/2018	2
APPROVED BY	MW	SCALE@A4	1:3,000	

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