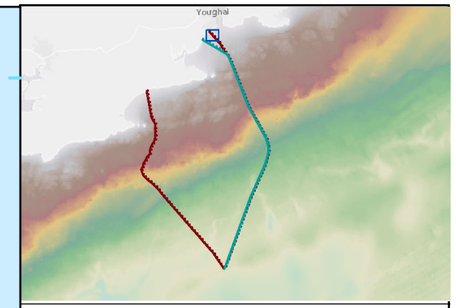
578500
579000
579500
5754500
5754000
5753500
CL-BH-1
CL-TP1
CL-TP2
CL-BH-2
CL-BH-3
CL-CPT_VC-1A
CL-CPT_VC-1
Claycastle Beach
Irish Sea



Legend

- 2018 Sample Locations
- Redbarn Route
- Claycastle Route
- Ballinwilling route

Bathymetry (m LAT)

High : 1.41

Low : -3.12083

0 200m

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PROJECT TITLE

Celtic Interconnector project

FIGURE TITLE

Geotechnical Site Investigations Claycastle

DRAWN BY	**MJG (UoS)**	*PROJECT NO*	**17758**	*FIGURE NO.*
CHECKED BY	**MW**	*DATE*	**25/01/2019**	**34**
APPROVED BY	**xx**	*SCALE@A3*	**1:5,000**	

Ballinwilling Strand

BW2-BH3

4.116. At 1.5 - 2.0m (-2.0 to -2.5m LAT) the geology is described (by Next GeoSolutions) as a 'red (2.5Y 4/8) CLAY with frequent plant remains (wood) and pockets of gravel. Plant remains are intact. Gravel is fine to medium, rounded'. This deposit may be comparable to the deposit recorded by IAC Archaeology (2018: 3.2.1; Plate 1) in BW2-BH1 where a 'very loose brown slightly clayey silty fine to medium sand with occasional medium to coarse sub-rounded gravel and occasional stains of organic matter' was encountered at 5.5-10.9m (1.23 to -4.17m LAT). Although this deposit was noted in the field it was, unfortunately, not recovered in the borehole and therefore no physical samples were retained to permit geo-archaeological assessment (Fig. 35).

Figure 35 Samples from BW2-BH3 (from Next GeoSolutions)

Redbarn beach

RB-CPT_VC-1

4.117. The geological description noted the presence of a thin peat recorded at 3.3 - 3.5m (-6.4 to -6.6m LAT) overlying probable Till. The core photographs, however, do not show the presence of a peat horizon. Next GeoSolutions account for this discrepancy by stating that the only organic matter encountered was related to smears of clayey organic matter on the walls of the SPT sampler (Fig. 36). The core was therefore deemed to have no geo-archaeological potential.

Figure 36 Samples from RB-CPT-VC-1 (from Next GeoSolutions)

Claycastle beach

CL-BH1

4.118. At 4.5 - 6.0m the geological description (supplied by Next GeoSolutions) was of a 'dense dark brown (7.5YR 3/4) to black (10 YR 2/1) slightly gravelly, slightly sandy PEAT with frequent decayed plant material'. This peat deposit is part of the submerged forest located on the foreshore (Cotswold Archaeology 2018b) and was monitored by IAC Archaeology (2018; 3.4.1).

4.119. All the material from 4.5 - 5.0m in Shelby tube P4 was used for geotechnical testing purposes; the only retained sample from 5.0 - 5.45m consisted of a deposit described as sands with organic matter within SPT4. There was no sample recovery at 5.5 - 6.0m, but the next sample recovered, at 6.0m, contained no evidence of peat, thus providing a maximum potential depth for the base of the peat (of 6m) and a thickness of up to 1.5m (Fig. 37).

CL-BH2

4.120. This core was taken adjacent to the known exposure of the submerged forest and was also encountered in CL-TP2 (see IAC Archaeology 2018). The recorded sequence was:

- 0.00 - 0.90m: Loose brown (10YR 5/3) gravelly slightly silty fine to medium SAND. Gravel is fine to coarse and sub-angular to sub-rounded of various lithologies;
- 0.90 - 1.50m: Grey silty sand with pockets of silt with rare spongy pseudo-fibrous peat and pseudo-fibrous spongy plant and wood remains. Intense organic odour;
- 1.50 - 3.40m: Very loose grey (2.5Y 5/1) to olive brown (2.5Y 4/4), slightly silty fine to coarse organic SAND with amorphous and fibrous peat;
- 3.40 - 6.50m: Very soft grey (2.5Y 5/1) to greenish grey (GLEY1 5/1) slightly sandy silty CLAY. Between 4.50 - 5.00m a band of slightly gravelly slightly sandy clayey silt, and at 6.00m a light grey (10YR 7/2) slightly gravelly very sandy very silty CLAY. Gravel is fine to coarse, sub-rounded to sub-angular of mudstone.

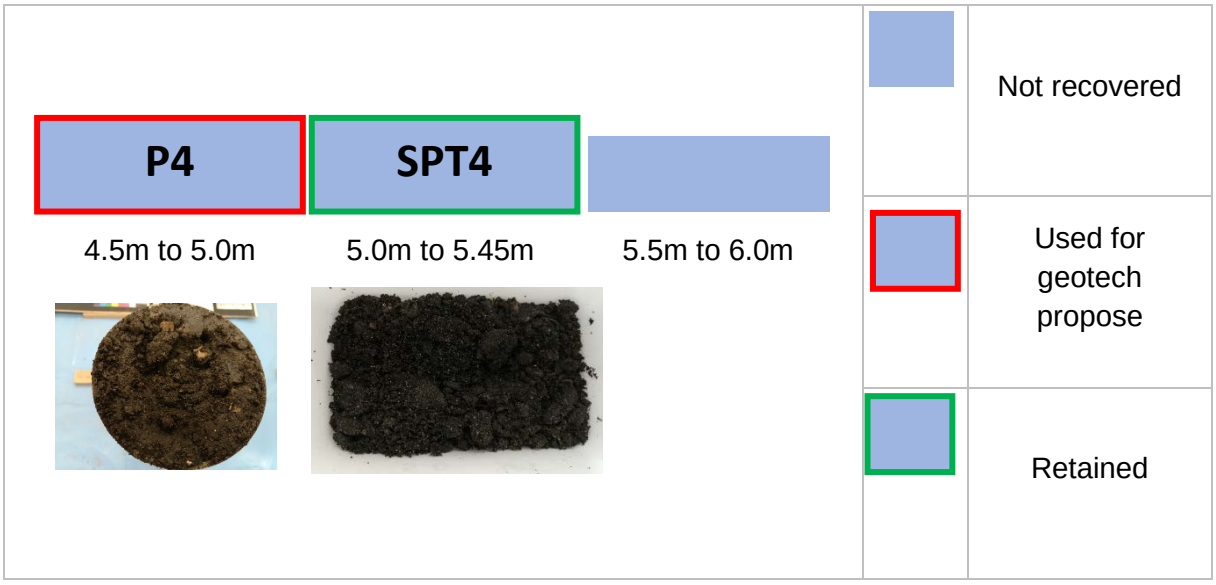

Figure 37 Samples from CL-BH1 (from Next GeoSolutions)

4.121. The adjacent core (**CL-TP2)** confirmed that the peat deposit was between 0.25m and 1.80m, overlying sand with shell fragments. This could indicate that the peat represents an extension of the peat over previous riverine / marine sand deposits and could therefore potentially provide a useful Late Holocene sea level index point (SLIP). There was no sample retention of the peat deposits suitable for geo-archaeological recording.

CL-BH3

4.122. A further extension of the submerged forest was recorded, with a possible basal palaeosol preserved at the base of the sequence. The geological description (supplied by Next GeoSolutions) for the section of interest, 8.3 - 9.1m (-7.9 to -8.7m LAT), was:

- 8.30 - 8.50m: Black (10YR 2/1) spongy clayey fibrous PEAT;
- 8.50 - 8.80m: Firm grey (2.5 5/1) soft (12 kPa) very gravelly very sandy CLAY with blocks of pseudo-fibrous spongy plant remains;
- 8.80 - 9.10m: Reddish brown (2.5YR 4/3) slightly silty slightly clayey very gravelly fine to medium SAND. Gravel is fine to coarse, sub-rounded to rounded meta-sandstone (low grade) quartz and flint.

4.123. The samples from this core that were available for the depths of interest were limited to 8.20 - 8.50m and 8.80 - 9.00m (Fig. 38); the remainder were either destructively tested or not retained. The core photos do not show a distinct peat horizon; Next GeoSolutions confirmed that the only rare evidence of spongy clayey fibrous peat was encountered at about 8.3m.

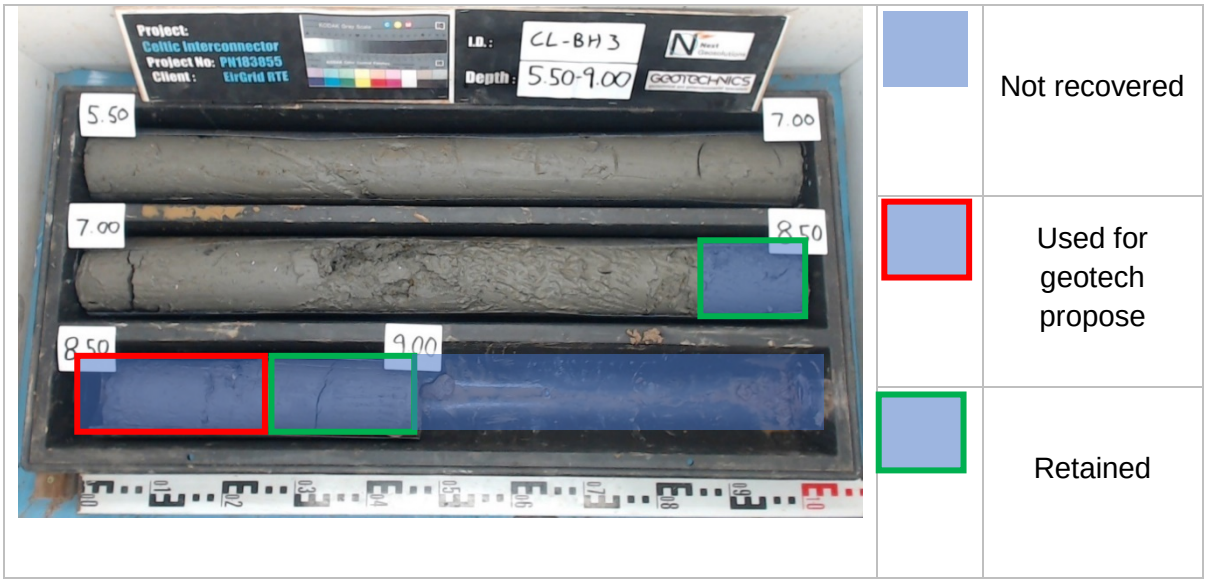

Figure 38 Samples from CL-BH3 (from Next GeoSolutions)

CL-CPT_VC-1A

4.124. The geological logs recorded clays with shells and occasional organic matter at 1.6 - 5.5m (-4.0 to -7.9m LAT). Next GeoSolutions confirmed that there was no evidence

of peat present and only occasional evidence of amorphous organic matter was highlighted. This core appears to contain a series of clays representing estuarine deposits (Fig. 39). Core **CL-CPT_VC-1**, immediately adjacent to this vibrocore, contained a similar sedimentary sequence.

4.125. The DBA and updated descriptions from Next GeoSolutions, resulted in the identification of four core sections from Claycastle beach where sediment was retained that might hold palaeo-environmental potential:

- CL-BH1: 5.00-5.45m;
- CL-BH3: 8.20-9.00m;
- CL-CPT-VC1A 1.6-2.5m; and 3.50-4.50m

4.126. These cores sections were sent to CA for geo-archaeological recording. The results have been tabulated and are presented below (Tables 10, 11 & 12)

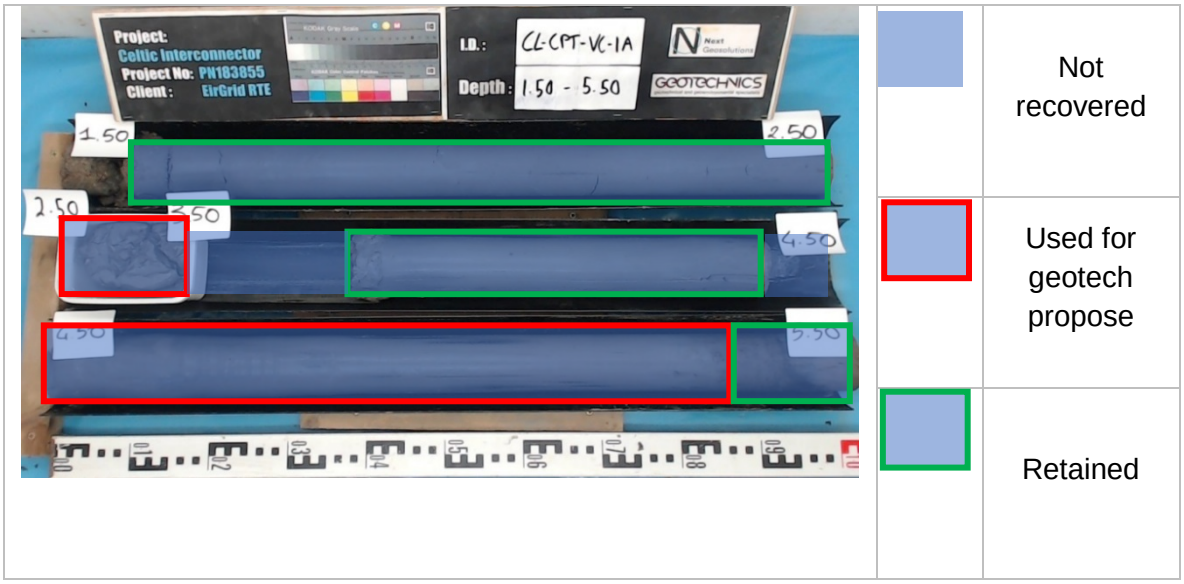

Figure 39 Samples from CL-CPT_VC-1A (from Next GeoSolutions)

Geoarchaeological recording results

4.127. Geoarchaeological descriptions of the samples from each of the three core samples are provided below.

CL-BH1: 5.00 - 5.45m

4.128. A single bulk sample was obtained and confirmed the presence of a woody peat. The elevation of the peat suggests it is probably an onshore extension of the submerged

forest deposits encountered on the foreshore and observed in CL-BH2 and CL-TP2 (see IAC Archaeology 2018). The sample may be suitable for an assessment of the waterlogged plant remains but would be of little use for other techniques such as pollen as the sample only represents a single bulk sample.

Table 10 Geoarchaeological description of CL-BH1

Depth in core	Depth (m LAT)	Description	Interpretation
5.00 - 5.45m	-1.67 to -2.12m	10YR 1/1 peat, some fibrous ?root remains and also small wooden ?twigs.	Peat

CL-BH3: 8.20 - 9.00m

4.129. The core sections available represent an estuarine deposit overlying a probable Late Pleistocene Glacial Till. The estuarine deposit was only sampled between 8.20 - 8.50m but contained distinct laminations which may relate to rhythmite deposition within a saltmarsh or mudflat environment. Broken shell could point towards the nearby presence of a channel with higher flow rates leading to the deposition of broken shell during periods of flooding. The base of the sequence, which could indicate a transgressive surface, was not sampled. The core, however, might have palaeo-environmental potential for understanding the environment of deposition associated with the deposits at 8.20 - 8.50m, especially if the organic material within the core is suitable for radiocarbon dating.

Table 11 Geoarchaeological description of CL-BH3

Depth in core	Depth (m LAT)	Description	Interpretation
8.20 - 8.50m	-5.57 to -8.87m	10YR 7/3 No mottles silty clay, finely laminated, stoneless, broken shell at 8.28 and 8.43m, 1-2%, organics, slightly laminated but not full core width, at 8.28, 8.33, 8.37, 8.43, 8.46, 8.51 and 8.57m. Base not reached	Estuarine deposit
8.50 - 8.80m	-8.87 to -9.17	GAP	
8.80 - 9.00m	-9.17 to -9.37	10YR 5/4 1-2% fine mottle, very dense (?over consolidated) 10YR 6/6 clay, finely laminated, sub-rounded to rounded / tabular stones, 10-40mm, very slightly stony, no shell, no organics, base not reached	Possible Glacial Till

CL-CPT-VC1A 1.60 - 2.50m and 3.50 - 4.50m

4.130. The top and base of the 1.60 - 2.50m section was not marked, so it is assumed that the coarser sand-rich horizon is the top of this core section. This is supported by the fact that the underlying Shelby sample is composed of clay with no sand inclusions.

4.131. The core contained a long estuarine sequence, although the base of this sequence was not reached. The coarsening of the grain size in the core suggests a transition towards a higher energy environment and the proximity of channels and / or the littoral zone. The basal clays are likely to represent intertidal environments.

4.132. The presence of intact bivalve molluscs in this deposit suggests a low energy environment and could also be diagnostic, relating to establishing the indicative elevation of this deposit, as well as providing good potential for radiocarbon dating.

4.133. Overlying organics are likely to reflect saltmarsh or reedbed deposits. Some organics could be dated if deemed appropriate taphonomically (i.e. not roots). This core provides the potential to date the change in estuarine conditions which might provide a palaeo-landscape context for the onshore submerged forest.

4.134. If dating is successful, this core could also provide a sea level record if coupled with foraminifera, diatom and pollen assessments.

Table 12 Geoarchaeological description of CL-CPT-VC1A

Depth in core	Depth (m LAT)	Description	Interpretation
1.60 - 1.625m	-4.01 to -4.035m	10YR2/1 No mottles, sandy silt loam, stoneless, small shell (<5mm), 1-2%, no visible organics, Abrupt boundary to:	Estuarine deposit
1.625 - 1.685m	-4.035 to -4.095m	10YR4/1 No mottles, sandy clay, rounded tabular stones, slightly stoney, up to 15mm, bivalve shell (up to 8mm), 2%, no visible organics. Sharp boundary to:	Estuarine deposit
1.825 - 2.50m	-4.095 to -4.91m	10YR4/1 No mottles, silt loam, stoneless (very rare), broken bivalve shell, 1.75, 2.26 and 2.38m. fine organics present at 2.14, 2.20m, with vertical rooting between 2.33-2.42m. Base not reached	Estuarine deposit
2.50 - 3.50m	-4.91 to -5.91m	GAP	

Depth in core	Depth (m LAT)	Description	Interpretation
3.50 - 4.50m	-5.91 to -6.91m	10YR 5/1 no mottles, clay, stoneless, intact bivalves up to 25mm, both horizontal and vertical orientation, but not articulated, 3.60-3.66 and 3.77m, 1% small organic at 3.52 and 3.75m. Base not reached	Estuarine deposit

Palaeo-environmental potential

4.135. The three cores subjected to geo-archaeological recording display good potential for understanding the Holocene palaeo-landscape of the Claycastle area. Onshore and offshore cores confirm the presence of estuarine deposits, which correlate with the channel area identified previously in the assessment of the marine geophysical survey data. The submerged forest deposits appear to extend from their intertidal exposures up to the location of **CL-BH1** and may be up to 1.6m in thickness (see Table 10).

4.136. Both the peat and estuarine deposits have the potential to provide material suitable for radiocarbon dating. Coupled with assessments of waterlogged plant remains, molluscs, pollen, diatoms and foraminifera, these cores could provide an important insight into the timing of marine transgression and regression in this area of southeast Ireland.

4.137. The geotechnical samples from **CL-CPT-VC1A** and **CL-BH3** provide sufficient material for an assessment of the changing sedimentary sequence. The sample from **CL-BH1** (coupled with **CL-BH2**) demonstrate the extent of the submerged forest but provide insufficient material for palaeo-environmental assessment.

Foreshore geotechnical investigations at Claycastle beach

4.138. A hand auger survey was conducted at Claycastle beach (Fig. 28; Cotswold Archaeology 2019b) to investigate further the exposed peat deposits (Cotswold Archaeology 2018a).

Previous research on Claycastle beach

4.139. Previous environmental research, conducted in 2001 by Delahunty (2002), investigated the peat deposits at Claycastle beach. Two core samples were taken from Ballyvergan Marsh and from Youghal Strand in order to investigate historical changes in local vegetation. The Youghal Strand Core (SC) was extracted in the

area of interest, at 51° 56.020 N; 07° 51.545 W. The SC revealed almost two metres of peat deposit above sediments consisting of grey silt. The peat deposit was radiocarbon (^{14}C) dated and the deepest peat from the core was dated to c. 4,555 years before present (BP) (3488-3242 BC OxCal). Dates obtained from the SC were calibrated by using the OxCal 4.3 program with 95% probability (OxCal 2019; Table 13).

Table 13 Strand core (SC) 14C data (Delahunty 2002 fig. 3, appendix B).

Depth	Date C14 BP / ID	Date OxCal. 95%	Period
12cm	1920±35 N45297	2-210 AD	Iron Age
86cm	3115±35 N45298	1488-1281 BC	Middle Bronze Age
120cm	3870±34 N45296	2768-2210 BC	Early Bronze Age
180cm	4555±35 N45295	3488-3241 BC	Early Neolithic

4.140. The pollen diagram for the SC suggests that at Youghal the landscape was covered by woodland that formed more than 5,000 years ago amid a freshwater ecosystem inland of the Atlantic Ocean. The changing climate had a significant impact on the woodland cover; around the first century A.D., the landscape was possibly affected by flooding. Consequently, the local woodlands were submerged, and a brackish environment was created northward into the low-lying land (Delahunty 2002, 88).

578300
578400
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578700
5754400
5754300
5754200
5754100
CL4005
CL4014
CL4006
CL4041
CL4031
CL4030
CL4015
CL4033
CL4032
CL4001
CL4029
CL4013
CL4004
CL4034
CL4035
Youghal Strand Core 2002
CL4037
CL4002
CL4007
CL4028
CL4027
CL4025
CL4024
CL4026
CL4036
CL4038
CL4016
CL4020
CL4021
CL4018
CL4022
CL4019
CL4017
CA 3011
CL4011
CL4023
CL4012a
CL4008
CL4012
CL4039
CA3010
CL4009
CL4009a
CA 3009
CA 3008
CL4003
CL4010
CL4040

Legend

- Auger
- Test pit
- Test pit and auger
- Machine test pit
- Youghal Strand Core 2002
- Exposed peat
- In phase peat extent (indicative)
- Quadrature peat extent (indicative)
- Auger survey peat extent (indicative)
- Cable Route
- 500m wide CSC

N

0 0.05km

Coordinate System: WGS 1984 UTM Zone 29N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -9.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

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PROJECT TITLE
Celtic Interconnector

FIGURE TITLE
Possible peat extents on Claycastle beach

DRAWN BY	RLF	PROJECT NO	770617	FIGURE NO.	40
CHECKED BY	MTW	DATE	22/05/2019		
APPROVED BY	MTW	SCALE@A3	1:1,600		

Auger and test pits logs from Claycastle beach

4.141. The auger logs from **CL4002**, **CL4003** and **CL4011** provide a full sedimentary sequence (Table 14). The lowermost unit comprised grey (2.5Y 5/1) loose fine silt to medium sand deposit (the GREY SAND) with occasional bivalve shell fragments. This unit was overlain by a reddish-black (2.5Y 2.5/1) spongy fibrous silty peat deposit containing identifiable plant material. The well-preserved wood fragments and herbaceous plant remains indicate the presence of woodland and / or reed swamp communities in the past (see Delahunty 2002). The PEAT deposits recorded in these auger cores range in thickness from 0.85m to 1.20m. Overlying the PEAT was a brown (10YR 5/3) to yellowish brown (10YR 5/4) fine to coarse sand (the SAND) with occasional rounded gravel and cobbles of different lithology. See Figure 34 for a map of the potential extent of the peat on Claycastle beach. The extents of the peat are not conclusive: they are indicative points based on the presence of peat in the augers/test pits and on the geophysical results.

4.142. The majority of the TPs show that the SAND tends to become more coarse and gravelly lower down in the deposit. The SAND coverage in the areas of exposed peat, has probably been eroded by tidal action. Across the entire surveyed area, the SAND ranged in thickness from 0.05m to c. 2.70m. Nine bulk samples were taken from the three auger cores for possible palaeo-environmental analysis. No remains suggesting prehistoric human activity were encountered in the areas of exposed peat.

4.143. It is worth noting that the depth of SAND coverage increased in the landward TPs and auger holes. In test pit **CL4041**, the SAND deposit was c. 2.70m deep (Fig. 3), and no peat was recorded. It corresponds with data obtained from the trial pit log **CL-TP1** and borehole log **CL-BH2**, where the PEAT deposit was covered by c. 0.90m to c. 2.50m of the SAND sediments respectively. In borehole **CL-BH1**, situated next to the car park, the peat was recorded under 4.50m deep deposits of beach sand (IAC Archaeology 2018).

Summary

4.144. To summarise, with the exception of the exposed deposits, the peat is overlain by a fine to coarse sand which becomes more gravelly with depth (ranging from 0.05m to 2.70m). The peat deposit recorded in the auger cores range in thickness from 0.85m to 1.20m. However, according to the watching brief report by IAC

Archaeology 2018 the thickness of the peat across the site varies from 0.40m (**CL-TP1**) to 1.45m (**CL-TP2**).

4.145. The peat was recorded primarily in the area west of the proposed cable but was not encountered to the north-east of the CSC. This does not indicate that the peat is necessarily absent from these areas of the beach but may be buried deeper under the overlying sand.

Table 14 Auger and test pit logs

Auger/Test Pit No.	Depth [m]	Unit	Colour	Description	Sample	Comments
CL4001	0-0.40	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Very few very coarse gravel (30 to 60mm).		Auger. End at 0.90m due to side collapse.
	0.40-0.70	GRAVELLY SAND	10YR 5/4 Yellowish brown	Coarse sand with gravel and cobbles (2 to 150mm, moderately sorted, well rounded).		
	0.70-0.90	GRAVELLY SAND	10YR 5/4 Yellowish brown	Coarser than unit above. Common cobbles (60 to 200mm) and few (<3%) bivalves shell fragments.		
CL4002	0-1.20	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. From c. 0.75m more humified, pseudo fibrous plant material, less wood visible. More compact at the bottom. Intense organic odour.	<1> 0-0.20; <2> 0.70-0.80; <3>1.00-1.20	Auger
	1.20-1.30	GREY SAND	2.5Y 5/1 Grey	Silty fine to medium sand. Loose. Very few wood fragments (possibly contamination form above).		

Auger/Test Pit No.	Depth [m]	Unit	Colour	Description	Sample	Comments
CL4003	0-0.05	SAND	10YR 5/3 Brown	Fine to coarse loose sand.	<4> 0-0.15; <5> 0.60-0.70; <6>0.80-.90	Auger
	0.05-0.90	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. From c. 0.80m more humified, pseudo fibrous plant material. More reddish (2.5R 2.5/4 dark red) in colour and more compact towards the bottom. Intense organic odour.		
	0.90-1.00	GREY SAND	2.5Y 5/1 Grey	Silty fine to medium sand. Loose. Few (<4%) bivalve shell fragments.		
CL4004	0-0.70	SAND	10YR 5/3 Brown	Fine to coarse loose sand. More gravelly towards bottom. Well rounded pebbles and cobbles (20-180mm).		Test pitted to c. 050m and augered to 0.90m. Abandoned due to sides collapsing.
CL4005	0-1.00	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Very few gravel, well rounded (20 to 60mm). More gravelly with depth.		Auger. End at 1.10m due to side collapse and gravel hard to drill.
CL4006	0-0.20	SAND	10YR 5/3 Brown	Fine to coarse loose sand.		Test pitted to c. 030m and augered to 0.60m. Abandoned due to sides collapsing.
	0.20-0.60	GRAVELLY SAND	10YR 5/4 Yellowish brown	Coarse sand with gravel and cobbles (2 to 150mm, moderately sorted, well rounded).		

Auger/Test Pit No.	Depth [m]	Unit	Colour	Description	Sample	Comments
CL4007	0-0.40	SAND	10YR 5/3 Brown	Fine to coarse loose sand. More gravelly towards bottom. Well rounded pebbles and cobbles (20-180mm).		Test pit to c. 0.50m and auger. Stopped at 1.20 due to sides collapse.
	0.40-1.10	GRAVELLY SAND	10YR 5/4 Yellowish brown	Coarse sand with gravel and cobbles (2 to 150mm, moderately sorted, well rounded). Few (<4%) bivalve shell fragments.		
	1.10-1.20	SAND	10YR 5/4 Yellowish brown	Fine to coarse loose sand. Few very coarse gravel (30 to 60mm).		
CL4008	0-0.20	SAND	10YR 5/3 Brown	Fine to coarse loose sand.		Test pit to c. 0.50m and auger. Stopped at 0.50 due to obstruction (possibly a large cobble).
	0.20-0.50	GRAVELLY SAND	10YR 5/3 Brown	Coarse sand with gravel and cobbles (2 to 150mm, moderately sorted, well rounded). Loose.		
CL4009	0-0.40	SAND	10YR 5/3 Brown	Fine to coarse loose sand.		Test pit to c. 0.60m and auger. Stopped at 0.70 due to sides collapse.
	0.40-0.70	GRAVELLY SAND	10YR 5/3 Brown	Coarse sand with gravel and cobbles (2 to 150mm, moderately sorted, well rounded). Loose.		
	0.70-0.72	GREY SAND	2.5Y 5/1 Grey	Silty fine to medium sand. Loose.		
CL4009a	0-0.30	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit to c. 0.30m and auger. Stopped at 1.10 due to obstruction.
	0.30-1.10	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		

Auger/Test Pit No.	Depth [m]	Unit	Colour	Description	Sample	Comments
CL4010	0-0.20	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Auger location abandoned due to high tide.
CL4011	0-1.30	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.	<7> 0-0.30; <8> 0.50-0.60; <9> 1.10-1.30	Auger
	1.30-1.35	GREY SAND	2.5Y 5/1 Grey	Silty fine to medium sand. Loose.		
CL4012	0-0.20	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Auger. Stopped at 0.50 due to sides collapse.
	0.20-0.50	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		
CL4013	0-0.50	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Common well rounded pebbles and cobbles (20-180mm).		Test pit.
CL4014	0-0.30	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit. Loose sediments and sides collapse.
	0-0.60	GRAVELLY SAND	10YR 5/3 Brown	Coarse sand with gravel and cobbles (2 to 150mm, moderately sorted, well rounded). Loose.		
CL4015	0-0.80	GRAVELLY SAND	10YR 5/3 Brown	Coarse sand with gravel and cobbles (2 to 180mm, moderately sorted, well rounded). Very few shell fragments (<2%). Loose.		Test pit. Loose sediments and sides collapse.

Auger/Test Pit No.	Depth [m]	Unit	Colour	Description	Sample	Comments
CL4016	0-0.25	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit. Loose sediments and sides collapse.
	0.25-0.60	GRAVELLY SAND	10YR 5/3 Brown	Coarse sand with gravel and cobbles (2 to 180mm, moderately sorted, well rounded). Loose.		
CL4017	0-0.10	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. **Peat** under 0.10m		Line of test pits dug by hand to establish presence of the peat towards North. Line started c. 10m from the peat exposure zone. Due to loose sediments and water, no augering was possible.
	0.10+	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		
CL4018	0-0.25	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. **Peat** under 0.25m		
	0.25+	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		
CL4019	0-0.40	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. **Peat** under 0.40m		
	0.40+	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		
CL4020	0-0.60	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. NO Peat **NO** recorded under 0.60m		

Auger/Test Pit No.	Depth [m]	Unit	Colour	Description	Sample	Comments
CL4021	0-0.65	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. **Peat** under 0.65m		
	0.65+	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		
CL4022	0-0.20	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit. Loose sediments and sides collapse.
	0.20-0.60	GRAVELLY SAND	10YR 5/4 Yellowish brown	Coarse sand with gravel and cobbles (2 to 180mm, moderately sorted, well rounded). Loose.		
CL4023	0-0.30	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit. Stopped due to loose sediments and sides collapse.
	0.30-0.35	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		
CL4024	0-0.07	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit and auger. Taken to test the peat presence. Stopped due to sides collapse.
	0.07-0.75	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		
CL4025	0-0.13	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. **Peat** under 0.13m		Line of test pits dug by hand to establish presence of the peat. Due to loose sediments and water, location CL4024 was selected for augering.
	0.13+	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		

Auger/Test Pit No.	Depth [m]	Unit	Colour	Description	Sample	Comments
CL4026	0-0.30	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. **Peat** under 0.30m		
	0.30+	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		
CL4027	0-0.45	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. **Peat** under 0.45m		
	0.45+	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		
CL4028	0-0.60	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. **Peat** under 0.60m		
	0.60+	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		
CL4029	0-0.40	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit. Loose sediments and sides collapse.
CL4030	0-0.50	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit. Loose sediments and sides collapse.
	0.50-0.52	GREY SAND	2.5Y 5/1 Grey	Silty fine to medium sand. Loose.		
CL4031	0-0.40	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. Few very coarse gravel (30 to 60mm).		Test pit. Loose sediments and sides collapse.

Auger/Test Pit No.	Depth [m]	Unit	Colour	Description	Sample	Comments
CL4032	0-0.30	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit. Loose sediments and sides collapse.
	0.30-0.33	GREY SAND	2.5Y 5/1 Grey	Silty fine to medium sand. Loose.		
CL4033	0-0.50	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. Few very coarse gravel (30 to 60mm) and cobbles (64-150mm) more common with depth.		Test pit. Loose sediments and sides collapse.
CL4034	0-0.50	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. Few very coarse gravel (30 to 60mm) and cobbles (64-150mm) more common with depth.		Test pit. Loose sediments and sides collapse.
CL4035	0-0.30	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. Few very coarse gravel (30 to 60mm) and cobbles (64-150mm) more common with depth.		Test pit. Loose sediments and sides collapse.
	0.30-0.35	GREY SAND	2.5Y 5/1 Grey	Silty fine to medium sand. Loose.		
CL4036	0-0.60	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. Few very coarse gravel and cobbles (20 to 100mm).		Test pit and auger. Loose sediments and sides collapse.
	0.60-0.65	PEAT	2.5Y 2.5/1 Reddish black	Silt with spongy fibrous plant remains and wood fragments. Intense organic odour.		
CL4037	0-0.40	GRAVELLY SAND	10YR 5/4 Yellowish brown	Coarse sand with gravel and cobbles (2 to 180mm, moderately sorted, well rounded). Loose.		Test pit. Loose sediments and sides collapse.

Auger/Test Pit No.	Depth [m]	Unit	Colour	Description	Sample	Comments
CL4038	0-0.60	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit. Loose sediments and sides collapse.
	0.60-0.65	GREY SAND	2.5Y 5/1 Grey	Silty fine to medium sand. Loose.		
CL4039	0-0.20	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit. Loose sediments and sides collapse.
	0.20-0.30	GREY SAND	2.5Y 5/1 Grey	Silty fine to medium sand. Loose.		
CL4040	0-0.30	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose.		Test pit. Loose sediments and sides collapse.
	0.30-0.35	GREY SAND	2.5Y 5/1 Grey	Silty fine to medium sand. Loose.		
CL4041	0-2.70	SAND	10YR 5/3 Brown	Fine to coarse loose sand. Loose. Pebbles and cobbles more common with depth (20-180mm, rounded, <7%).		Machine trial pit

Irish territorial limit to the Irish / UK median

4.146. 100 vibrocore logs from the Irish territorial waters out to the Irish / UK median line were acquired by Osiris in 2015 (Osiris 2015) and reviewed by Wessex Archaeology (2016) (see Fig. 5; Table 15 & Appendix 4).

4.147. A targeted assessment of SBP data was conducted where palaeo-channels had been identified in the nearshore area of the cable route in an archaeological review of geophysical survey data undertaken by Headland Archaeology (2015). The geophysical data were also re-assessed in locations where logs were found to contain organic remains.

4.148. The vibrocore geoarchaeological data were classified using four sedimentary sequences:

- Unit 1, Bedrock;
- Unit 2, Quaternary glacial/glacio-marine sediments;
- Unit 3, Estuarine and terrestrial sediments; and
- Unit 4, Seabed sediments (Wessex Archaeology 2016).

Unit 1: Bedrock deposits

4.149. The Upper Cretaceous chalk bedrock unit was identified in 20 vibrocores and concentrated in the centre of the CSC between **VC-025** and **VC-049A**. The unit was recorded in water depths between 81m below LAT in **VC-025** and 93.87m below LAT in **VC-049A** (Appendix 4). The deposit was not fully penetrated in any of the vibrocores; a maximum thickness of 1.72m was recorded in vibrocore **VC-048**. The bedrock is visible in the cores as a structureless chalk comprising stiff to very stiff friable light grey and off-white, slightly sandy, slightly gravelly clay.

This chalk bedrock is described in the solid geology maps and BGS interpretation (Tappin et al 1994) as a widespread deposition of chalk deposited in the Late Cretaceous period due to a combination of high sea levels and regional subsidence. It has been identified in a concentrated area offshore overlain by a thin cover of Quaternary sediments. No vibrocores penetrated deeply into this unit.

Unit 2: Quaternary glacial/glacio-marine sediments

4.150. These Quaternary glacial / glacio-marine sediments units were identified in 95 vibrocores across the majority of the CSC (see Appendix 4), with seven of these units directly overlying bedrock (**VC-030, VC-035A, VC-037A, VC- 039, VC-041, VC-044 & VC-NS03**). The differentiation between Unit 2 and Unit 4 (Seabed sediments) is based on the composition of vibrocores, with denser silts and clay sediments observed in the Unit 2 cores as well as sands and gravels.

4.151. There is a large and diverse range of sediments grouped into this one unit due to the scale of the project. Owing to the limited depth of recovery a range of Quaternary units dating to a range of glacial stages within the Pleistocene, that are extant within the CSC, cannot be clearly separated presently.

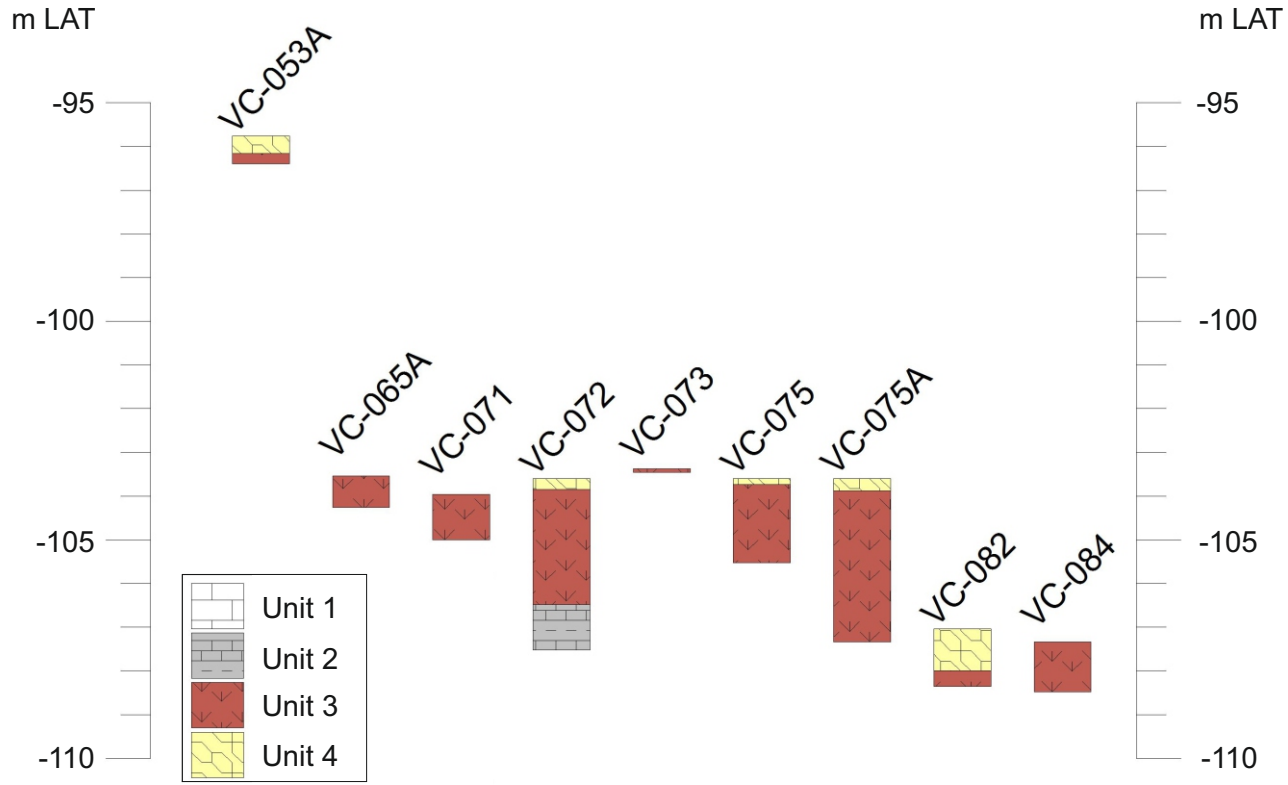
4.152. The principal sediments mapped across the site are thin layers of the Lower Unstratified member (LU); this is part of the Caernarfon Bay Formation attributed to the Middle Pleistocene (Tappin et al 1994). BGS borehole evidence has identified this deposit as olive-grey till comprising hard diamicton of matrix-supported, gravelly muddy sand with broken shells and abundant chalk and lignite fragments. This large expanse of deposit has probably been penetrated across the CSC, although it is difficult to identify this unit irrefutably.

4.153. Expanses of Bedded member (BE) also of the Caernarfon Bay Formation are present across the CSC, which is cited to either overlie the LU deposit or grade laterally into it. A BGS borehole that penetrated this unit (although poorly recovered) identified sand with occasional clay beds and scattered pebbles with shell debris (Tippen *et al* 1994). This type of deposit has been identified across the CSC.

4.154. The Western Irish Sea Formation (WIS) attributed to the Upper Pleistocene is present across the CSC. It is described in the BGS as both localised incision infill deposits up to 200m thick and overlying, more-widespread, tabular-stratified deposits that are generally less than 10m thick. This is made up of five different facies some of which correspond to glacio-marine events. This unit typically overlies a marked erosion surface (Tappin *et al* 1994).

Unit 3: Estuarine and terrestrial sediments

4.155. Nine vibrocores containing peat were identified across the CSC (**VC-053A, VC-065A, VC-071, VC-072, VC-073, VC-075, VC-075A, VC-082 & VC-084**) (Fig. 42 & Table 16). The deposits have been recovered from cores located between 96.19m



Company Name: Wessex Archaeology **Client Name:** EirGrid plc **Project:** Celtic Interconnector - Feasibility Study **Drawing Title:** Log section of vibrocores containing Unit 3: Estuarine and terrestrial sediments **Drawing Number:** 112110_Fig03.cdr		Date: 08/02/2016	Revision Number: 0
		Scale: see above	Illustrator: KJF
		Path: X:\PROJECTS\112110\Graphics_Office\Rep figs\Geotech\2016_04_05\Fig03.cdr	

Figure 41 Log section of vibrocores containing Unit 3: Estuarine and terrestrial sediments

below LAT (**VC-053A**) and 104.8m below LAT (**VC-082**) and all are visible in the upper layers of Unit 2.

4.156. **VC-073** contained the shortest sequence of peat measuring 0.06m; the deposit is present in slightly sandy, slightly gravelly clay with occasional small black organic / peaty pockets up to 6mm. The largest organic sequence was recorded in core **VC-075A** which contains 2.52m of black organic and peaty deposits; between 1.60m to 2.10m the deposits are clearly visible as organic and peaty laminae.

4.157. In a number of vibrocores an organic odour was recorded, although no *in situ* organic sediments were observed in the corresponding sample photographs to suggest further analysis (i.e. Unit 3).

Unit 4: Seabed sediments

4.158. This unit primarily relates to the modern seabed. It was observed in the majority of the vibrocores and generally comprised unconsolidated sands and gravels with frequent bivalve and gastropod shell. This deposit was seen across the entire length of the CSC with the largest sequence, 2.53m in thickness at 83.3m below LAT, recovered at **VC-023A**. These sediments may form part of the large sand waves and ridges over which the CSC crosses in this area.

Table 15 Vibrocore stratigraphy interpretation (after Wessex Archaeology 2016)

Vibrocore ID	Depth from (m downcore)	Depth to (m downcore)	Stratigraphic Interpretation
VC-018	0	1.87	Unit 4
	1.87	2.25	Unit 2
VC-019	0	2.1	Unit 4
VC-020	0	0.24	Unit 4
	0.24	0.65	Unit 2
VC-020A	0	0.44	Unit 2
VC-021	0	1.13	Unit 4
VC-021A	0	1.5	Unit 4
VC-022	0	1.4	Unit 4
VC-022A	0	2.5	Unit 4
VC-023	0	1.18	Unit 4
VC-023A	0	2.53	Unit 4
VC-024	0	0.38	Unit 2
VC-024A	0	0.2	Unit 2
	0	0.42	Unit 4
VC-025	0	0.3	Unit 4
	0.3	0.6	Unit 1

Vibrocore ID	Depth from (m downcore)	Depth to (m downcore)	Stratigraphic Interpretation
VC-026	0	0.84	Unit 4
VC-027	0	0.2	Unit 4
	0.2	1.2	Unit 2
VC-027A	0	0.2	Unit 4
	0.2	1.25	Unit 1
VC-028	0	0.25	Unit 4
	0.25	0.44	Unit 1
VC-029	0	0.28	Unit 4
	0.28	0.5	Unit 1
VC-030	0	0.3	Unit 2
	0.3	0.81	Unit 1
VC-032	0	0.3	Unit 4
	0.3	0.4	Unit 1
VC-033	0	0.28	Unit 4
	0.28	1.3	Unit 1
VC-034	0	0.32	Unit 4
	0.32	0.65	Unit 1
VC-035	0	0.1	Unit 4
VC-035A	0	0.27	Unit 2
	0.27	0.58	Unit 1
VC-036	0	0.15	Unit 4
VC-036A	0	0.15	Unit 4
VC-037	0	0.5	Unit 2
VC-037A	0	0.49	Unit 2
	0.49	0.7	Unit 1
VC-038	0	0.29	Unit 4
	0.29	0.36	Unit 1
VC-039	0	0.68	Unit 2
	0.68	0.91	Unit 1
VC-040	0	0.1	Unit 4
	0.1	0.3	Unit 1
VC-041	0	0.21	Unit 2
	0.21	1.51	Unit 1
VC-041A	0	0.22	Unit 4
	0.22	1	Unit 1
VC-043	0	1.68	Unit 4
VC-043A	0	1.5	Unit 4
VC-044	0	0.4	Unit 2
	0.4	3	Unit 1
VC-046	0	0.4	Unit 4
	0.4	1.3	Unit 1
	0	2.37	Unit 4

Vibrocore ID	Depth from (m downcore)	Depth to (m downcore)	Stratigraphic Interpretation
VC-047	2.37	3	Unit 1
VC-048	0	0.23	Unit 4
	0.23	1.95	Unit 1
VC-049	0	1.4	Unit 4
VC-049A	0	0.87	Unit 4
	0.87	1.04	Unit 1
VC-050	0	1.72	Unit 4
VC-050A	0	0.59	Unit 2
VC-051	0	0.65	Unit 2
VC-051A	0	0.85	Unit 4
VC-052	0	0.9	Unit 4
VC-052A	0	1.68	Unit 4
VC-053	0	0.8	Unit 2
VC-053A	0	0.29	Unit 4
	0.29	0.46	Unit 3
VC-055	0	0.4	Unit 2
VC-055A	0	0.03	Unit 4
VC-056	0	0.08	Unit 4
VC-056A	0	1.56	Unit 4
VC-056B	0	1.95	Unit 4
	1.95	2.18	Unit 2
VC-057	0	2	Unit 4
VC-058	0	1.38	Unit 4
VC-058A	0	0.81	Unit 4
VC-059	0	1.38	Unit 2
VC-059A	0	0.31	Unit 4
	0.31	1.87	Unit 2
VC-060	0	1.08	Unit 4
VC-060A	0	2.25	Unit 4
VC-061	0.3	0.9	Unit 2
VC-061A	0	1.2	Unit 2
VC-062	0	0.85	Unit 2
VC-062A	0	0.82	Unit 2
VC-063	0	0.82	Unit 2
VC-063A	0	0.8	Unit 2
VC-064	0	1.54	Unit 2
VC-064A	0	0.24	Unit 4
VC-065	0	0.05	Unit 4
VC-065A	0	1.08	Unit 2
	0.56	1.08	Unit 3
VC-066	0	1.75	Unit 4
VC-066A	0	1.95	Unit 2

Vibrocore ID	Depth from (m downcore)	Depth to (m downcore)	Stratigraphic Interpretation
VC-067B	0	0.4	Unit 2
VC-068	0	1.3	Unit 4
	1.3	2	Unit 2
VC-069A	0	0.92	Unit 2
VC-071	0	1.12	Unit 2
	0.36	1.12	Unit 3
VC-071A	0	0.25	Unit 2
VC-072	0	0.18	Unit 4
	0.18	2.1	Unit 3
	2.1	2.85	Unit 2
VC-073	0	0.3	Unit 2
	0.24	0.3	Unit 3
VC-073A	0	0.69	Unit 4
VC-074	0	0.07	Unit 4
VC-074A	0	1.33	Unit 2
VC-075	0	0.1	Unit 4
	0.1	1.4	Unit 3
VC-075A	0	0.2	Unit 4
	0.2	2.72	Unit 3
VC-076	0	1.15	Unit 2
VC-076A	0	0.2	Unit 4
	0.2	0.67	Unit 2
VC-077	0	1.9	Unit 2
VC-077A	0	1.01	Unit 2
VC-079	0	0.53	Unit 2
VC-079A	0	0.07	Unit 4
	0.07	1.13	Unit 2
VC-082	0	0.7	Unit 4
	0.7	0.96	Unit 3
VC-082A	0	0.36	Unit 2
VC-083	0	0.7	Unit 2
VC-083A	0	1.65	Unit 2
VC-084	0	1.25	Unit 4
	0.42	1.25	Unit 3
VC-084A	0	0.88	Unit 2

Submerged palaeo-channels

4.159. One palaeo-channel (**HA3007**) was detected in the Irish EEZ by Headland Archaeology (2015) during the assessment of the marine geophysical survey data.

4.160. This feature (**HA3007),** a maximum depth of 18m below the seabed, is characterised by steeply sloping sides and an uneven base (Fig. 42). The channel is likely to be a

glacial feature cutting into Unit 2 possible Lower Unstratified member (LU) and filled with possible Bedded Member (BE) or Western Irish Sea Formation (WIS)) of Unit 2 Quaternary glacial or glacio-marine sediments. This is overlain by an approximately 3.8m thick deposit of possible terrestrial sediments of Unit 3 estuarine and terrestrial sediments. Overlaying this, up to 2.5m depth below the seabed, is a possible thin layer of seabed sediments (Unit 4). The Unit 3 deposits could possibly contain sediments of palaeo-environmental potential. Vibrocore **VC-021** intersects this location with a recovery depth of 1.5m; the composition of this core was interpreted to be Unit 4 seabed sediments which correlates with the sub-bottom seismic data.

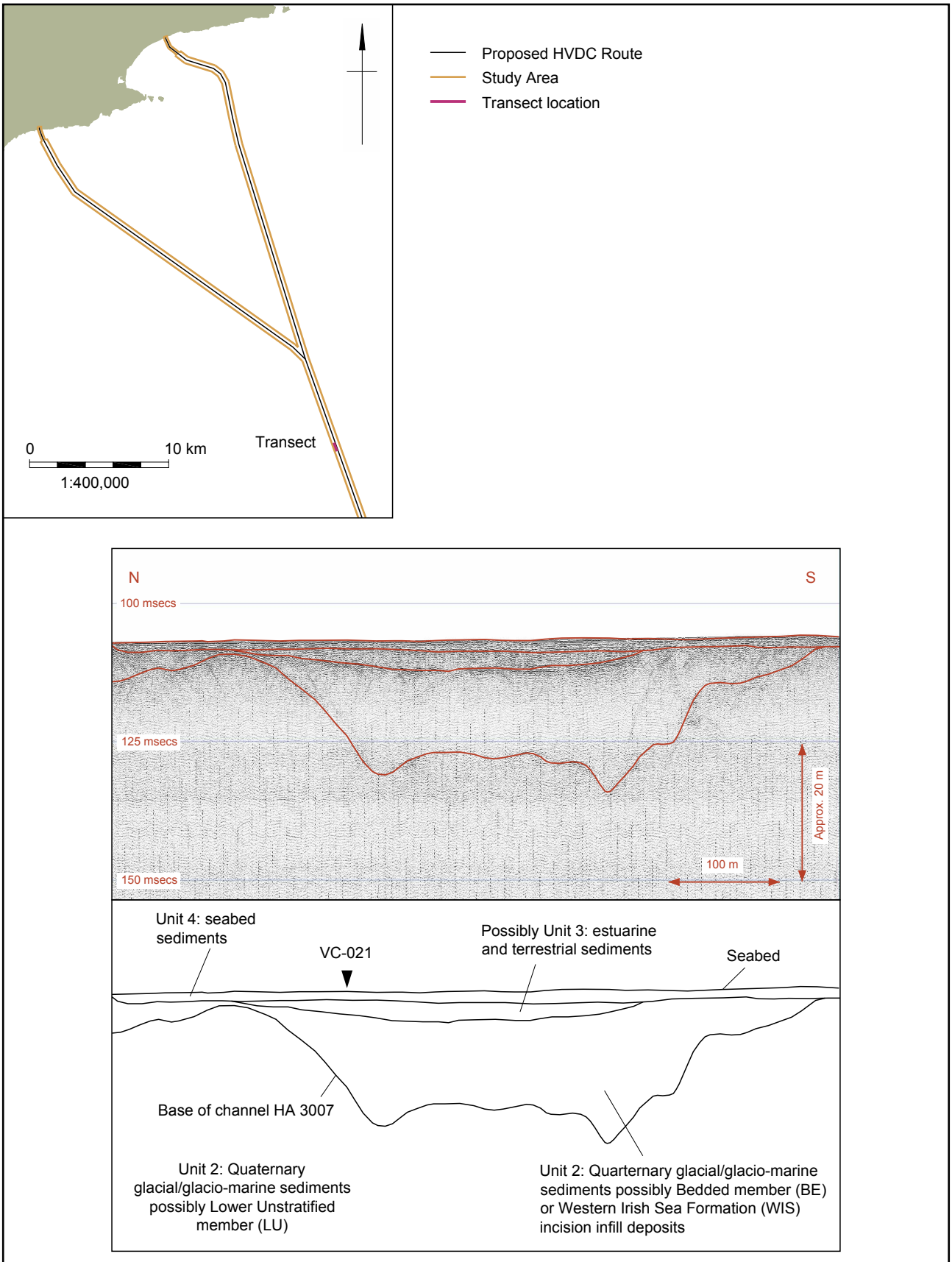
4.161. Five vibrocore locations that contained peat (**VC-53A, VC-65A, VC-71, VC-72 and VC-73)** were assessed in the SBP data for their palaeo-environmental potential. Peat was present in cores up to 2.52m below the seabed. There was no evidence in the geophysical data of peat or organic deposits; this may be owing to the loss of response in the seabed pulse.

Summary

4.162. Bedrock deposits (Unit 1) are of no archaeological interest as they are too old to contain any archaeological material.

4.163. The youngest deposit of Seabed sediments (Unit 4) is similarly of little or no geoarchaeological importance but may contain reworked artefacts and material in addition to more recent archaeological material. The deposition of this unit is likely to have occurred initially during the Holocene sea level rise, so some of this sediment is probably part of marine bedforms, some of which are mobile such as sand ribbons, sand waves and sandbanks. These deposits, however, do have the potential to contain reworked prehistoric archaeological material or more recent archaeological remains such as shipwrecks.

4.164. Unit 2 is identified as a group of Quaternary glacial/glacio-marine sediments comprising finer-grained clays and silts. It is likely that these deposits relate to multiple glacial events mapped across the area (Tappin et al 1994) and may have potential for understanding the timing and influence of marine transgression and the development of geomorphology since the last glaciation. Archaeological material and artefacts are unlikely to be present in these deposits owing to the nature of their formation (glacial / glacio-marine) and their likely age. There is low potential that



Company Name: Wessex Archaeology
Client Name: EirGrid plc
Project: Celtic Interconnector - Feasibility Study
Drawing Title: Sub-bottom profiler data example (Channel HA 3007)
Drawing Number: 112110_Geotech_Fig04-8.dwg

Date:	27/04/2016	Revision Number:	0
Scale:	1:500 horizontal @A3	Illustrator:	KJF
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Figure 42 Sub-bottom profiler data example (channel HA3007)

reworked artefacts may be present in marine units transported down-river from terrestrial contexts. The archaeological record of the neighbouring coasts is presently restricted to the current post-glacial (<MIS2: Late Upper Palaeolithic and Mesolithic) (Bicket and Tizzard 2015) with some potential for MIS 8/7 Neanderthal activity near Liverpool Bay (*Pontnewydd* cave) distal from the survey area.

4.165. As Unit 3 contains repeated layers of peats in silts and clays, visible as small black organic/peaty deposits, pockets, bands and laminae, it is of archaeological interest. These deposits are concentrated mainly at the Irish/UK median line and may represent the first stages of terrestrial environmental development immediately following the last or a previous glacial period. As such these deposits have potential for providing scientifically important information on sea level minima and early post-glacial environments of archaeological interest (Bicket and Tizzard 2015).

4.166. **HA3007** is interpreted as glacial in formation with multiple phases of Unit 2 observed throughout. Possible evidence of remnants of Unit 3 is, however, observed. Unit 3 may be of palaeo-environmental interest. No evidence of peat was identified in the SBP data of the channel.

4.167. Nine vibrocores were recommended for further geoarchaeological assessment (Table 16). Since the original sampling, however, the vibrocores have been tested and no further assessment is recommended.

Table 16 Geotechnical vibrocores of archaeological potential

ID	Depth from (m downcore depth)	Depth to (m downcore depth)	Rationale	Research potential
VC-053A	0.29	0.46	Firm friable amorphous black Peat (H8)	• Palaeo-environmental interest • Sea level minima reference points
VC-065A	0.56	1.08	Occasional black organic pockets up to 7 mm	• Palaeo-environmental interest • Sea level minima reference points
VC-071	0.36	1.12	Occasional black organic pockets up to 12 mm	• Palaeo-environmental interest • Sea level minima reference points

ID	Depth from (m downcore depth)	Depth to (m downcore depth)	Rationale	Research potential
VC-072	0.18	2.1	Occasional black organic and peaty pockets up to 12 mm, between 1.6 - 2.1 m many black organic/peaty laminae	• Palaeo-environmental interest • Sea level minima reference points
VC-073	0.24	0.3	Occasional small black organic/peaty pockets up to 6 mm	• Palaeo-environmental interest • Sea level minima reference points
VC-075	0.1	1.4	Black organic/peaty pockets and laminae up top 12 mm, between 0.9 - 0.95 m black organic peaty band	• Palaeo-environmental interest • Sea level minima reference points
VC-075A	0.2	2.72	Small bands of organic/peaty pockets and laminae up to 7 mm	• Palaeo-environmental interest • Sea level minima reference points
VC-082	0.7	0.96	Dark brown/black slightly sandy Silt	• Palaeo-environmental interest • Sea level minima reference points
VC-084	0.42	1.25	Slightly peaty slightly sandy clayey Silt	• Palaeo-environmental interest • Sea level minima reference points

5. CONCLUSIONS

5.1. It is clear from this technical report that considerable efforts have gone into assessing the archaeology, the archaeological potential, and the palaeo-environmental evidence along the route through which the Celtic Interconnector cable is proposed to pass. This will ensure that the impact from this proposed development on the cultural heritage resource will be minimised.

5.2. The numbers of wrecks, obstructions and anomalies of archaeological potential identified along the route are in very low numbers and are therefore easily avoided. For example, in Irish territorial waters of 12 anomalies with archaeological potential, only one (**CA1001**), which corresponds to **CA8** recorded in the DBA) is a probable wreck of high archaeological potential.

5.3. Relative to the length of the route, the density of archaeological and geophysical anomalies identified along the route is sparse, so the potential to encounter unknown archaeological sites and features within the CSC is low.

5.4. The exposed peat deposits identified in the intertidal zone on Claycastle beach have been dated from the Early Neolithic (at the bottom) through to the Iron Age (at the top) and are therefore of considerable archaeological and palaeo-environmental significance. Investigations of these deposits (hand auguring and test pitting) has shown them to be extensive, as is common with deposits of this nature. The discovery of peat deposits in nearshore borehole **CL-BH3** suggest that the exposed peat deposits on Claycastle beach extend out to this location.

5.5. Analysis of SBP data has identified 21 areas with features of archaeological / palaeo-environmental potential. Assessments of glacio-marine deposits associated with some of the offshore palaeo-channels have suggested that the deposits are pre-Holocene and are therefore of low archaeological potential.

5.6. Should Claycastle beach be selected as the preferred landfall option, a linear development such as the Celtic Interconnector can be relatively easily mitigated through further archaeological assessment and investigation of the peat deposits. In conclusion then, nothing has yet been discovered that could not be mitigated through further archaeological site investigation.

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APPENDIX 1: METAL DETECTOR ANOMALIES

Tables A1.1 – A1.3 presents the results of the metal detector surveys at the three landfall locations (Claycastle beach, Redbarn beach and Ballinwilling Strand).

Claycastle beach

Table A1.1 Metal detector results at Claycastle beach (Cotswold Archaeology 2018a)

ID	Latitude	Longitude	Material	Detector value
CA 3020	51.934439	-7.859074	Metal	12
CA 3021	51.934453	-7.858761	Metal	24
CA 3022	51.934582	-7.858681	Metal	-4
CA 3023	51.934606	-7.858604	Metal	36
CA 3024	51.934627	-7.858371	Metal	-6
CA 3025	51.934690	-7.858334	Metal	-6
CA 3026	51.934423	-7.858696	Metal	-6
CA 3027	51.934399	-7.858831	Metal	12
CA 3028	51.934691	-7.858009	Metal	12
CA 3029	51.934805	-7.857671	Metal	34
CA 3030	51.934756	-7.857847	Metal	8
CA 3031	51.934382	-7.858426	Metal	8
CA 3032	51.933490	-7.859022	Metal	10
CA 3033	51.933560	-7.859922	Metal	8
CA 3034	51.933569	-7.859672	Metal	30
CA 3035	51.933559	-7.859693	Metal	12
CA 3036	51.933930	-7.858923	Metal	30
CA 3037	51.933141	-7.859081	Metal	2
CA 3038	51.932679	-7.860028	Metal	4
CA 3039	51.933156	-7.858883	Metal	40
CA 3040	51.933360	-7.859617	Metal	3
CA 3041	51.932997	-7.860182	Metal	4

Redbarn beach

Table A1.2 Metal detector results at Redbarn beach (Cotswold Archaeology 2018a)

ID	Latitude	Longitude	Material
CA 3043	51.922159	-7.867026	Metal
CA 3044	51.923582	-7.872708	Metal
CA 3045	51.923331	-7.872920	Metal
CA 3046	51.923311	-7.872874	Metal
CA 3047	51.923503	-7.872702	Metal
CA 3048	51.923558	-7.872646	Metal
CA 3049	51.923845	-7.872240	Metal

ID	Latitude	Longitude	Material
CA 3050	51.924293	-7.871665	Metal
CA 3051	51.924342	-7.871613	Metal
CA 3052	51.925522	-7.871119	Metal
CA 3053	51.925602	-7.870978	Metal
CA 3054	51.925111	-7.871068	Metal
CA 3055	51.925259	-7.870829	Metal
CA 3056	51.925158	-7.870755	Metal
CA 3057	51.924730	-7.871041	Metal
CA 3058	51.923251	-7.872140	Metal
CA 3059	51.923693	-7.871617	Metal
CA 3060	51.925014	-7.870385	Metal
CA 3061	51.923717	-7.871420	Metal
CA 3062	51.923734	-7.871205	Metal
CA 3063	51.923894	-7.871069	Metal
CA 3064	51.924098	-7.870888	Metal
CA 3065	51.924977	-7.870221	Metal
CA 3066	51.924946	-7.870227	Metal
CA 3067	51.924739	-7.870383	Metal
CA 3068	51.924691	-7.870405	Metal
CA 3069	51.924616	-7.870448	Metal
CA 3070	51.924527	-7.870493	Metal
CA 3071	51.924439	-7.870543	Metal
CA 3072	51.924334	-7.870619	Metal
CA 3073	51.924039	-7.870932	Metal
CA 3074	51.923907	-7.871028	Metal
CA 3075	51.923833	-7.871066	Metal
CA 3076	51.923730	-7.871119	Metal
CA 3077	51.923518	-7.871343	Metal
CA 3078	51.923477	-7.871366	Metal
CA 3079	51.923412	-7.871409	Metal
CA 3080	51.923325	-7.871509	Metal
CA 3081	51.923303	-7.871517	Metal
CA 3082	51.923064	-7.871638	Metal
CA 3083	51.923202	-7.871452	Metal
CA 3084	51.923254	-7.871371	Metal
CA 3085	51.923360	-7.871229	Metal
CA 3086	51.923415	-7.871182	Metal
CA 3087	51.923501	-7.871084	Metal
CA 3088	51.923638	-7.871012	Metal
CA 3089	51.923647	-7.870953	Metal
CA 3090	51.923756	-7.870860	Metal
CA 3091	51.923834	-7.870780	Metal

ID	Latitude	Longitude	Material
CA 3092	51.923970	-7.870618	Metal
CA 3093	51.923988	-7.870618	Metal
CA 3094	51.924137	-7.870491	Metal
CA 3095	51.924307	-7.870339	Metal
CA 3096	51.924366	-7.870326	Metal
CA 3097	51.924496	-7.870193	Metal
CA 3098	51.924643	-7.870088	Metal
CA 3099	51.924731	-7.870037	Metal
CA 3100	51.924737	-7.870010	Metal
CA 3101	51.924899	-7.869945	Metal
CA 3102	51.924966	-7.869921	Metal
CA 3103	51.925035	-7.869864	Metal
CA 3104	51.925173	-7.869677	Metal
CA 3105	51.925069	-7.869605	Metal
CA 3106	51.924993	-7.869624	Metal
CA 3107	51.924933	-7.869758	Metal
CA 3108	51.924864	-7.869784	Metal
CA 3109	51.924776	-7.869858	Metal
CA 3110	51.924676	-7.869979	Metal
CA 3111	51.924616	-7.869972	Metal
CA 3112	51.924504	-7.870051	Metal
CA 3113	51.924461	-7.870078	Metal
CA 3114	51.924405	-7.870139	Metal
CA 3115	51.923819	-7.870523	Metal
CA 3116	51.923753	-7.870577	Metal
CA 3117	51.923599	-7.870755	Metal
CA 3118	51.923313	-7.870988	Metal
CA 3119	51.922903	-7.871070	Metal
CA 3120	51.924107	-7.869172	Metal
CA 3121	51.924153	-7.869103	Metal
CA 3122	51.924557	-7.868831	Metal
CA 3123	51.923387	-7.869025	Metal

Ballinwilling Strand

Table A1.3 Metal detector results at Ballinwilling Strand (Headland Archaeology 2015)

Response based on the Garrett 250 discrimination screen	Latitude	Longitude
Iron (Fe)	51,51.954	007,85.765
Aluminium (Al)	51,52.010	007,58.525
Aluminium (Al)	51,51.999	007,58.579
Iron (Fe)	51,51.990	007.58.622

Response based on the Garrett 250 discrimination screen	Latitude	Longitude
Copper alloy (modern coin)	51.51.980	007.58.659
Aluminium (Al)	51,51.962	007,58.741
Aluminium (Al)	51,52.018	007,58.500
Copper alloy (modern coin)	51,51.000	007,51.511
Aluminium (Al)	51,51.025	007,58.483
Aluminium (Al)	51,51.996	007,58.588
Iron (Fe)	51,51.992	007,58.609
Aluminium (Al)	51,51.987	007,58.634
Iron (Fe)	51,51.978	007,58.678
Aluminium (Al)	51,51.760	007,58.757
Aluminium (Al)	51,52.025	007,58.465
Aluminium (Al)	51,51.958	007,58.758
Aluminium (Al)	51,51.976	007,58.680
Copper alloy (modern coin)	51,51.981	007,58.661
Copper alloy (modern coin)	51,51.993	007,58.602
Copper alloy (modern coin)	51,51.007	007,58.541
Aluminium (Al)	51,52.009	007,58.534
Copper alloy (modern coin)	51,52.010	007,58.527
Aluminium (Al)	51,52.020	007,58.474
Silver (Ag)	51,52.016	007,58.483
Aluminium (Al)	51,52.010	007,58.504
Aluminium (Al)	51,52.007	007,58.513
Copper alloy (modern coin)	51,52.000	007,58.540
Aluminium (Al)	51,51.973	007,58.670
Copper alloy (modern coin)	51,52.001	007,58.538
Copper alloy (modern coin)	51,52.002	007,58.533
Copper alloy (modern coin)	51,52.005	007,58.501
Aluminium (Al)	51,51.953	007,58.736
Iron (Fe)	51,51.947	007,58.765
Iron (Fe)	51,51.948	007,58.741
Copper alloy (modern coin)	51,51,996	007,58.533
Aluminium (Al)	51,52.005	007,58.474
Gold (Au) / Silver (Ag)	51,51.972	007,58.617
Aluminium (Al)	51,51.944	007,58.731
Gold (Au) / Silver (Ag)	51,51.973	007,58.634
Aluminium (Al)	51,51.991	007,58.502
Aluminium (Al)	51,51.942	007,58.730
Iron (Fe)	51,51.929	007,58.773
Iron (Fe)	51,51.936	007,58.773
Sliver	51,51.955	007,58.658
Aluminium (Al)	51,51.994	007,58.473

Response based on the Garrett 250 discrimination screen	Latitude	Longitude
Copper alloy (modern coin)	51,51.954	007,58.647
Aluminium (Al)	51,51.923	007,58.775
Copper alloy (modern coin)	51,51.959	007,58.622
Iron (Fe)	51,51.977	007,58.547
Copper alloy (modern coin)	51,51.988	007,58.461
Silver (Ag)	51,51.931	007,58.706

APPENDIX 2: OFFSHORE GEOPHYSICAL ANOMALY LOCATIONS

580754

580954

5724330

5724130

5723930

33.0

CA 1001

33.0

Bathymetry

580754

580954

5724330

5724130

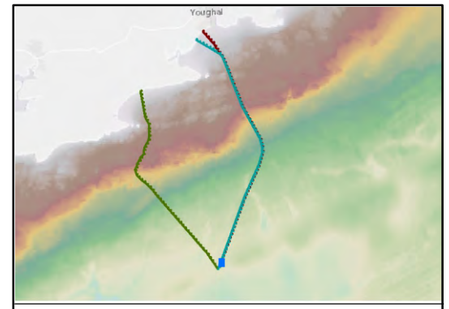
5723930

33.0

CA 1001

33.0

Side Scan Sonar



Legend

- Proposed Coring Locations
- Geophysical Anomaly
- Redbarn Route
- Claycastle Route
- Ballinwilling Route

Magnetic Anomaly (nT)

- 2-5
- 5-10
- 10-50
- 50-100
- >100

Bathymetry (m LAT)

-76.3

-80.4

0 50m

Cotswold Archaeology marine

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Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

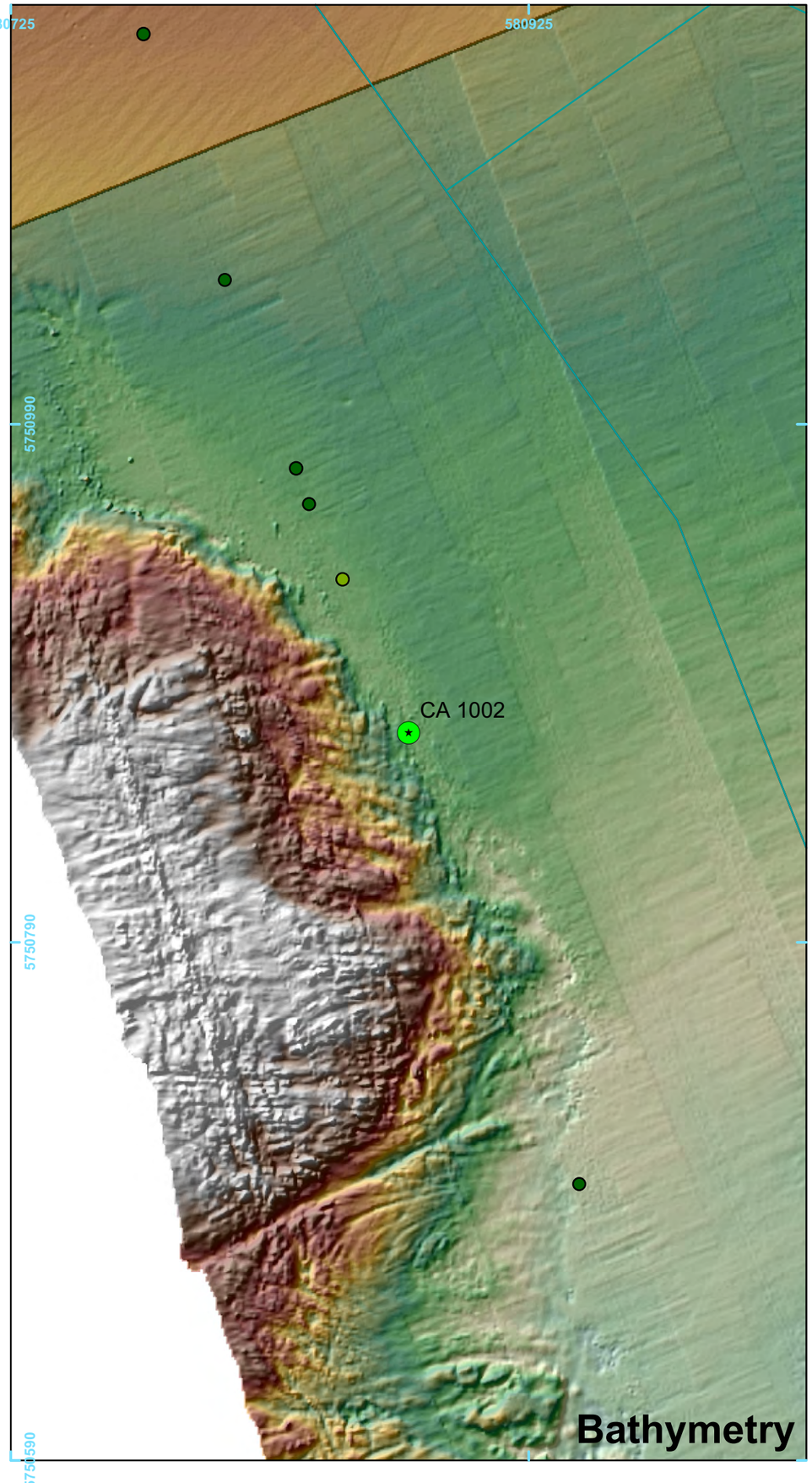
PROJECT TITLE

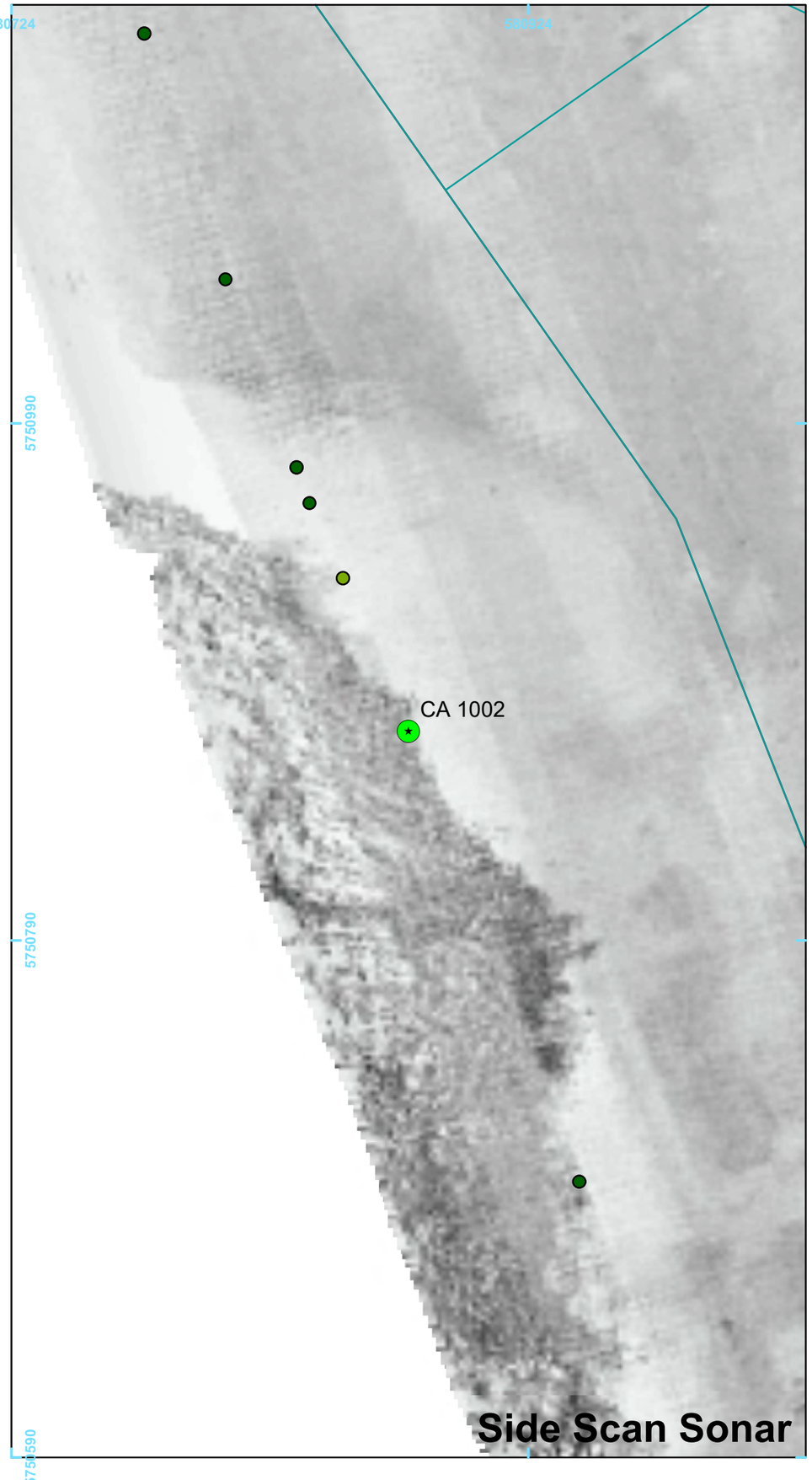
Celtic Interconnector

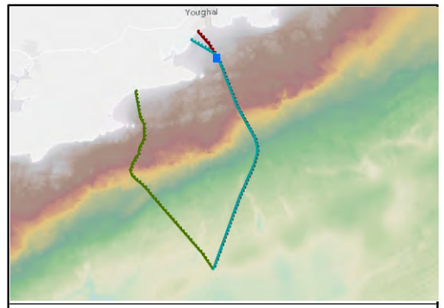
FIGURE TITLE

Geophysical anomaly CA1001

DRAWN BY	**MJG (UoS)**	*PROJECT NO*	**770617**	*FIGURE NO.*
CHECKED BY	**MW**	*DATE*	**30/01/2018**	**A2.1**
APPROVED BY	**xx**	*SCALE@A3*	**1:2,000**	







Legend

- Proposed Coring Locations
- Geophysical Anomaly
- Redbarn Route
- Claycastle Route
- Ballinwilling Route

Magnetic Anomaly (nT)

- 2-5
- 5-10
- 10-50
- 50-100
- >100

Bathymetry (m LAT)

-10.6

-17.0

0 50m

Cotswold Archaeology marine

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PROJECT TITLE

Celtic Interconnector

FIGURE TITLE

Geophysical anomaly CA1002

DRAWN BY	**MJG (UoS)**	*PROJECT NO*	**770617**	*FIGURE NO.*
CHECKED BY	**MW**	*DATE*	**30/01/2018**	**A2.2**
APPROVED BY	**xx**	*SCALE@A3*	**1:2,000**	

586265

586465

5738870

17.5

CA 1003

17.5

5738470

Bathymetry

586265

586465

5738870

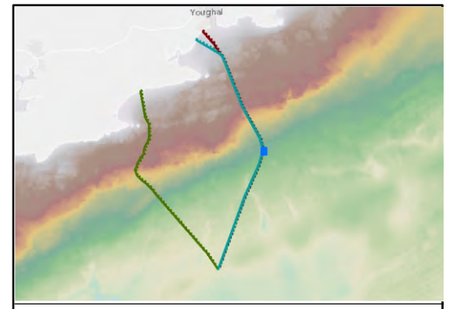
17.5

CA 1003

17.5

5738470

Side Scan Sonar



Legend

- Proposed Coring Locations
- Geophysical Anomaly
- Redbarn Route
- Claycastle Route
- Ballinwilling Route

Magnetic Anomaly (nT)

- 2-5
- 5-10
- 10-50
- 50-100
- >100

Bathymetry (m LAT)

-66.1

-67.9

0 50m

Cotswold Archaeology marine

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PROJECT TITLE

Celtic Interconnector

FIGURE TITLE

Geophysical anomaly CA1003

DRAWN BY	**MJG (UoS)**	*PROJECT NO*	**770617**	*FIGURE NO.*
CHECKED BY	**MW**	*DATE*	**30/01/2018**	**A2.3**
APPROVED BY	**xx**	*SCALE@A3*	**1:2,000**	

579005

579205

5725400

5725200

5725000

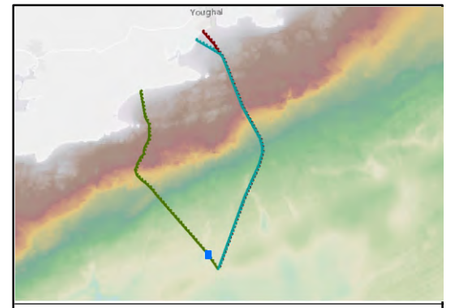
25.5

GS_IRE_W_B01_013

CA 1004

Bathymetry

Side Scan Sonar



Legend

- Proposed Coring Locations
- Geophysical Anomaly
- Redbarn Route
- Claycastle Route
- Ballinwilling Route

Magnetic Anomaly (nT)

- 2-5
- 5-10
- 10-50
- 50-100
- >100

Bathymetry (m LAT)

-78.0

-78.9

0 50m

Cotswold Archaeology marine

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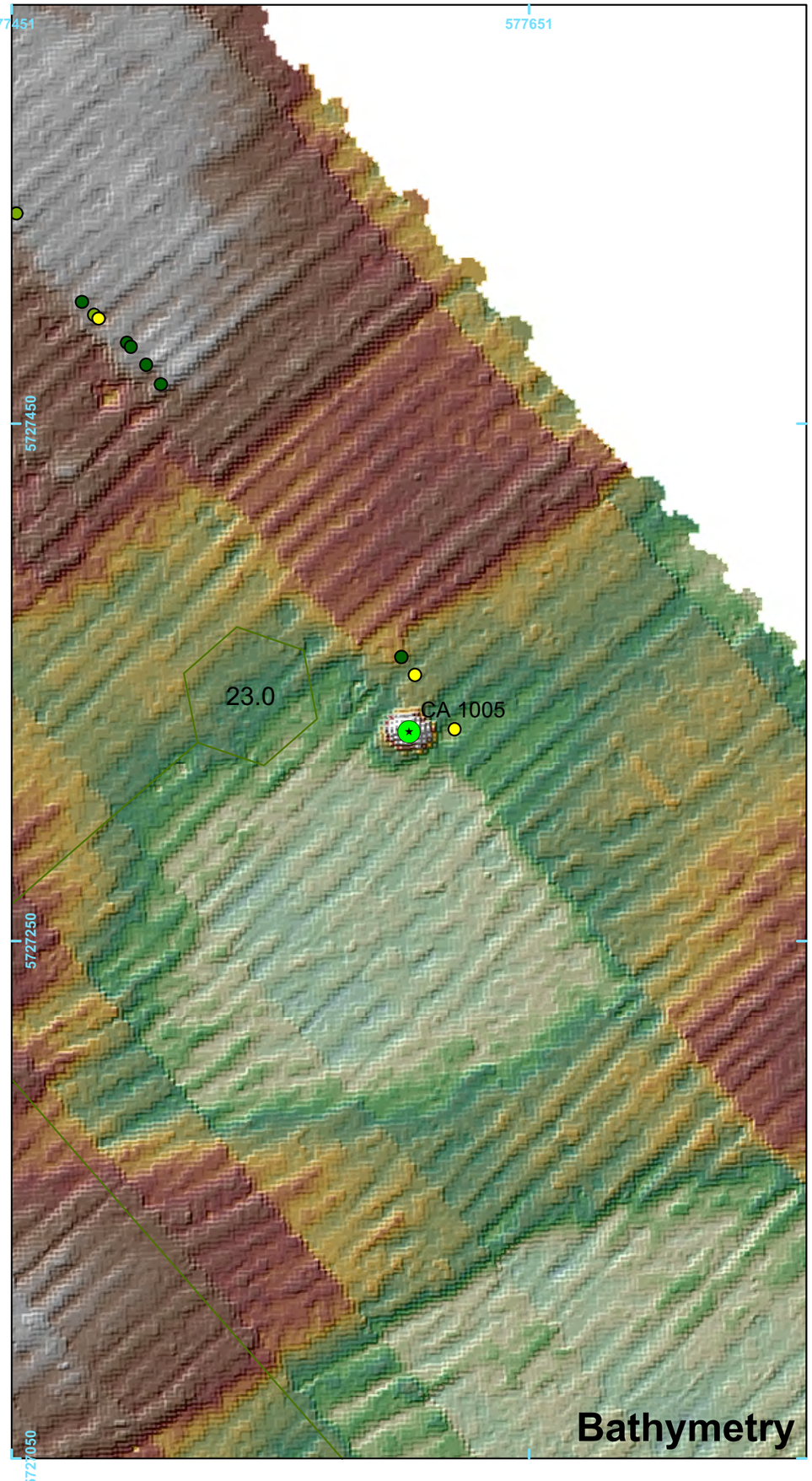
PROJECT TITLE

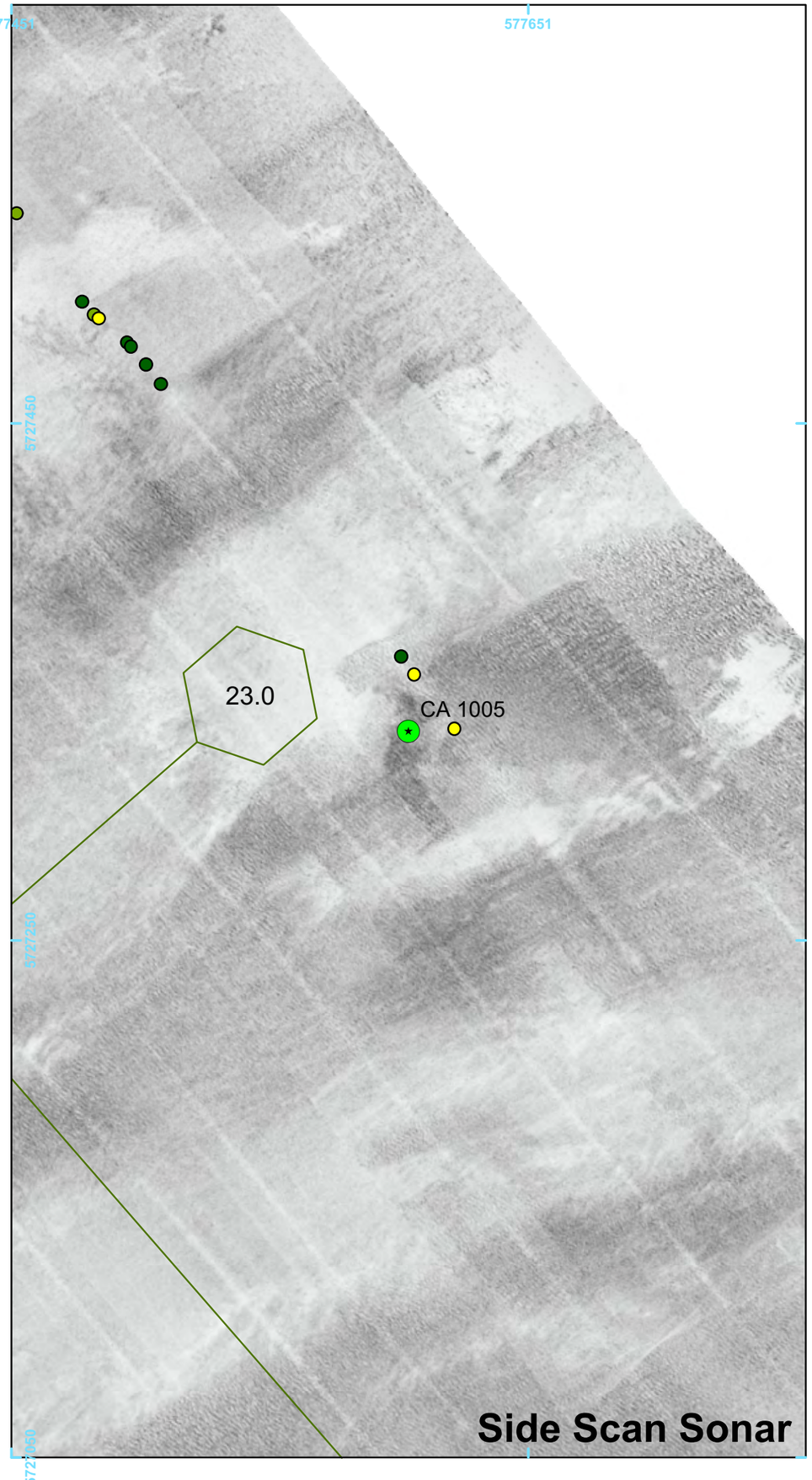
Celtic Interconnector

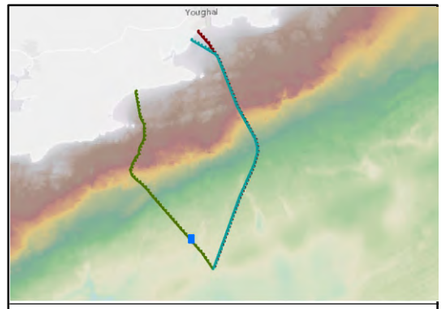
FIGURE TITLE

Geophysical anomaly CA1004

DRAWN BY	MJG (UoS)	PROJECT NO	770617	FIGURE NO.
CHECKED BY	MW	DATE	30/01/2018	A2.4
APPROVED BY	xx	SCALE@A3	1:2,000	







Legend

- Proposed Coring Locations
- Geophysical Anomaly
- Redbarn Route
- Claycastle Route
- Ballinwilling Route

Magnetic Anomaly (nT)

- 2-5
- 5-10
- 10-50
- 50-100
- >100

Bathymetry (m LAT)

-75.3

-77.1

0 50m

Cotswold Archaeology marine

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PROJECT TITLE

Celtic Interconnector

FIGURE TITLE

Geophysical anomaly CA1005

DRAWN BY	**MJG (UoS)**	*PROJECT NO*	**770617**	*FIGURE NO.*
CHECKED BY	**MW**	*DATE*	**30/01/2018**	**A2.5**
APPROVED BY	**xx**	*SCALE@A3*	**1:2,000**	

573227

573427

16.5

5732200

CA 1006

5732000

5731800

Bathymetry

573227

573427

16.5

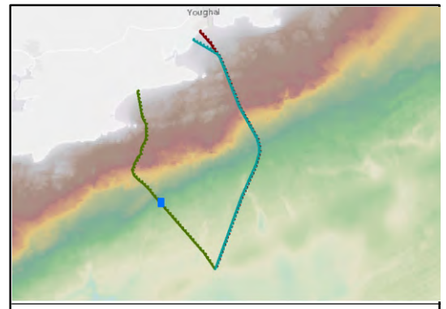
5732200

CA 1006

5732000

5731800

Side Scan Sonar



Legend

- Proposed Coring Locations
- Geophysical Anomaly
- Redbarn Route
- Claycastle Route
- Ballinwilling Route

Magnetic Anomaly (nT)

- 2-5
- 5-10
- 10-50
- 50-100
- >100

Bathymetry (m LAT)

-67.6

-69.0

0 50m

Cotswold Archaeology marine

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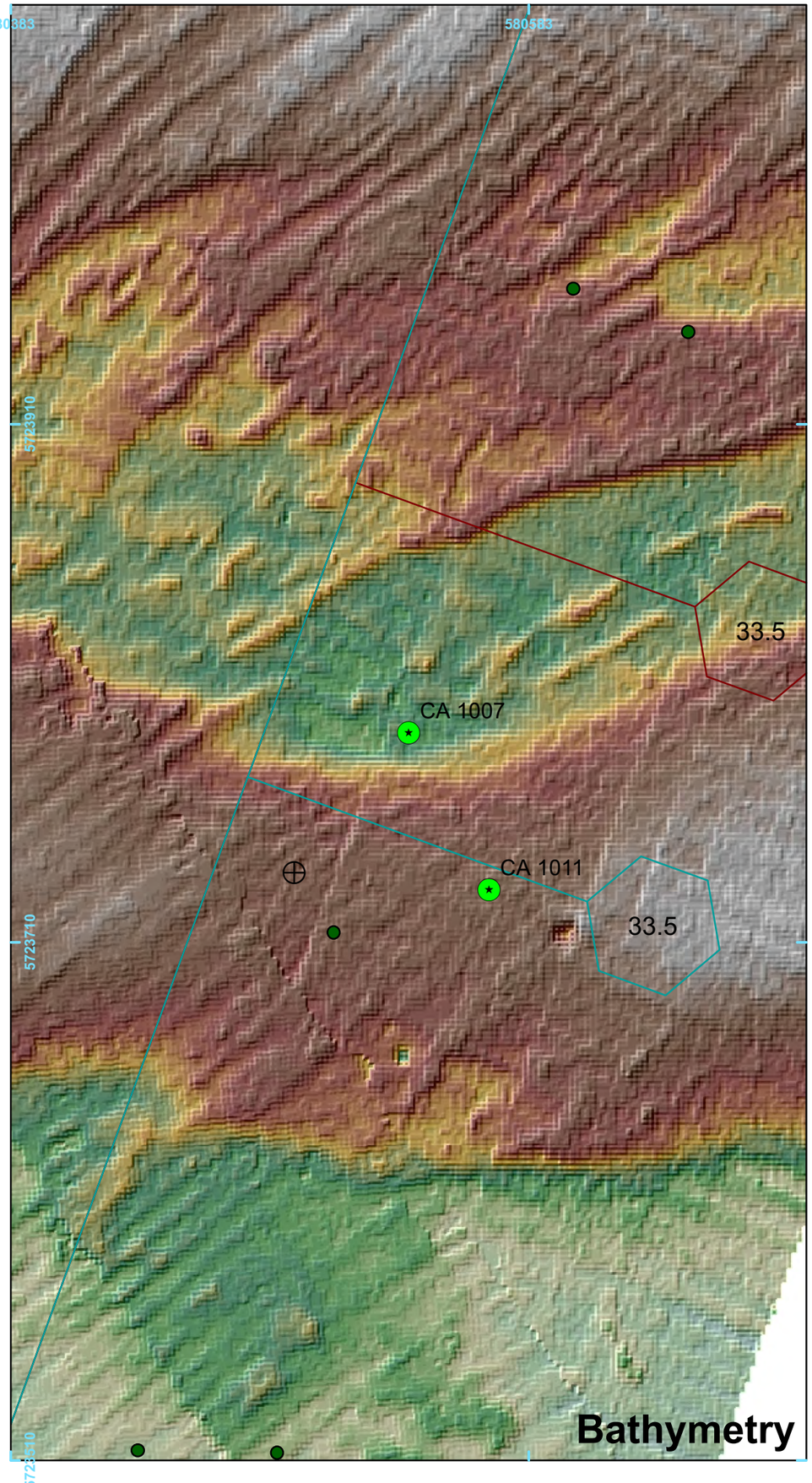
PROJECT TITLE

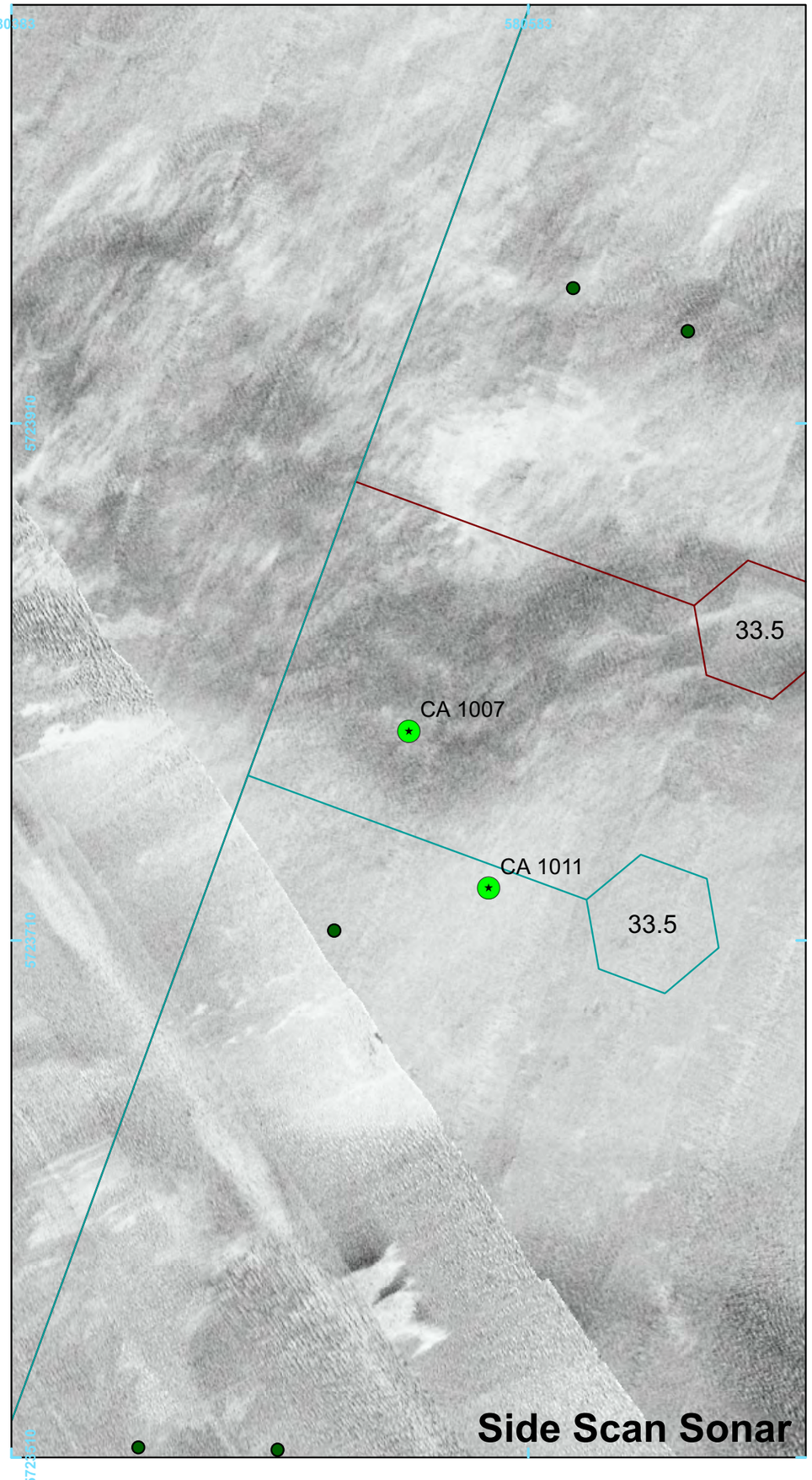
Celtic Interconnector

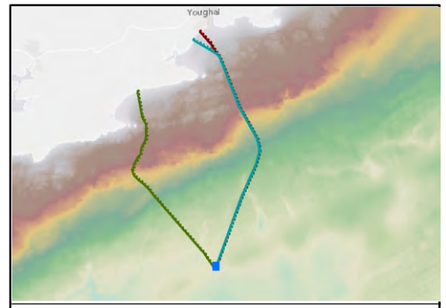
FIGURE TITLE

Geophysical anomaly CA1006

DRAWN BY	**MJG (UoS)**	*PROJECT NO*	**770617**	*FIGURE NO.*
CHECKED BY	**MW**	*DATE*	**30/01/2018**	**A2.6**
APPROVED BY	**xx**	*SCALE@A3*	**1:2,000**	







Legend

- Proposed Coring Locations
- Geophysical Anomaly
- Redbarn Route
- Claycastle Route
- Ballinwilling Route

Magnetic Anomaly (nT)

- 2-5
- 5-10
- 10-50
- 50-100
- >100

Bathymetry (m LAT)

-79.9

-80.7

0 50m

Cotswold Archaeology marine

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PROJECT TITLE
Celtic Interconnector

FIGURE TITLE
Geophysical anomaly CA1007

DRAWN BY	**MJG (UoS)**	*PROJECT NO*	**770617**	*FIGURE NO.*
CHECKED BY	**MW**	*DATE*	**30/01/2018**	**A2.7**
APPROVED BY	**xx**	*SCALE@A3*	**1:2,000**	

570663

570863

5738800

5738600

5738400

CA 1008

GS_IRE_W_B02_020

8.5

Bathymetry

570663

570863

5738800

5738600

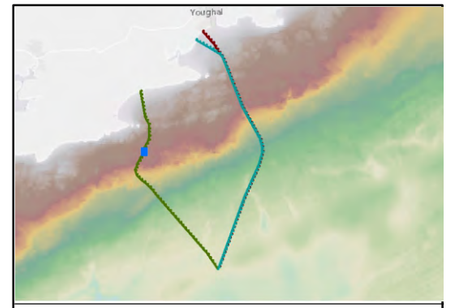
5738400

CA 1008

GS_IRE_W_B02_020

8.5

Side Scan Sonar



Legend

- Proposed Coring Locations
- Geophysical Anomaly
- Redbarn Route
- Claycastle Route
- Ballinwilling Route

Magnetic Anomaly (nT)

- 2-5
- 5-10
- 10-50
- 50-100
- >100

Bathymetry (m LAT)

-32.4

-38.1

0 50m

Cotswold Archaeology marine

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PROJECT TITLE

Celtic Interconnector

FIGURE TITLE

Geophysical anomaly CA1008

DRAWN BY	**MJG (UoS)**	*PROJECT NO*	**770617**	*FIGURE NO.*
CHECKED BY	**MW**	*DATE*	**30/01/2018**	**A2.8**
APPROVED BY	**xx**	*SCALE@A3*	**1:2,000**	

578457

578457

5725940

CA 1009

5725740

5725540

Bathymetry

578257

578457

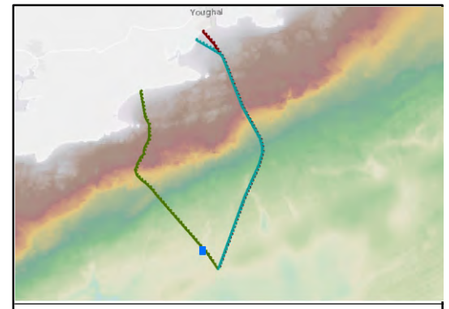
5725940

CA 1009

5725740

5725540

Side Scan Sonar



Legend

- Proposed Coring Locations
- Geophysical Anomaly
- Redbarn Route
- Claycastle Route
- Ballinwilling Route

Magnetic Anomaly (nT)

- 2-5
- 5-10
- 10-50
- 50-100
- >100

Bathymetry (m LAT)

-78.3

-80.3

0 50m

Cotswold Archaeology marine

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PROJECT TITLE

Celtic Interconnector

FIGURE TITLE

Geophysical anomaly CA1009

DRAWN BY	**MJG (UoS)**	*PROJECT NO*	**770617**	*FIGURE NO.*
CHECKED BY	**MW**	*DATE*	**30/01/2018**	**A2.9**
APPROVED BY	**xx**	*SCALE@A3*	**1:2,000**	