

CPAT Report No 1215.1

**Scottish Power Energy Networks
Dolgarrog to Pentir 132kV Overhead Powerline
Foundation Upgrades**

CULTURAL HERITAGE MITIGATION



THE CLWYD-POWYS ARCHAEOLOGICAL TRUST

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Cover: Part of the field system on Cae'r Mynydd, west of Abergwynnog (PRN 34713)

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SUMMARY

A further stage of cultural heritage assessment has been conducted for the existing 132kV overhead powerline between Dolgarrog and Pentir, which is known as the AD Line. The present assessment has focused specifically on the potential need to upgrade the tower foundations and has assessed all tower locations even though some at least are not likely to require upgrades. The decision on which towers will require upgrades will be taken following the completion of a programme of ground investigations which is still on-going.

The assessment has identified a number of cultural heritage assets where there is the potential for impacts as a result of the scheme, and appropriate mitigation has been recommended. Further field survey may be required in order to finalise access routes to those towers where no foundation investigations are to be conducted and which were not therefore assessed during the previous survey.

In most cases the mitigation requires the avoidance of an asset through careful planning and demarcation, although there are a number of assets where there is a more significant potential for impacts and where the implementation of mitigation measures may have an affect on the overall work programme. These are summarised below.

Tower	Assets within 50m	Mitigation
AD13	Tower lies on a substantial bank (Site 1) assoc. with other field banks and house platforms	Archaeological excavation to be conducted in advance of foundation upgrades Watching brief during foundation upgrades
AD26	Scheduled Bronze Age cairn	SMC / archaeological excavation and watching brief
AD27	enclosure	Preservation in situ - Avoid / demarcate or prior excavation and survey if damage is unavoidable
AD44	Field system (ridge and furrow)	Site meeting to assess extent of disturbance and determine mitigation, which may include survey of earthworks and watching brief
AD45	Field system	Site meeting to agree access route, assess extent of disturbance and determine mitigation, which may include survey of earthworks and watching brief
AD46	Field system / lynchets	Depending on the results from the foundation investigations and watching brief further excavation may be required in advance of foundation upgrades and/or a watching brief during groundworks
AD51	Field system	Site meeting to agree access route, assess extent of disturbance and determine mitigation, which may include survey of earthworks and watching brief

1 Introduction

- 1.1 This report presents a mitigation strategy prepared by the Field Services Section of the Clwyd-Powys Archaeological Trust (CPAT) relating to the potential direct impacts on cultural heritage assets along a section of an existing 132kv overhead powerline for which a scheme of foundation upgrades is proposed. The overhead line known as the AD line, runs from Dolgarrog in Conwy to Pentir near Bangor in Gwynedd, passing through the Snowdonia National Park between towers AD5 and AD65.
- 1.2 A cultural heritage assessment was originally completed in April 2012 and revised in October of the same year (Jones 2012), with an additional report being produced in April 2013 (Jones 2013) once further details of the scheme became available.
- 1.3 It is understood that there are no elements of the scheme which require planning permission, but the works are subject to the Electricity Act of 1989 which makes provision for the supply, generation and transmission of electricity. Schedule 9 of the Act details the preservation of amenity and fisheries, stating that:
- ‘In formulating any relevant proposals, a licence holder or a person authorised by exemption to generate or supply electricity:
- (a) shall have regard to the desirability of ... protecting sites, buildings and objects of architectural, historical or archaeological interest; and
- (b) shall do what he reasonably can to mitigate any effects which the proposals would have on ... any such flora, fauna, features, sites, buildings or objects.’
- 1.4 This report (CPAT 1215) originally related only to the eastern end of the scheme, extending for 2.2km from tower AC193 at Dolgarrog to tower AD9, near Llanbedr-y-cennin, but it has subsequently been revised to incorporate the entire scheme. Towers AD5-9 lie within the Snowdonia National Park.
- 1.5 Information from the baseline studies has been used to develop the programme of works for the remaining phases of the scheme in order to mitigate any potential impacts to known cultural heritage assets. Access routes have been designed to avoid assets and the location and extents of assets have been taken into account within the overall scheme of works.

2 Nature of the works

Access Routes

- 2.1 General access to the powerline will use existing tracks where possible, and this will necessitate infilling of potholes and ruts. A report has already been produced by Interserve (Kington 2013) outlining the proposed track improvements, including comments by CPAT on potential impacts on and mitigation for the cultural heritage. However, it is possible that a number of temporary bridges may be required between AD26 and AD46, although at the time of writing details have yet to be finalized and further assessment and mitigation will be considered at a later date should this be required.
- 2.2 It has been assumed that the access routes to individual towers will follow those previously assessed in relation to the programme of foundation inspections which were designed to avoid known cultural heritage assets. These routes have been checked during a previous field survey to ensure no unrecorded but recognizable assets will be affected, although it is possible that foundation upgrades will be required for towers which were not assessed as part of previous surveys. For these further fieldwork might be required.

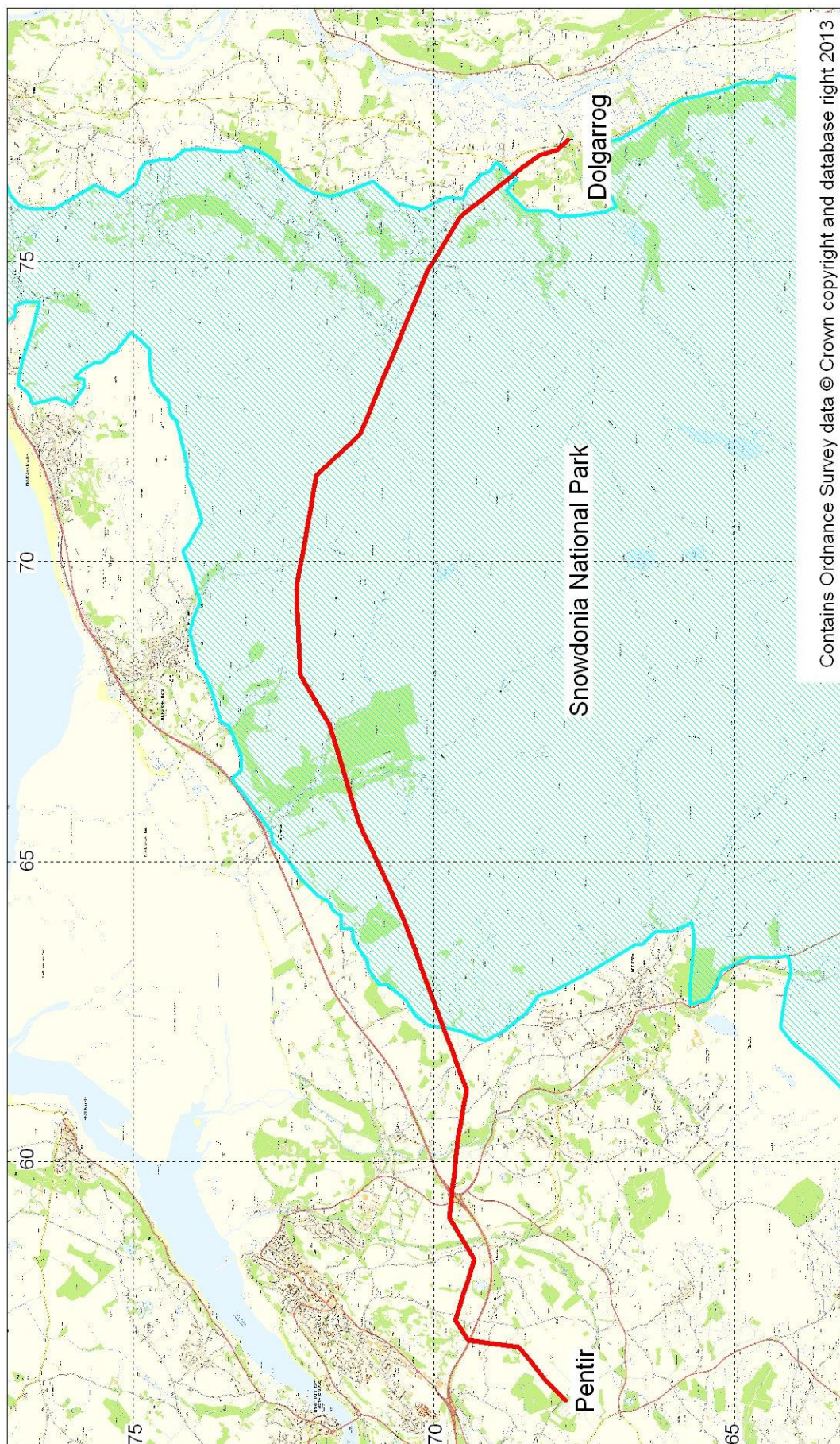


Fig. 1 The overall route of the AD line

Foundation investigations

- 2.3 A programme of ground investigations is currently underway to investigate the foundations of 51 of the metal towers, each of which is supported on four separate concrete pads. This will determine the requirements for any remedial works to the tower bases which would involve a further stage of ground disturbance. A programme of mitigation has already been developed for this stage of the scheme.

Foundation reinforcements

- 2.4 Although the investigations are far from complete it is already evident that the majority of towers under consideration are likely to require upgrades to their foundations which could involve works to the foundations of all four supporting legs. In order to avoid any potential delays to the project the decision has been made to develop a mitigation strategy based on a worst case scenario, whereby all towers under consideration might require foundation upgrades. The final details of the scheme are still being developed and will be taken into account with revised mitigation if appropriate before the scheme commences.
- 2.5 In addition to excavations for each foundation the intention is to strip turf and topsoil from an adjacent area for the temporary storage of subsoil.
- 2.6 Phase 1 of the foundation upgrades (AC193 to AD9) is required prior to the restringing operations in order to ensure the stability of the towers and there is a deadline for completion of the works within this section of 22 September 2013 since the works must integrate with a programme of power outages which has already been put in place. Upgrades to the remaining towers will follow in due course.
- 2.7 It is possible that stays may be required at certain towers during the reinforcement work in order to ensure the stability of the tower. The stays would be anchored using either steel pins driven into the ground or using a concrete block on the surface as a ground anchor.

Site compound

- 2.8 Other than the positioning of winching equipment and cable drums at those locations identified above, the only site compound will be located away from the scheme in Conway.

3 Mitigation Strategy

- 3.1 Cultural heritage assets represent a non-renewable resource, and should be avoided wherever this is feasible in order to avoid damage or destruction. The purpose of mitigation is to avoid or reduce any adverse impacts that might result from the proposed scheme on the cultural heritage resource. The main strategy for minimising impacts from the scheme is avoidance, through careful planning, design and demarcation of sensitive assets. The various stages of the scheme have been designed around the basic premise of the preservation in situ all cultural heritage assets. The location and known extent of assets have been taken into account in planning access routes, locating ground investigations and positioning equipment and materials storage. However, potential impacts remain for a number of assets where proactive mitigation will be required during the implementation phases of the scheme, which are detailed in Table 1. The mitigation strategy outlined below is in draft form, pending the results of consultation with Snowdonia National Park Authority.

Table 1: Summary of cultural heritage assets adjacent to towers AC192A3 to AD90

Tower	Assets within 50m	Distance to nearest asset	Potential impacts	Mitigation
AC192A	none		none	none
AC193	PRN 1544 chambered tomb	15m	none	Preservation in situ demarcate/avoid
AD2	none	>200m	none	none
AD3	none	>200m	none	none
AD4	none	>200m	none	none
AD5	none	170m	none	Field survey of access route
AD6	none	100m	none	Field survey of access route
AD7	none	55m	none	Field survey of access route
AD8	none	60m	none	Field survey of access route
AD9	none	60m	none	none
AD10	PRN 33950 Tyddyn Robin building	35m	none	Field survey of access route
AD11	none	200m	none	Field survey of access route
AD12	none	190m	none	none
AD13	Tower lies on a substantial bank (Site 1) assoc. with other field banks and house platforms in same field (PRNs 7560-1, 4694)	0m	damage to bank	Archaeological excavation to be conducted in advance of foundation upgrades Watching brief during foundation upgrades
AD14	none	200m	none	none
AD15	none	>200m	none	Field survey of access route
AD16	none	>200m	none	none
AD17	none	>200m	none	none
AD18	none	55m	none	none
AD19	none	80m	none	none
AD20	none	200m	none	none
AD21	none	>200m	none	none
AD22	none	>200m	none	none
AD23	Hut circles PRN 514 Longhuts PRN 518	50m	potential impact during access	Preservation in situ Avoid / demarcate
AD24	none	>200m	none	none
AD25	Low bank (Site 2) adj to tower, poss. assoc. with its construction or part of a field system	3m	potential damage to bank	Watching brief
AD26	CN 131 Bronze Age cairn	0m	potential buried deposits	SMC / archaeological excavation and watching brief

Tower	Assets within 50m	Distance to nearest asset	Potential impacts	Mitigation
AD27	PRN 4702 enclosure	<5m	damage to enclosure	Preservation in situ - Avoid / demarcate or prior excavation and survey if damage is unavoidable
AD28	SAM CN129	110m	none	Use existing grassy track to access tower
AD29	none	100m	none	none
AD30	none	70m	none	none
AD31	none	65m	none	none
AD32	none	70m	none	none
AD33	Access crosses holloway (Site 3) - former route of present track	90m	removal of section of field wall for access and damage to holloway (Site 3)	Rebuild wall in same style with original stones Holloway to be preserved in situ and taken into account when determining access route
AD34	none	200m	poss. removal of section of field wall for access	Rebuild wall in same style with original stones
AD35	Predicted line of Roman road follows present track	10m	none	none
AD36	Predicted line of Roman road follows present track	20m	none	none
AD37	none	105m	none	none
AD38	none	60m	none	Access route to avoid burnt mound PRN 389
AD39	Holloway (Site 4) at SH 69104 72160	62m	none	Preservation in situ Holloway to be taken into account when determining access route
AD40	none	60m	none	none
AD41	PRN 5398 boundary bank	60m	none	Use existing break in bank during access
AD42	PRN 7433 enclosure	40m	none	Use existing grassy track for access
AD43	none	100m	none	Careful access routing, using existing farm track
AD44	Field system (ridge and furrow) PRN 5474	0m	damage to field system	Site meeting to assess extent of disturbance and determine mitigation, which may include survey of earthworks and watching brief
AD45	Field system 34714	0m	damage to field system during	Site meeting to agree access route, assess

Tower	Assets within 50m	Distance to nearest asset	Potential impacts	Mitigation
			foundation upgrade and as a result of access	extent of disturbance and determine mitigation, which may include survey of earthworks and watching brief
AD46	Field system / lynchets PRN 7150	0m	damage to lynchet	Depending on the results from the foundation investigations and watching brief further excavation may be required in advance of foundation upgrades and/or a watching brief during groundworks
AD47	none	200m	none	Field survey of access route
AD48	none	90m	none	Field survey of access route
no towers AD49-50	-	-	-	-
AD51	Field system PRN 34713	<10m	damage to field system	Site meeting to agree access route, assess extent of disturbance and determine mitigation, which may include survey of earthworks and watching brief
AD52	CN 344-5 Bronze Age cairns PRN 7115 field system	20m	none	Preservation in situ Keep to existing track passing CN 344-5 Demarcate / avoid
AD53	CN 344-5 Bronze Age cairns	90m	none	Keep to existing track passing CN 344-5 Demarcate / avoid
AD54	Site 7 stone structure	45m	Vehicular damage to upstanding features	Preservation in situ Demarcate / avoid
AD55	Sites 8-11 Sheepfolds and shelters	20m	Vehicular damage to upstanding features	Preservation in situ Demarcate / avoid
AD56	none	160m	None	none
AD57	none	100m	none	none
AD58	PRN 71 Longhut	30m	none	Field survey of access route
AD59	PRN 20832 quarry	25m	none	none
AD60	none	75m	none	Field survey of access

Tower	Assets within 50m	Distance to nearest asset	Potential impacts	Mitigation
				route
AD61	none	>200m	none	Field survey of access route
AD62	Quarry PRN 33964	5m	none	Field survey of access route
AD63	none	>200m	none	none
AD64	none	95m	none	Field survey of access route
AD65	none	95m	none	Field survey of access route
AD66	none	100m	none	Field survey of access route
AD67	none	100m	none	Field survey of access route
AD68	none	100m	none	Field survey of access route
AD69	none	180m	none	none
AD70	none	180m	none	Field survey of access route
AD71	none	70m	none	Field survey of access route
AD72	none	>200m	none	none
AD73	none	110m	none	Field survey of access route
AD74	none	105m	none	Field survey of access route
AD75	none	170m	none	Field survey of access route
AD76	none	145m	none	Field survey of access route
AD77	none	165m	none	none
AD78	none	150m	none	Field survey of access route
AD79	none	55m	none	Field survey of access route
AD80	none	>200m	none	none
AD81	none	90m	none	Field survey of access route
AD82	none	>200m	none	Field survey of access route
AD83	none	>200m	none	Field survey of access route
AD84	none	>200m	none	none
AD85	none	100m	none	none
AD86	none	>200m	none	Field survey of access route
AD87	none	60m	none	none
AD88	none	>200m	none	none

Tower	Assets within 50m	Distance to nearest asset	Potential impacts	Mitigation
AD89	none	>200m	none	Field survey of access route
AD90	none	55m	none	none

Scheduled Ancient Monuments: General Mitigation Measures and Consents

- 3.2 The recommended mitigation is the avoidance of all scheduled areas through careful planning of the works programme, but specifically:
1. Scheduled monument consent will be required for all groundworks within the scheduled area for CN 131
 2. No vehicular access within or across a scheduled area without prior consent. However, existing trackways which can be used for access cross the scheduled areas for CN 344, CN 345, CN 129 and CN 131 and it has been acknowledged by Cadw that access can be permitted across the scheduled areas provided that all vehicles adhere strictly to these tracks.
 3. Ensure all assets are included on project access maps
 4. No positioning or operation of machinery within a scheduled area without prior consent from Cadw
 5. No storage of equipment or materials within a scheduled area without prior consent from Cadw
 6. Appropriate demarcation of scheduled areas. To be conducted under the supervision of an archaeologist prior to the commencement of works
 7. An archaeologist to be present during initial access to areas containing scheduled ancient monuments to ensure awareness and avoidance
 8. An archaeologist should conduct monitoring visits during any operations within the vicinity of a scheduled area to ensure the effectiveness of the mitigation strategy
 9. All contractors to be made aware of the protected status of the monuments and the legal restrictions that this status imposes.
 10. Cadw to be provided with a method statement in advance of the works commencing
 11. Cadw to be provided with a timetable to facilitate monitoring
 12. Cadw to be provided with report(s) detailing compliance with statutory requirements
- 3.3 *Consents* Scheduled monument consent will be required for all ground investigation works and any subsequent remedial works within the scheduled area for CN 131. Any changes to the work programme must address potential impacts on scheduled areas and should be discussed with Cadw at the earliest opportunity.

Table 2: General Mitigation Measures for Scheduled Ancient Monuments

Tower	SAM No	Name	Mitigation
AD27-8	CN129	Bwlch y Ddeufaen Standing Stones	avoid/demarcate
	CN130	Cerrig Pryfaid Stone Circle	avoid
AD26	CN131	Barclodiad-y-Gawres Round Cairn	Scheduled Monument Consent watching brief
AD51	CN245	Hut Circle Settlement on Caer Mynydd	avoid/demarcate

AD45	CN286	Hut Circle and Rectangular Hut, N of Wern y Pandy	none
-	CN341	Cairn to NNW of Yr Orsedd	none
-	CN342	Cairn to NE of Foel Dduarth	none
AD52-53	CN344	Cairn to N of Cras	avoid/demarcate
AD52-53	CN345	Ring cairn to N of Cras	avoid/demarcate
-	CN346	Cras cairn	none
AD30-33	CN402	Roman Road N of Llannerch Fedw	avoid/demarcate

Undesignated Assets: General Mitigation Measures and Consents

- 3.4 The recommended mitigation is avoidance through the careful planning of the works programme and specifically:
- Ensure all assets are included on project access maps
 - No vehicular access across an asset
 - No positioning or operation of machinery within the immediate area of an asset
 - No storage of equipment or materials within the immediate area of an asset
 - Demarcation where appropriate to ensure avoidance. To be conducted under the supervision of an archaeologist prior to the commencement of works
 - An archaeologist must be present should access or works be unavoidable within any of the identified areas of archaeological sensitivity defined on the accompanying mapping to ensure the awareness and avoidance of assets.
 - Sufficient time and resources must be made available to ensure the preservation by record of any archaeological features or deposits which are revealed during the watching brief.
- 3.5 *Consents* No formal consents are required, although in line with best practice the Snowdonia National Park Archaeologist, the National Trust Archaeologist, and the Gwynedd Archaeological Planning Service should be provided with a method statement and kept informed of the work programme for the relevant sections of the powerline.

Operation-specific Mitigation Measures

General access

- 3.6 The line of the Roman road between Caerhun and Caernarfon, which is crossed by the powerline a number of times and in some cases is assumed to have been adopted by a present-day trackway, between SH 7208 7155 and SH 7099 7197, and SH 7029 7206 and SH 6958 7227, will be used to gain access to the powerline. A temporary bridge may be required to cross a stream at SH 7028 7206, which is close to scheduled ancient monument CN 402, which should be avoided through demarcation. There are proposals to improve the existing track by the infilling of potholes and ruts with locally sourced, imported stone. Any requirements for additional improvements will require a further stage of assessment and appropriate mitigation.

Foundation reinforcements

- 3.7 Although ground investigations are currently underway at 56 towers in order to determine the requirements for foundation reinforcements it has been assumed that potentially work might be required all towers. The exact details of the reinforcement scheme are not yet available, although it is understood that the works could affect an area extending up to 12m from each tower, taking into account the area of excavations and the storage of equipment and spoil.

Stays may also be required on some of the corner towers, involving the placement of ground anchors up to 30m from the towers.

- 3.8 Access routes to individual towers have yet to be confirmed but may require additional field survey if routes deviate from those already agreed, or were not covered by previous surveys which related only to ground investigations. The need to bring concrete to the base of each tower may, at least in some cases, necessitate the construction of temporary tracks from the existing roads and tracks and further stages of assessment and mitigation would therefore be required.
- 3.9 Seven towers have been identified where there is the potential for significant impacts to cultural heritage assets, which are listed in Table 2. Although other towers, listed in Table 1, have also been identified where mitigation is required, those in Table 2 require more detailed consideration which may impact on the overall work programme.

Table 2 Summary of the main potential impacts and mitigation

Tower	Assets within 50m	Potential impacts	Mitigation
AD13 See Fig. 2	Tower lies on a substantial bank (Site 1) assoc. with other field banks and house platforms in same field (PRNs 7560-1, 4694)	damage to bank	Archaeological excavation to be conducted in advance of foundation upgrades Watching brief during foundation upgrades
AD26 See Fig. 3	CN 131 Bronze Age cairn	potential buried deposits	SMC / archaeological excavation and watching brief
AD27 See Figs 4 and 5	PRN 4702 enclosure	damage to enclosure	Preservation in situ - Avoid / demarcate or prior excavation and survey if damage is unavoidable
AD44	Field system (ridge and furrow) PRN 5474	damage to field system	Site meeting to assess extent of disturbance and determine mitigation, which may include survey of earthworks and watching brief
AD45	Field system 34714	damage to field system during foundation upgrade and as a result of access	Site meeting to agree access route, assess extent of disturbance and determine mitigation, which may include survey of earthworks and watching brief
AD46	Field system / lynchets PRN 7150	damage to lynchets	Depending on the results from the foundation investigations and watching brief further excavation may be required in advance of foundation upgrades and/or a watching brief during groundworks
AD51	Field system PRN 34713	damage to field system	Site meeting to agree access route, assess extent of disturbance and determine mitigation, which may include survey of earthworks and watching brief

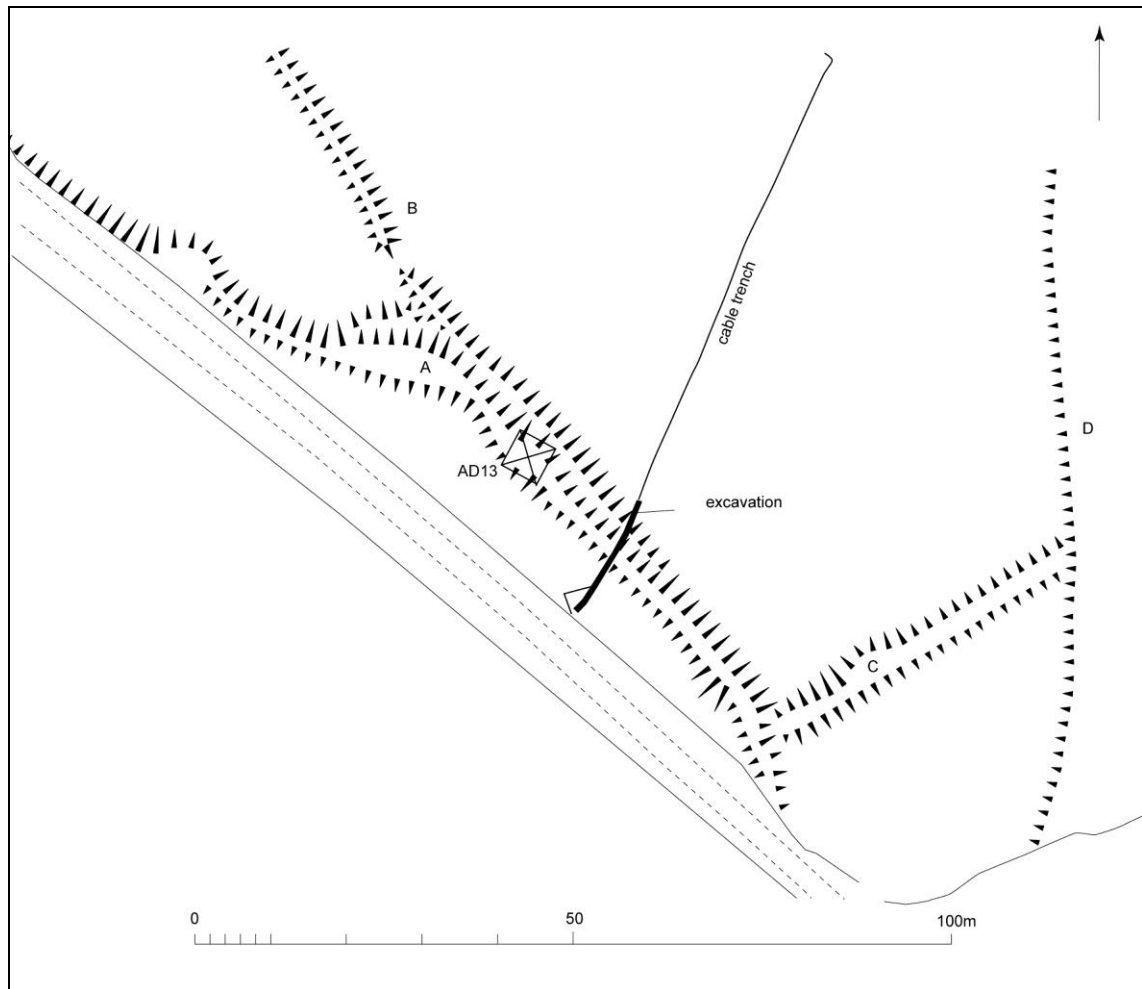


Fig. 2 Plan of the field system (site 1) in the areas around tower AD13, and the location of previous excavations in advance of underground cabling

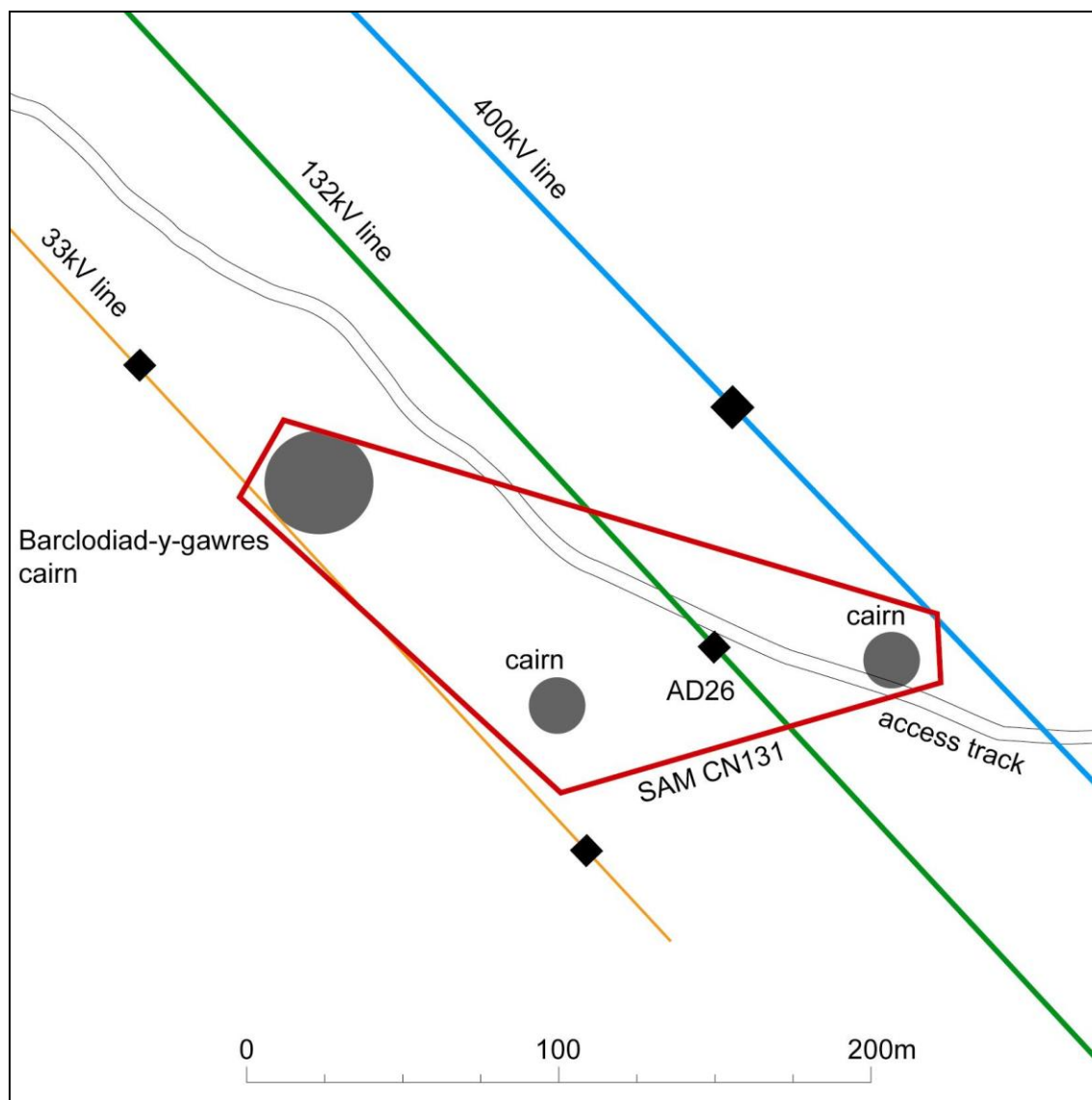


Fig. 3 Location of tower AD26 in relation to the cairns within the scheduled area of SAM CN131

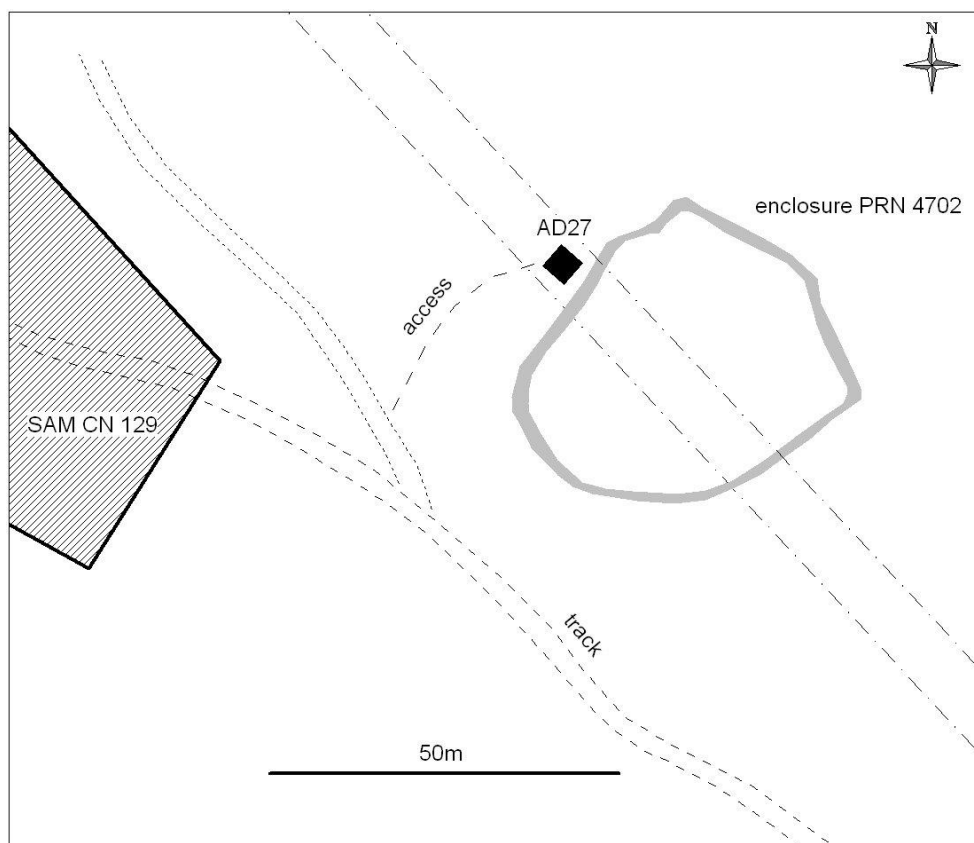


Fig. 4 Plan showing the proximity of enclosure PRN 4702 to tower AD27



Fig. 5 Tower AD27 – the person is standing at the point at which enclosure PRN 4702 is closest to the tower. Photo CPAT 3610-0060

4 References

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