
**Site Preparation and Clearance
Environmental Statement
Volume 3 – Appendix 14-19
European Protected Species Mitigation Licence
Method Statement Background and
Supporting Information: Great Crested Newt**

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EUROPEAN PROTECTED SPECIES MITIGATION LICENCE METHOD STATEMENT BACKGROUND AND SUPPORTING INFORMATION: GREAT CRESTED NEWT

DCRM Ref Number: WN034-JAC-PAC-REP-00050

Revision: 0.1

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Date	Rev No.	Summary of Changes	Ref Section	Purpose of Issue
27/04/17	1	Update to address SPC scope change		Information
June 17	2	Update to address SPC scope change		Information

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A. Executive summary

Horizon Nuclear Power Wylfa Limited (Horizon) is planning to develop a new Nuclear Power Station on Anglesey (the Wylfa Newydd Generating Station) as identified in the National Policy Statement for Nuclear Power Generation (EN-6) (Department of Energy and Climate Change, 2011). The Wylfa Newydd Project will require a number of applications to be made under different legislation to different regulators. Jacobs U.K. Limited (Jacobs) was commissioned to collect baseline data to inform the various applications, assessments and permits that will be submitted for approval to construct and operate the Wylfa Newydd Generating Station.

In order to determine likely environmental effects as a result of the construction, operation and decommissioning of the new Nuclear Power Station, Horizon has undertaken a suite of surveys between 2009 and 2017. This included surveys within a study area comprising the Wylfa Newydd Development Area and a buffer of 500m around its boundary.

The surveys recorded great crested newts (*Triturus cristatus*) (GCN) in three ponds within 250m of each other. Within these ponds there was one breeding pond with a peak count of seven GCN where eggs were recorded (Pond 11a), one pond with a peak count of one GCN where breeding was not confirmed (within the Cae Gwyn Site of Special Scientific Interest (SSSI)), and one pond where GCN presence was only established after GCN eDNA was detected (Pond 11b). The combined meta-population supported by these ponds was low (eight GCN in total).

The effect of the Wylfa Newydd Project on this population will comprise the loss of 0.3ha of terrestrial habitat within 250m of these ponds. Furthermore, in the absence of mitigation, there is the potential for mortality, injury and disturbance effects to individual GCN. These effects will primarily happen during the habitats clearance works phases of the Wylfa Newydd Project between 2018 and 2020. During this period, all above ground habitats within the SPC Application Site will be removed.

A European Protected Species Mitigation Licence (EPSML) is required to legalise the proposed works

A translocation will be undertaken to prevent GCN being harmed during the proposed works. The details of the proposed translocation are not within the scope of this document, and are detailed in full in the delivery statement sections. However, there is no requirement to deviate from standard best practice methods. The translocation will therefore include a trapping and translocation scheme of GCN, and their release into suitable areas of retained habitat owned by Horizon adjacent to where they are caught. The land in which the GCN will be released will remain in the ownership of Horizon in perpetuity under suitable management to support GCN in their terrestrial phase.

The loss of 0.3ha of terrestrial habitat only, which is also on the outer boundary of the 250m buffer around ponds that support GCN, is not considered likely to materially affect the low population of GCN present. The area of land lost will therefore not be compensated for as this is not considered necessary. However, the area GCN would be released into would no longer be grazed, and so would develop from a short-turf sward into rank grassland and scrub of greater value to GCN than those existing.

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Monitoring of the population in the three ponds will be undertaken to ensure that the population has not been affected by the loss of 0.3 ha of terrestrial habitat, and to inform the need for any remedial action.

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B. Introduction

B.1 Background to activity/development

Horizon is planning to develop a new nuclear power station on Anglesey as identified in the National Policy Statement for Nuclear Power Generation (EN-6). National Policy Statements (NPSs) EN-1 and EN-6 set out and justify the need for new nuclear power, and particularly a new station at Wylfa. NPS EN-1 identifies the urgent need for new (and particularly low carbon) electricity generating capacity in the UK within 10 to 15 years, and NPS EN-6 asserts the urgent need for nuclear power stations and their role in contributing towards a secure and diverse energy mix.

Horizon Nuclear Power is developing a new generation of nuclear power stations to help meet the United Kingdom's (UK's) need for stable and sustainable low carbon energy. Nuclear power can play a vital role in meeting the challenge of maintaining secure energy supplies for the UK, whilst also tackling the global threat of climate change by contributing to emissions reduction targets.

The Wylfa Newydd Project comprises the proposed Wylfa Newydd Generating Station, including the reactors, associated plant and ancillary structures and features, together with all of the development needed to support its delivery, such as highway improvements, worker accommodation and specialist training facilities.

There are two phases of the Wylfa Newydd Project, the first of which is site preparation and clearance (SPC proposals), which is to be consented via the Town and Country Planning Act 1990. This licence covers this phase of the Wylfa Newydd Project.

Currently, the terrestrial habitats within the Wylfa Newydd Development Area are dominated by agricultural land comprising improved grassland and poor semi-improved grassland. Other habitats present include isolated areas of gorse (*Ulex europaeus*) scrub, and pockets of marshy grassland associated with hollows and drainage features, including ponds. Additionally, the areas immediately surrounding the Existing Power Station to the south and east are predominantly conifer plantations dominated by pine species (*Pinus* spp.).

The approximate centre of the Wylfa Newydd Development Area is located at Ordnance Survey grid reference SH 3517 9258.

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B.2 Full details of proposed works on site that are to be covered by the licence

This licence will cover habitat clearance as part of the SPC proposals. The actions required to achieve habitat clearance include:

- Vegetation clearance
 - targeted removal of vegetation, mostly above ground or to ground;
- Clearance of other features
 - targeted removal of above ground features e.g. gates, poles, etc.; and
 - clearance of walls and buildings to ground level.
- Remediation and management
 - management of vegetation after grazing ceases;
 - eradication/removal of invasive non-native species of plant (INNS) and soils with INNS contamination; and
 - species translocation from within the perimeter fence.
- Site establishment
 - security buildings (modular buildings) including a control room and gatehouse;
 - installation of perimeter fencing;
 - installation of security fencing for site compound area;
 - haul roads;
 - water course diversion; and,
 - construction of bat barns.

It is anticipated that works will commence during 2018 and take approximately 24 months to complete.

B.3 Actions requiring licensing

The actions to clear habitats described in B.2 have the potential to affect GCN when in their terrestrial phase only. Translocation will therefore need to be completed to protect GCN from being killed or injured and to avoid any detriment to the maintenance of the GCN population at favourable conservation status in its natural range. The following actions will be licensable during translocation works:

- disturbance to animals in terrestrial habitats when exclusion fencing required for the translocation of GCN is installed;
- obstruction of access to a structure or place used for shelter or protection by a GCN in terrestrial habitats as they are excluded from the SPC Application Site;
- capturing, taking and transporting GCN during translocation to where they are released; and
- damaging and destruction of resting places (terrestrial habitats) used by GCN.

It is not predicted that any GCN will be killed or injured during the works completed under the translocation works covered by the licence.

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C. Survey and site assessment

C.1 Existing information on great crested newts

Background data searches were requested in 2013 and in 2015 by Jacobs (on behalf of Horizon). This information was requested from Cofnod (the North Wales Environmental Information Service) and included all legally protected and notable species records, including GCN, within 2.5km of the centre of the Wylfa Newydd Development Area. The background data searches did not return any records of GCN.

A Phase 1 habitat survey was completed in 2013 (Jacobs, 2013a), and identified suitable habitat for breeding, foraging and hibernating GCN in the Wylfa Newydd Development Area and 500m buffer zone. A botanical survey was also completed within the Cae Gwyn SSSI (Jacobs, 2013b), during which a single GCN was recorded in terrestrial habitats. This was therefore not during GCN surveys but did influence the scope of future surveys.

C.2 Statutory sites notified for the species (SSSIs or SACs) within 10km

A search using freely available online sources found that there are no SSSIs or Special Areas of Conservation which include GCN as a qualifying feature within 10km of the Wylfa Newydd Development Area. There are therefore no pathways for interaction between the metapopulation affected by the works covered under this licence and statutory designated sites for conservation notified for GCN.

C.3 Objectives of the survey

The objective of the surveys was to determine presence/absence of all populations of GCN likely to be affected by works within the SPC Application Site, an estimate of population size and their usage of site (e.g. breeding, hibernation, and foraging).

C.4 Scaled plan/map of survey area

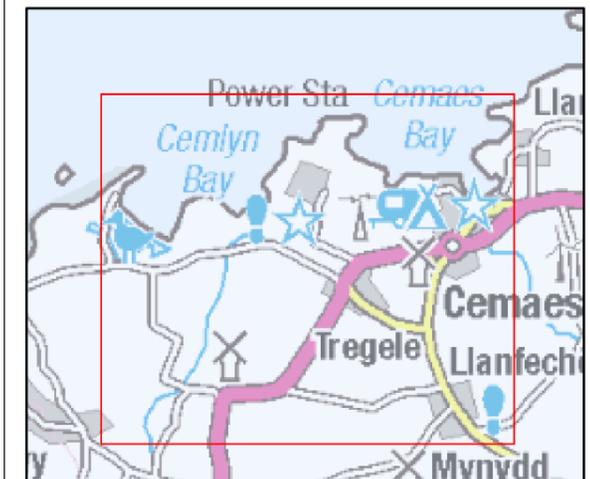
See overleaf.



FIGURE C4

Legend

- Wylfa Newydd Development Area
- Site Preparation and Clearance Application Site
- Study area



0	AUG 17	Client review	BW	KL	NC	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

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HORIZON
 NUCLEAR POWER

Project
 WYLFA NEWYDD PROPOSED NUCLEAR POWER STATION

Drawing Title
 GREAT CRESTED NEWT
 STUDY AREA

Drawing Status
 Scale @ A3: 1:15,000 (Inset 1:50,000) **DO NOT SCALE**

Jacobs No. 60PO8058

Client No.

Drawing No. 60PO8058_GC_N_LIC_C_4b



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C.5 Site/habitat description

The Wylfa Newydd Development Area comprises the indicative areas of land and sea, including the Power Station Site, the Wylfa National Policy Statement Site and the surrounding areas that would be used for the construction and operation of the Wylfa Newydd Generating Station as shown in figure C4. It is bounded to the north by coast and the existing Magnox power station (the Existing Power Station). To the east, it is separated from Cemaes by a narrow corridor of agricultural land. The A5025 and residential properties define part of the south-east boundary, with a small parcel of land spanning the road to the north-east of Tregel. To the south and west, the Wylfa Newydd Development Area abuts agricultural land, and to the west it adjoins the coastal hinterland. This area is approximately 380ha. The SPC Application Site covers 299ha within the Wylfa Newydd Development Area that would be cleared as part of the SPC proposals.

The SPC Application Site has been surveyed extensively to determine the ecological baseline, as described by Jacobs (2013a and 2013b), using Phase 1 habitat survey and national vegetation classification methodologies.

As described in B.1, the SPC Application Site is dominated by low-quality agricultural land comprising improved grassland and poor semi-improved grassland. Other habitats present include isolated areas of scrub, marshy grassland, ponds and conifer plantations. The field boundaries within the SPC Application Site and surrounding area are generally traditional clawdd walls: earth banks faced with stone, often colonised with gorse and hawthorn (*Crataegus monogyna*) scrub. Where the banks have collapsed, the vegetation more closely resembles hedges. Management of the SPC Application Site has historically been for the purposes of agriculture, mainly cow and sheep grazing, with some fields used to grow grass which is cut for silage. In general the quality of terrestrial habitats for GCN is poor, with the most suitable habitats being rank grassland and riparian vegetation mainly limited to within 50m of ponds.

C.6 Field survey(s)

C.6.1 Methods

Initial assessments of the ponds' suitability to support GCN were undertaken using the Habitat Suitability Index (HSI) methodology developed by Oldham *et al.* (2000). In addition to this method, factors such as the presence of pollution e.g. oil or eutrophication, and excessive poaching and disturbance by livestock was used to determine whether a pond may support breeding GCN. Those ponds found to be suitable were then surveyed using standard presence or likely absence methods described below.

Presence or likely absence surveys were undertaken according to standard methods (English Nature, 2001; Froglife, 2001; and Langton *et al.*, 2001). Methods included the deployment of bottle traps, egg searching, netting, and torching using torches with a minimum of 1,000,000 candle power. Where possible, a minimum of three survey methods were applied at each pond or ditch. Reasons for not using three techniques included:

- Ponds that were too shallow to bottle trap or net;

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- Night-time temperatures were predicted to drop below 5°C during the night, thereby preventing bottle trapping;
- Ponds that had no vegetation to search for the presence of GCN eggs; and
- Rain during surveys preventing effective torching.

In all instances where three techniques were not used in any given year, the pond was resurveyed in subsequent surveys to provide robust survey results.

The four visits required to determine likely absence were completed in all ponds where possible¹, with an additional two surveys for ponds where GCN were confirmed, in order to provide a population estimate. Population estimates were based on the maximum count of adult GCN on a single survey visit, using a single survey method.

The collection of water for testing for the presence of GCN environmental DNA (eDNA) was also used as a method for detecting GCN in 2016 and 2017. This survey method was completed using methods described by Biggs *et al.* (2014).

The surveys were completed at the correct time of year for GCN surveys i.e. between mid-March and June, with at least two surveys of each pond, or three where GCN were detected, being completed between mid-April and mid-May to coincide with the peak of newt breeding activity. The eDNA surveys were completed in the survey window for this approach, between 15 April and 30 June.

C.6.2 Surveyors

All surveys of ponds were conducted by experienced surveyors and led by surveyors who hold licences granted by Natural Resources Wales (NRW) to survey for the species (see Appendix 1). The eDNA sampling was undertaken by surveyors trained in using the technique.

C.6.3 Surveys completed each year

Great crested newt pond HSI scoping and presence or likely absence surveys took place within the Wylfa Newydd Development Area each year between 2010 and 2013 (Arup, 2012a, 2012b, 2013a and 2013b).

Great crested newt pond HSI scoping and presence or likely absence surveys took place within the Wylfa Newydd Development Area and a 500m buffer zone around its boundary in 2014 (Jacobs, 2014).

In 2015, HSI scoping of ponds took place for ponds to the south of the Wylfa Newydd Development Area where, in previous years, access had been denied. The ponds identified as having potential to support breeding GCN were then surveyed in 2016 using presence or likely absence techniques and population estimates (Jacobs, 2016). In addition to this, water from each suitable pond in this area was tested for the presence of GCN eDNA. A water sample from Pond 7 (within the Wylfa Newydd Development Area) was also taken as it had not been possible to complete a robust survey using four methods in previous years.

¹ A number of ponds did not have four surveys as they dried out during the survey period.

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In June 2016 there were also water samples taken for eDNA testing of three ponds within the Wylfa Newydd Development Area as part of the proposed A5025 highways improvement works (Pond 30, 37 and 38) (Jacobs, 2016).

In 2017 surveys of all ponds within the Wylfa Newydd Development Area and surround 500m (access permitting) were repeated (Jones Brothers/Balfour Beatty, 2017) using HSI surveys followed by eDNA testing of water samples from ponds found to be suitable to potentially support breeding GCN. Surveying using bottle trapping, torching and egg searching were also completed at Pond 18, 28 and 37.

C.7 Survey results

All survey information pertinent to this licence application is shown in table 3 within Appendix 1, and figure C7. Due to the volume of data gathered, table 3 does not contain meta-data e.g. weather, presence of non-native plant species information or full HSI scores. These data are available in referenced documents for each year's survey.

Surveys of ponds completed in 2010, 2011, 2012, 2013, and 2014 recorded no GCN. There were two ponds that could not be accessed during the surveys. These were Pond 15 and 16. The effect that this limitation may have is discussed in Section C.8.

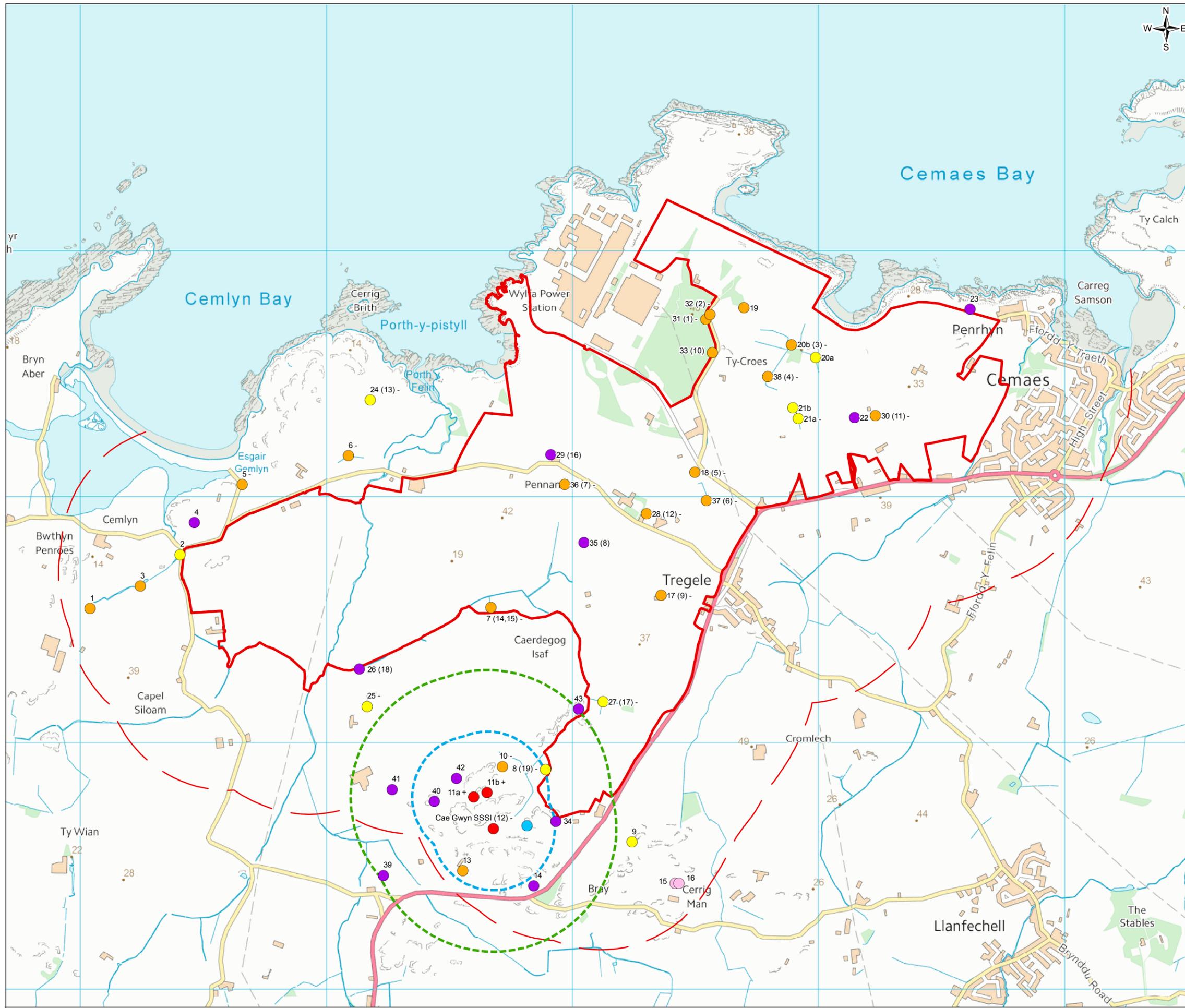
Surveys in 2016 recorded evidence of GCN in four ponds 11a, 11b, 12 (Cae Gwyn SSSI) and Pond 37, as summarised in table 1.

Surveys in 2017 did not record GCN in any ponds, including Pond 37 within the SPC Application Site.

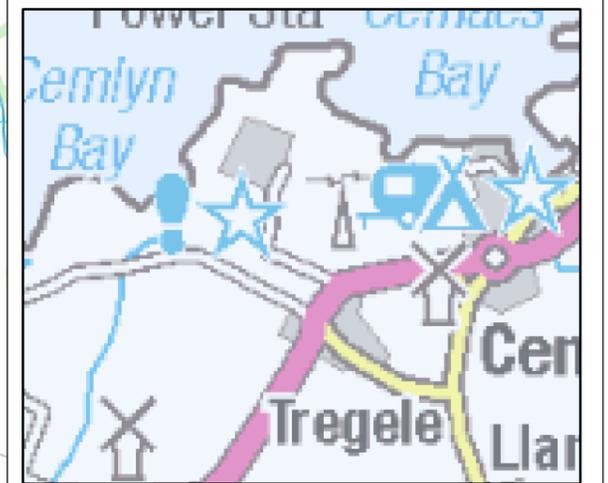
Pond	Max count via population estimate surveys	eDNA result
11a	7	Positive
11b	0	Positive
12 (Cae Gwyn SSSI)	1	Negative
37	Not surveyed for presence or likely absence	Positive

Table 1 Summary of ponds where GCN were detected.

FIGURE C7



- Legend**
- Study area
 - Site Preparation and Clearance Application Site
 - 250m buffer around GCN positive ponds
 - 500m buffer around GCN positive ponds
- Survey results**
- GCN present
 - +/- eDNA results, positive/negative*
 - GCN absent
 - Pond not surveyed
 - Pond not present
 - Pond not suitable
 - Incidental GCN record



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Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

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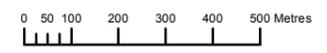
Client
HORIZON
NUCLEAR POWER

Project
WYLFA NEWYDD PROPOSED NUCLEAR POWER STATION

Drawing Title
GREAT CRESTED NEWT SURVEY - MOST RECENT RESULT FROM EACH POND

Drawing Status
Scale @ A3: 1:15,000 (Inset 1:50,000) DO NOT SCALE

Jacobs No. 60PO8058
Client No.
Drawing No. 60PO8058_GC_N_LIC_C_7



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C.8 Interpretation/evaluation of survey results

Pond 15 and 16 could not be accessed for the purposes of survey. However, this is not considered to be a limitation to the assessment of effects that works within the SPC Application Site may have on GCN. This assessment is based on the presence of the A5025 which separates areas the SPC Application Site, from populations of GCN that may be present in habitats around Pond 15 or 16. This is due to the A5025 being a busy, wide road with curbs, drains and dry-stone walls that combine to act as a significant barrier to dispersal to GCN. It is therefore highly unlikely that any GCN present in the areas of habitat surrounding Pond 15 or 16 would cross the A5025 and be present within the SPC Application Site. Similarly, the barrier formed by the A5025 would prevent populations of GCN within the SPC Application Site from using habitats around Pond 15 or 16. On this basis, not having data on potential GCN populations south of the A5025 is not considered to be a limitation.

Surveys in 2017 did not record GCN in Pond 37 despite eDNA sampling and six visits using standard techniques (torching, bottle trapping and egg searching). It is therefore considered that the 2016 eDNA result indicating GCN presence was erroneous and GCN are absent from this pond.

The 2017 surveys omitted Ponds 11a, 11b and 12 (Cae Gwyn SSSI), where for the purposes of this document it is assumed that the population present in them has not changed since 2016.

The survey results from 2016 showed that there were three ponds in which GCN had been present in during the 2016 breeding season. This is referred to as the Cae Gwyn SSSI metapopulation in the remainder of this licence application.

The Cae Gwyn SSSI metapopulation includes Pond 11a where a maximum count of seven individuals was recorded, together with eggs, and standing water areas of Cae Gwyn SSSI where there was a maximum count of one. Environmental DNA was also detected in Pond 11a and 11b, but not in Cae Gwyn SSSI itself. These data suggest that the Cae Gwyn SSSI metapopulation comprises a small population of GCN that move between at least three different waterbodies. The apparent discrepancy between eDNA results and presence or likely absence survey results is considered to be a product of the small populations present, and is not a limitation for assessing likely impacts on the Cae Gwyn SSSI metapopulation.

It is assessed that GCN could be present in all suitable habitats within 500m of ponds where they were detected, although based on the numbers present, this is likely to reduce rapidly with increasing distances from ponds. It is therefore likely that only habitats features of the SPC Application Site that are within 250m of ponds will support sheltering or hibernating GCN in their terrestrial phase.

D. Impact assessment

D.1 Short-term impacts: disturbance

In the absence of any mitigation measures there is the potential for disturbance impacts on GCN as 0.3ha of habitat is cleared during SPC works. These effects will occur as habitats are

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cleared by plant machinery as features that support sheltering or potentially hibernating GCN are dismantled and removed, exposing them to the risk of predation and killing or injury.

No disturbance effects on GCN in their breeding habitat are predicted.

D.2 Long-term impacts: site modification

There will be no modification of habitats within 250m of Cae Gwyn SSSI metapopulation breeding ponds, with the exception of that described in section D.3.

D.3 Long-term impacts: site loss

There would be the loss of 0.3ha of terrestrial habitat within 250m of ponds that support GCN from the Cae Gwyn SSSI metapopulation. This loss would be a negative impact on the population. This loss would be caused by installation of fencing, followed by removal of all features from this area with the potential to support GCN during their terrestrial phase.

The Cae Gwyn SSSI metapopulation is isolated from other populations by sub-optimal habitats to the north (as evidenced by lack of records) and the A5025 to the south. The loss of this area of habitat will therefore only affect the conservation status of the Cae Gwyn SSSI metapopulation and therefore GCN at a 2km scale, as it is extremely unlikely to feed into a wider population.

D.4 Long-term impacts: fragmentation and isolation

Fragmentation and isolation impacts are not predicted for the Cae Gwyn SSSI metapopulation. This is due to only a small area being affected on the eastern periphery of the core foraging habitats within 250m of breeding ponds.

D.5 Post-development interference impacts

There are not predicted to be any significant post-development mortality interference impacts on the Cae Gwyn SSSI metapopulation. This is due to effects being limited to 0.3ha on the eastern periphery of habitat within a 250m radius of ponds that GCN from the metapopulation have been recorded as using. In this area, habitats will be changed in part from agricultural uses to a built environment, and whilst it is recognised that this may contain hazards such as gully pots, the likelihood of GCN reaching them is remote.

It is also assessed that interference from disturbance will be unchanged from that currently experienced by GCN in the Cae Gwyn SSSI metapopulation. There are currently no plans for additional management of the SSSI and land ownership of areas used by the Cae Gwyn SSSI metapopulation will remain unchanged.

D.6 Predicted scale of impact

In the absence of any mitigation measures the scale of predicted impacts is provided in Table 2, and based on guidance from English Nature (2001), whereby the most significant impact (development effect) for each habitat feature is provided.

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Table 2 Summary of predicted scale of impact in the absence of mitigation

Habitat feature	Development effect	Low scale of impacts	Medium scale of impact	High scale of impact
Intermediate terrestrial habitat (approximately 50-250m from breeding pond)	Destruction		X	
Distant terrestrial habitat (>250m from breeding pond)	Destruction	X		

Table 2 shows that there are development effects which will have a medium scale of impact. However, in-line with English Nature Guidance (2001), determining the combined effect should primarily be based on professional judgement.

The medium scale impact caused by the destruction of habitats within 250m of breeding ponds indicated in Table 2 is not assessed as being appropriate. This is due to the size of the habitats that will be lost being small (0.3ha) compared to the habitats present in the wider environment. Secondly, the habitats present comprise mostly of short-grazed improved grassland. This habitat type is of extremely limited value to GCN for foraging, as it offers very little shelter; more suitable habitat would be taller more rank grassland sward or scrub. The habitats would therefore only generally be used by commuting GCN, which is also unlikely as evidenced by the lack of GCN ponds within likely commuting range. Whilst there is a wall present which could provide shelter, in the context of the other available habitats within the rest of the 250m radius, this would comprise a very small proportion of the overall resource available.

Based on the highest scale impact likely, and in the absence of mitigation, a low scale negative impact is predicted at the site. Due to the isolation of the metapopulation present (discussed above), it is also assessed as being highly unlikely that effects on GCN conservation status will be possible beyond a site level, with a 2km radius being the maximum at which the conservation status of the species will be affected. As the number of ponds within the metapopulation is low, the size of the metapopulation is small and the adjacent habitat is of low suitability, it is considered unlikely that this metapopulation makes a significant contribution to favourable conservation status at a county level (Russell et al., 2017).

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F. Appendix 1

Table 3 Summary of GCN presence or likely absence surveys from all years (alternative pond names provided in brackets)

Pond No.	2010	2011	2012	2013	2014	2015/2016	2017
1	Not surveyed	Not surveyed	Not surveyed	Not surveyed	HSI 0.55 Jonathan Jackson and Barney Scott Torch/net/trap/egg search 15/05/14, 27/05/14, 29/05/14 (dried out) Zero GCN	Not surveyed	Not surveyed
2	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Jonathan Jackson 25/03/14 Flowing ditch – scoped out	Not surveyed	Not surveyed
3	Not surveyed	Not surveyed	Not surveyed	Not surveyed	HSI 0.28 Barney Scott Torch/net/trap/egg search 27/05/14, 29/05/14 (dried out)	Not surveyed	Not surveyed

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					Zero GCN		
4	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Jonathan Jackson 25/03/14 Not holding water – scoped out	Not surveyed	Not surveyed
5	Not surveyed	Not surveyed	Not surveyed	Not surveyed	HSI 0.66 Jonathan Jackson and Barney Scott Torch/net/trap/egg search 07/04/14, 28/04/14, 13/05/14, 27/05/14 Zero GCN	Not surveyed	Jamie Glossop eDNA 18/04/17 Negative
6	Not surveyed	Not surveyed	Not surveyed	Not surveyed	HSI 0.9 Jonathan Jackson and Barney Scott Torch/net/trap/egg search 07/04/14, 28/04/14, 13/05/14, 28/05/14 Zero GCN	Not surveyed	Jamie Glossop eDNA 18/04/17 Negative
7	Not surveyed	Not surveyed	(Pond 14 and 15) Sam Dyer and Kate Williamson	(Pond 14 HSI 0.45 and 15 HSI 0.47)	Not surveyed	Barney Scott eDNA 09/05/16	Jamie Glossop eDNA 18/04/17

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			Torch/egg search 24/04/12, 03/05/12, 15/05/12, 22/05/12 Zero GCN	Sam Dyer and Kate Williamson Torch/egg search 24/04/13, 08/05/13, 16/05/13, 21/05/13 Zero GCN		Negative – GCN absent	Negative
8	Not surveyed	Not surveyed	Not surveyed	(Pond 19) Sam Dyer and Kate Williamson Torch/egg search 24/04/13, 08/05/13, 16/05/13, 21/05/13 Zero GCN	Jonathan Jackson 26/03/14 Flowing ditch – scoped out	Not surveyed	Jamie Glossop eDNA 18/04/17 Negative
9	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Jonathan Jackson 26/03/14 Unsuitable poached depression in field – scoped out	Not surveyed	Not surveyed
10	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Barney Scott eDNA	Not surveyed

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						09/05 Negative – GCN absent Torch/net/trap/egg search 09/05/16, 11/05/16 (dried out) Zero GCN	
11a	Not surveyed	Barney Scott eDNA 09/05 Positive – GCN present Torch/net/trap/egg search 09/05/16, 11/05/16, 16/05/16, 18/05/16, 06/06/16, 08/06/16 Max count seven GCN	Not surveyed				
11b	Not surveyed	Barney Scott eDNA 09/05	Not surveyed				

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						Positive – GCN present Torch/net/trap/egg search 09/05/16, 11/05/16, 16/05/16, 18/05/16 Zero GCN	
12	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Cae Gwyn SSSI Not surveyed	Cae Gwyn SSSI Barney Scott eDNA 09/05 Negative – GCN absent Torch/net/trap/egg search 10/05/16, 12/05/16, 16/05/16, 18/05/16, 06/06/16, 08/06/16 Max count one GCN	Not surveyed
13	Not surveyed	Not surveyed	Not surveyed	Not surveyed	HSI 0.55 Jonathan Jackson and Barney Scott Torch/net/trap/egg search	Not surveyed	Not surveyed

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					14/04/14, 27/04/14, 29/05/14 (dried out) Zero GCN		
14	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Barney Scott 10/05/16 No evidence of a pond – scoped out	Not surveyed
15	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Not surveyed – could not be accessed	Not surveyed	Not surveyed
16	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Not surveyed – could not be accessed	Not surveyed	Not surveyed
17	(Pond 9) Sam Dyer and Kate Walsh Torch 26/04/10, 29/04/10, 06/05/10, 11/05/10 Zero GCN	(Pond 9) Sam Dyer and Kate Walsh Trap 24/04/11, 01/06/11 Zero GCN	(Pond 9) Sam Dyer and Kate Williamson Trap/egg search 24/04/12, 03/05/12, 15/05/12, 22/05/12 Zero GCN	(Pond 9) Sam Dyer and Kate Williamson Trap/egg search 23/04/13, 07/05/13, 16/05/13, 21/05/13 Zero GCN	HSI 0.67 Jonathan Jackson and Barney Scott Torch/trap/egg search 08/04/14, 30/04/14, 12/05/14, 15/05/14 Zero GCN	Not surveyed	Jamie Glossop eDNA 18/04/17 Negative
18	(Pond 5)	(Pond 5)	(Pond 5)	(Pond 5)	HSI 0.74	Not surveyed	Jamie Glossop

EUROPEAN PROTECTED SPECIES MITIGATION LICENCE METHOD STATEMENT: GREAT CRESTED NEWT	DCRM Reference No	Revision: 0.1
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	Sam Dyer and Kate Walsh No open water 26/04/10, 29/04/10, 06/05/10, 11/05/10 Zero GCN	No open water, not surveyed Zero GCN	Sam Dyer and Kate Williamson Torch 24/04/12, 03/05/12, 15/05/12, 22/05/12 Zero GCN	Sam Dyer and Kate Williamson Trap/torch 23/04/13, 07/05/13, 16/05/13, 21/05/13 Zero GCN	Jonathan Jackson and Barney Scott Torch/trap/egg search 08/04/14, 29/04/14, 12/05/14, 15/05/14 Zero GCN		eDNA 18/04/17 Negative Jamie Glossop, Lizzie Slingsby, Alex Hatton and Becky Clews- Roberts Torch/trap/egg search 24/04/17 02/05/17 08/05/17 22/05/17 08/06/17 14/06/17 Zero GCN
19	Not surveyed	Not surveyed	Not surveyed	Not surveyed	HSI 0.63 Jonathan Jackson and Barney Scott Torch/net/trap/egg search 09/04/14, 30/04/14, 13/05/14, 28/05/14 Zero GCN	Not surveyed	Not surveyed

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20a	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Jonathan Jackson 26/03/14 Flowing ditch – scoped out	Not surveyed	(Ditch 2) Jamie Glossop eDNA 18/04/17 Negative
20b	(Pond 3) Sam Dyer and Kate Walsh Torch 26/04/10, 29/04/10, 06/05/10, 11/05/10 Zero GCN	(Pond 3) Sam Dyer and Kate Walsh Torch 05/04/11, 19/04/11, 24/04/11, 01/06/11 Zero GCN	(Pond 3) Sam Dyer and Kate Williamson Trap/torch/egg search 24/04/12, 03/05/12, 15/05/12, 22/05/12 Zero GCN	(Pond 3) Sam Dyer and Kate Williamson Trap/torch/egg search 23/04/13, 07/05/13, 16/05/13, 21/05/13 Zero GCN	HSI 0.54 Jonathan Jackson and Barney Scott Torch/trap/egg search 10/04/14, 01/05/14, 14/05/14, 28/05/14 Zero GCN	Not surveyed	Jamie Glossop eDNA 18/04/17 Negative
21a	Not surveyed	Not surveyed	Not surveyed	Not surveyed	HSI 0.21 Jonathan Jackson 26/03/14 Unsuitable polluted, poached depression in field – scoped out	Not surveyed	Not surveyed
21b	Not surveyed	Not surveyed	Not surveyed	Not surveyed	HSI 0.3 Jonathan Jackson	Not surveyed	Not surveyed

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					26/03/14 Unsuitable polluted, poached depression in field – scoped out		
22	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Jonathan Jackson 26/03/14 No evidence of a pond – scoped out	Not surveyed	Not surveyed
23	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Jonathan Jackson 26/03/14 Flowing pool below outfall pipe – scoped out	Not surveyed	Not surveyed
24	Not surveyed	Not surveyed	(Pond 13) Sam Dyer and Kate Williamson Torch/egg search 24/04/12, 03/05/12, 15/05/12, 22/05/12 Zero GCN	(Pond 13) Sam Dyer and Kate Williamson Torch/egg search 24/04/13, 08/05/13, 16/05/13, 21/05/13 Zero GCN	HSI 0.3 Jonathan Jackson 25/03/14 Shallow polluted and poached depression in field – scoped out	Not surveyed	Jamie Glossop eDNA 18/04/17 Negative
25	Not surveyed	Not surveyed	Not surveyed	Not surveyed	HSI 0.44	Not surveyed	Jamie Glossop

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					Jonathan Jackson 25/03/14 Small polluted and polluted with 100% turbidity – scoped out		eDNA 18/04/17 Negative
26	Not surveyed	Not surveyed	Not surveyed	(Pond 18) Sam Dyer and Kate Williamson Torch 24/04/13, 08/05/13, 16/05/13, 21/05/13 Zero GCN	Jonathan Jackson 25/03/14 Flowing ditch – scoped out	Not surveyed	Not surveyed
27	Not surveyed	Not surveyed	Not surveyed	(Pond 17) Sam Dyer and Kate Williamson Torch/egg search 24/04/13, 08/05/13, 16/05/13, 21/05/13 Zero GCN	Jonathan Jackson 26/03/14 Flowing ditch – scoped out	Not surveyed	Jamie Glossop eDNA 18/04/17 Negative
28	Not surveyed	(Pond 12)	Not surveyed	(Pond 12)	HSI 0.47	Not surveyed	Jamie Glossop

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		Sam Dyer and Kate Walsh 05/04/11 No open water – scoped out		Sam Dyer and Kate Williamson Torch/egg search 23/04/13, 07/05/13, 16/05/13, 21/05/13 Zero GCN	Jonathan Jackson and Barney Scott Torch/trap/egg search 09/04/14, 29/04/14, 12/05/14, 15/05/14 Zero GCN		eDNA 18/04/17 Negative Jamie Glossop, Lizzie Slingsby, Alex Hatton and Becky Clews- Roberts Torch/trap/egg search 24/04/17 02/05/17 08/05/17 22/05/17 08/06/17 14/06/17 Zero GCN
29	Not surveyed	Not surveyed	Not surveyed	(Pond 16) Sam Dyer and Kate Williamson Torch/egg search 24/04/13, 08/05/13, 16/05/13, 21/05/13	Jonathan Jackson 25/03/14 No evidence of a pond – scoped out	Not surveyed	Not surveyed

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				Zero GCN			
30	Not surveyed	(Pond 11) Sam Dyer and Kate Walsh Torch 05/04/11, 19/04/11, 24/04/11, 01/06/11 Zero GCN	(Pond 11) Sam Dyer and Kate Williamson Torch/egg search 24/04/12, 03/05/12, 15/05/12, 22/05/12 Zero GCN	(Pond 11) Sam Dyer and Kate Williamson Torch/egg search 24/04/13, 08/05/13, 16/05/13, 21/05/13 Zero GCN	HSI 0.62 Jonathan Jackson and Barney Scott Torch/trap/egg search 09/04/14, 29/04/14, 12/05/14, 15/05/14 Zero GCN	Barney Scott eDNA 21/06/16 Negative – GCN absent	Jamie Glossop eDNA 18/04/17 Negative
31	(Pond 1) Sam Dyer and Kate Walsh Torch 26/04/10, 29/04/10, 06/05/10, 11/05/10 Zero GCN	(Pond 1) Sam Dyer and Kate Walsh Torch 05/04/11, 19/04/11, 24/04/11, 01/06/11 Zero GCN	(Pond 1) Sam Dyer and Kate Williamson Torch/egg search 24/04/12, 03/05/12, 15/05/12, 22/05/12 Zero GCN	(Pond 1) Sam Dyer and Kate Williamson Trap/torch/egg search 23/04/13, 07/05/13, 16/05/13, 21/05/13 Zero GCN	Not surveyed	Not surveyed	Jamie Glossop eDNA 18/04/17 Negative
32	(Pond 2) Sam Dyer and Kate Walsh Torch	(Pond 2) Sam Dyer and Kate Walsh Torch	(Pond 2) Sam Dyer and Kate Williamson Torch/egg search	(Pond 2) Sam Dyer and Kate Williamson Trap/torch/egg search	Not surveyed	Not surveyed	Jamie Glossop Pond dry – Not surveyed 18/04/17

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	26/04/10, 29/04/10, 06/05/10, 11/05/10 Zero GCN	05/04/11, 19/04/11, 24/04/11, 01/06/11 Zero GCN	24/04/12, 03/05/12, 15/05/12, 22/05/12 Zero GCN	23/04/13, 07/05/13, 16/05/13, 21/05/13 Zero GCN			
33	(Pond 10) Sam Dyer and Kate Walsh Torch 26/04/10, 29/04/10, 06/05/10, 11/05/10 Zero GCN	(Pond 10) Sam Dyer and Kate Walsh Torch 05/04/11, 19/04/11, 24/04/11, 01/06/11 Zero GCN	(Pond 10) Sam Dyer and Kate Williamson Torch/egg search 24/04/12, 03/05/12, 15/05/12, 22/05/12 Zero GCN	(Pond 10) Sam Dyer and Kate Williamson Trap/torch/egg search 23/04/13, 07/05/13, 16/05/13, 21/05/13 Zero GCN	Not surveyed	Not surveyed	Not surveyed
34	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Jonathan Jackson 02/09/15 No evidence of a pond – scoped out	Not surveyed
35	(Pond 8) Sam Dyer and Kate Walsh Trap 26/04/10, 29/04/10,	(Pond 8) Sam Dyer and Kate Walsh Torch 05/04/11, 19/04/11,	(Pond 8) Not surveyed	(Pond 8) Not surveyed	Jonathan Jackson 25/03/14 No evidence of a pond – scoped out	Not surveyed	Not surveyed

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	06/05/10, 11/05/10 Zero GCN	24/04/11, 01/06/11 Zero GCN					
36	(Pond 7) Sam Dyer and Kate Walsh Bottle trap 26/04/10, 29/04/10, 06/05/10, 11/05/10 Zero GCN	(Pond 7) Sam Dyer and Kate Walsh Bottle trap 24/04/11, 01/06/11 Zero GCN	(Pond 7) Sam Dyer and Kate Williamson Trap/egg search 24/04/12, 03/05/12, 15/05/12, 22/05/12 Zero GCN	(Pond 7) Sam Dyer and Kate Williamson Trap/torch/egg search 24/04/13, 08/05/13, 16/05/13, 21/05/13 Zero GCN	Not surveyed	Not surveyed	Jamie Glossop eDNA 18/04/17 Negative
37	(Pond 6) Sam Dyer and Kate Walsh No open water – scoped out 26/04/10, 29/04/10, 06/05/10, 11/05/10 Zero GCN	(Pond 6) No open water – scoped out Zero GCN	(Pond 6) No open water – scoped out Zero GCN	(Pond 6) No open water – scoped out Zero GCN	Not surveyed	Barney Scott eDNA 21/06/16 Positive – GCN present	Jamie Glossop eDNA 18/04/17 Negative Jamie Glossop, Lizzie Slingsby, Alex Hatton and Becky Clews- Roberts Torch/trap/egg search

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							24/04/17 02/05/17 08/05/17 22/05/17 08/06/17 14/06/17 Zero GCN
38	(Pond 4) Sam Dyer and Kate Walsh Torch/trap 26/04/10, 29/04/10, 06/05/10, 11/05/10 Zero GCN	(Pond 4) Sam Dyer and Kate Walsh Trap 24/04/11, 01/06/11 Zero GCN	(Pond 4) Sam Dyer and Kate Williamson Torch/trap/egg search 24/04/12, 03/05/12, 15/05/12, 22/05/12 Zero GCN	(Pond 4) Sam Dyer and Kate Williamson Trap/torch/egg search 23/04/13, 07/05/13, 16/05/13, 21/05/13 Zero GCN	Not surveyed	Barney Scott eDNA 20/06/16 Negative – GCN absent	Jamie Glossop eDNA 18/04/17 Negative
39	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Jonathan Jackson 02/09/15 No evidence of a pond – scoped out	Not surveyed
40	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Not surveyed	Barney Scott 10/05/16 No evidence of a pond – scoped out	Not surveyed

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41	Not surveyed	Jonathan Jackson 02/09/15 No evidence of a pond – scoped out	Not surveyed				
42	Not surveyed	Barney Scott 10/05/16 No evidence of a pond – scoped out	Not surveyed				
43	Not surveyed	Barney Scott 10/05/16 No evidence of a pond – scoped out	Not surveyed				

**Site Preparation and Clearance
Environmental Statement
Volume 3 – Appendix 14-20
European Protected Species Mitigation
Licence Method Statement Delivery
Information: Great Crested Newt**

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EUROPEAN PROTECTED SPECIES MITIGATION LICENCE METHOD STATEMENT DELIVERY INFORMATION: GREAT CRESTED NEWT

Mitigation, Compensation and Monitoring

DCRM Ref Number: WN034-JAC-PAC-REP-00146

Revision: 1.0

Additional Requirements or Controls	
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EUROPEAN PROTECTED SPECIES MITIGATION LICENCE METHOD STATEMENT DELIVERY INFORMATION: GREAT CRESTED NEWT	DCRM Reference No	Revision: 1.0
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Revision History				
Date	Rev No.	Summary of Changes	Ref Section	Purpose of Issue
26/01/17	1	Update with work schedule dates		Information
June 2017	2	Update to address SPC scope change		Information

EUROPEAN PROTECTED SPECIES MITIGATION LICENCE METHOD STATEMENT DELIVERY INFORMATION: GREAT CRESTED NEWT	DCRM Reference No	Revision: 1.0
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E. Works to be undertaken

E.1 Great Crested Newt capture and exclusion

Great crested newts (GCN) in impacted suitable habitat within 250m of ponds 11a, 11b and 12 (Cae Gwyn SSSI metapopulation) will be trapped and translocated using standard techniques as specified in the *Great Crested Newt Mitigation Guidelines (GCNMG)* (English Nature, 2001). The layout of the trapping area and extent of the destructive search for are shown in Figure E1-1.

No GCN ponds (aquatic habitat) are to be impacted as a result of the works to the east of Cae Gwyn SSSI. As such, no aquatic mitigation is required.

Trapping of terrestrial habitats will comprise the following: the installation of fencing will be preceded by a fingertip search of the proposed fence lines by licensed GCN ecologists, concentrating on discrete habitat features, e.g. hedge crossings, rather than areas of homogenous sub-optimal habitat such as improved grassland. Exclusion fencing will be erected within the development area up to 250m from GCN ponds 11a, 11b and 12 to prevent GCN from entering the construction area. Trapping beyond 250m is not considered appropriate due to the small populations recorded at ponds 11a, 11b and 12, and the generally low habitat quality within 250m of these ponds (predominantly grazed improved grassland) which is expected to limit dispersal of GCN from these ponds.

A line of drift fencing will be installed within the trapping area to divide it, increasing trapping efficiency. Pitfall traps and artificial refuges will be placed at regular intervals (every 10m for each type and alternating) along the inside of the perimeter exclusion fencing and on both sides of the drift fencing. The required trapping density is specified within the *GCNMG* (English Nature, 2001) at 50 traps/ha for a small population size class.

Diagram 1 (below) shows the standard specification for amphibian exclusion fencing, pitfall trap design and layout as reproduced from the *GCNMG* (English Nature, 2001). Note that one-way fencing is not proposed on this site.

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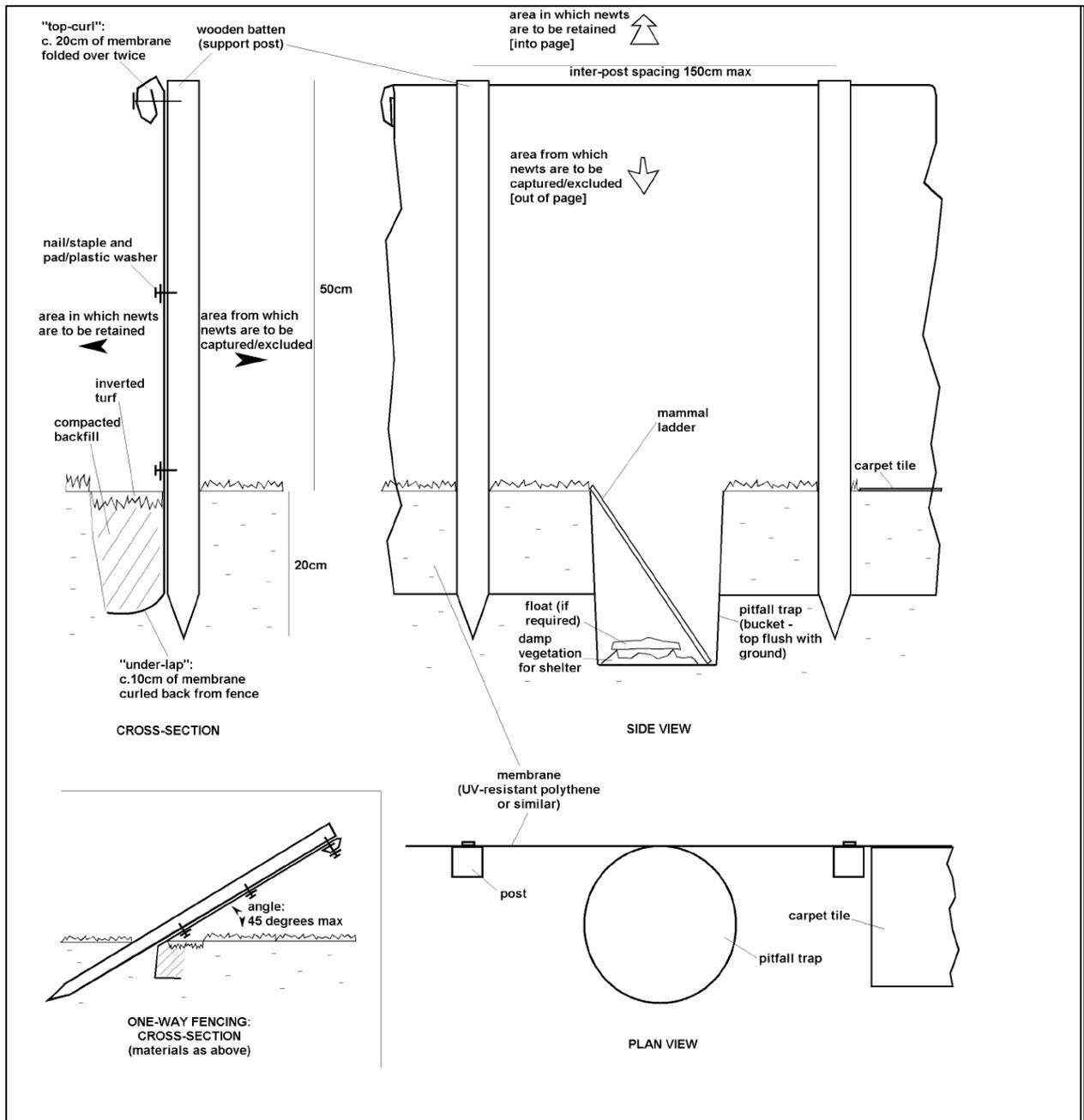


Diagram 1 shows the standard specification for amphibian exclusion fencing, pitfall trap design and layout as reproduced from the GCNMG (English Nature, 2001) (note that one-way fencing is not proposed on this site)

Trapping will be suspended and pitfall traps will be closed when the overnight temperature is expected to fall below 5°C or there are prolonged periods of hot and dry weather during which GCN activity would be limited. Daily records of weather conditions will be kept throughout the trapping period using a maximum/minimum thermometer and rain gauge set up within the trapping area (according to the manufacturer's instructions e.g. in a shady position).

All fencing will be subject to daily checks during the active trapping period and a log of these daily checks will be kept as part of the trapping protocol. Any repairs required will be reported to the licence holder for urgent remedial action by an experienced GCN fencing contractor.

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Repairs to perimeter fencing will be prioritised over repairs to internal drift/ring fencing so as to minimise the risk of any additional GCN accessing the trapping area. Any fence removal required as part of repair work, e.g. removal and replacement of a damaged section, will be supervised by a licensed GCN ecologist and will be preceded by a careful finger-tip search for any GCN that may be using the base of the fence as a refuge. Any GCN found during repair works will be released in the area of habitat to the west of the fencing, where trapped GCN would also be released. GCN released would be placed under suitable refuges to protect them from predation.

Outside of the active trapping period, the fencing will be checked on at least a fortnightly basis to ensure the perimeter exclusion fencing maintains an effective barrier to GCN. Any required repairs will be communicated and actioned as above.

Upon completion of 30 suitable nights trapping followed by five clear days of no captures (small population size class), the internal drift fencing will be removed under ecological supervision and a destructive search of all suitable habitats and high-risk complex habitat features (e.g. mounds of rubble, vegetated soil mounds, logs, the lower courses of stone walls, bases of hedgerows, tree roots etc.) within the trapping area will then be conducted under ecological supervision. Before commencing the destructive search phase of the licence, the contractors undertaking the work will be inducted by a licensed GCN ecologist to make them aware of the possible presence of GCN, their legal protection and of working practices to avoid harming GCN. As well as taking place within the 250m trapping area, the destructive search phase will also take place in the area 250-500m from the ponds as a precaution. To ensure a pragmatic and risk based approach, the level of effort employed in this area will decrease the further from the ponds the destructive search progresses, to be instructed by a licensed GCN ecologist.

All GCN (and other amphibians) from the trapping area (and additional 250m-500m destructive search area) will be released at suitable natural refuges within the Cae Gwyn SSSI at the end of each day's trapping session. It is legitimate to release GCN on the 'other side of the fence' in this manner (*in situ* translocation) as the majority of habitat of this metapopulation of GCN will remain unaffected by the Wylfa Newydd Development.

Records will be kept of where GCN (and other amphibians) are released so they can be evenly distributed to minimise the risk of predation/competition if they were too aggregated.

Once the destructive search phase is completed within the trapping areas the temporary exclusion fencing that crosses the development footprint will be removed (under ecological supervision and during suitably mild conditions) to allow vegetation clearance to commence. Perimeter exclusion fencing will remain in place throughout the construction period of the Wylfa Newydd Development.

A copy of the method statement and licence documentation will remain available on site at all times. A summary sheet of guidance will be given to each contractor undertaking the destructive search phase.

If a GCN is discovered at any other, unsupervised times, the contractor will be instructed to cease all works immediately and for the named ecologist or accredited agent to be contacted promptly for advice.

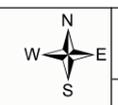
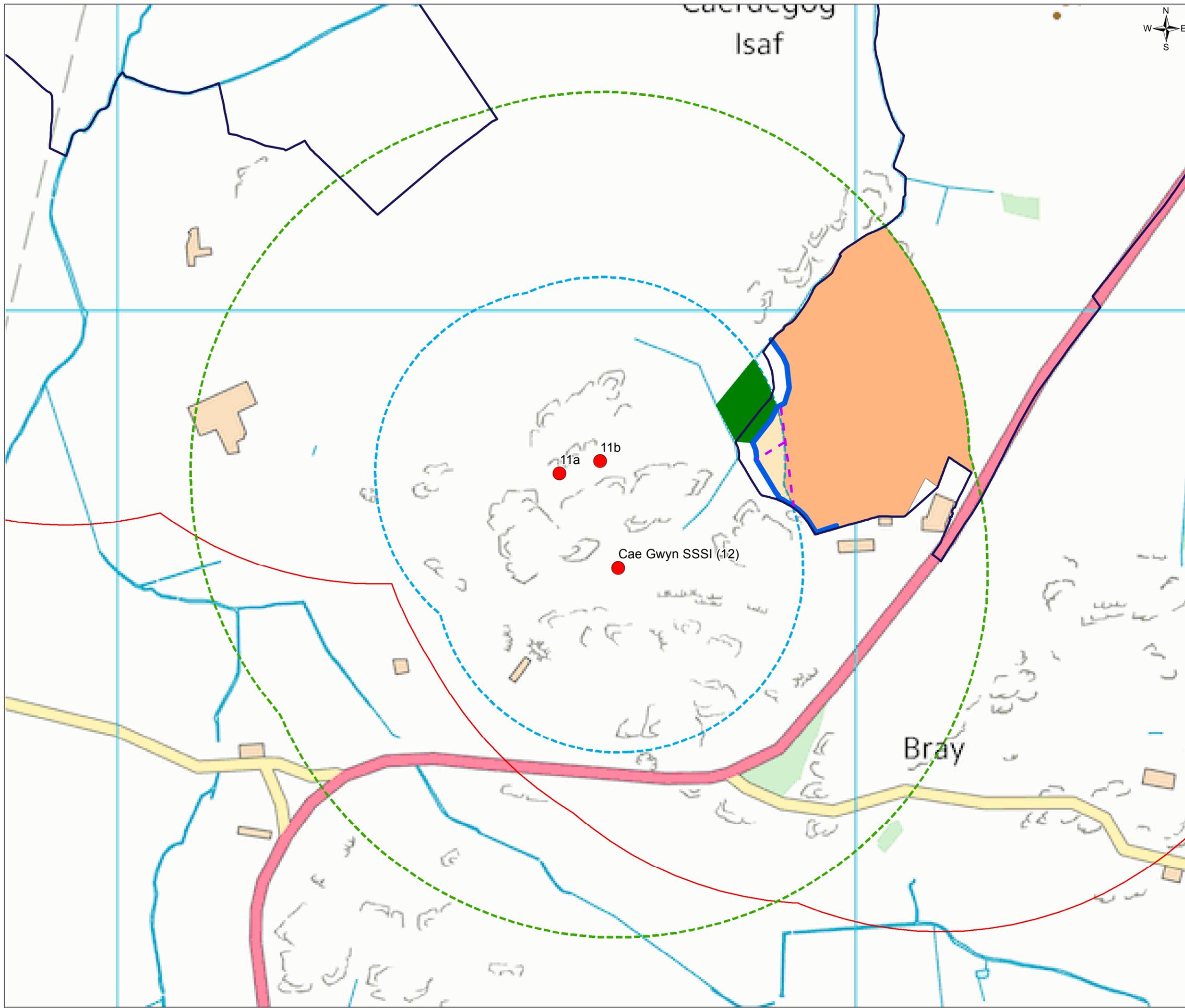


FIGURE E1-1

- Legend**
- Wylfa Newydd Development Area
 - Study area(500m buffer around Wylfa Newydd Development Area)
 - GCN release area
 - GCN present pond
 - 250m buffer around GCN positive ponds
 - 500m buffer around GCN positive ponds
 - Area subject to trapping and translocation and destructive search
 - Area subject to destructive search only
- Fencing strategy**
- Indicative drift fencing
 - Permanent exclusion fencing



0	AUG 17	Client review	BW	JJ	NC	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd



Client
HORIZON
NUCLEAR POWER

Project
WYLFA NEWYDD PROPOSED NUCLEAR POWER STATION

Drawing Title
GREAT CRESTED NEWT
CAPTURE AND EXCLUSION

Drawing Status		
Scale @ A3	1:5,000	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.		
Drawing No.	60PO8077_GC_N_LIC_E_1_01	

This drawing is not to be used in whole in or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.



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E.2 Great crested newt habitat

E.2.1 Receptor site modification, enhancement or creation

No habitat modification, enhancement or creation will take place in the short-term to mitigate impacts to the Cae Gwyn SSSI metapopulation as the anticipated impacts to this metapopulation are minimal.

In the medium-term, the area in which GCN will be released will improve as a foraging resource as there will be a cessation of grazing, and therefore a taller rank grassland habitat will develop.

E.2.2 Temporary loss of breeding sites, resting places

No temporary loss of breeding sites or resting places is anticipated. Any losses of resting places will be regarded as permanent due to the timescales and extent of the project, therefore no temporary avoidance measures are advocated.

E.2.3 Destruction of existing breeding sites, resting places

The trapping and translocation exercise is expected to commence in March 2018. The first stage is the installation of exclusion and drift fencing, traps and artificial refuges. The layout of the fencing, traps and artificial refuges is shown in Figure E1-1. It is anticipated that setting up the trapping area on a site of this size will take up to two weeks. As this is regarded as a small population, a minimum of 30 suitable trapping nights (plus five consecutive nights of no captures) is required before destructive searches can commence in terrestrial habitat. The destructive search phase will take place between April and July 2018, and involve hand/hand-tool dismantling (where safe and practical to do so) discrete habitat features such as log piles, small rubble and soil mounds, the bottom courses of stone walls, small exposed rootstocks etc. looking for any GCN that may be present. Where it is unsafe or impractical to tackle certain habitat features by hand, this will be done by an excavator (size depending on the specific task) with an ecologist supervising the operation. If a GCN, or other small animal, is spotted, the ecologist will signal to the driver to stop immediately and will remove the animal from the works area. Once the animal is removed and no others are visible, the destructive search by machine will continue. All GCN and other animals captured during the destructive search phase will be released that day into suitable refuge habitat adjacent to the west of the trapped area as shown in Figure E1-1.

Table 1 below shows a project programme covering all GCN mitigation works required for the Wylfa Newydd Project.

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Activity	Date and Duration of Activity	Notes
Installation of trapping layout within development footprint	March 2018 – approximately two weeks	Within 250m of GCN ponds. To include a fingertip search of proposed fence line and installation of perimeter exclusion, temporary exclusion and drift fence, pitfall traps and refuges in compliance with the <i>GCNMG</i> (English Nature, 2001)
Terrestrial trapping of GCN	March-May 2018 – minimum of 30 trapping nights	Within 250m of GCN ponds. A minimum of 30 suitable trapping nights. A suitable trapping night is where the temperature is at least 5°C and there has been recent rainfall such that the ground is damp. Obtaining five clear days with no GCN captures is required at the end of this 30 night trapping period.
Destructive search phase away from ponds	April-August 2018	Within 500m of GCN ponds. Hand and machine dismantling of discrete habitat features to search for GCN under supervision and direction of licensed GCN ecologists.
Release of GCN	March-July 2018 – 3 month period where GCN may be encountered.	Captured GCN will be released in to retained natural refuge in the adjacent Cae Gwyn SSSI.
Land declared cleared	August 2018	Once all GCN capture measures have been exhausted (trapping and translocation followed by destructive search phase)

Table 1 Shows the project programme for GCN mitigation for the whole Wylfa Newydd Project.

E.2.4 Scaled maps/plans

Figure E1-1 shows the proposed area of habitat loss; the trapping layout; the extent of the destructive search; and the area in which GCN will be released after capture.

E.2.5 Maintenance and/or modification of new and existing habitat

Although not forming part of the planning application for the site preparation and clearance works which this document relates to, Horizon is producing a Landscape and Habitats Management Strategy as part of the Wylfa Newydd Development. This illustrates the coordinated range of environmental mitigation and enhancement measures to be incorporated into the landscape restoration of the Wylfa Newydd Development Area at different phases of construction and during operation. It includes commitments to protect and sensitively manage

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retained and newly planted vegetation for biodiversity benefits, including the protection and enhancement of GCN breeding, foraging and connective habitats.

The Landscape and Habitats Management Strategy has been developed in draft and takes account of the predicted environmental effects at each stage of construction at the Wylfa Newydd Development Area, setting out the way in which mitigation and enhancement proposals are expected to be implemented. These proposals cover ecology, landscape, drainage, recreation and agricultural use, integrated with the progression of the earthworks within the Wylfa Newydd Development Area.

The core principle for the landscape design of relevance to ecology comprises integrating mounding of excavated material to achieve an appropriate solution to balance potential environmental effects, and incorporate mitigation and enhancement measures and features of biodiversity value. The area in which GCN will be released will form part of this wider Landscape and Habitats Management Strategy design and its ongoing management, which will be secured for the full operational lifetime of the new power station.

The Landscape and Habitats Management Strategy is contained within the Design and Access Statement, and illustrates the fully restored landscape setting for the operational power station. Also relevant are the Landscape Restoration Principles (figure 3-3 of the Environmental Statement), showing what state the SPC Application Site would be returned to should the development not go ahead.

E.3 Mechanisms for ensuring delivery of mitigation and compensation measures

E.3.1 Measures to ensure compliance with this method statement

Horizon is committed to the delivery of the mitigation and compensation measures outlined in this document as they are a pre-requisite to permit successful completion of the site preparation and clearance works and to demonstrate their full compliance with protected species legislation and licensing.

Horizon fully recognises the legally-binding nature of the commitments and conditions of this method statement upon the granting of any licence.

Contractual obligations between Horizon and its sub-contractors will ensure that all personnel are informed of the legal obligations to fulfil this licence.

Key performance indicators which can be measured by a nominated third party for audit will include:

- persistence of at least a small population of GCN using pond 11a, 11b and within wetlands within the Cae Gwyn SSSI (to be determined by eDNA and conventional survey techniques) two years post translocation (2023).
- exclusion fencing is maintained for the duration of the construction period.
- the area of habitat in which GCN will be released is not affected by works, and develops into a habitat of increased value to GCN from its existing close grazed sward.

A European Protected Species licence return will be sent to NRW.

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E.3.2 Ensure that sufficient land has been acquired for compensation purposes

No receptor area is being provided to mitigate for the loss of terrestrial habitat. This is because only a small area of habitat is to be lost within 250m of the ponds (0.3ha, of which the majority is suboptimal improved grazed grassland) such that an *in-situ* translocation is feasible. A further 8.82ha of habitat is to be lost within 500m of the Cae Gwyn SSSI ponds, the majority of which (7.35ha) is suboptimal improved grassland. Given that the Cae Gwyn SSSI metapopulation is currently understood to support a small population of GCN, the habitat loss is not expected to adversely effect the conservation status of this population. This is particularly the case as much of the losses to be incurred at this population will be of habitat regarded as being suboptimal. In the longer term additional habitat for GCN will become available across the site as part of the Wylfa Newydd Development Landscape and Habitats Management Strategy if the development goes ahead, or as part of site restoration works if it does not.

The location of the habitat loss to be incurred and area of land in which GCN will be released are shown in Figure E1-1.

E.3.3 Ensure that designs of subsequent development are newt friendly

Horizon is committed to ensuring that the designs for the Wylfa Newydd Development are sympathetic to the needs of wildlife and will actively avoid any design features known to have an adverse impact on GCN and other amphibians e.g. gully-pot drainage systems.

E.3.4 Provide sufficient resources

Horizon is committed to providing qualified and competent personnel to ensure the proper instatement and long-term sympathetic management of all habitat features and landscaping for the benefit of GCN. Similarly, all GCN monitoring will be compliant with the requirements of the GCNMG (English Nature, 2001) as set out in this licence application. This will include contracting sufficiently experienced and licensed GCN ecologists to conduct the required monitoring.

E.4 Mitigation contingencies

In the event that any of the mitigation proposals contained in this application are considered to be undeliverable/unsuitable prior to their implementation (e.g. due to a change of conditions on site or the discovery of additional animals, GCN ponds, populations, etc.) then a full review of the mitigation proposals will be undertaken by experienced ecologists to determine what measures will adequately address the changes. These changes will be discussed and agreed with NRW and, if required, a formal licence resubmission/modification request will be made.

Similarly, if problems are identified with any mitigation measures following their implementation, Horizon will seek prompt ecological advice on appropriate remedial measures and, if required seek agreement and licence approval from NRW prior to taking action to address the problem. Horizon is committed to ensuring there is no detriment to the maintenance of the GCN population at favourable conservation status in its natural range, and to taking the necessary measures to ensure the maximum benefit is derived from this mitigation strategy within the Wylfa Newydd Development Area.

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E.5 Biosecurity risk assessment

To prevent the possible spread of the GCN fungal pathogen Chytridiomycosis, amongst other harmful species, best practice biosecurity measures for working within the translocation area and area in which GCN will be released will be followed e.g. disinfecting boots. NRW have stated there is no requirement to undertake Chytridiomycosis testing for the Project as GCN will only be translocated within areas they could access naturally i.e. within less than one kilometre of their source ponds.

Horizon will ensure that the site clearance works strictly adhere to best practice construction measures as detailed within the Site Preparation and Clearance Code of Construction Practice to prevent, amongst other things, the spread of invasive non-native species such as the known invasive aquatic plants on site and Japanese knotweed (*Fallopia japonica*). Horizon will be advised throughout the Project by ecologists experienced in the preparation of invasive species management plans and will employ the services of specialist contractors, as required, to undertake any control measures. Similarly, landscape planting will not include the planting of any ash (*Fraxinus excelsior*) trees so as to prevent the further spread of ash dieback (Chalara).

Given these control measures it is considered that the residual risk of spreading non-native species, or disease, as a result of these works is negligible.

F. Post-development site safeguard

F.1 Habitat/site management and maintenance

Horizon will have sole responsibility for future maintenance of the GCN release area and will incorporate sympathetic management of this area for GCN within the Landscape and Habitats Management Strategy.

F.2 Population monitoring

Future monitoring of the three ponds supporting the Cae Gwyn SSSI metapopulation and the success of the mitigation/compensation measures (in accordance with the key performance indicators) will be carried out by GCN licensed ecologists.

The *GCNMG* (English Nature, 2001) sets out the requirements for monitoring of small populations of GCN like those found at the Cae Gwyn SSSI metapopulation. Although the impact assessment made in the background and supporting information document concludes a low scale impact for the Cae Gwyn SSSI metopopulation, the monitoring proposals are based on guidance for a medium scale impact. This is designed to provide additional assurance over the efficacy of the mitigation strategy. For a medium scale impact, presence/absence surveys are required for two years. As such, the following monitoring programme is required as shown in Table 2.

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Year post translocation	Ponds	Type of monitoring
1 (2019)	Cae Gwyn SSSI metapopulation ponds	HSI scores. Presence/absence established by either conventional or eDNA methods, followed by population estimate surveys where GCN are recorded.
2 (2020)	Cae Gwyn SSSI metapopulation ponds	HSI scores. Presence/absence established by either conventional or eDNA methods, followed by population estimate surveys where GCN are recorded.

Table 2 GCN population monitoring requirements - in accordance with the GCNMG (English Nature, 2001)

An annual report will be submitted to NRW during the monitoring period and a licence report will be completed and submitted to NRW once all licensable activities have been completed.

F.3 Post-development mitigation contingencies

If the monitoring works demonstrate that mitigation measures have proven to be unsuccessful when compared to the key performance indicator criteria, appropriate remedial action will take place. This would take the form of the following types of measure but will be decided on a case-by-case basis as determined by an experienced and licensed GCN ecologist (including consultation with NRW as necessary):

- Review monitoring data (in particular from site visits) to assess whether any on site conditions are/have become unsuitable e.g. water levels, water quality, vegetation cover, presence of invasive species, rubbish dumping, pollution etc.
- Take corrective actions, if appropriate. This could include planting of additional vegetation in the GCN release area.

F.4 Mechanism for ensuring delivery of post-development works

Whilst there are currently no legally binding commitments to ensure the delivery of post-development works, Horizon fully recognises the legally binding nature of the commitments and conditions of this method statement upon the granting of any licence. Furthermore, as stated in section E3, Horizon is committed to the delivery of the mitigation and compensation measures outlined in this document as they are a pre-requisite to permit successful completion of the site preparation and clearance works, and to demonstrate Horizon's full compliance with protected species legislation.

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G. Timetable of works

Action	Dates	Comments
Installation of trapping layout within development footprint	March 2018 – approximately two weeks	Within 250m of GCN ponds. To include a fingertip search of proposed fence line and installation of perimeter exclusion, temporary exclusion and drift fence, pitfall traps and refuges in compliance with the GCNMG (English Nature, 2001).
Terrestrial trapping of GCN within 250m of GCN ponds	March-May 2018 – minimum of 30 trapping nights	Small population present so a minimum of 30 suitable trapping nights is required. Obtaining five clear days with no GCN captures is required following this 30 night trapping period. Captured GCN from the will be released in retained natural refuges in the adjacent Cae Gwyn SSSI.
Destructive search phase away from ponds	April-August 2018	Within 500m of GCN ponds. Hand and machine dismantling of discrete habitat features to search for GCN under supervision and direction of licensed GCN ecologists.
Land handed over to construction	August 2018	Once all GCN capture measures have been exhausted (trapping and translocation followed by destructive search phase).
Monitoring	2019-2020 (two years)	HSI scores of the three Cae Gwyn SSSI metapopulation ponds will be measured. Presence/absence surveys of the three Cae Gwyn SSSI metapopulation ponds will be completed using conventional or eDNA survey methods, followed by population estimate surveys where GCN are recorded.
Removal of permanent exclusion fencing	2025	GCN exclusion fencing will be removed on completion of landscaping works within 500m of the Cae Gwyn SSSI metapopulation ponds so that GCN can colonise additional new habitat areas.

Table 3 Timetable of works

H. Land ownership – mitigation site/compensation site

H.1 Mitigation site/compensation site ownership

The GCN release area will be in the ownership of Horizon who will have the responsibility for its future maintenance and monitoring. There is no third party involved in this licence application.

H.2 Mitigation site/compensation ownership post construction

The GCN release area will be in the ownership of Horizon who will have the responsibility for its future maintenance and monitoring. There is no third party involved in this licence application.

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I. References

English Nature. 2001. *Great crested newt mitigation guidelines*. English Nature: Peterborough.

J. Annexes

J.1 Pre-existing survey reports

To be appended to any formal licence application.

J.2 Raw survey data

N/A – all available data is contained within the pre-existing survey reports contained in annex J.1.

**Site Preparation and Clearance
Environmental Statement
Volume 3 – Appendix 14-21
Water Vole Licence Method Statement**

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WATER VOLE LICENCE METHOD STATEMENT (DRAFT)

DCRM Ref Number: WN034-JAC-PAC-REP-00149

Revision: 2.0

Additional Requirements or Controls			
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Comments: Draft document – not for formal licence submission

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Approvals Table				
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Checked by	Head of Section			
Approved by	EMT Representative			

WATER VOLE LICENCE METHOD STATEMENT (DRAFT)	DCRM Reference No	Revision: 0.1
	WN034-JAC-PAC-REP-00051	Issue date: 06/04/2016

Revision History				
Date	Rev No.	Summary of Changes	Ref Section	Purpose of Issue
07/11/16	1	Amendments following Horizon comments		Information
25/04/17	2	Updated work schedule	4	Information

WATER VOLE LICENCE METHOD STATEMENT (DRAFT)	DCRM Reference No	Revision: 0.1
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1 Introduction

1.1 Scheme background

The Wylfa Newydd Project involves the development of a new nuclear power station (the Wylfa Newydd Generating Station) on Anglesey by Horizon Nuclear Power Wylfa Ltd. (Horizon) as identified in the National Policy Statement for Nuclear Power Generation (EN-6). Construction is currently programmed to commence in mid-2018. The main area of land within which construction of the Wylfa Newydd Generating Station would occur is described as the Wylfa Newydd Development Area and is shown on figure 1 (Appendix A).

This licence application describes the potential impacts on water vole (*Arvicola amphibious*) caused by the Wylfa Newydd Project, and the protection measures and mitigation that would be put in place to ensure that the favourable conservation status of water vole is maintained.

This licence only includes impacts to water vole resident in the Nant Caerdegog Isaf¹ located in the south of the Wylfa Newydd Development Area, near to the property called Caerdegog Isaf. However, if further preconstruction surveys identify water vole in other watercourses to be directly affected by the Wylfa Newydd Project, then the mitigation principles described for Nant Caerdegog Isaf in this document would be adopted.

1.2 Applications for Natural Resources Wales conservation licence

As a nationally significant infrastructure project, the Wylfa Newydd Project would be authorised by a development consent order. The Wylfa Newydd Project comprises the proposed new nuclear power station (the Wylfa Newydd Generating Station), including the reactors, associated plant and ancillary structures and features, together with all of the development needed to support its delivery, such as highway improvements, worker accommodation and specialist training facilities. This licence covers the Enabling Works phase of the Wylfa Newydd Project only, which comprises habitat removal from the majority of the Wylfa Newydd Development Area. These works include the channel realignment of Nant Caerdegog Isaf. The Enabling Works phase would be completed prior to the Main Construction activities commencing. This draft licence is required to demonstrate the mitigation approach and conservation benefit of the Wylfa Newydd Project to Natural Resources Wales.

The licence is sought for the potential displacement and/or relocation of water vole from the Nant Caerdegog Isaf to allow for channel realignment as part of the Enabling Works, should they be present at that time. This approach is intended to be undertaken following principles set out in the *Water Vole Conservation Handbook* (Strachan *et al.*, 2011) and the *Water Vole Mitigation Handbook* (Dean *et al.*, 2016). If no water voles are identified on watercourses to be directly impacted by the Enabling Works then the need for a licence will be reviewed.

¹ This stream has been described using the name 'Watercourse 13' in previous reports.

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1.3 Aims and objectives

This document forms a method statement to accompany an application for a conservation licence (Natural Resources Wales) to undertake works for the purposes of conservation that would otherwise be an offence under Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended), and outlines the actions which will be undertaken if water vole need to be displaced or relocated (via trapping and soft releasing).

The aim of this draft method statement is to:

- provide a robust rationale for the proposed water vole mitigation strategy in sufficient detail to provide confidence in a licence application to displace or exclude, trap and relocate water vole from suitable habitat within the working area of the Nant Caerdegog Isaf; and
- provide a method for the design, establishment, creation and management of the new Nant Caerdegog Isaf channel and enhancement of other suitable stretches of watercourses to provide a conservation benefit for water vole in the Wylfa Newydd Development Area.

2 Baseline information

2.1 Site context

The Wylfa Newydd Development Area comprises the indicative areas of land and sea, including the Power Station Site, the Wylfa National Policy Statement Site and the surrounding areas that would be used for the construction and operation of the Wylfa Newydd Generating Station. It is bounded to the north by coast and the existing Magnox power station (the Existing Power Station). To the east, it is separated from Cemaes by a narrow corridor of agricultural land. The A5025 and residential properties define part of the south-east boundary, with a small parcel of land spanning the road to the north-east of Treglele. To the south and west, the Wylfa Newydd Development Area abuts agricultural land, and to the west it adjoins the coastal hinterland. This Wylfa Newydd Development Area is approximately 380ha, of which approximately 290ha of terrestrial and freshwater habitat would be affected during Enabling Works.

2.2 Desk study results

A total of seven records for water vole were received from Cofnod (North Wales Environmental Records Centre) between 1986 and 2005 in a request by Jacobs on behalf of Horizon in 2015 (Jacobs, 2015). These records are all from the Cemlyn Bay area and include live sightings, prints and burrows.

2.3 Field survey results

Field surveys have been completed within the Wylfa Newydd Development Area and surrounding 500m buffer zone in connection with the Wylfa Newydd Project since 2009. These areas combine to form the study area for water vole. A combined summary of the data

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available on the species is provided below and is presented in table 1, taken from the *Consultancy Report: Otter and Water Vole Technical Summary Report* (Appendix B).

In 2009, an extended Phase 1 Habitat Survey identified suitable habitat for water vole including rivers, streams, ditches and ponds. During this survey evidence of water vole was found on two watercourses, shown as Watercourse 1 (a Tre'r Gof SSSI drain) and Watercourse 3 on figure 1 (Appendix A), with field signs including burrows, latrines and feeding stations.

In 2010 water vole were found in a Tre'r Gof SSSI drain (Watercourses 1), and Watercourse 3 as determined by the presence of latrines and feeding stations.

In 2011 a single latrine was identified on a third watercourse, shown as Watercourse 8 on figure 1 (Appendix A).

In 2013 water vole latrines were found on Afon Cafnan (Watercourse 10), watercourse 15 and the Nant Caedegog Isaf, shown on figure 1 (Appendix A).

In 2014, Afon Cafnan (Watercourse 10) was found to support water voles with latrines and feeding stations identified. A further watercourse, shown as Watercourse 19 on figure 1 (Appendix A), was identified as supporting water vole, as field signs including live sightings, burrows, prints, latrines and feeding stations were found.

No evidence for water vole was found on a Tre'r Gof SSSI drain (Watercourse 1), Watercourses 3 or Watercourse 8. It is therefore suggested there have been localised extinctions of water vole from these watercourses. The most likely causative factors for this are considered to be flooding; agricultural practises (especially poaching and over-grazing); prolonged lapses in appropriate management leading to scrub encroachment; and habitat isolation. As a result, only four watercourses (Afon Cafnan, Watercourse 15, Watercourse 19 and the Nant Caedegog Isaf), were considered to be supporting a population of water vole at the most recent time of survey in 2014.

Given the current baseline information, the Nant Caerdegog Isaf is the only watercourse that has been assessed as potentially having a water vole population that could be directly affected by Enabling Works. The Nant Caerdegog Isaf is a narrow watercourse at only 1m in width for most of its length. Although the watercourse opens out towards the confluence with watercourse 8 at the eastern end, the remainder of the banks are covered with very dense scrub dominated by bramble (*Rubus fruticosus agg.*). This is shown in plates 1 and 2 in Appendix C.

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Watercourse reference	Habitat quality assessment	2009	2010	2011	2013	2014	Watercourse considered currently occupied by water vole
Tre'r Gof SSSI drain (Watercourse 1)	Optimal	Burrows, latrines and feeding stations	Latrines and feeding stations	No evidence	No evidence	No evidence	NO
Watercourse 3	Optimal	Latrines and feeding stations	Latrine	No evidence	No evidence	Not surveyed*	NO
Watercourse 8	Sub-optimal	No evidence	No evidence	Latrine	No evidence	Not surveyed*	NO
Afon Cafnan (Watercourse 10)	Optimal	No evidence	No evidence	No evidence	Latrines	Latrines and feeding stations	YES
Nant Caerdegog Isaf (Watercourse 13)	Optimal	-	-	No evidence	Latrines	Not surveyed*	YES
Watercourse 15	Optimal	-	-	-	Latrines	Not surveyed*	YES
Watercourse 19	Optimal	-	-	-	-	Live sightings, burrows, prints, latrines and feeding stations	YES

*Not surveyed indicates where access permission was not granted for that watercourse in that year of survey. Watercourses 15, 19 and the Nant Caedegog Isaf were added to the survey scope as the survey area increased.

Table 1: Summary of water vole survey results on watercourses where evidence of the species has been found

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3 Mitigation methodology

3.1 The Nant Caedegog Isaf rationale and pre-construction surveys

A channel realignment of the Nant Caedegog Isaf will permanently affect approximately 360m of its length. The proposed realignment to a new location approximately 60m to the south of its current position will be completed in order to facilitate construction of the Wylfa Newydd Generating Station, as shown on figure 2 (Appendix A). This will be completed during the Enabling Works phase of the Wylfa Newydd Project, prior to Main Construction.

The existing channel is currently located within the development footprint. Realignment is the preferred solution to maximise biodiversity benefit as it allows the creation of new habitat that will be designed specifically for water voles and links to existing, retained habitat. Standard practice from the Environment Agency recommends any new channel should be designed in detail before the dewatering of the original channel. This allows the new channel to be developed and made suitable for water vole habitation as part of a mitigation strategy.

At this current point in time the evidence of water vole recorded in the Nant Caedegog Isaf means that licensable mitigation prior to construction will be required, although the results of previous surveys suggest that the water vole distribution within the study area is dynamic and subject to change on an annual basis. Enabling Works are due to start in 2018 although no works which would affect the Nant Caedegog Isaf would occur until 2019. Monitoring of all watercourses affected by the scheme will occur during 2018 to highlight any changes to the current baseline water vole data; the results of these surveys will inform the need to obtain a licence.

Using the results of the pre-construction surveys a specific mitigation strategy will be developed adapting one or more of the following approaches shown in table 2.

Mitigation Strategy	Reasoning	Timing restrictions
No licensable activities	If no water vole are identified in the affected section of the Nant Caedegog Isaf.	N/A
Displacement	If water vole are found in a <50m length (or <30m length for a high density population) within the affected section of the Nant Caedegog Isaf and where there is sufficient adjacent habitat for dispersal into ('sufficient' is as defined in paragraph 4.6.24 of the <i>Water Vole Mitigation Handbook</i> (Dean <i>et al.</i> , 2016)).	15 th February to 15 th April 2019
Trapping and direct soft release into new channel	If water vole are found in a >50m length within the affected section of the Nant Caedegog Isaf and the new	New channel development February 2018 to March 2018. Trapping and soft release into new channel 1 st March to 15 th

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Mitigation Strategy	Reasoning	Timing restrictions
	channel is developed into a receptor area.	April 2019 (once new habitat is suitably established).

Table 2: Potential mitigation strategies

If trapping is required it will take place between 1st March and 15th April 2019 when water vole are active but not in the breeding season to minimise the chance of trapping pregnant or lactating females with dependant young.

This draft licence application and the accompanying method statement will be amended depending on the results of additional water vole surveys scheduled for 2018. For the purposes of the draft licence application and this accompanying method statement, the mitigation measures described in Sections 3.2 to 3.6 apply to potential licensable activities related to the proposed realignment of the Nant Caedegog Isaf, only where there is a direct impact on water vole.

3.2 Displacement

If displacement is considered the most favourable strategy, the following methods will be implemented in line with Appendix 1 of the *Water Vole Mitigation Handbook* (Dean *et al.*, 2016):

- All burrows in the working area will be identified and marked.
- Vegetation from the working width (up to 5m either side) will be removed using a strimmer until only bare earth remains. The strimmed area will extend to the top of the bank and a further 2m back.
- All arisings from the strimmed area will be raked off and removed.
- The burrow entrances will be checked to ensure they have not become blocked.
- The strimmed area will be monitored on a daily basis for field signs of water voles. Where field signs are recorded the need to repeat or extend the strimming will be reviewed.
- A destructive search will be carried out five days following strimming and if no evidence of water vole is recorded following a re-survey, as detailed in Section 3.5.5.
- The area will then be maintained as unsuitable for water voles as the works are carried out.

3.3 Habitat enhancement

To increase the conservation benefit to water vole in the area, any suitably identified stretches of other watercourses within the Wylfa Newydd Development Area will be managed to enhance their suitability to support water vole. This will include sections of sub-optimal ditch habitat joined to stretches of optimal habitat where water vole signs have been found previously.

The appropriate design of the proposed receptor site and enhancement to other watercourses/riparian habitats will include the following where applicable:

- altering bank profiles to include a two-staged channel (realigned Nant Caedegog Isaf only);

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- erosion control using coir fibre rolls or similar;
- de-silting;
- prevention of bank poaching; and
- appropriate habitat management, including reducing scrubby vegetation encroachment.

Enhancements will not be undertaken on sections where water voles are already present or where there is a likelihood of local population isolation.

3.4 Habitat creation – new channel

The new realigned watercourse, measuring approximately 350m in length, will be established over a 12 month period prior to its use as a receptor site for any displaced animals. This will provide sufficient time for newly planted vegetation to become established prior to water vole soft release. The wetland habitat in the newly constructed watercourse will be designed specifically to benefit water voles and will ensure that the following are provided: areas of high ground for burrowing and refuge, and riparian vegetation for food and shelter (Strachan *et al.*, 2011). The new channel will be meandered to create natural diverse flow, pools and berms with a two stage channel, where appropriate.

Within the newly aligned channel, the proposed planting of aquatic, terrestrial and marginal plants will be undertaken using locally sourced stock as far as possible. Terrestrial and aquatic plant establishment will be accomplished via a mixture of natural colonisation, translocation of turfs and/or individual plants from on-site sources, and nursery-sourced pre-planted coir mattresses and plug plants to reduce establishment time. The banks of the newly created channel may also be hydro-seeded with a species-rich grass mix, if appropriate. The final plan for instating of these vegetation types and their layout will be drawn up at the detailed design stage and will be used to support a final licence application.

Water voles require dense growth of herbaceous bankside and emergent vegetation to provide suitable food and cover. Native species of local provenance known to be of importance to water vole will be used (Strachan *et al.*, 2011). These include:

- branched bur-reed (*Sparganium erectum*);
- floating sweet-grass (*Glyceria fluitans*);
- flowering rush (*Butomus umbellatus*);
- fool's watercress (*Apium nodiflorum*);
- meadowsweet (*Filipendula ulmaria*);
- reed canary grass (*Phalaris arundinacea*); and
- reed sweet-grass (*Glyceria maxima*).

Where these species cannot be suitably sourced, similar species listed as important for water voles in the *Water Vole Conservation Handbook* (Strachan *et al.*, 2011) will be used.

Throughout the development of the newly created habitat within the new channel, monitoring will review the success of vegetation development and establishment with regard to water vole food plant and vegetation cover.

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3.5 Relocation of water vole

If relocation is required, the following methods and specifications will be used as per the *Water Vole Mitigation Handbook* (Dean *et al.*, 2016).

3.5.1 Exclusion fencing

Water vole-resistant fencing will be erected around the section of affected Nant Caedegog Isaf to isolate the area and allow trapping and exclusion of water vole to take place. This exclusion fencing will be installed 5m past the last burrow on each end of the channel if any extend further than the affected section of watercourse, but its final configuration will be determined at the detailed design stage.

Any water vole fencing will be constructed following the guidance set out in Appendix 5 of the *Water Vole Mitigation Handbook* (Dean *et al.*, 2016). This recommends the use of 20mm (min) thick marine plywood, or similar, with a minimum above-ground height of 1.2m and a buried depth of 0.5m (min). Posts used to ensure stability will be located on the inside of the excluded area and on the outside around the new channel to prevent water vole using them as an aid to climb the fence. A further deterrent of an outward return of wire mesh at the base of the fence may also be used if considered necessary. Installation of the fencing will be supervised by an experienced ecologist with care taken to avoid any burrows. By necessity, therefore, the position of the fencing may change slightly to avoid burrows. This fencing will be inspected regularly to ensure effectiveness in providing a physical barrier to water vole movement. Where the exclusion fence crosses the watercourse, 1.5cm x 1.5cm weld mesh will be sunk to a depth of 1m across the channel and topped with boards to prevent climbing.

Throughout the period of excluding water voles, including the trapping period, the exclusion fencing will be inspected twice a week to ensure it remains an effective barrier to water voles and is undamaged. Any field signs within the exclusion area will be recorded and used to estimate current occupancy by water vole. In the event that the exclusion fencing is damaged and field signs are recorded within the exclusion area, a new trapping period will commence following the procedures outlined below once damage is repaired and the breach has been closed.

3.5.2 Trapping

On the Nant Caedegog Isaf, water voles will be trapped within the excluded area and directly released into the new realigned channel.

The following details the proposed trapping methodology and is adapted from the protocol described in Appendix 2 of the *Water Vole Mitigation Handbook* (Dean *et al.*, 2016) and experience undertaking licensed water vole trapping and translocation on other projects (e.g. Crossness Sewage Treatment Works Improvements and Medmerry Managed Realignment).

- Trapping will be conducted from 1st March to 15th April (inclusive) on the Nant Caedegog Isaf. Trapping will not be undertaken during night-time temperatures of below freezing, day-time temperatures above 20°C, or during flood conditions.

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- Purpose-built traps, such as the Greenalyte water vole traps or Sherman traps, will be used to capture water voles. These will be fitted with a wooden nest box at the rear to allow for sufficient food and bedding provisions to be stored.
- The nest box will be prepared by packing with straw for bedding/insulation and at least one carrot and half an apple to provide food for captured animals. As a minimum, this will be replaced every two days if the trap has not been sprung, and following each successful capture.
- The traps will be soaked in local river water before use and allowed to drip-dry. The traps will be left in situ for two days before trapping to take on the scent of the habitat and thus become more attractive to water voles. During these two days the traps will be pre-baited with the catch mechanism disengaged so the water voles can become accustomed to entering them.
- Traps will be set at 10m intervals along the length of the watercourse on both banks, placing them next to latrines, burrows and feeding stations where possible. If appropriate, traps will also be positioned on floating rafts.
- Each trap will be secured in place with a peg, cane or wire to hold it in position and prevent it being dislodged into the water. For some traps it will be suitable to dig a small channel at a right angle from the watercourse into the bank to hold it in place. The traps will be set high enough up the banks to account for water level rises.
- Each trap will be tested before setting ensuring the treadle works efficiently. A small amount of apple will be left outside the entrance of the trap to act as a lure. The trap itself will be covered by vegetation.
- All trap positions will be numbered, recorded and mapped.
- The traps will be set at approximately 06:00 on the first trapping day. The traps will then be checked every eight hours at approximately 06:00, 14:00 and 22:00 each day. Each check will be carried out by two people familiar with the positions of the traps. The check will involve all traps being checked for bait and bedding with replenishing taking place if necessary.
- After five days of trapping during suitable conditions (i.e. when the temperature has not dropped below freezing), historic water vole field signs will be removed from the trapping area to assist with the identification of fresh field signs; these will be used to determine the continued presence or likely absence of water voles from the trapping area.
- Trapping will be considered complete once there has been a period of five days or more (when overnight temperatures are above freezing) with no captured animals and no field signs within the trapping area. If no captures are made within the trapping period, the attendant ecologist will make a decision on whether water vole can be deemed absent from the exclusion zone or whether additional days of trapping are required.
- If a lactating female is caught (i.e. obvious swollen bare nipples) it will be immediately released where it was caught to ensure no dependent young are left abandoned. Trapping in this area will cease for a period up to four weeks with new release pens being included in the new channel to accommodate for all of the litter.
- All trapped water voles will be run from the trap into a pop-up garden bag where they will undergo a visual health check including being weighed and sexed. Water vole handling will be kept to a minimum to reduce stress. Cardboard crisp tubes or similar will be used to aid handling. Animals will be processed individually and will not be allowed to mix.

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- The care of captured water voles will be in accordance with the protocol described in Appendix 3 of the *Water Vole Mitigation Handbook* (Dean *et al.*, 2016). Captured water voles will then be transferred to holding cages, labelled with the location and date/time of capture, sex and any other pertinent details (e.g. distinguishing marks and condition of animal). Holding cages will be provisioned with food, water and bedding. Captured water voles will be held in holding cages for no longer than 16 hours in a secure environment with limited disturbance.
- Following a capture, traps will be cleaned and reset.
- The weather conditions will be monitored daily when trapping is taking place. If there is any risk of rapidly rising water levels, traps will be removed. The traps will be closed if night-time temperatures are expected to fall below freezing or if day-time temperatures are expected to rise above 20°C.
- All animals will have a basic health assessment (as per Appendix 6 of the *Water Vole Mitigation Handbook* (Dean *et al.*, 2016)) and be transferred to soft-release pens within the new channel.
- If any non-target animals are captured in the traps they will be released immediately with the exception of American mink (*Neovision vison*). As it is illegal to release mink back into the wild if caught in a trap, veterinary assistance will be sought to have the animal humanely euthanised.

3.5.3 Soft release

The soft release methodology will be as per the protocol described in Appendix 4 of the *Water Vole Mitigation Handbook* (Dean *et al.*, 2016). All water voles caught during the trapping period will be soft released into pens within the new channel. This will allow the animals to acclimatise to their new surroundings whilst being kept safe from predation. The plywood release pens to be used will follow the specification in the *Water Vole Conservation Handbook* (Strachan *et al.*, 2011) as follows:

- having a minimum of a 1m² floor area;
- having a minimum height of 45cm;
- holding one individual only (unless family groups of mother and young are trapped);
- being dug into the ground around 15-20cm;
- being located as close to the water as possible surrounded by tall vegetation;
- having a predator-proof wire mesh; and,
- having sufficient nesting material (straw/hay) provided.

The release pens will be constructed and installed two to three weeks prior to the water vole release allowing vegetation cover to establish in and around the pens.

Individuals of the same sex will be separated by a minimum of 40m intervals along the watercourse, with alternating females and males if possible.

To provision the pens, one sixth of a straw bale will be placed inside before water vole release to provide immediate cover. This will be broken up so the water voles cannot reach the lid when standing upon it and injure themselves. A large (60x30x15cm) water trough e.g. a cat litter tray containing stream water will be placed within the pen. Each water vole will be provided with quarter of an apple, half a carrot and cut external vegetation daily. Water vole will

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be supported with food for eight days before the pen is removed leaving the old bedding in place.

3.5.4 Destructive search

Immediately following the strimming (displacement) or trapping period (relocation), a destructive search within the fenced area of the excluded channel will be undertaken, under the direct supervision of the named ecologist or accredited agent. This will seek to make the habitat and bank structure unsuitable for water vole. The following stages of destructive searching will be undertaken as advised in the *Water Vole Mitigation Handbook* (Dean *et al.*, 2016):

- All burrows will be identified and marked so that they can be located and remain unobstructed. Vegetation from the banks (and 5m to either side) and within the channel will initially be strimmed/removed to ground level. Any arisings will be raked off and removed from the cleared area.
- Burrow entrances will be checked to ensure they have not become blocked and any latrines or feeding remains will be removed.
- The existing channel will be dewatered as the water is directed through the new channel.
- The strimmed area will be left for five days to allow water vole to relocate.
- The area will be re-surveyed for evidence of water voles. A destructive search will commence if no field signs are recorded.
- All burrows will be excavated by hand where possible. Gloves, nets and animal holding tanks containing bedding and food will be kept at hand in case animals need to be caught. If any water voles are caught they will be taken to be soft-released in the new channel.
- The use of a mechanical digger, with a toothed bucket, will be supervised by ecologist to rake through the turf and topsoil on the bank face and top. With a second or third sweep of the bucket, the turf and top soil will be removed to a depth beyond which any burrows would be present.
- Remaining vegetation (including in-channel) will then be stripped, roots included, to maintain an unsuitable habitat for water vole colonisation. After this the areas will be monitored for two to four hours to observe any further water voles.
- Following the removal of all vegetation the main works will commence immediately or the site will be maintained in an unsuitable condition for water voles.

If water voles are sighted within the excluded area, but not caught, the destructive search will cease and trapping will re-commence (if a trapping strategy is being implemented at that location). On completion of such additional trapping, the destructive search would recommence and be continued through to completion.

3.5.5 Fence removal

When the watercourse has been dewatered and the destructive search is complete, the exclusion fencing surrounding the old channel will be removed. Fencing may be retained where it is still a functional barrier to water voles, mainly at the east and west edges of the realignment

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perpendicular to the channel. This fencing will be removed on the completion of the works in the area.

3.6 General scheme mitigation for water vole

3.6.1 Disturbance

There are no other major impacts to other watercourses proposed as part of the Enabling Works, and a 15m buffer will be in place around Afon Cafnan (Watercourse 10), Nant Caedegog Isaf (Watercourse 13), Nant Cemlyn (Watercourse 16), and Tre'r Gof SSSI drains (Watercourses 1, 2, and 11) within which there will be no significant construction activity. However, there will be small scale works to construct drainage outflows which will feed into existing streams. These will be managed on a case-by-case basis with a view to avoiding licensable works through micro-siting the structures to avoid sensitive areas; this will be informed by pre-construction surveys and will be supervised by an ecological clerk of works. The effects of disturbance are therefore not predicted to affect the conservation status of the species.

3.7 Post development monitoring

After the construction and planting of the realigned watercourse, regular visits will be undertaken to monitor the establishment and development of vegetation along the banks. In doing so, the need for any further management can be identified and implemented to ensure vegetation suitability for food and coverage for water vole.

Post-development monitoring will also assess the success of the displacement / relocation strategy within the local water vole population and will be undertaken in accordance with Box 4 in the *Water Vole Mitigation Handbook* (Dean *et al.*, 2016). On completion of the works, when all fencing is removed, annual water vole surveys will be undertaken during the breeding season for a minimum of three years within the Wylfa Newydd Development Area. All water vole field signs as described in the *Water Vole Conservation Handbook* (Strachan *et al.*, 2011) will be recorded and used to ascertain whether water vole are present. Latrine counts within these areas will give an approximate estimate of population size, which can be compared to pre-construction estimates.

Overall the post-development monitoring will assess the success of the mitigation strategy as well as the suitability and level of occupation of newly-created compensation habitat post-construction.

3.8 Post-development maintenance

Post-construction, the new channel and other watercourses within the Wylfa Newydd Development Area will be maintained indefinitely by Horizon to retain suitability for water vole occupation. This may require maintenance which would include:

- Scrub removal to stimulate growth of bank-side and aquatic vegetation; this will increase the complexity of vegetation types and offer more reliable and sustained food resources;
- Ensuring fencing erected to prevent poaching by livestock is maintained; and,

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- Watercourse maintenance operations to remove silt to improve the availability of standing water and vegetative growth.

Additional enhancements will not be undertaken in surrounding habitat where evidence for a good established water vole population with suitable vegetation is found.

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4 Works schedule

	2018												2019				
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Preparation																	
Pre-construction surveys (spring and autumn)				X	X			X	X								
Licence Submission and Issue												X	X				
Habitat creation																	
Creation and development of new realigned watercourse		X	X														
Relocation																	
Exclusion fencing installed around the Nant Caedegog Isaf exclusion area														X			
Inspections of Nant Caedegog Isaf exclusion area (fencing/water vole signs)														X	X	X	
Trapping															X	X	
Soft release of water vole into new channel															X	X	
Destructive Search / dewatering and backfilling of old channel																X	
Fencing removal																	
Exclusion fencing removed from the excluded Nant Caedegog Isaf area																X	

WATER VOLE LICENCE METHOD STATEMENT (DRAFT)	DCRM Reference No	Revision: 0.1
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5 References

Dean, M., Strachan, R., Gow, D., and Andrews, R. 2016. *The Water Vole Mitigation Handbook* (The Mammal Society Mitigation Series). Eds. Matthews F. and Chanin P. The Mammal Society: London.

Strachan, R., Moorhouse, T., and Gelling, M. 2011. *Water Vole Conservation Handbook*. Third Edition. Wildlife Conservation Research Unit (WildCRU): Oxford University.

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6 Appendix A – Figures

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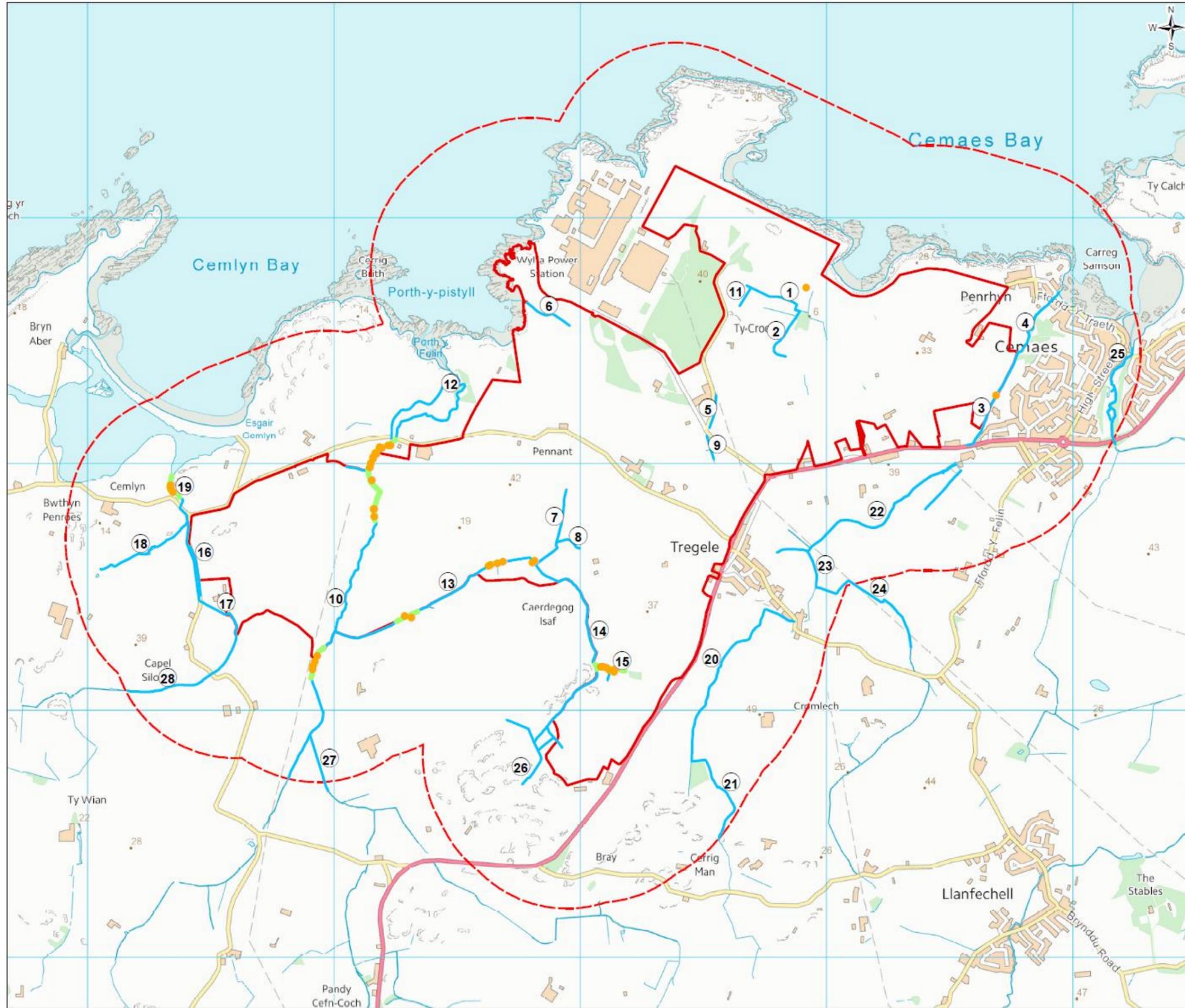


FIGURE 1

- Legend**
- Site Preparation and Clearance Application Site
 - Study area boundary
 - Surveyed watercourses
 - Water vole present 2014
 - Water vole results
 - # Watercourse reference number



0	NOV 17	Initial Issue	RM	JJ	NC	TK
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

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NUCLEAR POWER

Project: SITE PREPARATION AND CLEARANCE
ENVIRONMENTAL STATEMENT

Drawing Title: WATER VOLE SURVEY RESULTS

Drawing Status		
Scale @ A3	1:15,000	DO NOT SCALE
Jacobs No.	60PO8078	
Client No.		
Drawing No.	60PO8078_SPC_ES_TE_01	

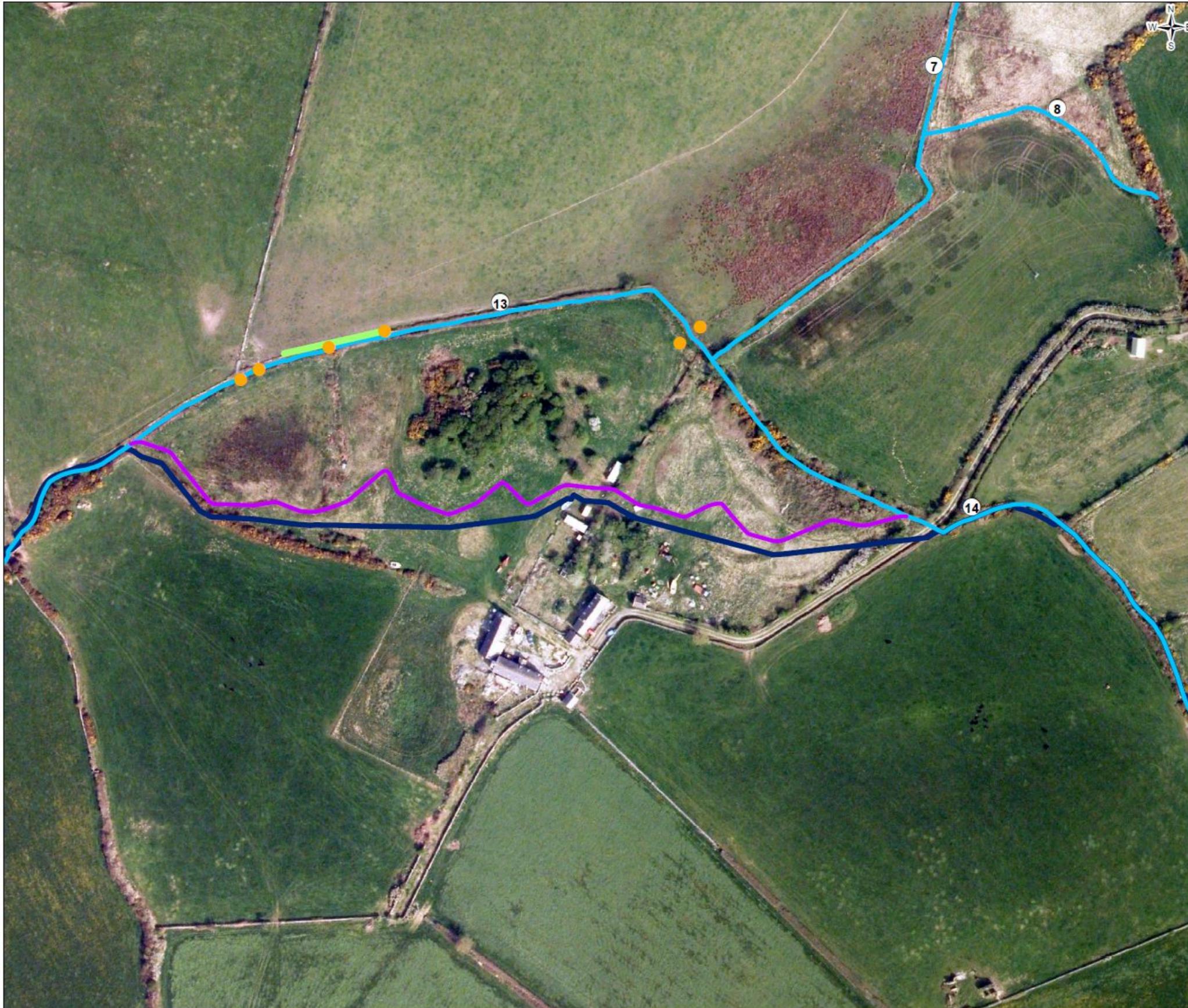


FIGURE 2

- Legend**
- Wylfa Newydd Development Boundary
 - Proposed watercourse realignment
 - Existing watercourses
 - Water vole present 2014
 - Water vole results
 - Watercourse reference number



0	NOV 17	Initial Issue	RM	JJ	NC	TK
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	App'd

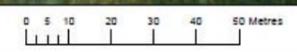
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NUCLEAR POWER

Project
SITE PREPARATION AND CLEARANCE
ENVIRONMENTAL STATEMENT

Drawing Title
Channel realignment

Scale @ A3	1:1,500	DO NOT SCALE
Jacobs No.	60PO8078	
Client No.		
Drawing No.	60PO8078_SPC_ES_TE_02	



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7 Appendix B – Technical Summary Report

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8 Appendix C – Plates



Plate 1: Dense scrub on the banks of the Nant Caedegog Isaf in spring 2013

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Plate 2: Emergent vegetation on the more open area of the Nant Caedegog Isaf in spring 2013

**Site Preparation and Clearance
Environmental Statement
Volume 3 – Appendix 14-22
European Protected Species Mitigation
Licence Method Statement: Bats**

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EUROPEAN PROTECTED SPECIES MITIGATION LICENCE METHOD STATEMENT BACKGROUND AND SUPPORTING INFORMATION: BATS

(DRAFT)

DCRM Ref Number: WN034-JAC-PAC-REP-00050

Revision: 1.0

Additional Requirements or Controls			
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EUROPEAN PROTECTED SPECIES MITIGATION LICENCE METHOD STATEMENT: BATS (DRAFT)	DCRM Reference No	Revision: 0.1
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Revision History				
Date	Rev No.	Summary of Changes	Ref Section	Purpose of Issue
02/05/17	1	Update to programme dates		Application appendix

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A. Executive summary

Horizon Nuclear Power (Wylfa) Ltd (Horizon) has undertaken a suite of bat surveys between 2009 and 2015 in relation to the proposed development of a new nuclear power station on the Isle of Anglesey, referred to as the Wylfa Newydd Project. The Wylfa Newydd Project will take place within the Wylfa Newydd Development Area. The study area described in this report is the area including the Wylfa Newydd Development Area and a buffer of 500m around the boundary.

The Wylfa Newydd Project will involve the demolition of existing structures prior to construction commencing. Of the structures to be demolished, 16 buildings have been confirmed as supporting roosting bats. Of these, only one maternity roost was identified (at The Lodge), the remainder having only individual or low numbers of bats at varying times through the bat activity season.

The roosting bat species present are common pipistrelle, soprano pipistrelle, brown long-eared, whiskered/Brandt's, and Natterer's. The maternity roost at The Lodge comprises Natterer's.

Subject to planning agreement, the 16 roost structures will be subject to supervised sensitive demolition between March and June 2018. No exclusion is proposed due to the seasonality of works and the complexity of the structures.

To mitigate for the loss of the 16 roosts, two dedicated bat barns will be built in summer/autumn 2017 to allow sufficient time for bats to find them and occupy them prior to structure demolition in 2018. Roost features in the design of the bat barns include access points at tiles, lead flashing, gable ends, exposed rafters and wall tops; and roosting provision in the form of roost boards, multiple internal/external Schwegler bat tubes, ridge beams, an uncluttered loft, and a 'cool tunnel' to provide suitable conditions for hibernation.

The bat barns will be located within Horizon's permanent land-holding in areas away from the Wylfa Newydd Development Area. In addition, within 50m of each bat barn two telegraph poles will be installed along existing hedgerow/scrub vegetation and these will support four Schwegler bat boxes each (two 1FF and two 2FN boxes per pole). The purpose of these pole mounted boxes is to provide roosting habitat for species that will readily roost in trees, in the absence of natural mounting sites. Each building will be surrounded by a buffer strip of tree and shrub planting up to 10m wide with native species of local provenance, including oak, rowan, willow, hazel, holly and hawthorn. A small wildlife pond will be created within 50m of each bat barn to provide an additional local foraging resource.

A further 24 Schwegler bat boxes will be hung within an area of retained woodland to the east of the Existing Power Station (four 1FF, six 2FN, 12 2F [double front panel] and two 1FS boxes). The boxes will comprise a range of designs. The exact locations of the bat boxes will be determined by the named ecologist on the licence but will be positioned to maximise the likelihood of them being used by bats, providing a range of roosting conditions and allowing for effective monitoring.

Horizon will have sole responsibility for future maintenance of the bat barn roosts, bat boxes, surrounding habitat and landscaping maintenance.

Horizon is currently developing a Landscape and Habitats Management Strategy, which illustrates the coordinated range of environmental mitigation and enhancement measures to be incorporated into the landscape restoration of the Wylfa Newydd Development Area at different

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phases of construction and during operation. This includes commitments to protect and sensitively manage retained and newly planted vegetation for biodiversity benefits, including the protection and enhancement of bat commuting and foraging habitats.

Monitoring of the bat barns and the 40 external bat boxes will be undertaken annually in August/September throughout the construction of the new Power Station. The monitoring will inform the need for any remedial action to ensure their long-term effectiveness.

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B. Introduction

B.1 Background to activity/development

Horizon is currently planning to develop a new nuclear power station on Anglesey as identified in the National Policy Statement for Nuclear Power Generation (EN-6). The Wylfa Newydd Project (the Project) comprises the proposed new nuclear power station (the Wylfa Newydd Generating Station), including the reactors, associated plant and ancillary structures and features, together with all of the development needed to support its delivery, such as highway improvements, worker accommodation and specialist training facilities. The Project will require a number of applications to be made under different legislation to different regulators. As a nationally significant infrastructure project under the Planning Act 2008, the construction and operation must be authorised by a development consent order.

A previous European Protected Species licence application was made to Natural Resources Wales (and its predecessors) to permit the demolition of 20 buildings that were used by roosting bats. These buildings were demolished under licence between 2013 and 2015 (licence references: BAT/2879/WG/IND, 54318:OTH:EPS:201356038:OTH:EPS:2014). The purpose of these licences was for preserving public health and safety as the buildings were rapidly falling in to disrepair and subject to intrusion and vandalism.

The approximate centre of the Wylfa Newydd Development Area is located at Ordnance Survey grid reference SH 354 933.

B.2 Full details of proposed works on site that are to be covered by the licence

Sixteen known roost structures at eight property complexes require complete demolition as part of the site preparation and clearance works that will clear the Wylfa Newydd Development Area to enable construction of the new nuclear power station. The structures will be demolished in 2018 with the site preparation and clearance works being completed by mid-2019. The demolition of these structures will form part of a Town and Country Planning Act application for the site preparation and clearance works in advance of a development consent order application for the main nuclear power station development. This planning application is currently being prepared and planning will be secured prior to the formal submission of this licence application.

B.3 Actions requiring licensing

The demolition of the 16 known roost structures requires the following licensed actions: disturbance, capture of bats (if needed) and the destruction of breeding sites/resting places.

The destruction of breeding sites/resting places is necessary as the roost structures lie within the footprint of the Wylfa Newydd Development Area and so will need to be removed before the construction phase of the Project can commence.

Disturbance of roosting bats may occur as they may still be present in the spring and autumn period when sensitive demolition will take place (although the works are programmed for these seasons to reduce the likelihood of bats being present and to ensure they are neither hibernating, heavily pregnant or nursing young). Similarly, it may be necessary to capture any

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bats found by hand/net and remove them to a place of safety if they are at imminent risk of being harmed by demolition activity.

Exclusion of the bats from the buildings will not be possible due to the proposed timing of the works as there is a possibility of torpid bats being trapped inside the structures rather than successfully excluded. Also, the complexity of many of the structures and the multitude of potential access points for bats makes exclusion an impractical approach.

C. Survey and site assessment

C.1 Existing information on the bat species at the survey site

A background data search was requested in order to determine the scope of surveys required and to inform the Project's Environmental Impact Assessment. This was requested from Cofnod (North Wales Environmental Information Service) and included all legally protected and notable species records, including bats, within 2.5km of the centre of the Wylfa Newydd Development Area.

The data from the 2013 Cofnod background data search are summarised in table 1.

Species	Years	Live bat records	Dead bat records	Roosts recorded
Unknown	1989-2006	11	1	2
Myotis species	1986-1992	9	0	0
Whiskered bat (<i>Myotis mystacinus</i>)	1994	0	1	0
Noctule bat (<i>Nyctalus noctula</i>)	1998	1	0	0
Pipistrelle species (<i>Pipistrellus sp.</i>)	1986-2005	3	0	0
Common pipistrelle bat (<i>P. pipistrellus</i>)	1990-2008	20	0	0
Brown long-eared bat (<i>Plecotus auritus</i>)	1990	15	0	1

Table 1: Summary of background data search from Cofnod records

The desk study data were considered to be of limited value compared to the site specific survey data due to its age, limited number of records and the paucity of roost records returned.

Bat surveys have been completed within the Wylfa Newydd Development Area every year between 2009 and 2015, with surveys between 2013 and 2014 extended to include a 500m wide buffer around the initial survey area. No surveys are known to have taken place of the study area prior to 2009. The scope of the surveys that have taken place each year has varied and is summarised in table 2 below.

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	2009 (Arup, 2012a)	2010 (Arup, 2012b)	2011 (Arup, 2012b)	2012 (Arup, 2013)	2013 (Jacobs, 2014)	2014 (Jacobs, 2015a)	2015 (Jacobs, 2015b/2015c)
Internal building inspections	Yes	Yes	Yes	Yes	Yes	Yes	No
Building emergence surveys	No	Yes	Yes	Yes	Yes	Yes	Yes
Tree assessment surveys	No	Yes	Yes	Yes	Yes	No	No
Transect activity surveys	Yes	No	No	No	Yes	Yes	No
Static activity surveys	Yes	No	No	No	Yes	Yes	No
Mitigation monitoring	⁻¹	-	-	-	Yes	Yes	Yes

Table 2: A summary of the scope of bat surveys undertaken at the Wylfa Newydd Project site between 2009 and 2015

The habitat assessment and activity surveys showed that the composition of bats using the study area for foraging and commuting are what would be expected for a similarly sized area anywhere in north Wales. The composition was dominated by the most common and widespread species (common and soprano pipistrelle (*P. pygmaeus*), brown long-eared and commoner *Myotis* species, with rare occurrences of noctule and Nathusius' pipistrelle (*P. nathusii*). These species tended to be recorded more frequently in areas of greater habitat heterogeneity, including wooded areas and field boundaries, although it is recognised that this is partly an artefact of the transect routes used. However, bats did tend to be less frequently using marshy grassland areas, and showed an affinity to coastal interface environments.

The study area supports very small numbers of trees with features that have the potential to support roosting bats, with no tree roosts identified following surveys. The geographical location of the study area also makes it very unlikely that the study area supports any of the rarer bat species of higher conservation value and sensitivity that primarily roost in trees e.g. barbastelle (*Barbastella barbastellus*). The survey effort to date has not extended to include emergence surveys of all trees with features that have the potential to support roosting bats although this will occur prior to any felling works, currently scheduled for autumn 2017.

The number of structures that have been surveyed in the study area has varied between survey years. This has been caused by expansions of the study area as the Project design has developed. The most significant change was between 2012 and 2013 when the study area was increased to include a 500m buffer zone around the boundary of the Wylfa Newydd Development Area to better understand the context of bat populations within the wider

¹ Compensation roosts were built in 2013 to permit the demolition under licence of 20 known roost buildings.

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environment. Although the number of buildings surveyed in the 500m buffer zone was limited by access constraints, a number of additional bat roosts were identified in 2013 and 2014.

The emergence and internal inspection surveys have shown that bats use 36 of the 100 extant structures for roosting in the study area (16 of which will be lost to the development and are the subject of this licence application). These roosts predominantly comprise low numbers of bats, with only two structures ever having supported more than seven individual bats. The predominant species recorded are the same as those cited for the activity surveys, although whiskered /Brandt's (*M. brandtii*) bat roosts were also found.

There were no 'rarer' species, noctule bat or Nathusius' pipistrelle roosting records, indicating a population of lower value and sensitivity, unlikely to be of significance outside of the boundary of the study area. Not all structure roosts were occupied by bats each year and therefore the total number of occupied roosts varied greatly between years.

The two most significant extant roosts in the study area are the maternity colony of pipistrelle species in the Tyn y maes bat barn, and the Natterer's bat colony in The Lodge. The Tyn y maes bat barn and associated habitat enhancement works were completed as compensation following the demolition of Tyn y maes house in 2013. This building was occupied in 2015 by over 50 bats from four species (common and soprano pipistrelle, brown long-eared and whiskered/Brandt's bat) and is an example of successful mitigation. The blue print for this mitigation strategy will therefore be used for the displacement of The Lodge roost that will be required as part of this licence application.

Table 3 below summarises the survey results between 2010 and 2015 of properties requiring demolition as part of the Wylfa Newydd Project that included structures which support bat roosts.

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(Key: P45 = common pipistrelle; P55 = soprano pipistrelle; BLE = brown long-eared bat; LE = Long-eared bat (likely brown long-eared); NAT = Natterer's bat; WH/BR = whiskered/Brandt's bat; MYO = Myotis species bat; and Uk = unknown bat species. - = no survey conducted that year; N/A = not applicable)

Property name and grid reference	Buildings	Roost potential rating (Hundt, 2012 and Jacobs, 2015b)	2010	2011	2012	2013	2014	2015	Peak count per species
Magnox Depot and Back up office facility/back up auxiliary facility SH 35342 92892	1	Negligible	-	No bats	No bats	No bats	-	No Access	N/A
	2	Known roost	-	BLE x 3	BLE x 1	BLE x 2	BLE x 2	BLE x 1 MYO x 1	BLE x 3 MYO x 1
	3	Medium	-	No bats	No bats	No bats	-	No Access	N/A
Wylfa sports and social club (formerly referred to as the leisure centre) SH 35317 93321	1	Known roost	-	P45 x 1	No bats	No bats	No bats	No bats	P45 x 1
	2	Known roost	-	No bats	No bats	No bats	P45/P55 x 1 (probable P45)	No bats	Uk x 1 (probable P45)
	Out-building	Low	-	-	No bats	-	-	-	N/A
Nantorman SH 36237 93365	1	Known roost	-	No bats	No bats	P55 x 1	No bats	P55 x 1	P55 x 1
	22	Known roost	-	No bats	LE droppings only	No bats	No bats	No bats	LE x1
	3	Known roost	-	No bats	No bats	P55 x 2	No bats	No bats	P55 x 2
	4	Negligible	-	-	-	-	-	-	N/A
The Firs Hotel SH 35289 92983	Out-building	Known roost	No bats	-	-	NAT x 1	No bats	No bats	NAT x 1

² Building 2 at Nantorman is being considered as a roost of long-eared bats given the presence of droppings in 2012.

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Property name and grid reference	Buildings	Roost potential rating (Hundt, 2012 and Jacobs, 2015b)	2010	2011	2012	2013	2014	2015	Peak count per species
The Lodge SH35510 93130	The Lodge	Known maternity roost	BLE x 2 MYO x 2 P55 x 1	BLE x 2 MYO x 8 P55 x 2	BLE x 5 NAT x 12	BLE x 5 NAT x 26 (+ young)	BLE x 3 NAT x 38 (+ young) WH X 1	BLE x 4 NAT x 34 (+ young)	BLE x 5 NAT x 38 (+ young) MYO x 8 P55 x 2 WH x 1
Tre'r Gof Uchaf farm buildings SH 36325 93156	2 and 4 (buildings are joined)	Known roost	-	P45 x 1 BLE x 1	No bats	P45 x 2 P55 x 2	P45 x 1	No bats	P45 x 2 P55 x 2 BLE x 1
	5	Low	-	No bats	No bats	-	-	No bats	N/A
	6	Negligible	-	No bats	No bats	-	-	No bats	N/A
Tyddyn Gele SH 35068 92613	1	Known roost	-	-	P55 x 1 WH/BR x 1	P55 x 2 WH/BR x 1	P45 x 1 P55 x 6	No bats	P45 x 1 P55 x 6 WH/BR x 1
	2	High	-	-	No bats	No bats	No bats	No bats	N/A
	3	Known roost	-	-	No bats	P45 x 1 P55 x 1	BLE x 1	No bats	BLE x 1 P45 x 1 P55 x 1
	4	Known roost	-	-	No bats	No bats	P55 x 1	No bats	P55 x 1
	5	Negligible	-	-	No bats	No bats	No bats	No bats	N/A
	6	Known roost	-	-	No bats	No bats	P55 x 2	No bats	P55 x 2
	7	Low	-	-	No bats	No bats	No bats	No bats	N/A

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Property name and grid reference	Buildings	Roost potential rating (Hundt, 2012 and Jacobs, 2015b)	2010	2011	2012	2013	2014	2015	Peak count per species
	Containers	Negligible	-	-	No bats	No bats	No bats	-	N/A
Tyddyn Goronwy Farm SH 35848 93258	1	Known roost	-	No bats	No bats	P55 x 1	P45 x 1	P45 x 1	P45 x 1 P55 x 1
	2	Medium	-	No bats	N/A				
	3	Known roost	-	No bats	No bats	No bats	P45 x 1	No bats	P45 x 1
	4	Low	-	No bats	N/A				
	5	Negligible	-	No bats	N/A				

Table 3: A summary of the results of structure inspections and emergence/re-entry bat surveys undertaken between 2010 and 2015 at properties requiring demolition where roosting bats were confirmed

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Table 4 below provides a cumulative total of the peak numbers of each species recorded at each property between 2010 and 2015 (taken from table 3) so as to illustrate the approximate number of bats that will be affected by the demolition works under this licence application.

Estimated total number of roosting bats by species	
Common pipistrelle (P45)	7
Soprano pipistrelle (P55)	21
Brown long-eared (BLE)	13
Natterer's (NAT)	40
Whiskered/Brandt's (WH/BR)	1
Myotis sp.	8
Unknown species	1
Estimate of total number of affected roosting bats for all species (excluding young Natterer's)	91

Table 4: An estimate of the total number of roosting bats of each species that may be affected by the demolition works

The 'pipistrelle species' bat recorded at the Wylfa sports and social club in 2014 was identified from a photograph of a bat roosting on the exterior wall of the building by a member of the Existing Power Station staff. It is assumed that this individual, and the unknown bat recorded in 2015, were common pipistrelle as this species was confirmed as roosting in the same building in 2011.

The full bat survey reports for the Wylfa Newydd Project study area between 2009 and 2015 are shown in annex J.1 of Document 2: Delivery information – Mitigation, compensation and monitoring.

C.2 Statutory sites notified for the species (SSSIs or SACs) within 10km

There are no Sites of Special Scientific Interest or Special Areas of Conservation notified for roosting bat species within 10km of the Wylfa Newydd Project study area.

C.3 Objectives of the survey

The objective of the bat surveys was to establish which bat species were present on the site, the location and status of any roosts, and the use of any landscape features by bats that may be affected by the proposed development.

C.4 Scaled plan/map of survey area

See overleaf.

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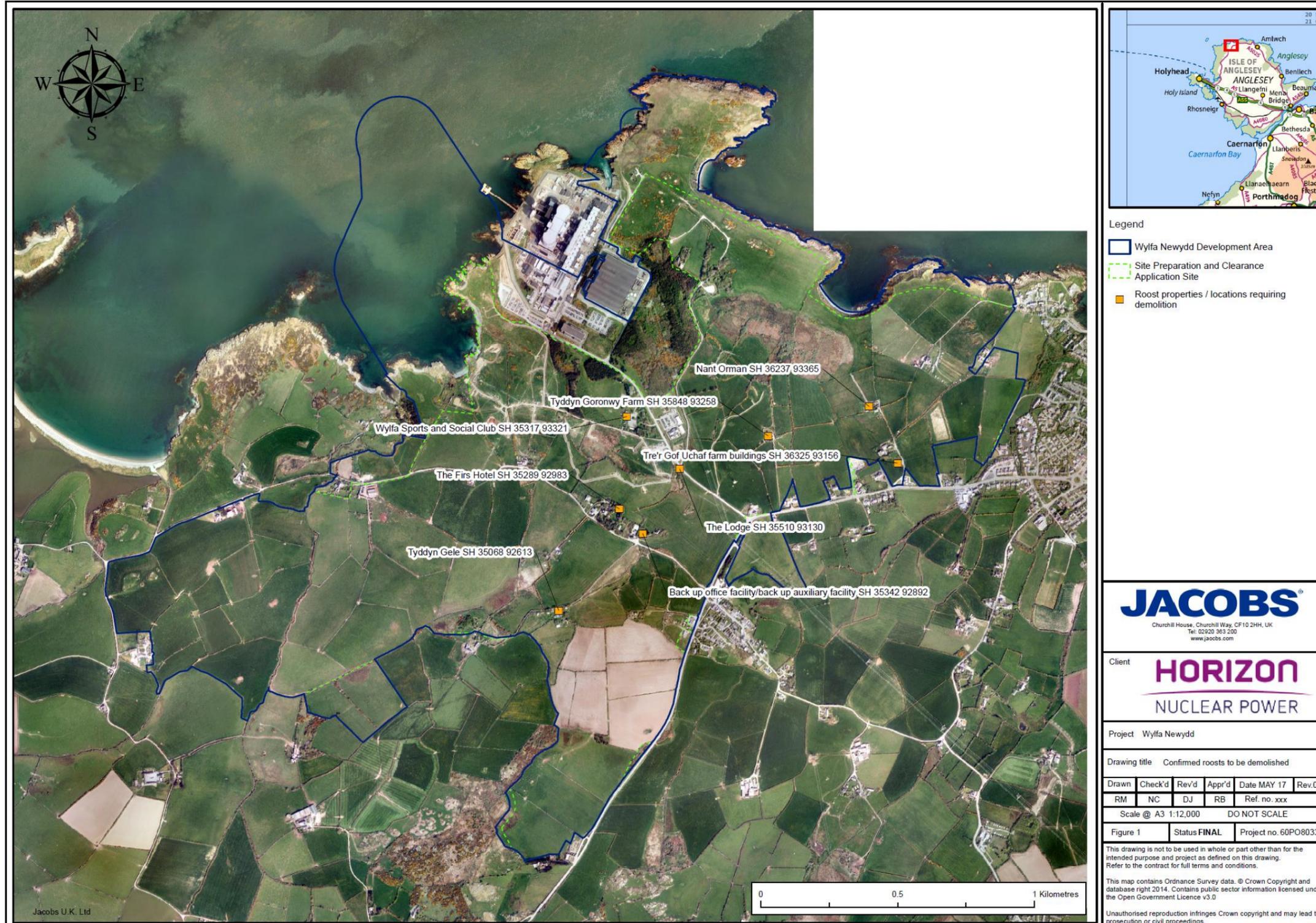


Figure 1: Site plan

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C.5 Site/habitat description

The Wylfa Newydd Development Area (the main footprint of which will be located within the blue boundary line as shown in figure 1, which is the Nuclear National Policy Statement boundary) is primarily dominated by grazed agricultural land surrounded by a rocky coastline. The fields are predominantly segregated by hedgerows which provide habitat connectivity. Areas of scrub, especially gorse, are present in some areas around the coast and there are two areas of woodland planted as landscaping for the Existing Power Station. These take the form of a coniferous plantation and a broadleaved woodland. There are also small areas of wetland, one of which is the Tre'r Gof Site of Special Scientific Interest.

The following eight named property complexes supporting roosting bats in 16 discrete structures are proposed for demolition under this licence application:

1. Back up office facility/back up auxiliary facility – building 2.
2. Wylfa sports and social club – buildings 1 and 2.
3. Nantorman – buildings 1, 2 and 3.
4. The Firs Hotel - out-building.
5. The Lodge.
6. Tre'r Gof Uchaf farm buildings – buildings 2 and 4.
7. Tyddyn Gele – buildings 1, 3, 4 and 6.
8. Tyddyn Goronwy Farm – buildings 1 and 3.

Figure 2 shows the location of each property complex where roosting bats were confirmed and the surrounding habitat types as shown using standard Phase 1 Habitat Survey codes (JNCC, 2010).

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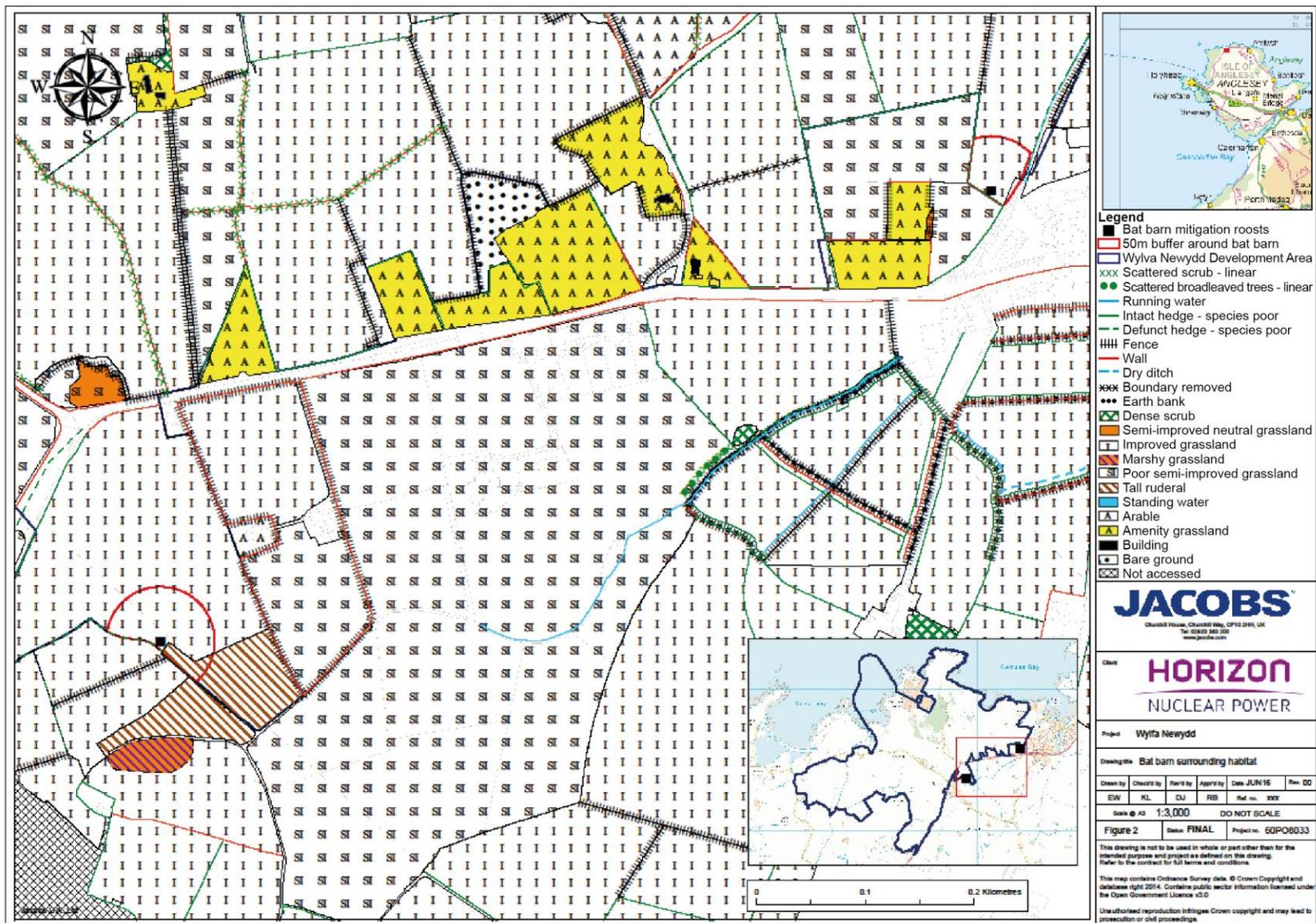


Figure 2 The locations of bat barns and surrounding habitat.

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Descriptions of the local habitat and structure for each confirmed roost are given below along with illustrative photographs.

C.5.1 Back up office facility/back up auxiliary facility – building 2

No photograph is available of this building as it is used for security purposes and permission was not granted to photograph it.

C.5.1.1 Habitat

The back-up office facility/back up auxiliary facility is sheltered by a large hedge of Lawson's cypress (*Chamaecyparis lawsoniana*), which not only provides shelter but also darkness and cover. Immediately adjacent to the facility is a large area of scrub and the heavily wooded gardens of a property named The Firs. There is also good connectivity with habitats in the wider landscape via the complex network of hedges.

C.5.1.2 Structure description

Building 2 is a single-storey brick structure with a slate roof. On the exterior, there are some gaps under slates and ridge tiles. The soffits are mostly sealed but there is a small gap on the west-facing gable end. There are large gaps on the east elevation and two ventilation grilles on this east side are missing. There is a rot hole in the fascia on the south-east corner of the building.

In the interior, there is a suspended ceiling below the un-insulated roof void area. There is a strip light set in this ceiling which partially illuminates the roof void. The roof void is sub-divided, but there is potential bat access between the sections. The slate is lined with traditional F1 roofing felt and the rafters appeared relatively new. There is an overlap on the purlins with a potential roosting crevice between.

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C.5.2 Wylfa sports and social club– buildings 1 and 2



Photograph 1: The front elevation of the Wylfa sports and social club (building 1).

C.5.2.1 *Habitat*

The Wylfa sports and social club has good connectivity with the wider landscape and is partially surrounded by mature and semi-mature broadleaved trees which provide sheltered habitat for foraging.

C.5.2.2 *Structure description*

The main body of building 1 (the Wylfa sports and social club) is a steel frame clad with corrugated cement sheeting on both the walls and roof. A suspended ceiling creates a sizable but cluttered roof void. Crevices and potential bat access points are formed where corrugated walling and roofing sheets meet the corner 'coping' sheets.

On the front and back of the club building are flat-roofed extensions. The walls of these extensions comprise block work, plastered internally and pebble-dashed externally. The flat roof is covered with bitumen felt, white UPVC soffits, and fascias are fitted and well-sealed.

Overall the Wylfa sports and social club has low potential to support roosting bats.

Building 2 (the garage) is constructed of large, prefabricated concrete block sections, with some standard block work around the doors. The roof is clad with corrugated cement sheeting.

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C.5.3 Nantorman – buildings 1 , 2 and 3



Photograph 3: Building 1 (Nantorman) shown from the eastern elevation



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Photograph 4 Building 2 (Nantorman Cottage) shown from the western elevation



Photograph 5: Building 3 (Bwthyn y Gafr) shown from the southern elevation

C.5.3.1 Habitat

Nantorman is in a very open, exposed location but has very good habitat connectivity via a network of hedges. This property is in relatively close proximity to the Tre'r Gof SSSI wetland which could provide a productive foraging habitat.

C.5.3.2 Structure description

The main house (building 1) at Nantorman has a pebble-dashed exterior although there are some gaps in the rendering which give potential bat access to behind the fascia boards. There are gaps under some slates, ridge tiles and lead flashing, particularly on the rear of the building. On the interior, the roof is lined with traditional F1 roofing felt and the loft insulated.

Building 2 (Nantorman Cottage) is a newly converted building, and has a pebble-dashed exterior. There are some gaps under ridge tiles but the roof is largely in a very good condition.

Building 3 is only partially converted and the exterior walls have been pebble-dashed. The roof is in poor condition with numerous gaps under the slates and in the stone-work of the chimney. There is potential bat access to the building interior via a vent in the west-facing elevation which is also used by swallows (*Hirundo rustica*). On the interior there are potential roosting locations between the foam insulation and the underside of the roof, in a cavity along the interior of the eaves and in the interior of the large open chimney.

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C.5.4 The Firs Hotel - out-building



Photograph 6: The outbuilding at The Firs

C.5.4.1 Habitat

The outbuilding is within the wooded garden of the old Firs Hotel. It is surrounded by mature trees, a mixture of conifers dominated by Scots pine (*Pinus sylvestris*) with some native broadleaf trees including ash (*Fraxinus excelsior*), horse chestnut (*Aesculus hippocastanum*) and cherry (*Prunus avium*).

C.5.4.2 Structure description

Building 1 is an out-building within The Firs garden and is a brick built structure with a cast concrete roof containing very few crevices. The doors are either missing or have had their glass broken. Internally, carpet has been hung from the walls as sound-proofing, creating potential roosting points behind.

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C.5.5 The Lodge



Photograph 7: The Lodge showing the southern elevation.

C.5.5.1 *Habitat*

The Lodge is bordered on the north and west by mature and semi-mature trees and has very good habitat connectivity via the network of hedges in the vicinity. There is a large, un-grazed field/wetland area to the immediate west and a small pond just over the garden boundary also to the west. To the east lies the approach road to the power station, across from which there is a network of hedges. There are street lights on the road but these terminate just to the north of the property.

C.5.5.2 *Structure description*

The Lodge is a single storey, rendered structure with a slate roof which is in poor condition with numerous gaps under the slates. The roof is of an 'exposed rafter ends' design which in places gives potential bat access to the area between the roof and the top of the exterior walls and to the roof void. There are sections of barge boarding missing on the south gable end giving potential bat access under the slates and between the slates and the top of the exterior wall. There are gaps behind decayed external timber-work and under ridge tiles.

The roof void from the interior was found to be divided into two halves separated by a supporting wall and the chimney breast. However, there are potential bat access points between the two sections via gaps around the chimney. The chimney is not thought to be lined.

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C.5.6 Tre'r Gof Uchaf farm buildings – buildings 2 and 4



Photograph 8: Building 2 shown from the southern elevation.



Photograph 9: Building 4 shown from the southern elevation.

C.5.6.1 Habitat

Although Tre'r Gof Uchaf Farm is situated in a fairly exposed location, there is good connectivity with habitats in the wider landscape via the complex network of hedges.

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C.5.6.2 Structure description

This property was originally a larger complex of farm buildings. Buildings 1 and 3 were unused stone barns and were demolished in spring 2013 under the Welsh Government European Protected Species derogation licence, leaving the utilised buildings 2 and 4 intact.

Building 2 is a large barn consisting of a steel frame clad with a combination of corrugated metal sheeting and corrugated cement sheeting. Due to the design of this building the internal light levels are high.

Building 4 is a large barn constructed with a frame which is a combination of steel, concrete and timber. The building is mostly clad with corrugated cement sheeting although some corrugated metal sheeting is also present. The interior is very light and draughty and the barn was still in use for agricultural purposes at the time of survey.

C.5.7 Tyddyn Gele – buildings 1, 3 4 and 6



Photograph 10: The front (western) elevation of the main house at Tyddyn Gele (building 1)

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Photograph 11: Buildings 2 and 3 respectively at Tyddyn Gele (western elevation). The distant building with the shallow pitched roof (building 3) is the confirmed roost



Photograph 12: The southern elevation of building 4 at Tyddyn Gele

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Photograph 13: The hot tub roof (building 6) at Tyddyn Gele

C.5.7.1 Habitat

Tyddyn Gele has particularly good connectivity with habitats in the wider landscape via the network of hedges. There are a number of mature trees, primarily sycamore (*Acer pseudoplatanus*) in the immediate vicinity. Bat potential may have been limited by the fact that the majority of this property was very heavily illuminated by powerful security lighting in the past.

C.5.7.2 Structure description

Building 1 (the main house) is divided into two sections with the northern section being two-storey and the southern section single-storey. The roof is clad with very old slate of uneven thickness, creating a multitude of potential roost sites on both sections of the building. There are gaps behind the fascias throughout the two-storey section and behind the barge boarding on the south-facing gable end of the single-storey section. The exterior of the building is rendered leaving no crevices in the masonry.

Building 3 is a two-storey structure with numerous gaps under slates and behind the fascias on the front of the building. The fascia was missing from the rear and the barge boarding was absent from both gable ends. There are potential access points under the slates on both gable ends.

Building 4 is a small, open-fronted barn with a slate roof. There are gaps under the slates, ridge tiles, behind fascias and in the masonry. On the interior, the lime torching was missing in places creating gaps between the slates and rafters.

Building 6 is the roof of a hot tub area in the garden to the west of the main house, roofed with wooden shingles attached to plywood. There are gaps between the boarding and roof supports and between the exterior timbers on the corners of the structure.

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C.5.8 Tyddyn Goronwy Farm – buildings 1 and 3



Photograph 14: Building 1 (Tyddyn Goronwy) shown from the eastern elevation.



Photograph 15: Building 3 shown from the southern elevation.

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C.5.8.1 *Habitat*

As with most of the site there is good connectivity at Tyddyn Goronwy with habitats in the wider landscape via the complex network of hedges.

C.5.8.2 *Structure description*

The main house (building 1) at Tyddyn Goronwy has a rendered, pebble-dashed exterior leaving no crevices in the masonry. There are no gaps behind soffits and fascias, but there are potential bat access points under slates, ridge tiles and the lead flashing around the dormer windows. On the interior, the roof is lined with traditional F1 roofing felt and is insulated.

Building 3 is a small, single storey barn which has been converted for residential use. Again, the walls are rendered but there are gaps under slates and ridge tiles.

C.6 *Field survey(s)*

All surveys were undertaken by Cambrian Ecological Limited (CEL), on behalf of Jacobs. Surveys were undertaken at the eight roost property complexes in 2015 that are shown in figure 1 in section 3.4.

Methods were developed with reference to the Bat Surveys – Good Practice Guidelines (Hundt, 2012). The bat emergence surveys were carried out between the beginning of May and the beginning of August 2015 and were led by licensed bat workers Chris Hall (NRW Licence No: 59784:OTH:CSAB:2014), Sam Dyer (NRW Licence No: 60825:OTH:CSAB:2014) and Kate Williamson (NRW Licence No: 60821:OTH:CSAB:2014), and assisted by a team of experienced survey assistants: Daniel Schwarzbaum, Tom Simone, Alan Cowlshaw, Sam Bryan, Nia Haf Jones, Dylan Vaughan-Williams, Rebecca Clews-Roberts, Lucia Ruffino, Shan Griffiths, Christian Middle and Bethan Lloyd.

A visual inspection of the exterior of each previously surveyed structure was made to note any changes in condition that might allow bats to gain entry to roost spaces, or that might reduce the suitability of roost sites through increased wind or water ingress into the structures.

The structures were placed in one of four categories: 'high', 'medium', 'low' and 'no potential'. These assessments were made in the context of the nature of the structures on the site.

Following the structure assessments, the emergence survey schedules comprised:

- three emergence surveys of the Natterer's bat maternity roost at The Lodge;
- two emergence survey of high and medium potential structures; and
- one emergence survey of low potential structures.

This reduction in the survey effort for these confirmed roosts compared with that prescribed by the Bat Conservation Trust's Bat surveys: good practice guidelines (Hundt, 2012) was a practical consideration given the large number of buildings requiring survey and the extensive baseline data that has been collected for those buildings over the past five years. As such, the reduction in survey effort in 2015 is not considered to be a constraint when determining levels of impact or proportionate mitigation. Any evidence of roost usage over the last five years will

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mean a structure is regarded as a roost and, as will be detailed in the delivery information document, all moderate and high potential buildings located at a property where a bat roost is to be demolished will be treated in the same manner as the roost structure itself as a precaution.

All emergence surveys were carried out in appropriate weather conditions with dusk temperatures in excess of 10 degrees centigrade and avoiding periods of heavy rain or strong wind. Details of the environmental conditions for each survey are provided in section 3.7.

Each surveyor used an Anabat SD1 or SD2 unit in conjunction with a Bat Box Duet frequency division bat detector. Confirmation of field identifications were completed via computer analysis of sonogram traces recorded on the Anabats using Analook software. The emergence surveys commenced 15 minutes before sunset and continued until 90 minutes after sunset to allow for the possible presence of late emerging species such as brown long-eared or Natterer's bats. Where required, night vision monoculars, Sony Nightshot camcorders with infra-red floodlighting or Flir E50 thermal imaging cameras were used to look for later emerging species against darker backgrounds.

Bats are highly mobile animals and some species move their roosting sites on a regular basis. It is possible that bats could move into any structure after the survey had taken place. An assessment of the suitability of the structure to support roosting bats is therefore important to establish the likelihood of this occurring. As such, as detailed in the delivery information, a licence is being sought to also cover the demolition of all moderate and high potential structures without evidence of bat use where these form part of a property complex that also supports a confirmed roost.

C.7 Survey results

Table 5 below presents the results of the 2015 structure emergence/re-entry surveys (including roost potential and weather data) at eight properties at which roosting bats have been recorded in one or more structures since surveys began in 2009 and which will be lost to the development.

Full bat survey reports for the Wylfa Newydd Project dating between 2009 and 2015 are appended in Annex J.1. Raw survey data is not included in Annex J.2. as the survey reports contain all of the available data.

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Property name	Roost potential status (High, Medium, Low and No)	Exterior structure condition (2014-2015)	Survey No. (reduced effort in 2015 discussed in section C6)	Date	Temp °C	Cloud cover %	Wind	Rain	Roost status 2009-2015	Notes
Back up office facility/back up auxiliary facility	B1 No, B2 High, B3 Medium	No change	1 – Dusk emergence survey	23/06/15	12.2	10	Light breeze	None	Day roost – regular	One brown long-eared bat emerged from the eastern gable of B2. One <i>Myotis</i> sp. bat emerged from under a ridge tile on the northern end of B2.
Wylfa sports and social club (formerly referred to as the leisure centre)	High	No change	1 – Dusk emergence survey	02/06/15	10.9	10	Moderate breeze	None	Day roost - occasional	Negative survey
			2 – Dusk emergence survey	28/07/15	13.0	100	Light breeze	None		Negative survey
Nantorman	B1-3 High, B4 No	No change	1 – Dusk emergence survey	19/05/15	12.1	20	Still	None	Day roost - occasional	One soprano pipistrelle bat emerged from under a ridge tile on the south eastern hip of B1.
			2 – Dusk emergence survey	30/06/15	20.1	2	Still	None		One soprano pipistrelle bat emerged from behind the fascia board on the right side of the front of B1.
The Firs out-building	High	No change	1 – Dusk emergence survey	23/06/15	12.2	10	Light breeze	None	Day roost - occasional	Negative survey

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Property name	Roost potential status (High, Medium, Low and No)	Exterior structure condition (2014-2015)	Survey No. (reduced effort in 2015 discussed in section C6)	Date	Temp °C	Cloud cover %	Wind	Rain	Roost status 2009-2015	Notes
			2 – Dusk emergence survey	28/07/15	13.0	100	Light breeze	None		Negative survey
Tre'r Gof Uchaf Farm	High	No change	1 – Dusk emergence survey	19/05/15	12.1	20	Still	None	Day roost – regular	Negative Survey
			2 – Dusk emergence survey	23/06/15	12.2	10	Light breeze	None		One common pipistrelle bat emerged from B4. It was heard foraging internally initially before emerging.
Tyddyn Gele 1 (House)	High	No change	1 – Dusk emergence survey	16/06/15	13.1	100	Moderate breeze	None	Day roost – regular	Negative survey
Tyddyn Gele Building 3	High	No change	1 – Dusk emergence survey	23/06/15	12.2	10	Light breeze	None	Day roost - occasional	Negative survey
			2 – Dusk emergence survey	21/07/15	15.1	100	Still	None		Negative survey
Tyddyn Gele Building 4	High	No change	1 – Dusk emergence survey	16/06/15	13.1	100	Moderate breeze	None	Day roost - occasional	Negative survey
			2 – Dusk emergence survey	21/07/15	15.1	100	Still	None		Negative survey

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Property name	Roost potential status (High, Medium, Low and No)	Exterior structure condition (2014-2015)	Survey No. (reduced effort in 2015 discussed in section C6)	Date	Temp °C	Cloud cover %	Wind	Rain	Roost status 2009-2015	Notes
Tyddyn Gele Building 6 (hot tub roof)	High	No change	1 – Dusk emergence survey	16/06/15	13.1	100	Moderate breeze	None	Day roost – regular	Negative survey
			2 – Dusk emergence survey	14/07/15	12.9	10	Light breeze	None		Negative survey
Tyddyn Goronwy Farm	B1 & 3 High, B2 Medium, B4 Low, B5 No	No change	1 – Dusk emergence survey	19/05/15	12.1	20	Still	None	Day roost - occasional	One common pipistrelle bat emerged from front fascia over dormer window
			2 – Dusk emergence survey	28/07/15	13.0	100	Light breeze	None		Negative survey
The Lodge	High	No change	1 – Internal inspection and dusk emergence survey	26/05/15	11.2	50	Still	None	Maternity roost	Twenty-six Natterer's bat in southern roof void. Three brown long-eared bats in northern roof void.
			2 – Internal inspection and dusk emergence survey	30/06/15	20.1	2	Still	None		34 x Natterer's bat (including at least two juveniles) in southern roof void. Four brown long-eared bats in northern roof void. One soprano pipistrelle bat emerged from the slate edge of the front porch.

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Property name	Roost potential status (High, Medium, Low and No)	Exterior structure condition (2014-2015)	Survey No. (reduced effort in 2015 discussed in section C6)	Date	Temp °C	Cloud cover %	Wind	Rain	Roost status 2009-2015	Notes
			3 – Internal inspection and dusk emergence survey	21/07/15	15.1	100	Still	None		19 x Natterer's bat (including at least six flying juveniles) in southern roof void. Three brown long-eared bats in northern roof void (including at least one male).

Table 5: Summary of the results of 2015 surveys at known roost structures to be demolished

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The structure diagrams below show the properties included in this licence application. A key showing how to interpret these diagrams is also provided which shows the colours assigned to each roost status of buildings at each property and the location of surveyors. Indicative bat foraging/commuting routes are shown; these reflect the cumulative results of all surveys undertaken on the structures between 2010 and 2014.

All diagrams are orientated to the north and are not to scale.

Diagram 1: Key to structure survey result diagrams

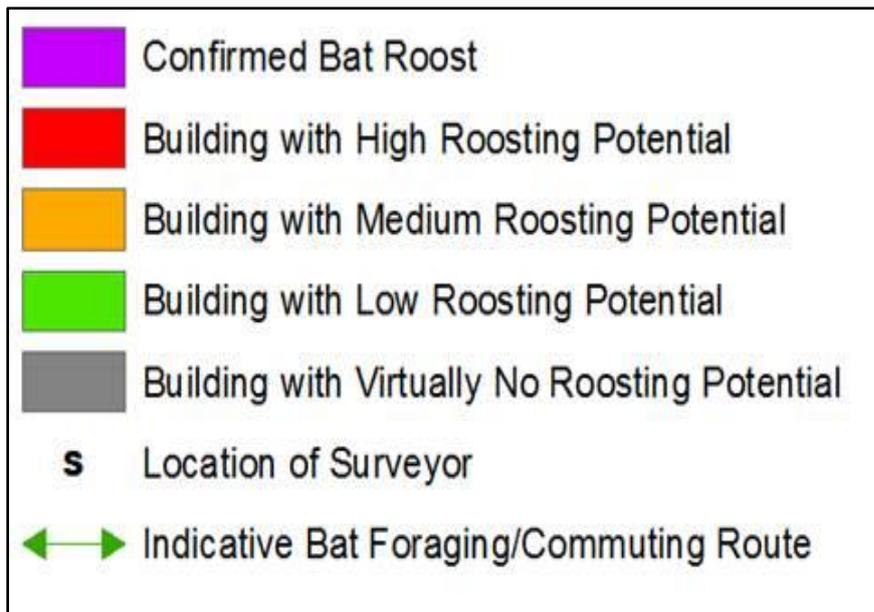
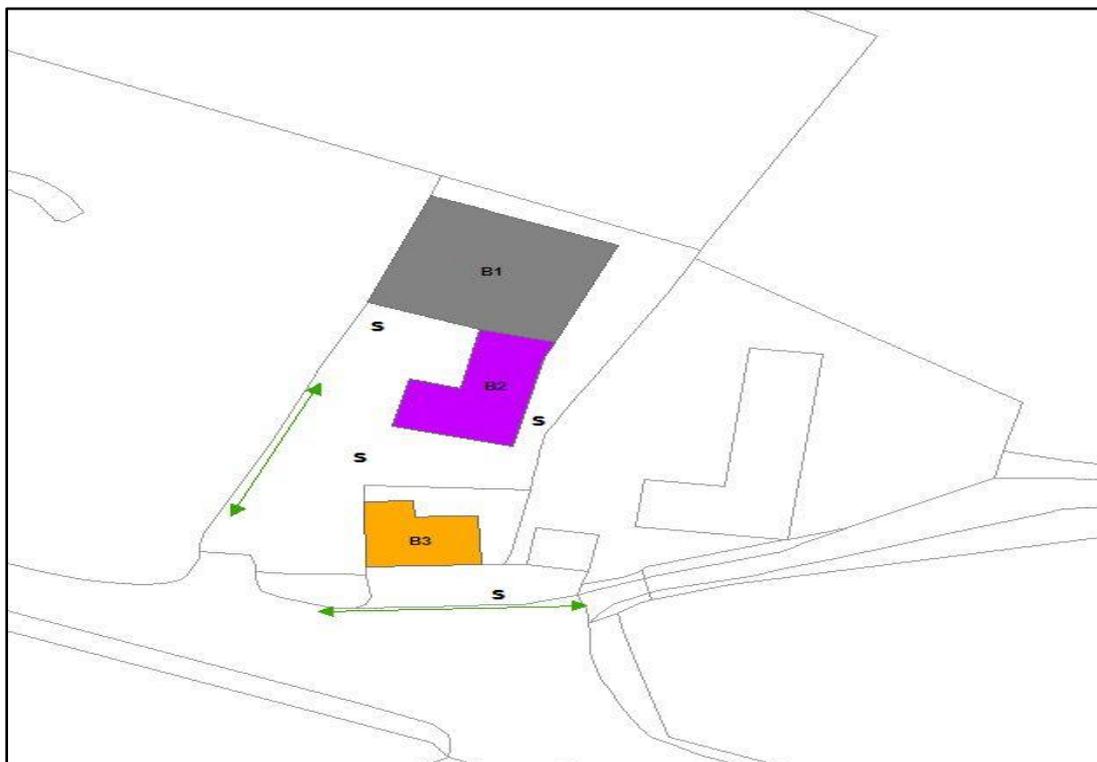


Diagram 2: Back up office facility/back up auxiliary facility (Roost building 2)



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Diagram 3: Wylfa sports and social club (Roost buildings 1 and 2)

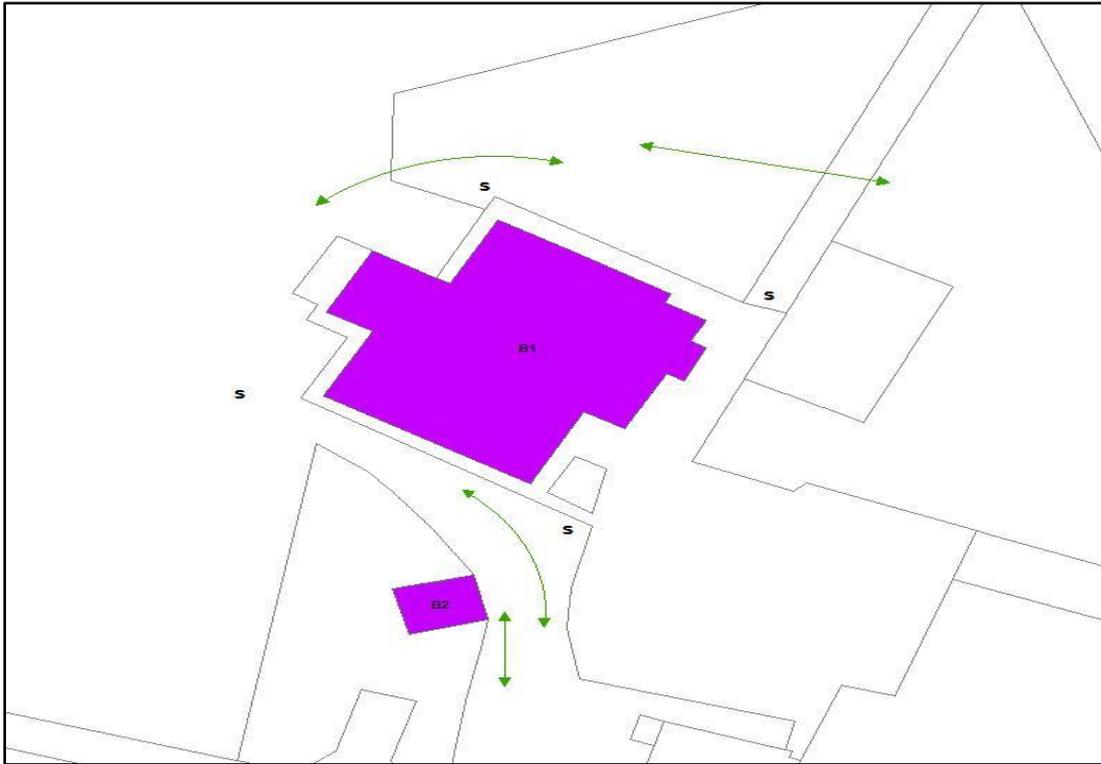


Diagram 4: Nantorman (Roost buildings 1, 2 and 3)



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Diagram 5: The Firs Hotel out-building (Roost)

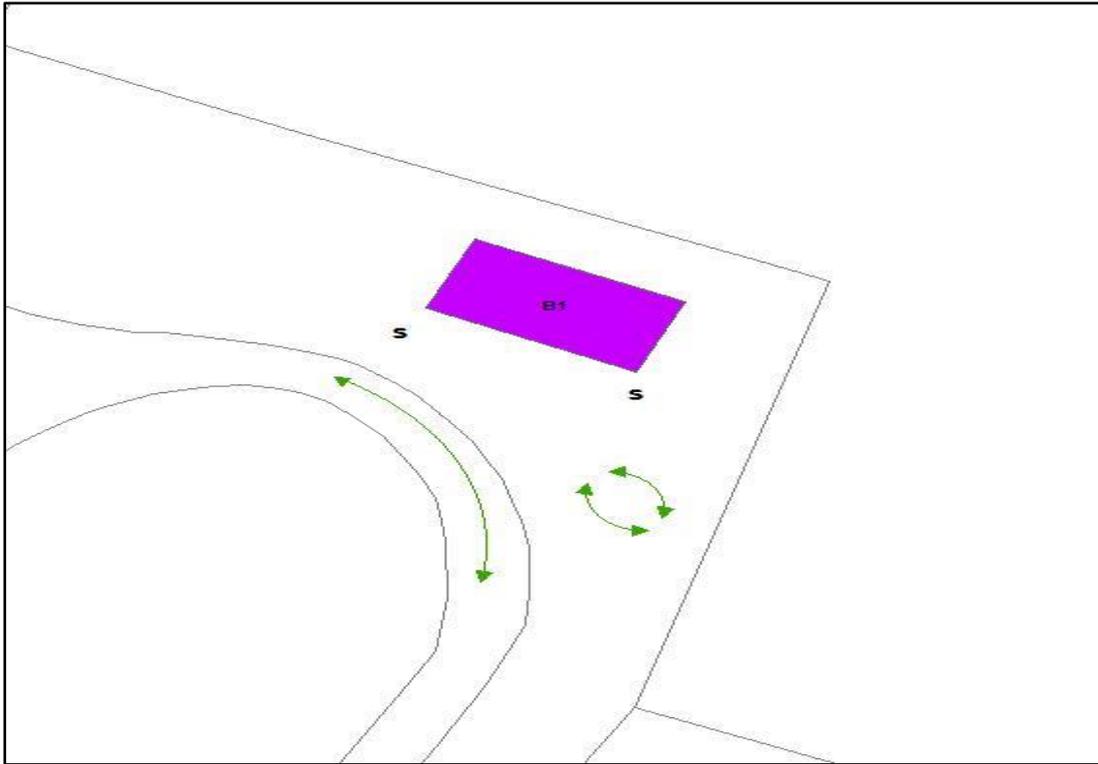
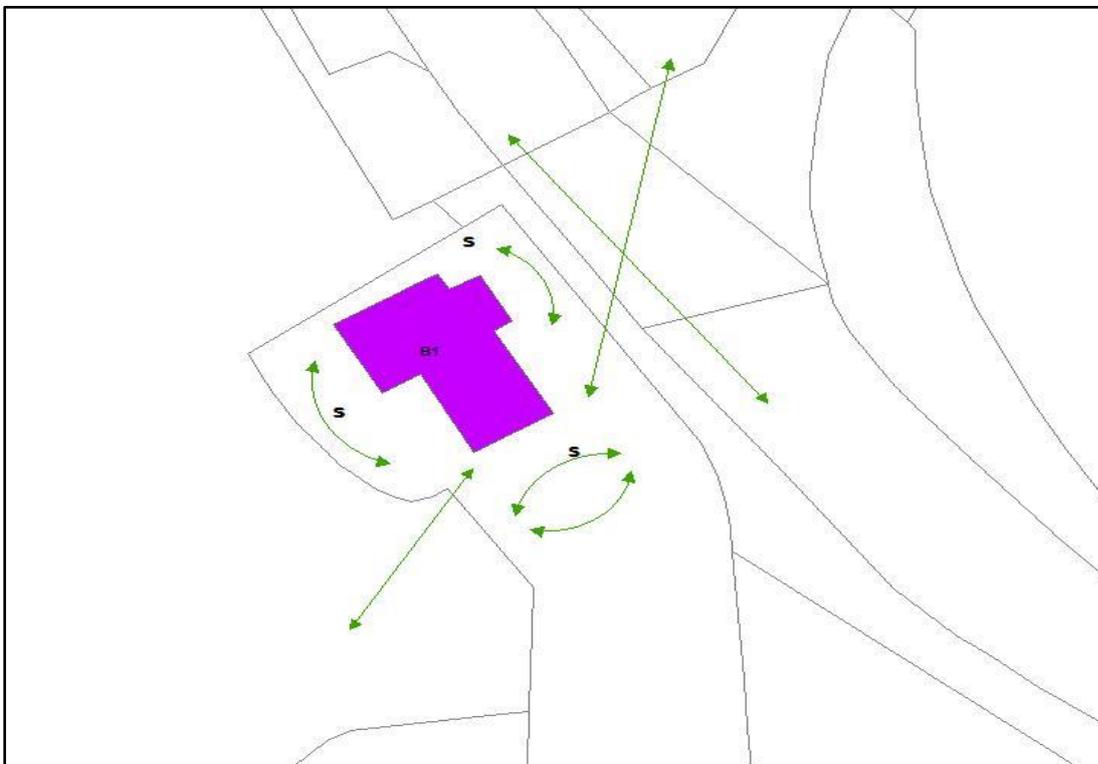


Diagram 6: The Lodge (Maternity roost)



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Diagram 7: Tre'r Gof Uchaf farm buildings (Roost buildings 2 and 4)

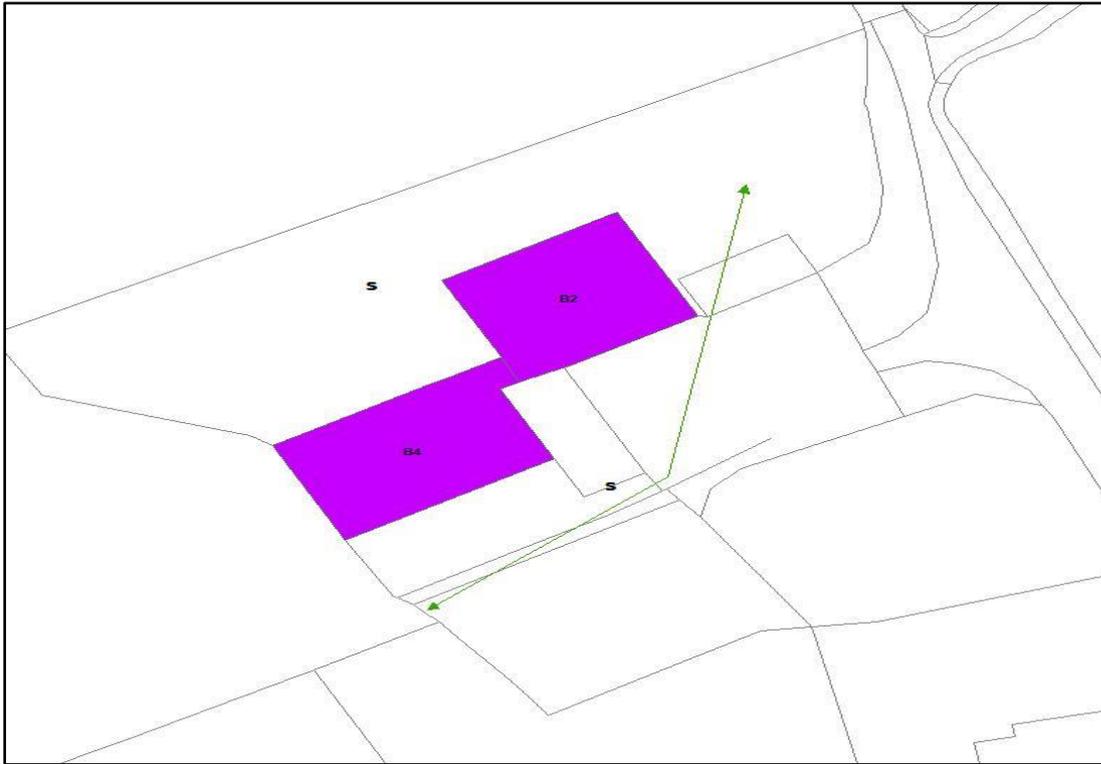
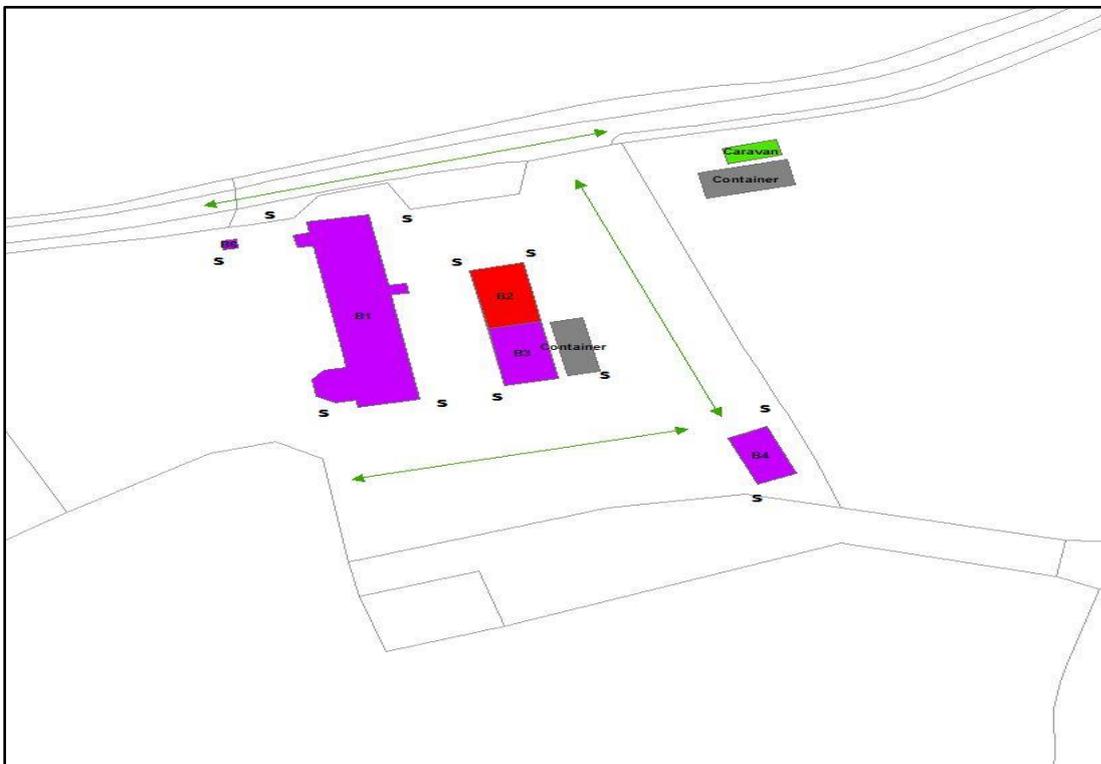
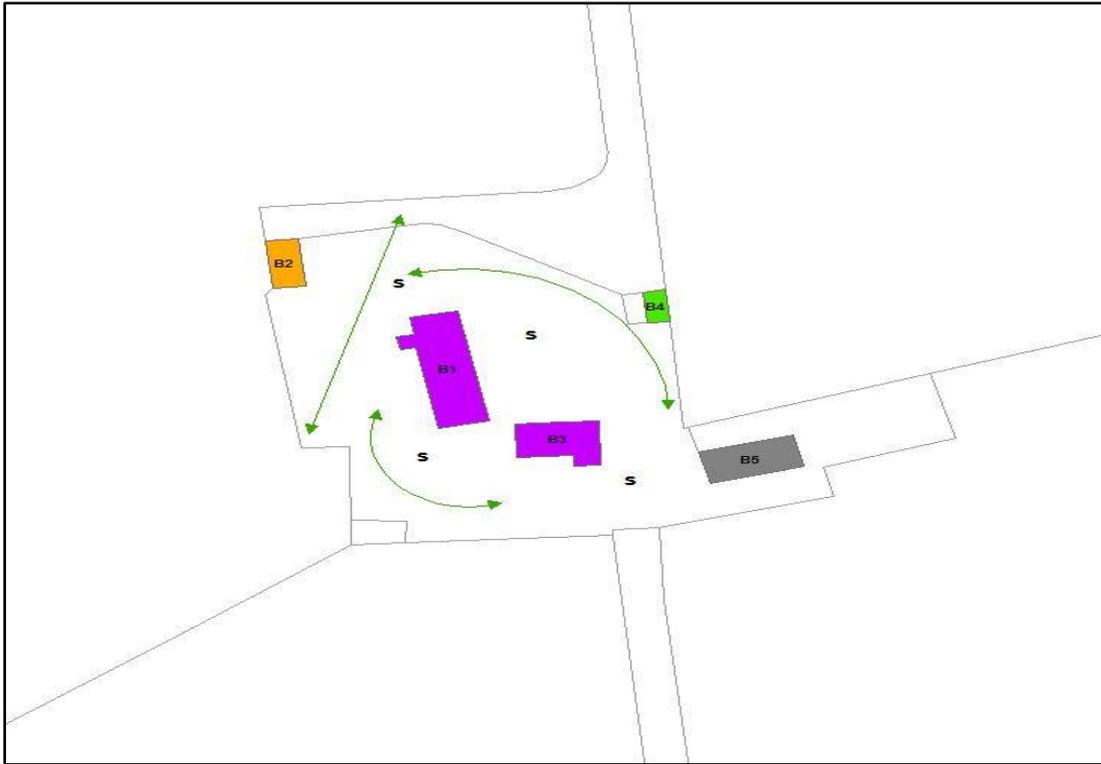


Diagram 8: Tyddyn Gele (Roost buildings 1, 3 4 and 6)



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Diagram 9: Tyddyn Goronwy Farm (Roost buildings 1 and 3)



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C.8 Interpretation/evaluation of survey results

The Wylfa Newydd Development Area only appears to support a low density bat population, as based on the results of current emergence surveys and previous transects. The site has very good habitat connectivity via a network of hedges, combined with potentially productive foraging habitats such as the wetland of Tre'r Gof SSSI.

The 2015 structure survey results show that the total number of structures in the study area that support roosting bats is 36 and that these generally comprise roosts containing only one or two bats at a time. Of these, 16 roost structures are scheduled for demolition as part of enabling works for the Wylfa Newydd Project. The species present within these roosts are generally common and widespread and typical for a site in north Wales.

The survey results strongly suggest low populations of bats are present in the area, with the majority of recorded roosts being utilised by low numbers or individual bats likely to be males or non-breeding females. Results suggest that these bats regularly move around the site, roosting within different structures as the season progressed. This pattern was displayed through the six summer seasons of surveys undertaken as the survey results were not consistent for each structure, with structures previously identified as having low usage often found to support no bats on repeat surveys, or vice versa.

There is one building requiring demolition that supports a maternity roost of Natterer's bats (The Lodge). The Lodge is the most significant roost of bats in the study area and supports a population of around 40 individuals as well as low numbers of brown long-eared, soprano pipistrelle and whiskered/Brandt's bats.

Overall the number of roosts is not considered to be exceptional in terms of density for an area the size of the study area (approximately 822ha). Similarly, the number of individuals and composition of species that the Wylfa Newydd Development Area supports is also not beyond what would be expected for a site with the range of structures and habitats that are present. However, the population of Natterer's bats in the Lodge would be of at least local significance, and is of primary concern when mitigating the impacts on bats of the site preparation and clearance works.

D. Impact assessment

D.1 Short-term impacts: disturbance

In the absence of any mitigation measures there is the potential for a negative impact on a local level on all of the bat species present with a risk of bats being injured, killed or disturbed as a result of the works. The disturbance would be in the form of noise and vibration from machinery and contractors, light disturbance, changes to airflow and humidity as parts of the structure are removed and loss of internal and external flightpaths around roost properties. This disturbance could cause bats to deplete their energy reserves at times when these are difficult to replenish such as during inclement or cold weather as they seek to escape from the source of the disturbance. It could lead to roost abandonment during daylight when bats would be more disorientated and vulnerable to injury and predation.

As a worst case scenario (if undertaken in the wrong season) disturbance could lead to the abandonment of dependant young in the maternity roost at The Lodge. The impact on the

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species breeding at this site would be expected to be significant. It is however anticipated that with the timing of the demolition and the provision of alternative roosts prior to demolition that this impact can be minimised.

D.2 Long-term impacts: roost modification

No roost modification impacts are anticipated as all 16 roost structures will be completely demolished.

D.3 Long-term impacts: roost loss

A total of 16 roost structures will be demolished and consequently complete roost loss will occur. The roosts comprise one Natterer's bat maternity roost at The Lodge with the remainder being transitory day roosts used by common and soprano pipistrelle, brown long-eared and whiskered/Brandt's bats.

In the absence of any mitigation measures there is the potential for a significant local impact on all of the bat species on this site. The loss of the maternity roost would impact primarily on Natterer's bats (but also on brown long-eared, soprano pipistrelle and whiskered/Brandt's bats) leading to a loss of breeding productivity and the possible death and injury to bats. The loss of the other roosts on the site would have a lesser impact as these are thought to be predominantly utilised by low numbers or individual males and non-breeding females of common species.

Based on the Bat Mitigation Guidelines (Mitchell-Jones, 2004), the destruction of a maternity roost is considered a 'high' level of impact whereas the loss of transitory night roosts would be considered individually as being a 'low' level of impact.

It is however anticipated that with the timing of the demolition and the provision of alternative roosts prior to demolition that these impacts can be minimised.

D.4 Long-term impacts: fragmentation and isolation

No habitat fragmentation will occur during the demolition stage of the proposals as this will only entail a minor loss of vegetation to enable plant and machinery to gain access to the structures. This is preferable to significant vegetation loss occurring prior to the loss of roost structures as it means bats would not be left isolated by a lack of established commuting routes.

There will however be a significant loss of habitat as a result of site preparation and clearance proposals, including the removal of hedges and dry stone walls which currently provide connectivity to the wider landscape. This could again have a significant impact on the bat population on the site. Measures are however in place to provide continued habitat connectivity with the proposed new roosts around the site perimeter during this next phase of the development as well as phased landscape and biodiversity measures (habitat creation/enhancement within the Wylfa National Policy Statement (NPS) Site) during and post construction.

D.5 Post-development interference impacts

No impact is anticipated due to post development interference as the existing roosts will all have been removed. The new roosts will be located in areas of land owned by Horizon. These

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areas would remain in the ownership of Horizon in perpetuity. Ensuring that the new roosts had not been inferred with e.g. vandalism, would also form part of the monitoring of the Wylfa Newydd Development Area by a security company employed by Horizon for the duration of the construction period of the Generating Station, and would therefore be for a minimum of ten years.

D.6 Predicted scale of impact

In the absence of any mitigation measures the overall cumulative scale of the impact as a result of the demolition phase is likely to be medium at a site/local scale for all of the bat species involved (common pipistrelle, soprano pipistrelle, brown long-eared, Natterer's and whiskered/Brandt's bat) due to the high potential for causing injury, death and disturbance. Although a maternity roost (high level of impact) and up to 15 other roost structures will be lost, the majority of these roosts support very low numbers of bats utilising the roosts at varying times of year (low level of impact), leading to the conclusion that there is a relatively low bat population on this exposed coastal site and the bats recorded tend to move between many of the surveyed structures at different times of year. As such, no impact is anticipated at either a county or regional scale.

Providing that the suggested mitigation is implemented, no significant negative impact is anticipated on any of the species identified utilising the roosts which will be demolished, at either a local, regional or national level, and the favourable conservation status and continued ecological functionality of the species will not be impacted by the proposed works. The key component of the mitigation strategy for this licence is the provision of two bat barns of the same design as that provided to compensate for the loss of the roost at Tyn y maes in 2013. This design has proven its potential effectiveness at this site being used by over 50 individuals from four species (common pipistrelle, soprano pipistrelle, brown long-eared and whiskered/Brandt's bat) in 2015.

Figure 3 is a plan that shows the eight property complexes and 16 known roost structures to be demolished in the context of the site preparation and clearance boundary and showing 'hot spots' of bat activity derived from transect and static monitoring surveys that show important flight lines to be lost as a result of the development.

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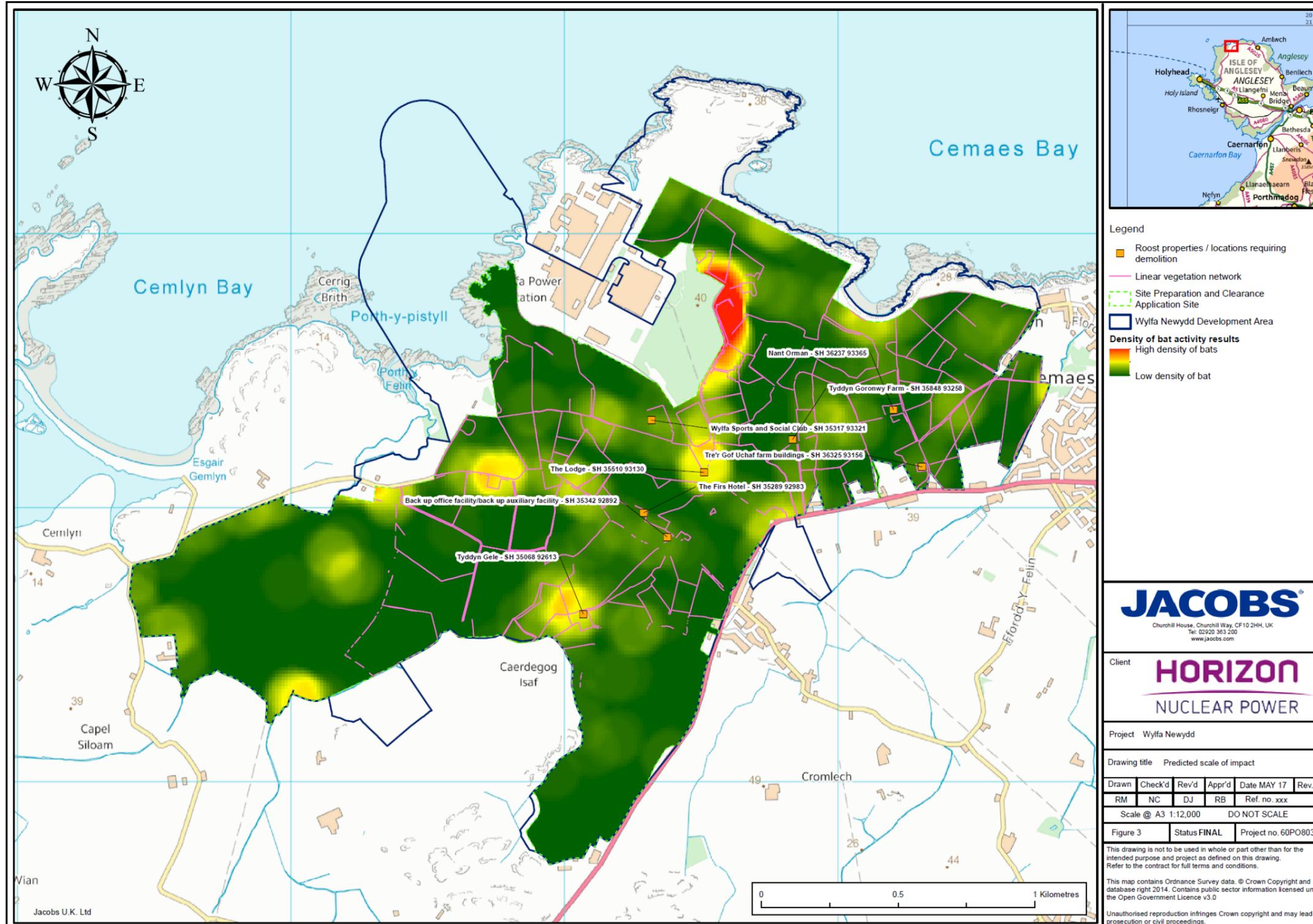


Figure 2: The location of each property complex where roosting bats were confirmed, the proposed vegetation clearance extent and key areas of bat activity indicating important flight lines.

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**Site Preparation and Clearance
Environmental Statement
Volume 3 – Appendix 14-23
European Protected Species Mitigation
Licence Method Statement Delivery
Information: Bats**

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Mitigation, Compensation and Monitoring

DCRM Ref Number: WN034-JAC-PAC-REP-00049

Revision: 1.0		Additional Requirements or Controls	
LISTED READERS ONLY		LEGALLY PRIVILEGED	

Comments: Draft document – not for formal licence submission

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Date	Rev No.	Summary of Changes	Ref Section	Purpose of Issue
02/05/17	1	Update to programme dates		Application appendix

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E. Works to be undertaken

Following extensive bat surveys in the last five years, and in consultation with Natural Resources Wales (NRW), the decision has been taken to approach mitigation for bats at this site in a holistic fashion to maintain the favourable conservation status of bats rather than taking a piecemeal approach for each structure and tree. This licence application is therefore intended to provide mitigation and compensation measures for all of the known roost structures, and for the loss of potential roost sites in trees incurred as part of the site preparation and clearance phase of the Project. However, dedicated tree surveys (in accordance with the latest best practice guidance) will be undertaken prior to felling, and any felling works to identified roosts would be covered by a separate licence application.

E.1 *Capture and exclusion*

E.1.1 Structures

Exclusion of the bats from the buildings will not be possible due to the proposed timing of the works (March - April) as there is a possibility of torpid bats being trapped inside the structures rather than successfully excluded. Also, the complexity of many of the structures, and the multitude of potential access points for bats makes exclusion an impractical approach.

Before commencing any works on site, the contractors undertaking the demolition works will be inducted by a licensed bat ecologist to make them aware of the possible presence of bats, their legal protection and of working practices to avoid harming bats. A copy of the method statement and licence documentation will remain available on site at all times. A summary sheet of guidance will be given to each contractor undertaking the demolition works.

Before the demolition works commence in spring 2018, the two bat barns and 40 additional Schwegler bat boxes will have been installed by autumn 2017 to provide alternative roosting habitats and time for bats to have become familiar with them. The bat boxes are to be installed a minimum of 4m above the ground in locations specified by a bat ecologist. These bat boxes will remain on site permanently to provide alternative roosting opportunities for the small number of bats that may be displaced during the works.

Any evidence of roost usage over the last five years (e.g. live bats, dead bats, positive emergence/re-entry surveys, droppings) will mean a structure is regarded as a roost and is included in this licence. All moderate and high potential buildings located at a property complex where a bat roost is to be demolished will be treated in the same manner as the roost structure itself as a precaution. In addition, the building demolition will be phased (where possible) so that structures are demolished in order of increasing potential: negligible, low, moderate, high and confirmed roost. This measure is so as to minimise the risk of displacing bats in to neighbouring previously unused buildings as a result of demolition.

To minimise the risk of encountering vulnerable bats, works affecting any part of a structure that could be used by roosting bats at the eight known roost property complexes will take place between March and June 2018. For The Lodge maternity roost, the sensitive stages of the works should be restricted to April so as to have greatest confidence of avoiding heavily pregnant females or dependant young. Sensitive demolition would avoid the hibernation period

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for bats (November to March inclusive) as, although there is no evidence of the structures being used for hibernation, species such as pipistrelle and brown-long eared bats will often hibernate in crevices in structures and, as such, would be particularly vulnerable to winter demolition works.

An internal building inspection will be undertaken (where access can safely be achieved) the day before works are due to commence on a given building roost. The purpose of this inspection is to attempt to ascertain whether any roosting bats are present at the time of demolition and to better determine where mitigation efforts should be targeted at a given structure. If it is possible to do so, any bats encountered should be captured by the licensed bat worker and taken to the closest bat barn for immediate release at a similar roost feature. A dawn re-entry survey of each structure will also be undertaken the day before works are due to commence, if possible (assuming suitable weather conditions for bat activity - as determined by a bat ecologist) with a view to identifying the exact locations where any bats are roosting at the start of demolition.

A licensed bat worker will supervise the bat-critical stages of the demolition works (mainly the dismantling of the roofs of the properties but particularly the removal of tiles, roof lining, any chimneys, porches, fascia boarding, weather boarding, lead flashing, cavity walls etc.). The removal of all tiles and roof lining will be by hand (where it is safe to do so). The licensed bat worker will decide how long to supervise the demolition works for at a given property, or whether to stay 'on-call' once the works have started depending on the potential risk of bats being present.

When roof tiles are removed, they will be lifted up and away from the roof, and not twisted or slid, to avoid injury to any bats potentially roosting beneath them. Each tile will be turned over to check the underside for the presence of roosting bats.

If an active bat is encountered during the inspection survey or supervised works, the licensed bat worker will attempt to capture the bat with gloved hands or a hand net, place the bat in a draw-string cloth bag and then take it to one of the pre-arranged receptor sites which will all be constructed/erected prior to works commencing. Receptor sites will be the new bat barns at Cemaes and north of Tregel (SH 36603 93167 and SH 35847 92747), and the eight telegraph pole-mounted Schwegler bat boxes (4 x 1FF and 4 x 2FN) installed within 50m of each bat barn. Figure E.1 illustrates the location of the eight roost property complexes to be demolished and the locations of the two bat barns, and 40 bat boxes, that will be erected prior to this demolition to compensate for the loss of roosting habitat. Bats will be released directly in to the closest box to their point of origin subject to dry weather conditions. To prevent bats from flying straight out of a box they would be released into, a 'stuffer' (a soft cloth) will be used to block the entrance. A string-tied securely to the stuffer will allow it to be removed from ground level at the end of the working day once the bats have become calm in the temporary roost.

If the weather conditions are not suitable for immediate release (e.g raining heavily), the bat will be temporarily taken into care and fed and watered until such time conditions are suitable (i.e. dry and with an evening temperature of 8°C or more) at which point the bat will be released at dusk. If required, the temporary care of bats will be undertaken by a licensed bat worker with experience of caring for captive bats [a named individual will be provided in the formal licence

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application, but this is not possible to provide at this draft stage]. The capture and handling of any bats will only be undertaken by licensed bat workers. Injured bats will immediately be taken into care (as directed by The Bat Workers Manual, s7.3, pp. 64-66, 3rd Edition, 2004). Injured bats will be taken in by a licensed bat worker with experience of looking after injured bats. The Bat Conservation Trust's bat helpline will be contacted for advice and for the contact details of a local bat carer if required (0345 1300 228. October-April [non-peak season]: Monday-Friday 9am-5.30pm. Out of hours emergency calls can be made May-September). The closest veterinary surgery to the Wylfa Newydd Development Area is Bodrwnsiwn Veterinary Practice Group, Dinorben Cottage, Amlwch, LL689AL, 01407 832367.

To minimise the risk of encountering torpid bats, the sensitive stages of the demolition works will proceed during periods when temperatures have not dropped below 8°C over three consecutive nights, where practicable. If working during this period is unavoidable, and a torpid bat is discovered, it will be captured by hand by the licensed bat worker and temporarily taken into care and fed until such time conditions are suitable (i.e. dry and an evening temperature of 8°C or more), at which point the bat will be released at dusk.

If a bat is discovered at any other, unsupervised times, the contractor will be instructed to cease all works immediately and for the named ecologist or accredited agent to be contacted for advice. This advice may involve leaving the bat to disperse of its own accord, or waiting for the licensed handler to arrive on site to move the bat. Contractors will be instructed to at no point handle bats.

E.1.2 Trees

Similarly, if any tree roosts are identified on site during dedicated surveys (in advance of site clearance) the following measures will be employed to ensure the favourable conservation status of tree roosting bats in the Wylfa Newydd Development Area is maintained. Where possible, any known tree roosts or trees with potential roosting features would be retained. Where this is not possible, removal of any trees with bat potential will take place when bats are least vulnerable as they are not hibernating, heavily pregnant or have dependant young i.e. during April and September/October (with the latter favoured to avoid constraints from nesting birds).

Exclusion devices – effectively one-way valves – will be used to safely evict bats from known tree roosts under licence. Exclusion is required when a tree is known to be in current use by roosting bats or when the roost features are too extensive/complex to be fully inspected by endoscope such that there is no confidence that bats are absent and the feature cannot be blocked or the tree felled.

Soft-felling techniques will be utilised for any trees with bat potential that cannot be fully inspected at height by a licensed bat worker with an endoscope immediately prior to felling to give confidence that bats are absent. If it is not possible/practical to fell a tree immediately following a climbing inspection by a licensed bat worker, any features that can be fully inspected and do not contain roosting bats can be blocked off to prevent them being colonised by bats in the interim period; features will be blocked off by a licensed bat worker using a robust sheet material e.g. thick plastic sheeting or fine wire mesh stapled securely in place (this is a reversible method unlike expandofoam or similar fillers).

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Further measures to protect any bats encountered during tree felling operations will be the same as those discussed for bats encountered during structure demolition works above e.g. the capture of bats, weather conditions when works take place, the scenario when bats need to be taken in to care and the course of action should bats be encountered by tree felling contractors when an ecologist is not present.

Known tree roost features and/or highly suitable potential roost features will be carefully cut out and securely strapped to healthy trees so they can potentially be used by roosting bats in the future (where this is safe and practical to do so and suitable receptor trees exist in retained habitat). The loss of any known and potential tree roosts will be further compensated for by the provision of artificial bat boxes as described for structures above. Additional boxes may be deemed necessary to mitigate for the loss of known roost trees; if this were the case the requirement would be detailed in a specific tree roost licence application.

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Figure E.1: A plan showing the location of the eight roost property complexes to be demolished and the sites of the proposed bat barn and bat box compensation measures



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E.2 Bat roosts and habitat

E.2.1 *In-situ retention of roost(s)*

No existing roosts will be retained within the SPC boundary, apart from the previously installed mitigation structures.

E.2.2 Modification of existing roost(s)

No existing roosts will be modified as part of the proposals.

E.2.3 New roost creation (including bat houses and bat boxes)

According to the Bat mitigation guidelines (Mitchell-Jones, 2004), the mitigation requirements to offset the impacts to roosting bats range from:

In the case of low conservation significance transitory roosts: *“Flexibility over provision of bat-boxes, access to new buildings etc. No conditions about timing or monitoring”* to *“Provision of new roost facilities where possible. Need not be exactly like-for-like but should be suitable, based on species’ requirements”*.

In the case of the moderate conservation significance of the Natterer’s bat maternity roost at The Lodge: *“Timing constraints. More or less like-for-like replacement. Bats not to be left without a roost and must be given time to find the replacement”*.

As such, two new dedicated bat barns will be erected to mitigate for the loss of the 16 known roosts covered by this licence application. The two bat barns will be of the same design as that provided to compensate for the loss of the roost at Tyn y maes in 2013. This design has proven its effectiveness at this site as it was being used by over 50 bats from four species (common pipistrelle, soprano pipistrelle, brown long-eared and whiskered/Brandt’s bat) in 2015.

Plate E-1 below shows the Tyn y maes bat barn that was constructed in 2013, which is of identical design to the two bat barns that will be constructed in advance of the demolition of 16 known roosts in 2018 as part of this licence application. The photograph below was taken at the end of construction but prior to the landscape planting around the bat barn. The retained tree ‘monoliths’ are used for the mounting of bat boxes.

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Plate E-1: The existing bat barn at Tyn y maes prior to landscape planting



Mitigation buildings will be surrounded by a buffer strip of planting up to 10m wide of native species of local provenance.

Bat barns

One of the two dedicated bat barn mitigation roosts will be located in the eastern corner of the Wylfa Newydd Development Area near Cemaes (SH 36603 93167); the other will be located on the Wylfa Newydd Development Area, south of the A5025, north of Tregelle (SH 35847 92747). Figure E.1 illustrates the locations of the two bat barns.

These locations have been selected to ensure that they will be outside the future development land usage area but within land owned by Horizon Nuclear Power Wylfa Ltd. (Horizon) to ensure long term security of the mitigation. Both bat barns are located in pasture-land adjacent to existing hedgerows and scrub but there is currently a paucity of trees in these locations on which to mount any bat boxes. As with the existing bat barn, the land surrounding the proposed bat barns will be planted with appropriate tree and shrub vegetation to provide enhanced foraging and commuting habitat for bats. Figure E.2 illustrates the locations of the two bat barns and the associated telegraph pole mounted bat boxes, in the context of the surrounding existing Phase 1 Habitat Survey vegetation types. This information shows the existing habitat connectivity of the two bat barns and the linear vegetation along which the telegraph pole mounted bat boxes would be installed.

The barns will internally be 4m wide by 6m long. The total height of each building will be 5.175m, allowing the roof void to be 2.975m high. The ground floor of each bat barn will be designed to allow bats the opportunity to hibernate within the building.

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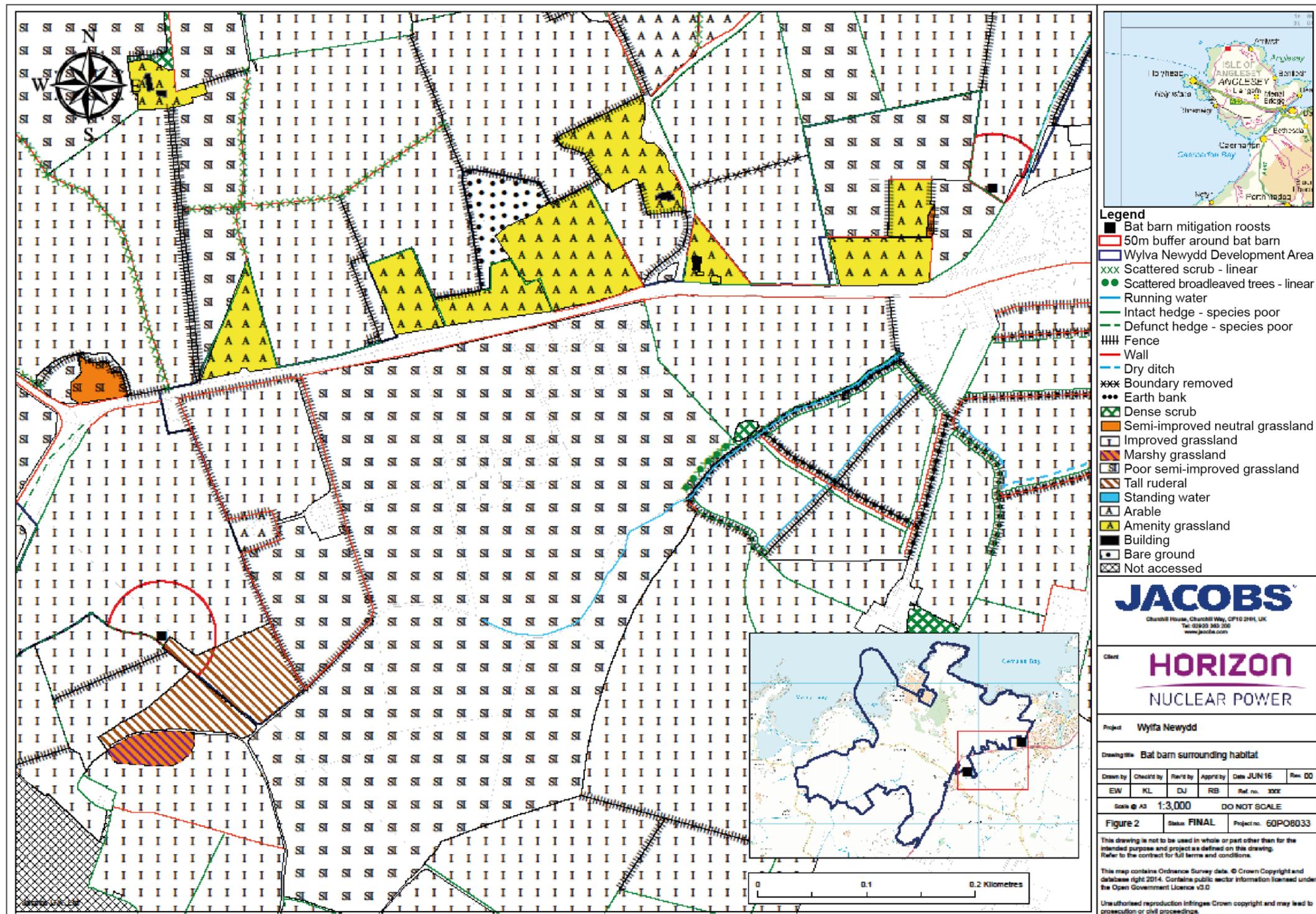
The roofs will be clad with slate and the walls will be constructed of block work, clad with reclaimed stone from previous demolition activities.

Within each roof space, a single traditional braced king post truss will be installed at the centre point of the roof to give structural strength without compromising open flight space.

The floor of each roof void will be load bearing and boarded to allow the assessment of its usage by bats and facilitate periodic cleaning if required. The floor of each roof void will be seeded with bat droppings collected from The Lodge and any other roost where large accumulations of droppings can be accessed. This may assist in the replacement roosts being adopted more readily as they will smell more familiar to displaced bats.

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Figure E.2: The location of the bat barns, pole mounted bat boxes and their surrounding habitat



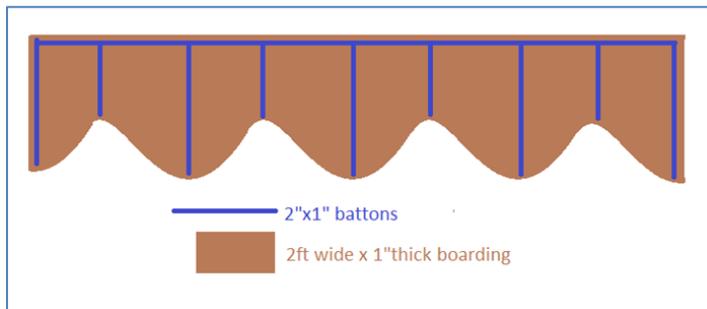
EUROPEAN PROTECTED SPECIES MITIGATION LICENCE METHOD STATEMENT DELIVERY INFORMATION: BATS (DRAFT)	DCRM Reference No	Revision:	0.1
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A permanent human access hatch will be provided into the roof roosting area within each building, as the success of the mitigation will need to be monitored. This will also allow internal bat movement between the roof void and the ground floor.

All roofing felt will comprise traditional bitumen felt, and not modern breathable roofing membrane.

Within the roof void of each roost building, three Schwegler 1FR bat tubes will be hung on each gable end and two extra on the central king post of the truss, totalling eight internal Schwegler 1FR bat tubes in each building. In addition to this, on the gable ends further roost boarding will be fitted. Roost-boarding, as shown in figure e.3, is designed to create many different crevices within the roof void as possible giving bats a range of micro-climates to choose from.

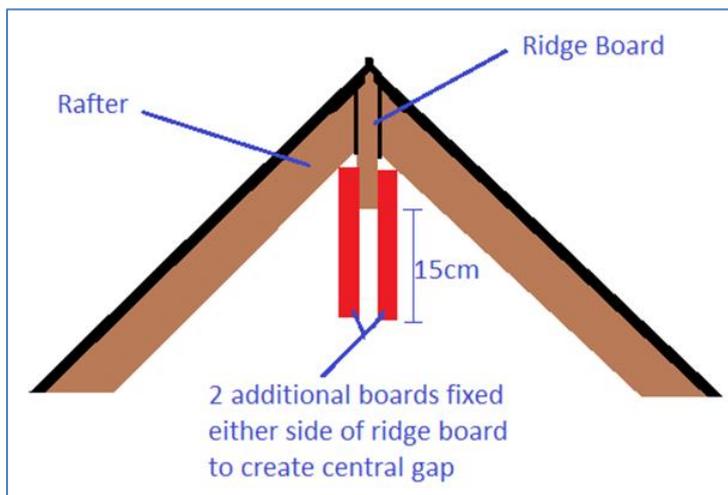
Figure E.3: A representation of the layout and dimensions of roost boarding to be installed within the bat barn roof voids



A hot box will be installed into the roof void by attaching a baffles board to the roof rafters. This will produce a 1m deep hot box. Boarding will be one inch thick marine plywood, scored for grip and painted with black non-toxic paint.

A board will be fixed on either side of the ridge boards as shown in figure e.4 below to form a 15cm central crevice running the length of each building.

Figure E.4: A representation of the positioning and dimensions of ridge board roosting features to be installed within the bat barn roof voids



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Entrance points will be formed in the slating of each building via fashioned lead flashing replacing a maximum of two slates on each building, as appropriate, and directed by the licensed ecologist during slating. Other bat access points will be on gable ends running over wall tops, at the apex and over purlins. Bat entrance points will also be available via exposed rafter ends along the eaves where a gap will be left next to the rafters.

On the ground floor of each bat barn, a chamber will be designed to allow for hibernation. A 'cool tunnel' will be constructed, which will be in the form of a 1.5m wide x 1.0m high tunnel to loop around the ground floor of the building with a 2m x 2m x 2m 'Avon chamber' at the end. Construction will be breeze block, with block work inside the tunnel left un-pointed to create one inch wide gaps in between all blocks on the same row i.e. forming many vertical crevices. These crevices can be capped from the outside by the rendering of the external surface of the tunnel. The roof can be made of concrete block beams, again with one inch wide open gaps between each. The external top of the beams should be covered with hessian then covered with cement/mortar to block the tops of the crevices. An alternative building method for this tunnel is a combination of block and prefabricated concrete square ducting. This option may be selected to give greater structural integrity. Should it be selected, a combination of gaps as previously described and roost boarding will be applied to create roosting crevices.

The walls of each hibernation chamber will also have roost boarding applied on all four walls to offer roosting opportunities.

A single entrance point will be installed into the ground floor of each bat barn through the external wall in the form of a 'letter box slot' measuring 30cm wide by 10cm high. The exact location will be determined and agreed on site as the building walls are constructed to ensure the best location possible. The size of entrance has been selected to limit the probability of owls utilising the buildings.

Any timber treatment in areas accessible to bats will be carried out using chemicals from the list approved by NRW. A list of approved timber treatments is cited in Natural England Advice Note TIN092 Ed.2, available for download at:

<http://publications.naturalengland.org.uk/publication/31005?category=31008>.

Two data loggers will be installed within each bat barn, one in the roof hot box and one in the hibernation chamber. The loggers will be EL-USB2 loggers and will be downloaded and analysed annually. The data loggers allow the temperature and humidity within the bat barn features to be monitored to ensure they are suitable for maternity roost (hot box) and hibernation (hibernation chamber) usage. This would allow for remedial action to be taken if required. This monitoring is consistent with that being undertaken for the existing bat barn at Tyn y maes.

Ducting will be installed for potential future CCTV applications, the installation of which will depend upon the success of the bat barn and the locations in which the species roost. If bats cluster in the roof void rather than utilise the crevices then CCTV can be installed once power supplies and site communications have been implemented.

The external walls of each bat barn will have three Schwegler 1FR bat tubes built into the stone cladding on each of the four walls, totalling 12 external Schwegler 1FR bat tubes externally per building. Additional crevices in stone work will be achieved by leaving some gaps un-pointed.

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A single external human access door will be installed on each building to allow monitoring of the roosts' success by licenced bat workers. This door will be designed to be vandal and break-in resistant. A dummy security camera will be installed on the building to discourage antisocial behaviour.

While the results from the monitoring of the existing Tyn y maes bat barn suggest that the design for the building is successful, there is scope for improvement and the following recommendations will be incorporated in the new bat barns to improve their effectiveness:

1. The floors of the buildings will be exposed in earth (or at least in part) to create increased humidity inside the buildings.
2. Guttering design will be modified to trickle water through the inside of the buildings to increase internal humidity.
3. The drawings issued to building contractors will specify all timber to be 'rough sawn'.
4. The drawings will be updated to move the hatchway into the upper roost void away from the hibernation chamber 'avon' as an error on the current drawings would result in no access for monitoring. The access hatch must be located at the coolest end of the building, away from the 'hot box'.
5. As the new bat barns are not in shady locations there will be no requirement for solar panels and heating elements. However, ducting will be installed in walls to allow an electric supply in the future should heating be required.
6. The roof design will be altered if structurally possible to remove the requirement for a central truss. Instead, purlins would be utilised which span the length of the building. If purlins of that length must be of steel, then the steel will be clad with wood after installation.

Bat boxes

As there is a paucity of existing trees at the locations of the two bat barns on which to mount bat boxes, two telegraph poles will be installed as close as possible to the existing hedgelines, each to be within 50m of each bat barn. On each pole two Schwegler 1FF woodcrete bat boxes and two Schwegler 2FN woodcrete bat boxes will be securely mounted. The 1FF boxes will be mounted between four and five metres in height (one pair facing north and south and the other pair facing east and west). The 2FN boxes will be mounted higher up at between five and seven metres high (one pair facing north and south and the other pair facing east and west). This will ensure the pole mounted boxes provide a range of roosting microclimates in close proximity to the bat barns. These 16 boxes will offer further roosting potential and act as receptor sites during the demolition works for any bats needing to be relocated. An example of similar pole mounted bat boxes at a site in Scotland is shown in plate e-2 below.

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Plate E-2: An example of the use of pole mounted bat boxes in an area with trees unsuitable for attaching bat boxes

In addition, a further 24 Schwegler bat boxes will be hung within an area of retained woodland to the east of the Power Station (Ordnance Survey grid reference SH 35488 93724) as shown in figure e.1. The boxes will comprise a mixture of four 1FF, six 2FN, 12 2F (double front panel) and two 1FS Schwegler bat boxes. The exact locations of the bat boxes will be determined by the named ecologist on the licence at the time of their erection but will be positioned to maximise the likelihood of them being used by bats, providing a range of roosting conditions and allowing for effective monitoring.

The Schwegler woodcrete bat boxes that will be installed have a design life of approximately ten years.

Habitat works

Each building will be surrounded by a buffer strip of tree and shrub planting up to 10m wide using native species of local provenance including oak (*Quercus robur* and/or *Q. petraea*), rowan (*Sorbus aucuparia*), willow (*Salix* spp.), hazel (*Corylus avellana*), holly (*Ilex aquifolium*) and hawthorn (*Crataegus monogyna*).

In addition to the habitat works in the immediate vicinity of each building, the eventual landscape plan for the site developed as part of the DCO submission (the Landscape Environmental Masterplan (LEMP)) will ensure connectivity of bat habitat to roost buildings.

Lighting

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There will be no exterior lighting on or adjacent to the newly constructed bat barns which could spill on to the new roosting locations, the entrances, or into the immediately surrounding connecting habitat.

E.2.4 Maintenance and/or modification of new and existing habitat

It will not be possible to safeguard all bat habitat around existing roosts as some will be lost during the site preparation and clearance phase of the project. However, there would be 10m buffer zones around existing roosts in which vegetation would be retained. Horizon is developing a LEMP which illustrates the coordinated range of environmental mitigation and enhancement measures to be incorporated into the landscape restoration of the Wylfa Newydd Development Area at different phases of construction and during operation. This includes commitments to protect and sensitively manage retained and newly planted vegetation for biodiversity benefits, including the protection and enhancement of bat commuting and foraging habitats.

The LEMP has been developed in draft and takes account of the predicted environmental effects at each stage of construction at the Wylfa Newydd Development Area, setting out the way in which mitigation and enhancement proposals are expected to be implemented. These proposals cover ecology, landscape, drainage, recreation and agricultural use, integrated with the progression of the earthworks within the Wylfa Newydd Development Area.

The current version of the LEMP is subject to change and will be updated in line with comments received from ongoing discussions with stakeholders, regulators and feedback from members of the public.

The core principle for the landscape design of relevance to ecology comprises integrating mounding of excavated material, to achieve an appropriate solution to balance potential environmental effects, and incorporate mitigation and enhancement measures and features of biodiversity value.

As part of the landscaping proposals, the mounds would be planted at the earliest opportunity to reflect existing flora and fauna with typical local vegetation including hedgerows, native trees and shrubs. It is understood that some landscape planting will take place during the site preparation and clearance phase and some during the main construction earthworks following additional mound creation.

The draft LEMP is contained in annex J.1 for reference. Figure 5 in the draft LEMP illustrates the fully restored landscape setting for the operational power station.

E.2.5 Scaled maps/plans

Figure E.1 shows the proposed location of the two new bat barns and groups of bat boxes.

Figure E.2 shows the Phase 1 Habitat Survey codes of habitats in the vicinity of the two new bat barns and pole-mounted bat boxes.

The architect's plans for the designs of the two bat barns are shown in annex J.1 for reference.

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E.3 Mechanisms for ensuring delivery of mitigation and compensation measures

Horizon is committed to the delivery of the mitigation and compensation measures outlined in this document as they are a pre-requisite to permit successful completion of the site preparation and clearance enabling works and to demonstrate their full compliance with protected species legislation and licensing to assist in securing their development consent order for the construction of the new power station.

Horizon fully recognises the legally-binding nature of the commitments and conditions of this method statement upon the granting of any licence.

Contractual obligations between Horizon and its sub-contractors will ensure that all are informed of the legal obligations to fulfil this licence.

A European Protected Species licence return will be sent to both Horizon and NRW.

Planning permission has been granted for the construction of the two bat barns under Planning Permission reference 20C265A. These barns are of the same design as the bat barn built in 2013 and detailed in section 1.2.3. The construction of these two buildings is programmed for 2017.

E.4 Mitigation contingencies

In the event that any of the mitigation proposals contained in this application are considered to be undeliverable/unsuitable prior to their implementation (e.g. due to a change of conditions on site or the discovery of additional roosts, rarer species etc.) then a full review of the mitigation proposals will be undertaken by experienced ecologists to determine what measures would adequately address the changes. These changes will be discussed and agreed with NRW and, if required, a formal licence modification request will be made.

E.5 Biosecurity risk assessment

Horizon will ensure that the demolition and construction stages of the Project strictly adhere to best practice construction measures as detailed within the Project's Construction and Environmental Management Plan to prevent, amongst other things, the spread of invasive non-native species such as Japanese knotweed (*Fallopia japonica*). Horizon will be advised throughout the Project by ecologists experienced in the preparation of invasive species management plans and will employ the services of specialist contractors, as required, to undertake any control measures. Similarly, landscape planting will not include the planting of any ash (*Fraxinus excelsior*) trees so as to prevent the further spread of ash dieback (Chalara).

In order to prevent the possible spread of the bat pathogen white-nose syndrome (*Pseudogymnoascus destructans*), the relevant guidance within the Bat Conservation Trust's White-nose syndrome: guidance for bat workers in the UK and the Isle of Man should be complied with, in particular the need to not use equipment and footwear in the UK that has been used in infected roosts in North America, and to properly disinfect any equipment and footwear that has been used when undertaking visits to any underground sites.

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Given these control measures it is considered that the residual risk of spreading non-native species, or disease, as a result of these works is negligible.

F. Post-development site safeguard

F.1 Habitat/site management and maintenance

In the context of this bat licence application, post-development means following the completion of demolition activities as part of the site preparation and clearance stage of the project rather than referring to the completion of the construction of the new power station.

Management plan

Horizon will have sole responsibility for future maintenance of the bat barn roosts, bat boxes, surrounding habitat and landscaping maintenance.

The Wylfa Newydd Project has a draft LEMP which details the commitments to protect and sensitively manage retained vegetation and new landscaping for biodiversity benefits, including the protection and enhancement of bat commuting and foraging habitats.

F.2 Population monitoring, roost usage etc.

Future monitoring of the use of the roosts and the success of the mitigation/compensation measures will be carried out by bat licensed ecologists or their assistants.

This monitoring will continue for the duration of the enabling works post roost loss and the main construction of the new power station (anticipated to be 2026 on current programme). An annual report will be submitted to NRW.

Annual emergence surveys (throughout the enabling works and main construction period) of the two bat barn mitigation roosts in the months of June or July, along with internal surveys during the summer (August/September) and hibernation period will be undertaken. A programme of transects will be required to show if all previously recorded species are still utilising the site if they are not located within the mitigation roost buildings. Bat boxes will be monitored annually in August/September so as to avoid disturbance during the most sensitive part of the maternity period. The details of the monitoring programme will be agreed with NRW in advance.

Data loggers as specified in section 1.2.3 will be downloaded annually, and analysed to advise future management of the roosts.

During the baseline surveys it was discovered that common pipistrelles, soprano pipistrelles, brown long eared, Natterer's and whiskered/Brandt's bats were roosting within the buildings proposed for demolition. The mitigation/compensation package measures will be judged to have been successful if the following outcomes are achieved:

- Future monitoring shows all previously recorded species are found to be still present on the site during the first season following completion of the construction of the new bat barns and the start of this phase of demolition. Survey transects may be required to establish this.

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- All species recorded breeding on the site are found to be breeding in the new mitigation roosts in the season following the final phase of demolition works (2019 on current programme). Emergence surveys will be required to establish this along with internal checks of bat boxes.

During the anticipated ten year monitoring programme (2018-2027), annual reports will be submitted to NRW.

At the end of the ten year monitoring period, a report giving details of the monitoring and summarising the results will be submitted to NRW.

F.3 Post-development mitigation contingencies

If the monitoring works demonstrate that mitigation measures have proven to be unsuccessful when compared to the above criteria then appropriate remedial action will take place in an attempt to correct this. This is likely to take the form of the following types of measure but will be decided on a case-by-case basis as determined by an experienced and licensed bat ecologist (including consultation with NRW as necessary):

- Review monitoring data (in particular from site visits and data loggers) to assess whether any on site conditions are/have become unsuitable e.g. temperature, humidity, airflow, lighting, predation, interference, poor connectivity etc.
- Take corrective actions, if appropriate e.g. addition of solar panels to power heating to improve temperature conditions; provide an irrigation system through the ground floor to increase humidity; increase/decrease the porosity of the structure to improve/decrease air flow; undertake additional security measures/staff briefings to prevent future interference; predator control (preferably humane e.g. blocking access points, species-specific scare devices); remove/manage any light-spill; plant additional vegetation if connectivity to the structure is thought to be a limiting factor etc..
- Consider changing the siting of any bat boxes that have not been shown to be used for three seasons following their installation. This should include consideration of the micro-siting of boxes (height, aspect, adjacent vegetation etc.) as well as the tree, pole or structure they are affixed to.

F.4 Mechanism for ensuring delivery of post-development works

Whilst there are currently no legally binding commitments to ensure the delivery of post-development works, Horizon fully recognises the legally binding nature of the commitments and conditions of this method statement upon the granting of any licence. Furthermore, as stated in section E3, Horizon is committed to the delivery of the mitigation and compensation measures outlined in this document as they are a pre-requisite to permit successful completion of the site preparation and clearance proposals, and to demonstrate Horizons full compliance with protected species legislation and licensing to assist in securing the development consent order for the construction of the new power station.

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G. Timetable of works

Table G.1: Timetable of works

Action	Dates	Comments
Construction of bat barns	Autumn 2017	Two bat barns. One at SH 36603 93167 and one at SH 35847 92747. Includes installation of internal/external bat boxes.
Erection of bat boxes	To be completed by autumn 2017	Includes installation of 16 pole mounted bat boxes within 50m of the two bat barns. A further 24 bat boxes to be erected at woodland at SH 35488 93724.
Building demolition	March-June 2018	Sensitive/hand-demolition during these periods. Normal demolition can occur outside of these periods once buildings are declared free of bats by licensed ecologist.
Monitoring	2018 - 2026	Annual emergence survey of two bat barns (June/July). Annual internal inspection surveys of the two bat barns (August/September) Annual bat box checks (August/September) Annual programme of transects

H. Land ownership – mitigation site

H.1 Mitigation site/compensation site ownership

The compensation roosts and all of the scheme landscaping will be in the ownership of Horizon who will have the responsibility for their future maintenance and monitoring. Horizon has the land under a 999 year lease from the Nuclear Decommissioning Authority. There is no third party involved in this licence application.

H.2 Mitigation site/compensation ownership post construction

The compensation roosts and all of the scheme landscaping will be in the ownership of Horizon who will have responsibility for their future maintenance and monitoring. Horizon has the land under a 999 year lease from the Nuclear Decommissioning Authority. There is no third party involved in this licence application.

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I. References

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J. Annexes

J.1 Pre-existing survey reports

To be appended to any formal licence application

Arup. 2012a. *Initial Bat Activity and Building Assessment Report*. Unpublished report on behalf of Horizon Nuclear Power (Wylfa) Ltd.

Arup. 2012b. *Report on Bat Surveys 2010 & 2011*. Unpublished report on behalf of Horizon Nuclear Power (Wylfa) Ltd.

Arup. 2013. *Bat Roost Survey Report 2012*. Unpublished report on behalf of Horizon Nuclear Power (Wylfa) Ltd.

Jacobs. 2014. *Wylfa Newydd Project: Consultancy Report – Bat Monitoring 2013*. Unpublished report on behalf of Horizon Nuclear Power (Wylfa) Ltd. Ref. W202.01-S5-PAC-REP-00021.

Jacobs. 2015a. *Wylfa Newydd Project: Consultancy Report – Bat Monitoring 2014*. Unpublished report on behalf of Horizon Nuclear Power (Wylfa) Ltd. Ref. WN03.01.01-S5-PAC-REP-00011.

Jacobs. 2015b. *Wylfa Newydd Project: Bat Monitoring Survey Report 2015 – Addendum to Bat Technical Summary Report*. Unpublished report on behalf of Horizon Nuclear Power (Wylfa) Ltd. Ref. WN034-JAC-PAC-REP-00020.

Jacobs. 2015c. *Wylfa Newydd Project: Technical Summary Report*. Unpublished report on behalf of Horizon Nuclear Power (Wylfa) Ltd. Ref. WN034-JAC-PAC-REP-00008.

J.2 Raw survey data

N/A – all available data is contained within the pre-existing survey reports contained in annex J.1.

**Site Preparation and Clearance
Environmental Statement
Volume 3 – Appendix 14-24
Chough Report**

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Appendix C. Desk study figures

Appendix D. Breeding season survey results

Appendix E. Non-breeding season survey results

Appendix F. Wintering and breeding chough survey results 2017

Appendix G. 2017 Pursuit surveys

Appendix H. Summary map of survey results 2014-17

Executive Summary

Horizon Nuclear Power Wylfa Ltd. (Horizon) is currently planning to develop a new Nuclear Power Station on the north coast of Anglesey to the east of the town of Cemaes. Proposed works will involve the development of a large area of land currently being used for agriculture called the Wylfa Newydd Development Area. This includes habitats such as improved grassland, traditional field boundaries, streams, ditches, marshland and scrub.

This report focusses on red-billed chough (*Pyrhcorax pyrrhcorax*) in relation to the Wylfa Newydd Development Area. This species is afforded protection through its inclusion on Schedule 1 of the Wildlife and Countryside Act 1981 and Annex I of the Birds Directive). Chough is also listed as a priority species in accordance with Section 7 of the Environment (Wales) Act 2016, as well as being listed on Anglesey Local Biodiversity Action Plan. The species is closely associated with short, often coastal grassland and restricted to the west of the UK. Wales supports over 75% of the estimated UK population.

The purpose of this report is to bring together all available data from records held by conservation organisations, and bird survey data in order to establish a baseline on which future impact assessments for the Project can be formed. This includes establishing a likelihood of functional links with sites designated for the chough population they support currently, and sites that might be designated in the future. This also includes a review of the likely pathways to effect that any development might have e.g. habitat loss or disturbance, and how they might interact with the species throughout the breeding and non-breeding seasons.

The conclusions from this report are based on Anglesey-wide data searches and survey data gathered between November 2009 and July 2017. These comprised 281 walked transects; and 64 vantage point surveys, completed during 52 individual months. These data show that in population terms, the Wylfa Newydd Development Area regularly supports up to two pairs of chough in the breeding period, and their offspring prior to dispersal. Data from the non-breeding season show that the Wylfa Newydd Development Area generally supports a maximum of six birds.

In the context of functional links with the wider population, studies reviewed in this report show that there is likely to be a limited amount of interchange between populations from the study area with those from the Special Protection Area (SPA) network. However, the proportion of the populations that this level of interchange would represent is not functionally significant. This is also considered to be the case for possible (not yet actually designated) SPA / amalgamated SPA populations that have been proposed.

This report reviews studies which show the importance of suitable foraging habitat during the breeding and non-breeding seasons. In general, the consensus is that foraging habitat structure needs to be the same during both periods, with bare ground and grassland swards of less than 5 cm being optimal. Studies also show that during both breeding and non-breeding seasons, fidelity to habitats is very marked. The distance chough travel to foraging areas from roosts or nests is also well studied and reviewed in this report, with distances of 6 km quoted during the non-breeding season and 1 km during the breeding season. These distances preclude potential impacts to foraging birds from existing SPA populations, as there are none within foraging range. The review of available information shows the Church Bay / Carmel Head possible SPA (or possible Anglesey Coast amalgamated SPA) to be on the outer limits of winter foraging range from habitats within the study area.

1. Introduction

1.1 Overview of the Wylfa Newydd Project

Horizon Nuclear Power Wylfa Ltd. (Horizon) is currently planning to develop a new Nuclear Power Station on Anglesey as identified in the National Policy Statement (NPS) for Nuclear Power Generation (EN-6) (Department of Energy and Climate Change, 2011) within an area known as the Wylfa Newydd Development Area. The overall development is described as the 'Project' in this report.

The Project comprises the proposed new Nuclear Power Station (Wylfa Newydd Power Station) and associated plant and ancillary structures and features, together with all of the Associated Development needed to support its delivery and operation. This includes highway improvements, worker accommodation, specialist training facilities, radioactive waste storage buildings, ancillary structures, offices and coastal developments. The coastal developments will include a Cooling Water System, breakwater, and a Marine Off-Loading Facility.

The Project will require a number of applications to be made under different legislation to different regulators. As a nationally significant infrastructure project under the *Planning Act 2008*, the construction and operation must be authorised by an application for development consent.

Jacobs UK Ltd. (Jacobs) was commissioned by Horizon to undertake a full ecological survey programme within the study area. This work has included the gathering of baseline data to inform the various applications, assessments and permits that will be submitted for the Project.

1.2 Aims and objectives

The aim of this report is to present baseline information on red-billed chough (hereafter 'chough') (*Pyrrhocorax pyrrhocorax*) sufficient to support the Environmental Impact Assessment and Habitats Regulations Assessments for the Project. The information presented forms the basis for assessment of significance of ecological impacts on chough potentially arising as a result of the Project, and is intended for use in investigating potential pathways for likely significant effects on European sites for which chough is a qualifying features.

This report does not provide any form of assessment or mitigation design, as these will be presented within consenting documents required for the Project e.g. Environmental Statement chapters and Reports to inform Habitats Regulations Assessments.

1.3 Introduction to chough

The chough is the smallest of the crow family in the UK and is identified by its black plumage and distinctive red bill and legs (Mullarney *et al.*, 1999). Chough is restricted to the west of the British Isles and is known for foraging on coastal grassland in particular, and nesting on cliffs and occasionally in buildings. The species is also known for aggregating in large flocks during the winter and using inland upland habitats to forage for invertebrate prey. The legal protection afforded to chough is summarised in Appendix A.

1.4 Description of the study area

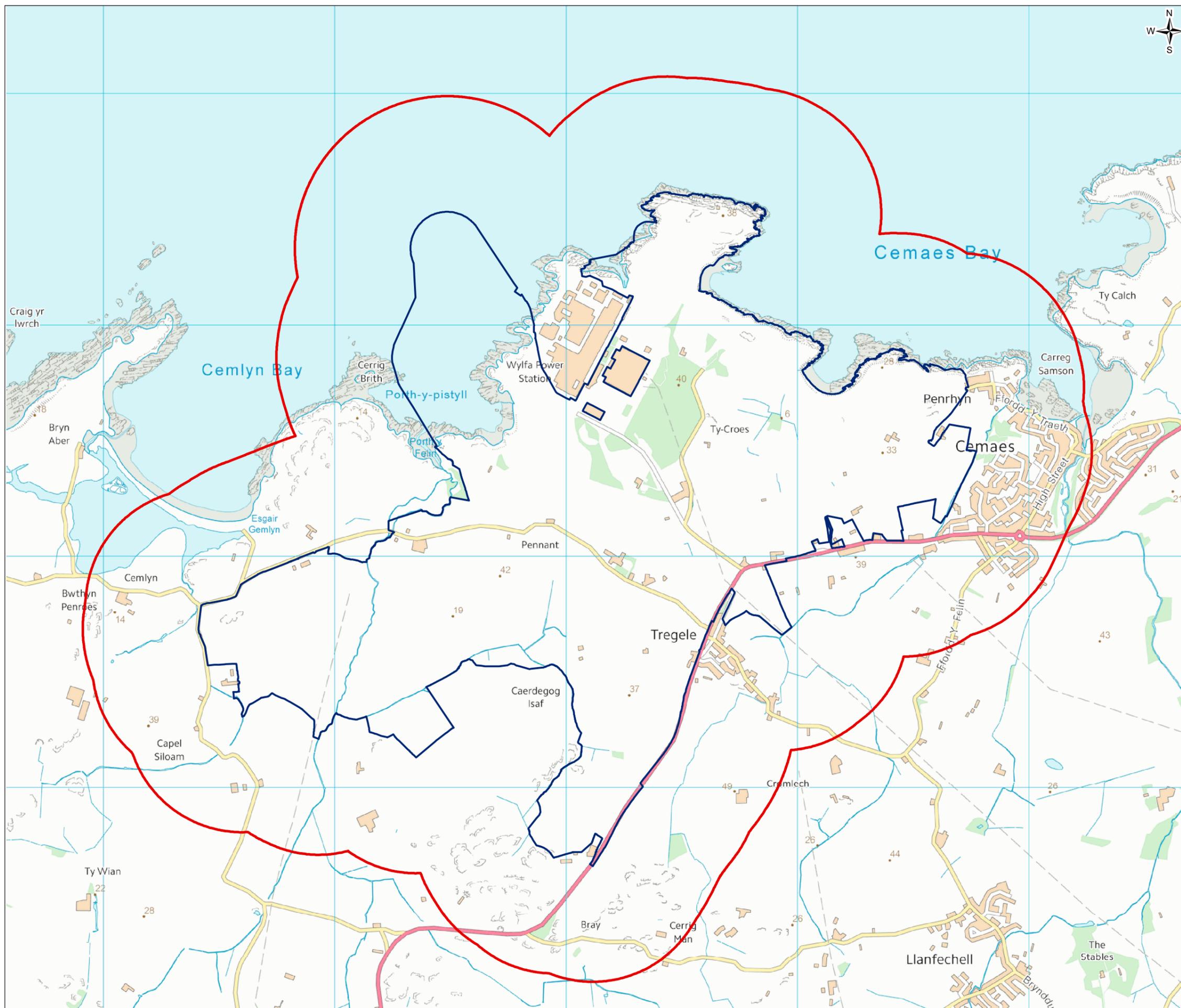
As well as presenting information on chough in an Anglesey-wide context, this report provides survey data collected on chough within the Wylfa Newydd Development Area and from within a 500 m survey buffer zone of its boundary; the 'study area' (Figure 1.1). The study area boundary was set at a distance of 500 m beyond the Wylfa Newydd Development Area based on it being a probable maximum distance at which terrestrial habitats could be affected by the Project. It was also selected to provide a degree of context to results from within the Wylfa Newydd Development Area itself, and identify where important ecological connectivity was present with areas of similar habitat nearby.

FIGURE 1-1



Legend

- Wylfa Newydd Development Area
- Buffer of 500m of WNDA boundary



0	JUL 17	Initial Issue	RM	JJ	RS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Client
HORIZON
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Project
 WYLFA NEWYDD PROJECT
 ENVIRONMENTAL STATEMENT

Drawing Title
 STUDY AREA FOR CHOUGH

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The Wylfa Newydd Development Area covers an area of approximately 380 ha. It is bounded to the north by the coast and the existing Magnox power station (the Existing Power Station). To the east, it is separated from Cemaes by a narrow corridor of agricultural land. The A5025 and residential properties define part of the south-east boundary, with a small parcel of land spanning the road to the north-east of Tregle. To the south and west, the Wylfa Newydd Development Area abuts agricultural land, and to the west it adjoins the coastal hinterland.

Historically the majority of the land use within the Wylfa Newydd Development Area has been for agricultural purposes with fields of improved and semi-improved grassland managed for grazing by sheep and cattle. These fields are bordered by a mixture of species-poor hedges, cloddiau (traditional stone-faced earth banks), lines of scrub and fences. The Wylfa Newydd Development Area also includes Tre'r Gof SSSI which forms a basin mire system with some wet woodland and rush pasture. Surrounding the Existing Power Station and in other small isolated pockets are areas of plantation woodland and broadleaved semi-natural woodland, three of which are ancient woodland sites. Wetland habitats in the Wylfa Newydd Development Area include heavily modified streams, ditches and ponds, many of which are ephemeral in nature.

Habitats of particular importance to chough are the areas of short coastal grassland formed on thin soils in the northern areas of the Wylfa Newydd Development Area. The most extensive areas of coastal grassland are found on Wylfa Head which itself comprises two distinct areas - the west side of Wylfa Head supports short maritime grassland grazed by rabbits (*Oryctolagus cuniculus*), and the east side consists of a mosaic of at least four plant communities including maritime heath, cliff and grassland habitats. This area is particularly important as it is the closest area of foraging habitat to the chough nest sites on the cliffs of Wylfa Head and in buildings within the Existing Power Station complex.

1.5 Consultation

Jacobs has been involved with consultation on the Project with regard to terrestrial ecological receptors since 2013. This has included engagement with, among others, Natural Resources Wales, the Cross and Stratford Welsh Chough Project, Isle of Anglesey County Council, the National Trust, North Wales Wildlife Trust and the Royal Society for the Protection of Birds (RSPB).

Key milestones in these consultations were the Pre-Application Consultation Stage One in late 2014, Wylfa Project Update in early 2016, Pre-Application Consultation Stage Two in summer 2016, and a Section 61Z consultation to the first submission of the *Town and Country Planning Act 1990* application for site preparation and clearance works in October 2016. The topics raised during the consultation as part of the Section 61Z process are summarised in Appendix B.

Jacobs met with RSPB, Adrienne Stratford and Horizon representatives on 16 March 2017 to discuss and clarify availability of further data on chough (especially records from the non-breeding season), chough habitat management planning and interpretation of evidence with respect to assessments.

Workshops covering ornithology issues including those pertinent to chough were held with non-governmental organisations in October 2016 and June 2017. Information on baseline data collected and potential implications of the Project was presented by Jacobs.

2. Methodology

2.1.1 Desk study methods

A comprehensive data search and literature review (desk study) was carried out to provide information on chough at a site, local, county and national scale. This included a search for designated sites for which chough is a qualifying species, purchase of data from Cofnod (the North Wales Environmental Information Service), gathering of information on chough numbers, distribution and movements from RSPB and acknowledged experts, and a review of SPA information. Primary sources of data and information included:

- JNCC SPA data and 3rd review of UK SPA network;
- Chough SPAs in Wales – RSPB 2009 report to Countryside Council for Wales;
- The Cross and Stratford Welsh Chough Project;
- Cofnod data from within the boundary of the Wylfa Newydd Development Area and from a search area including records up to 2.5 km of the boundary of the Wylfa Newydd Development Area were sought in 2015. A second data request in 2017 included the details of all records of chough held by Cofnod from the whole of Anglesey;
- Data from all-Anglesey annual winter chough survey of coastal areas; and
- Data from Land Use dataset for foraging chough.

Results of the desk study are presented in Section 3 below, with associated figures in Appendix C. These outputs, combined with the results of surveys carried out in the study area during the period 2009 to 2017 provide a comprehensive source of baseline information on abundance, distribution, movements and habitat usage of chough in the study area, and sets this information against a wider context to inform the EclA and HRA assessments required by the Project.

2.1.2 Breeding birds survey methods 2010-2014

Breeding bird surveys were completed in the vicinity of the Wylfa Newydd Development Area between 2010 and 2014. These were walkover transect surveys for all bird species, following methods described in Bibby *et al.* (2000) and Gilbert *et al.* (1998). The number of transects and routes taken evolved between 2010 and 2014 as the study area changed, most notably to include areas within a 500 m buffer from the boundary of the Wylfa Newydd Development Area. Transect routes are shown in figures in Appendix D.

The transects were designed to give good views of all fields, hedgerows, scrub, woodland, coastal heath and grassland, water bodies / watercourses and, where possible, cliffs present in the study area. Each transect was surveyed once per month in the breeding season as listed in Table 2.1.

Additionally, chough were searched for specifically in 2012 during breeding birds surveys, in habitats suitable for chough nest sites such as cliffs, caves and old buildings, using methods described by Monaghan *et al.* (1989). This effort focussed on areas close to the coastline including Wylfa Head, Cerrig Brith and Porth yr Ogof.

Table 2.1: Surveyed months for breeding birds in the study area 2010 – 2014

Breeding season	Survey months	Reference
2010	March – May	Arup, 2012a
2011	March – May	Arup, 2012a
2012	April – June	Arup, 2013a
2013	April – July	Jacobs, 2014a
2014	April – July	Jacobs, 2014b

In 2013 monthly vantage point surveys between April and July were also completed (Jacobs, 2014a). These watches involved surveyors remaining in one location and recording all birds seen within 250 m; a distance largely governed by local topography (see Section 4.1.4). The timing of each watch (16 watches in total) was for one hour before sunrise until two hours after and for a second period of one hour before sunset until one hour after. Locations of the vantage points (seven locations in total) are shown in Figure 6.14, Appendix D.

2.1.3 Wintering birds survey methods 2009-2015

Wintering bird surveys were completed (for all species) between 2009 and 2015. The methodology followed that described in Bibby *et al.* (2000) and Gilbert *et al.* (1998). Two transects were walked in winters 2009/2010 to 2012/2013. Six transects were surveyed in 2013/2014 and 2014/2015 as the study area was expanded to include a 500 m buffer zone around the boundary of the Wylfa Newydd Development Area. Transect routes are shown in figures in Appendix E.

Transects were designed to give good views of all fields, hedgerows, scrub, woodland, coastal heath and grassland, water bodies or watercourses present. Each transect was surveyed once per month as listed in Table 2.2.

Table 2.2: Surveyed months for over-wintering birds in the study area 2009 – 2015

Breeding season	Survey months	Reference
2009 – 2010	November – March	Arup, 2012b
2010 – 2011	October – March	Arup, 2012b
2012 – 2013	October – March	Arup, 2013b
2013 – 2014	October – March	Jacobs, 2014c
2014 – 2015	October – March	Jacobs, 2015

Vantage point surveys were also carried out in winter 2009-2010, 2010-2011 and 2012-2013 (Arup, 2012b and 2013b). Bird flight observations were recorded from four vantage points selected to provide maximum cover of the proposed development area. Surveys comprised 30-minute fixed point observations from each vantage point during each survey visit. All species flying over were mapped and the activity recorded. Locations of the vantage points are shown in figures in Appendix E.

2.1.4 Species-specific chough surveys 2017

Non-breeding season

Surveys specifically for chough were completed within the Wylfa Newydd Development Area between January and March 2017, in accordance with methods recommended by the RSPB. These surveys were carried out to provide further information on the numbers and distribution of chough within the Wylfa Newydd Development Area and the use the birds make of the habitats therein during the winter period. Methods comprised the following:

- i. Fortnightly walked transects following routes similar to those previously used by Jacobs for over-wintering and breeding bird surveys for the study area since 2013 (Figure 6.21, Appendix H).
- ii. Recording numbers of chough, their location and behaviour.
- iii. Recording details of any colour bands visible on chough legs.
- iv. Recording the following habitat variables in all fields in the study area:
 - number and type of livestock present;
 - approximate sward height within three categories (0 = 0-5 cm, 1 = 5-10 cm, 2 = >10 cm);
 - broad habitat classification (e.g. pasture, arable, heath); and

- any land management operations (e.g. ploughing, manure dressing or cutting).

Breeding season

Surveys specifically for chough were undertaken within the Wylfa Newydd Development Area during the breeding season, April – July 2017. As well as continuing the transect surveys described above, methods were based on the pursuit approach described in Whitehead *et al.* (2005). These surveys are intended to establish how much time is spent foraging within specific habitats by birds with active nests and / or dependent young. These surveys comprised 24 hours at Trwyn Pencarreg (three days of surveys for eight hours per day – four VPs per day last two hours each) and 50 hours at Wylfa Head (six days of surveys for eight hours per day – four VPs per day last two hours each (plus one extra two-hour VP)), with surveys proportionally longer at Wylfa Head to capture the larger visible area. In total 37 two-hour VPs were completed.

Surveys were timed to coincide with specific stages of the breeding cycle, with a set amount of effort applied to each stage within pre-defined temporal windows during daylight hours. The four stages of the breeding cycle were:

- 1) Incubation – mid-April to early May
- 2) Early chicks – early May to mid-May
- 3) Late chicks – mid-May to early June
- 4) Post-fledging – early June to end July

The time windows used within each stage (all +/- 1hr) were:

- 06:30-08:30
- 09:00-11:00
- 11:30-13:30
- 14:00-16:00

A minimum of six of the above listed time windows were observed during each of the four stages of the breeding cycle. Time spent by birds in the following habitat types (where applicable) was recorded:

- rock, cliff, scree, buildings and stone walls;
- improved and semi-improved agricultural grassland (grazed);
- coastal heath and heath / grass mixtures (grazed);
- coastal grassland (grazed);
- dry heathland and dwarf shrub heaths (grazed);
- improved and semi-improved agricultural grassland (ungrazed);
- coastal heath and heath / grass mixtures (ungrazed);
- coastal grassland (ungrazed);
- dry heathland and dwarf shrub heaths (ungrazed);
- improved and semi-improved agricultural grassland (mown);
- wet heath (grazed and ungrazed);
- paths (bare ground and worn swards associated with Public Rights of Way);
- burned areas;
- bracken; and
- cloddiau (traditional stock boundaries consisting of stone-faced earth banks).

3. Desk study results

This section presents the results obtained from data searches and literature reviews.

3.1 UK population data

In the UK, there are considered to be 205-350 breeding pairs of choughs (RSPB, 2015), with Wales supporting 76% of this population (Thorpe and Young, 2009).

3.2 SPAs designated for chough

There are seven SPAs for which chough is given as a reason for designation in Wales based on breeding numbers (112 pairs in total) six of which are also designated for the numbers of over-wintering chough they support (241 birds in total) (see Table 3.1). Table 3.1 also shows six-year mean population data between 2002 and 2007 for each of the seven SPAs in Wales, where available (Thorpe and Young, 2009).

There are further SPAs in Ireland and Scotland, the closest of which is more than 200 km from the study area, that are not discussed further in this report.

Table 3.1: Numbers of chough at UK SPAs - based on data from 1997 (JNCC, 2015a) and six-year means between 2002 and 2007 (Thorpe and Young, 2009)

SPA site name	Distance from the study area (km)	Breeding: 1997 site total pairs (national population %)	Breeding: 2002-2007 mean pairs (national population %)	Non-breeding: 1997 site total birds (national population %)	Non-breeding: 2002-2007 mean individuals (national population %)
Glannau Ynys Gybi / Holy Island Coast	15	18 (5.3)	16 (4.6)	18 (2.6)	8 (0.9) ¹
Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal / Mynydd Cilan, Trwyn y Wylfa and the St. Tudwal Islands	68	9 (2.7)	9 (2.6)	18 (2.6)	19 (2.0)
Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island	70	12 (3.5)	19 (5.5)	24 (3.5)	25 (2.7)
Craig yr Aderyn / Bird's Rock	97	6 (1.8)	4 (1.2)	55 (8)	16 (1.7)
Ramsey and St. David's Peninsula Coast	176	11 (3.2)	Not available	22 (3.2)	Not available
Skomer and Skokholm	195	4 (1.2)	4 (1.2)	Breeding only	Breeding only
Castlemartin Coast	200	12 (3.5)	Not available	24 (3.5)	Not available

¹ Roost figure only, foraging flock data was not available in the RSPB (2009) report.

3.3 Review of possible SPA and amalgamated SPA populations

This report also recognises the work of Thorpe and Young (2009) and their identification of 14 sites they consider qualify as possible SPAs for breeding and non-breeding populations of chough, as shown in Table 3.2. Thorpe and Young (2009) also suggest an `amalgamated` SPA approach, whereby six much larger SPAs are created in Wales to protect key breeding, foraging and roosting habitats for chough, and to include all existing SPAs and possible SPAs, rather than 21 individual sites. This would comprise amalgamated SPAs at:

- Anglesey Coast;
- Snowdonia;
- Llyn Coast;
- South Meirionnydd / North to mid-Ceredigion coast;
- South Ceredigion coast; and
- Pembrokeshire coast and islands.

Nearest to the Wylfa Newydd Development Area, the possible Anglesey Coast amalgamated chough SPA consists of an enlarged version of the existing Holy Island SPA and an extension covering the Church Bay / Carmel Head area (Figure 6.5, Appendix C). The suggested size / extent of the Church Bay / Carmel Head possible SPA is shown in Figure 6.6, Appendix C which itself comprises areas for non-breeding and breeding seasons (Figure 6.7 and Figure 6.8 respectively, Appendix C). Known chough foraging locations for both seasons and suggested land management units are illustrated in these figures.

Table 3.2: Numbers of chough at possible breeding and non-breeding SPAs - based on six-year means between 2002 and 2007 (Thorpe and Young, 2009)

SPA site name	Approximate distance from the study area (km)	Breeding: 2002-2007 mean pairs (national population %)	Non-breeding: 2002-2007 mean individuals (national population %)
Church Bay / Carmel Head	There is a small section within the boundary of the study area	5 (1.4)	14 (1.5)
Llanberis / Llanberis Pass	36	5 (1.4)	15 (2.0)
Aberdesach – Dinas Dinlle Coast	36	Non-breeding only	12 (1.3)
Penmaenmawr	37	5 (1.4)	38 (4.0)
Nantlle Valley	40	Non-breeding only	52 (5.5)
Cwm Ystradllyn	44	Non-breeding only	27 (2.9)
North Llyn Coast	44	12 (3.5)	37 (4.0)
Blaenau Ffestiniog	53	6 (1.7)	Breeding only
Traeth Penllech	60	Non-breeding only	13 (1.3)
Tonfannau Quarry	90	2 (0.6)	Breeding only
South Meirionnydd / North Ceredigion Coast	110	Non-breeding only	33 (3.5)
North Ceredigion Coast	110	5 (1.4)	Breeding only
Mid Ceredigion Coast	113	9 (2.6)	Breeding only
South Ceredigion Coast	136	3 (0.9)	10 (1.0)

3.4 UK SPA reviews

In 2016 the JNCC undertook review of all SPAs to further develop guidance and principles to assist the application of UK SPA selection criteria (Stroud *et al.*, 2016). This included an assessment of the adequacy of the SPA network for breeding and non-breeding populations of relevant species (see JNCC 2016a and 2016b for chough appendices within Stroud *et al.*, 2016). A summary of the chough data for Great Britain in this review is provided in Table 3.3.

Table 3.3 Summary of chough data presented in the JNCC Third Review of the status of UK SPAs²

Criteria	Breeding (pairs)	Non-breeding (individuals)
Total population	300	930
Population within SPA suite	149	371
Proportion of population within SPA suite	49.7%	39.9%
Long-term trend 1982 – 2002	+39.4%	+56.8%
Short-term trend 1992 – 2002	+28.1%	+38.2%
Overall assessment of sufficiency of SPA suite for:		
Population numbers	Sufficient	Sufficient
Range coverage	Insufficient	Insufficient
Ecological sufficiency	Insufficient	Insufficient

The SPA review includes a projected impact of climate change on the SPA suite. For breeding chough this included modelling impacts using the approaches developed by Pearce-Higgins *et al.* (2011) during the Climate Change Impacts on Avian Interests of Protected Area Networks (CHAINSPAN) project. This report found that under a medium emissions scenario, modelled numbers of breeding chough within the SPA suite would increase by 50%, but with a poor degree of confidence. Although not modelled, the non-breeding population was also predicted to increase by the same amount, but with the same poor degree of confidence.

Relevant to this report are the outcomes of the SPA Review Decision Framework regarding cropped habitats, including that:

- chough show fidelity to habitat types and locations;
- crop type determines usage by chough; and
- grazing animal presence and presence of autumn stubble is vital to maintain species usage.

The assessment outcome with regard to cropped habitats is that suitable grassland within 1 km of nests and outside the breeding period should be maintained on the basis of local evidence of regular field usage.

3.5 Breeding data from the study area

3.5.1 Numbers of birds and productivity

Surveys, from 2007 to 2015, as part of the Cross and Stratford Welsh Chough Project within the study area have comprised nest surveys and ringing of chicks (Cross and Stratford, 2015). Additional data for 2016 and 2017 was provided by Adrienne Stratford to Jacobs (*pers. comm.*). The project has identified four nesting sites (Nest Sites A and B are within buildings forming parts of infrastructure for the existing power station, and Nest Sites C and D are on sea-cliffs around Wylfa Head as shown in Figure 3.1) that have been monitored each year during this period. In this period, nesting has been attempted by one or sometimes two pairs of chough, and 37 chicks have been ringed before fledging (up until 2017) (see Table 3.3). During this time there have been a

² Primary data sources are not provided in this report.

total of 17 breeding attempts. Breeding was successful on 12 of the 17 occasions and therefore (when successful) the average number per year of choughs successfully fledged is three.

Table 3.4: Study area chough nest site data 2007 to 2017 from Cross & Stratford (2015) and Adrienne Stratford to Jacobs (*pers. comm.*)

Nest site	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Nest Site A	-	-	-	2	4	1	4	3	0	-	-
Nest Site B	-	-	0	-	-	-	-	-	-	-	-
Nest Site C	0	0	4	-	2	0	2	4	-	-	-
Nest Site D	-	-	-	4	-	-	-	-	-	3	4
Total number of ringed chicks	0	0	4	6	6	1	6	7	0	3	4
Total number of occupied nests	1	1	2	2	2	2	2	2	2	1	1

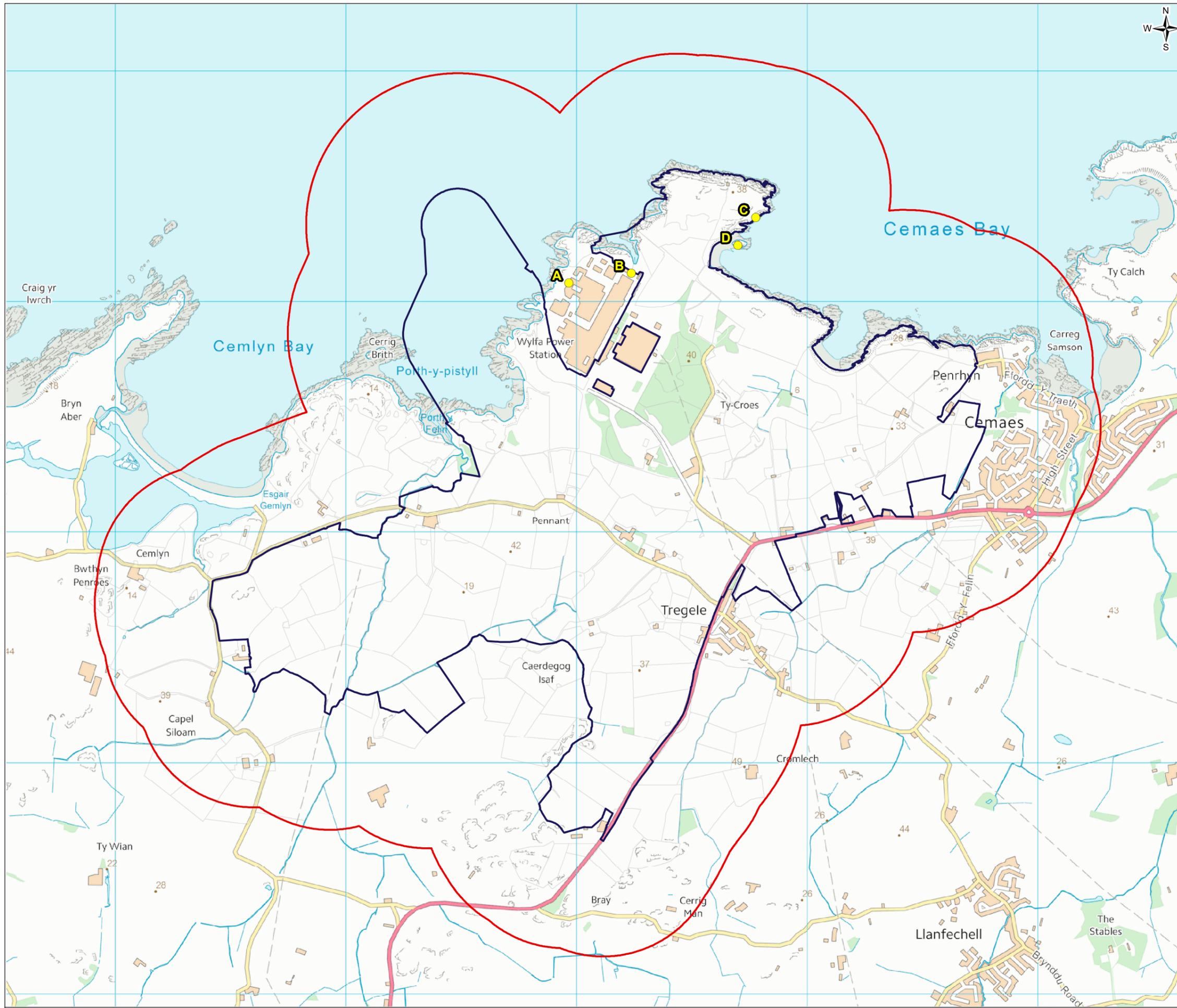
In 2015, 2016 and again in 2017, only one nest site was occupied (Nest site D). No young were fledged in 2015 – the preferred nest site was disturbed by a number of nearby anglers early in the breeding season, causing the adult pair to relocate the nest site to a less favourable location, which was subsequently washed out by wave action. Three birds were fledged in 2016 and four birds were ringed, and fledged, in 2017 (Adrienne Stratford, *pers. comm.*).

FIGURE 3-1



Legend

- Wylfa Newydd Development Area
- 500m buffer of Wylfa Newydd Development Area
- Chough nest locations



0	JUL 17	Initial Issue	AF	JG	PS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Client
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Project
 WYLFA NEWYDD PROJECT
 ENVIRONMENTAL STATEMENT

Drawing Title
 CHOUGH NEST LOCATIONS WITHIN
 THE STUDY AREA

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3.5.2 Colour-marked Wylfa Head breeding adult chough

To date, five adult choughs that have bred on Wylfa Head have had colour rings (fitted when these birds were juveniles, as part of other projects) which enabled the Cross and Stratford Welsh Chough Project to determine the locations of their natal nest sites and other aspects of their life history. This was possible for four of the birds, as summarised in table 3.5. This information shows that the colour-ringed adults observed breeding in the study area did not originate from within an SPA for which chough is a qualifying species. All four birds originated from locations elsewhere on Anglesey.

Table 3.5: Location of natal origin of colour-ringed adult breeding birds observed on Wylfa Head

Nest site (location of observations made within study area)	Sex	Years recorded	Four-figure grid square of natal origin	Distance and direction of natal nest from Wylfa Head (km)
Nest Site A	Male	2010-2013	SH4793	13 (east)
Nest Site C	Female	2007-2015	SH2988	8 (southwest)
Nest Site C	Male	2008-2015	SH4490	10 (east-southeast)
Nest Site C	Male	2008-2012	SH4793	13 (east)

The female bird listed above is known from ringing information (Right leg: Yellow / Black, Left leg: Red / BTO) (BTO = British Trust for Ornithology) to have been ringed as a juvenile at a nest site near Church Bay in 2004. Welsh Chough Project data from 40 sightings of this bird all originate from Wylfa Head, Cemlyn, Carmel Head and Church Bay.

3.5.3 Dispersal of Wylfa Head fledged chough

Of the 30 colour-ringed choughs from Wylfa Head nests between 2007 and 2015, 21 have been re-sighted following fledging (Stratford, 2015) and nine were not seen again (these were presumed to have died in the first few months after fledging) (see Figure 3.2). The maximum distance at which a ringed chough was sighted was approximately 35 km south of its natal site (one individual at Fort Belan), but most sightings were made within 10 km of Wylfa Head. Therefore, although chough from Wylfa Head could potentially disperse further, there is no evidence that they have done in the past.

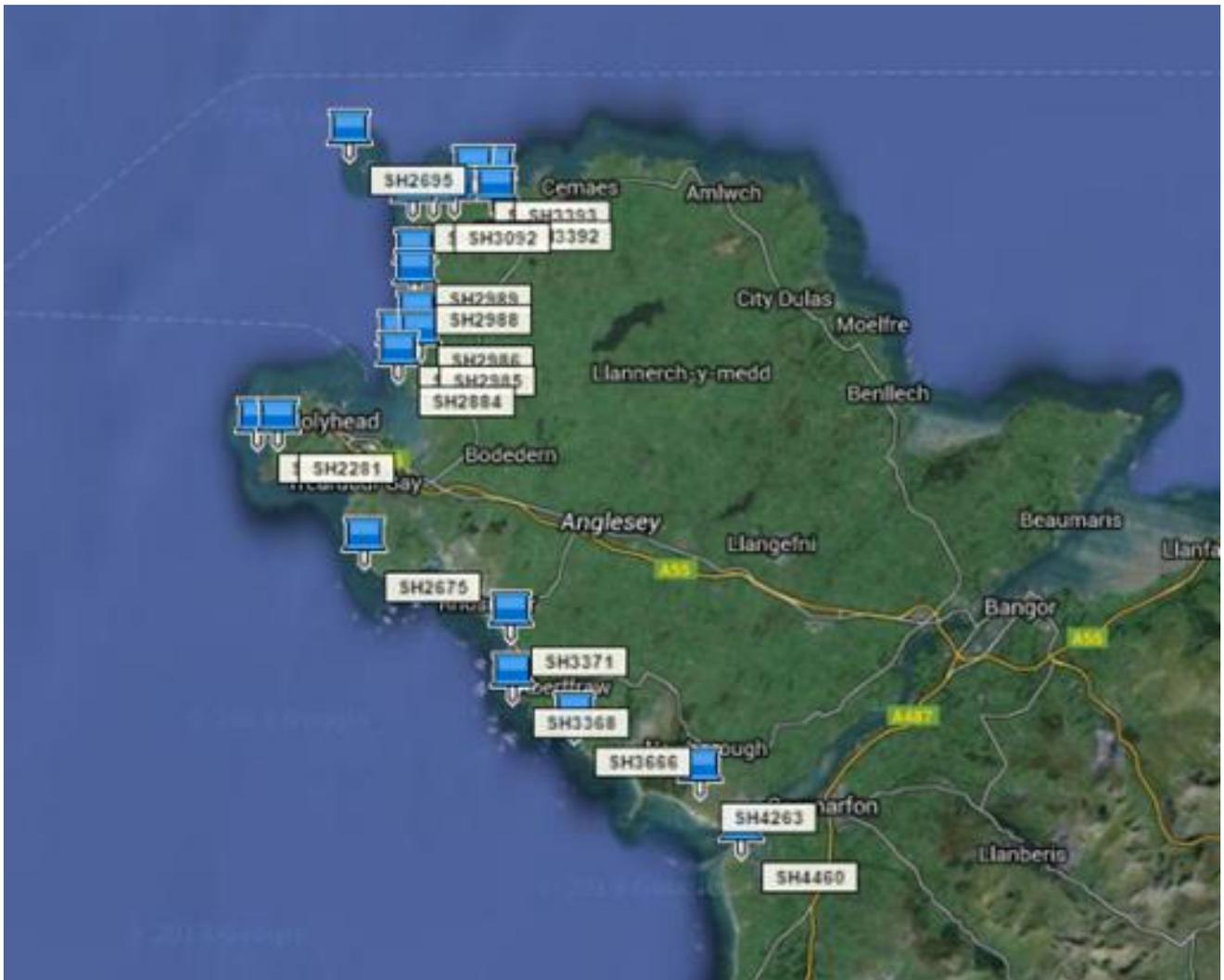


Figure 3.2: All sightings of chough ringed as juveniles at Wylfa Head since 2007 (from Stratford, 2015)

3.6 Data from other studies

3.6.1 Dispersal distances

A second source of information on the dispersal distances of chough in North Wales comes from an extensive study completed on chough nesting on the Llyn Peninsula (Stratford, undated). This included those birds nesting within the Aberdaron Coast and Bardsey Island SPA and the Mynydd Cilan, Trwyn y Wylfa and the St. Tudwal Islands SPA. The information from the Llyn Peninsula study includes data gathered between 1991 and 2014 from 1,281 chicks ringed as part of the study. Of these ringed birds, 115 were subsequently identified as being breeding adults, 94 of which remained in the Llyn Peninsula to nest and 21 moved outside of the area.

The study showed that dispersal distance of birds from where they fledged on the Llyn Peninsula to where they then went on to breed shows a steady decline (against numbers of individuals) beyond a peak of 15-20 km for females to a maximum of 75 km, and for males a peak of 0-5 km (see Figure 3.3) to a maximum of 45 km. Overall, the mean dispersal distance of chicks fledged from natal nesting sites on the Llyn Peninsula to breeding sites elsewhere was 23.2 km for females (n=61) and 10.1 km for males (n=54).

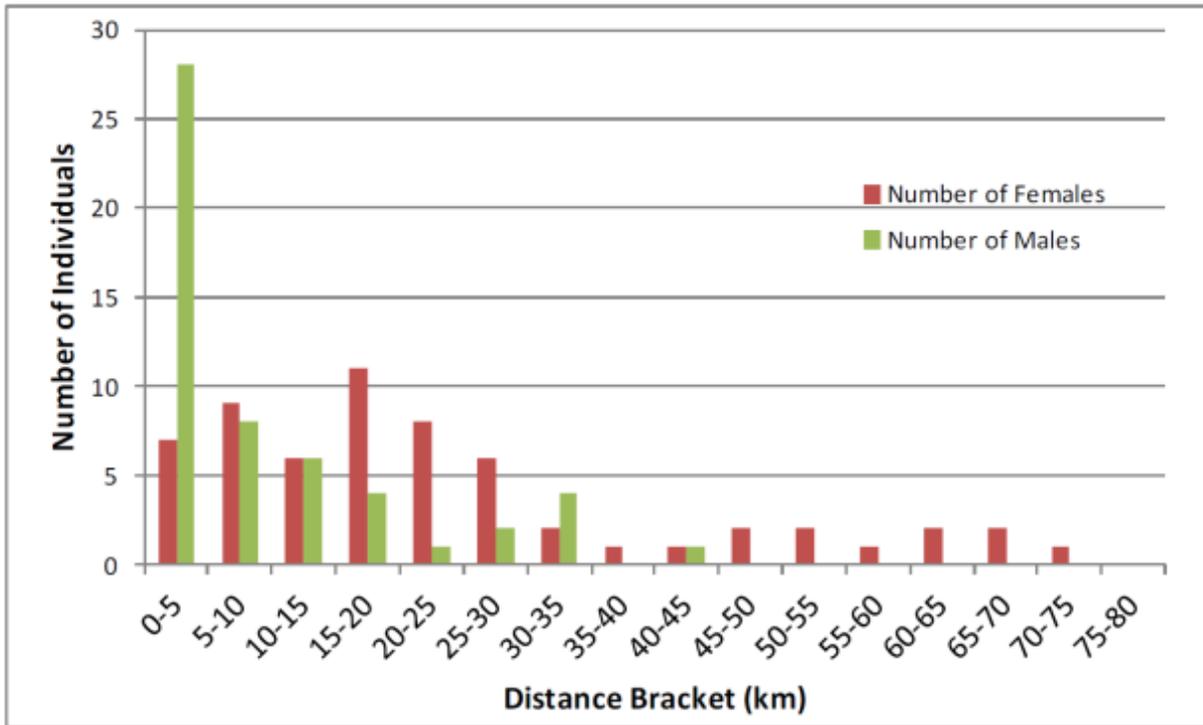


Figure 3.3: Dispersal distances in chough from Llyn Peninsula natal sites (from Stratford, undated)

The data show that the majority of choughs fledged from nests on the Llyn Peninsula which survived to breed, did so in locations within 40 km of their natal nests. Choughs fledged from the study area are therefore unlikely to breed in SPAs beyond 40 km, and the study area is unlikely to receive choughs coming from SPAs outside of the same distance. A similar pattern was found by Johnston *et al.* (2007) in a UK-wide study, whereby potential new populations were generally established within 50 km of existing colonies.

3.6.2 Regional numbers of breeding chough

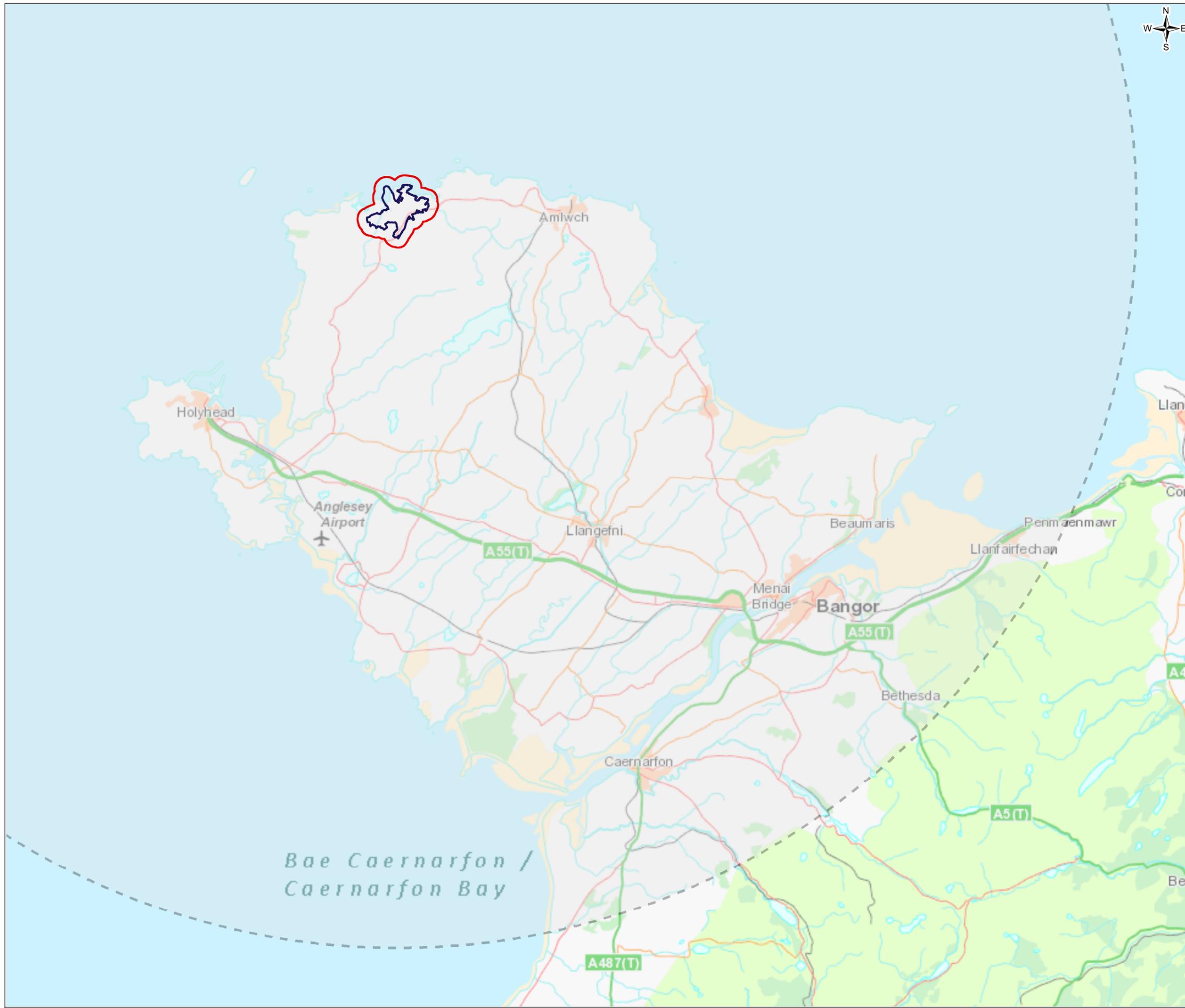
Using maximum chough dispersal distances discussed above (40 km) to broadly demarcate the region within which the study area sits, the total number of breeding pairs of chough in the region is approximately 96. This area is shown in Figure 3.4. Approximately 60 pairs of chough breed on the Llyn Peninsula (Stratford, undated). The Anglesey Biodiversity Action Plan states that there are approximately 36 pairs of chough on Anglesey in total, which includes the 18 pairs breeding within the Holy Island / Glannau Ynys Gybi SPA.

FIGURE 3-4



Legend

- Wylfa Newydd Development Area
- 500 m buffer of Wylfa Newydd Development Area
- 40 km dispersal distance



0	JUL 17	Initial Issue	AF	JJ	PS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Client
HORIZON
 NUCLEAR POWER

Project
 WYLFA NEWYDD PROJECT
 ENVIRONMENTAL STATEMENT

Drawing Title
 LIKELY MAXIMUM CHOUGH
 DISPERSAL DISTANCE FROM THE STUDY AREA (40 KM)

Scale @ A3: 1:200,000 DO NOT SCALE

Jacobs No.: 60PO8077

Client No.:
 Drawing No.: 60PO8077_DCO_VOL_D_APP_09_14_03_04

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3.6.3 Records of marked birds within the study area

During the 2017 winter chough surveys, leg ring information was recorded where possible. One of the birds sighted during each month of these surveys (Right leg: Blue / Red, Left leg: Red / BTO) was ringed as a (probable female) juvenile at a nest site in the Rhoscolyn area, within the Holy Island / Glannau Ynys Gybi SPA, in 2015 (Adrienne Stratford, *pers. comm.*), and was also seen within the study area near the Existing Power Station outfall by Adrienne Stratford in November 2016. This bird was recorded in the study area in November, January, February and March of winter 2016-17. This bird has also been recorded at Carmel Head and Church Bay.

3.7 Cofnod data

Data from Cofnod provided to Jacobs in 2015 from within the boundary of the Wylfa Newydd Development Area and from a search area including records up to 2.5km of the boundary of the Wylfa Newydd Development Area show that chough are well recorded in the area, with over 70 sightings of the species between 1981 and 2015.

An additional search was completed of records held by Cofnod for the whole of Anglesey in 2017. This returned 2,170 records which are shown on the following figures presented in Appendix C:

- Figure 6.1 – Records of chough in the breeding season (1 April to 31 July) for the whole of Anglesey
- Figure 6.2 – Records of chough in the non-breeding (1 August to 31 March) for the whole of Anglesey
- Figure 6.3 – Records of chough in the breeding season (1 April to 31 July) in the vicinity of the study area
- Figure 6.4 – Records of chough in the non-breeding season (1 August to 31 March) in the vicinity of the study area.

Figure 6.1 shows that there were records of chough in the breeding season mainly from the west and north coasts of Anglesey, with the highest numbers of records from the west coast of Holy Island. There were no records of chough numbering more than 10 birds on the north coast.

Figure 6.2 shows records of chough in the non-breeding season reasonably evenly distributed around the north, east and west coasts of Anglesey. Within these records there were two instances where more than 11 choughs were seen, one on the Skerries and one in the vicinity of Traeth Ynys y Fydlyn. These records are 7.6 km and 5 km from the Wylfa Newydd Development Area respectively.

Figure 6.3 shows 12 records of chough from the vicinity of the study area in the breeding season, with counts of chough ranging from one to eight individuals. None of the records were from within the Wylfa Newydd Development Area.

Figure 6.4 shows seven records from the vicinity of the study area in the non-breeding season, with counts ranging from one to three individuals. None of the records were from within the Wylfa Newydd Development Area.

Cofnod data originate from a variety of observers and are not systematically gathered. Locations of records are therefore likely to be biased towards well-used parking locations and walking routes typically used by submitters of records. Mapped results are shown to the nearest grid reference provided and are not always indicative of the precise location of the record.

4. Study area survey results

4.1 Breeding bird survey results

4.1.1 Breeding bird survey results 2010

Excerpts from the 2010 breeding bird survey results are provided in Appendix D (from Arup, 2012a). These show that during eight walked transects between March and May, chough were sighted on four occasions, as shown on Figure 6.10. The numbers of choughs recorded during these sightings is not available in the Arup report.

4.1.2 Breeding bird survey results 2011

Excerpts from the 2011 breeding bird survey results are provided in Appendix D (from Arup, 2012a). These show that during eight walked transects between March and May, chough were sighted on two occasions, as shown on Figure 6.10. The numbers of choughs recorded during these sightings is not available in the Arup report.

4.1.3 Breeding bird survey results 2012

Excerpts from the 2012 breeding bird survey results are provided in Appendix D (from Arup, 2013a). The results from the eight transects between April and July have not been provided in any detail other than a brief description of pairs of chough being seen regularly around the eastern side of Wylfa Head and flight across to the north of the Existing Power Station west towards Cerrig Brith.

4.1.4 Breeding bird survey results 2013

Excerpts from the 2013 breeding bird survey are provided in Appendix D. These data show that from 21 transect surveys, chough were recorded on five occasions. These records comprised sightings from Wylfa Head (four birds), pasture west of Nanortman cottage (two birds), Porth-y-wylfa (one bird), pasture west of Tregale (two birds) and pasture southwest of Cafnan Farm (two birds). The average number of chough seen during any one of the five sightings was 2.2.

There were also 16 vantage point (VP) surveys targeting certain key species (woodcock, snipe, merlin and goshawk) undertaken in the study area during which all other birds were recorded incidentally. These surveys did not record chough on any occasion.

4.1.5 Breeding bird survey results 2014

Excerpts from the 2014 breeding birds surveys are provided in Appendix D. These data show that from 24 transects (six transects walked monthly for four months between April and July) choughs were recorded on seven occasions, with 19 being the total number of chough seen. The peak number of choughs seen at any one time was six (Transect 4 in the vicinity of Cafnan Farm), and the average number of chough seen during any of the seven sightings was 2.7 birds.

4.1.6 Chough breeding season transect survey results 2017

Details of the breeding season 2017 species-specific chough surveys are provided in Appendix D. The breeding season transect surveys in 2017 covered a total of 211 fields. Choughs were recorded a total of 14 times during these surveys, of which 10 observations were of birds using the habitats within the survey area. The other four observations were of birds flying over. Choughs were recorded in seven different fields, as shown in Figure 6.22. All but one of these sightings were from Wylfa Head, with up to five birds recorded together. The remaining record was of six birds just east of Cemlyn Lagoon – the peak count during the transect surveys. All chough sightings were in short sward grassland habitats and adjacent areas of rocky outcrop.

4.1.7 Chough breeding season pursuit survey results 2017

The full results from the chough breeding season pursuit surveys 2017 are provided in Appendix G. These show that during 74 hours of survey (37 VPs), there were 107 separate periods of chough behaviour observed (pursuits) from 19 different fields within the study area. The average number of chough seen was 2.3. The maximum count from these surveys was 10 chough (from Land Parcel 181, see Figure 6.24), which comprised of Improved and semi-improved agricultural grassland (ungrazed). The most frequently visited area was Land Parcel 146, where chough activity represented 63.54% of chough minutes from both Wylfa Head. This was located to the east of the existing power station and to the north of the Tre'r Gof SSSI (see Figure 6.24).

Whilst the distribution of habitat use (core foraging area) is identified by field and by broad habitat type, the results of plotting specific locations of foraging behaviour has identified a number of small patches of habitat where foraging is concentrated (see Figure 25). Whilst the core foraging area can be calculated by field area, the actual area of land that chough forage in is much smaller and focussed on small patches of very specific microhabitat patches.

The habitats used most frequently at Trwyn Pencarreg had a habitat mosaic of Rock, cliff, scree, buildings and stone walls / Coastal grassland (ungrazed) / Paths (bare ground and worn swards associated with Public Rights of Way (33.5% of chough minutes at Trwyn Pencarreg) (see Table 6.20). Whilst these were not being grazed during the summer breeding survey period, all had been grazed over the winter and generally had short sward heights.

The habitats used most frequently at Wylfa Head had a combination of Coastal grassland (ungrazed) / Paths (bare ground and worn swards associated with Public Rights of Way) (42.1% of chough minutes at Wylfa Head) (see Table 6.21). These again were ungrazed but generally had short sward heights after grazing during the winter.

Overall the surveys showed that the majority of sightings involved the pair of chough and their juveniles that bred on Wylfa Head (90 of 107), and that Coastal Grassland, albeit ungrazed, was the habitat type represented most frequently in the land parcels that chough were most regularly seen.

4.2 Wintering bird survey results

4.2.1 Wintering bird survey results 2009-2010

Excerpts from the 2009-2010 wintering bird survey results are provided in Appendix E (from Arup, 2012b). These show that during 20 walked transects between November 2009 and March 2010 (including incidental sightings during other surveys), choughs were sighted on three occasions. Single choughs were sighted twice on Wylfa Head incidentally and a flock of four were seen to the east of the water treatment works south of Wylfa Head (Figure 6.16). No choughs were recorded during the 10 vantage point surveys.

4.2.2 Wintering bird survey results 2010-2011

Excerpts from the 2010-2011 wintering bird survey results are provided in Appendix E (from Arup, 2012b). These show that during 24 walked transects between October 2010 and March 2011, chough were sighted on nine occasions as shown in Figure 6.18. These included chough being seen in pairs on three occasions in pasture fields west of Caedegog Isaf Farm. In the data presented in this report, this is the first instance of chough being present in areas of habitat away from coastal grassland. The remaining records, including a peak count of four, are from habitats in close association with coastal grassland around Wylfa Head and short grassland east of the Existing Power Station. No choughs were recorded during the 12 vantage point surveys.

4.2.3 Wintering bird survey results 2012-2013

Excerpts from the 2012-2013 wintering bird survey results are provided in Appendix E (from Arup, 2013b). Although unclear from the data provided, the Arup (2013b) report describes a summary of the findings. During the 12 transects, chough were recorded on 15 occasions with a maximum count of four individuals from 11

different locations. The locations are shown in Figure 6.19 and include Wylfa Head, fields south of Cafnan Farm, and grassland south of Porth-y-pistyll.

4.2.4 Wintering bird survey results 2013-2014

Excerpts from the 2013-2014 wintering bird survey are provided in Appendix E (from Jacobs, 2014c). These data show that from 36 transects choughs were recorded on 13 occasions, with 34 being the total number of records. The peak number of chough seen at any one time was six (Transect 2 in the vicinity of Porth-y-pistyll), and the average number of chough during any of the 13 sightings was 2.6 birds.

4.2.5 Wintering bird survey results 2014-2015

Excerpts from the 2013-2014 wintering bird survey are provided in Appendix E (from Jacobs, 2015b). These data show that from 36 transects choughs were recorded on seven occasions, with 17 being the total number of chough records. The peak number of chough seen was four. This figure was recorded on Transect 1 in the vicinity of Wylfa Head and Transect 4 in pasture in the vicinity of Cafnan Farm. The average number of chough during any of the seven sightings was 2.4 birds.

4.2.6 Chough survey results winter 2017

Details of the winter 2017 species-specific chough surveys are provided in Appendix E. The wintering chough surveys in 2017 covered a total of 211 fields. Choughs were recorded using the habitats within the survey area a total of 10 times, from five of these fields as shown in Figure 6.21. These comprised three sightings from the grassland to the east of Cemlyn Lagoon with a peak count of four choughs (three using the habitats within the survey area, and a fourth flying over), and seven sightings from Wylfa Head with a peak count of three choughs. All sightings were in short sward grassland habitats adjacent to the coast.

4.3 Summary of chough records from breeding and wintering bird surveys

Table 4.1 provides a high-level summary of the data on chough following the breeding and wintering bird surveys in chronological order. These show that there have been a total of 52 months of survey of the study area, during which time there have been 281 transects walked and 64 vantage point surveys completed. Where averages are available, the average number of chough seen per sighting in a given year ranges from two to three birds, and peak counts for each sighting range from two to ten birds.

Table 4.1: Summary of all data from transect and VP surveys

Season	Months	Survey type	No. of transects / VPs	No. of sightings	Average count per sighting	Peak count within one sample
2009 – 2010 Wintering	Nov – Mar (5)	Transects	20	3	2	4
2009 – 2010 Wintering	Nov – Mar (5)	VPs	10	0	N/A	N/A
2010 Breeding	Mar – May (3)	Transects	8	5	Not recorded	Not recorded
2010 – 2011 Wintering	Oct – Mar (6)	Transects	24	9	2	4
2010 – 2011 Wintering	Oct – Mar (6)	VPs	10	0	N/A	N/A
2011 Breeding	Mar – May (3)	Transects	8	2	Not recorded	Not recorded
2012 Breeding	Apr – Jul (4)	Transects	8	Not recorded	Not recorded	2

Season	Months	Survey type	No. of transects / VPs	No. of sightings	Average count per sighting	Peak count within one sample
2012 – 2013 Wintering	Oct – Mar (6)	Transects	12	15	Not recorded	4
2013 Breeding	Apr – Jul (4)	Transects	21	5	2.2	4
2013 Breeding	Apr – Jul (4)	VPs	7	0	N/A	N/A
2013 – 2014 Wintering	Oct – Mar (6)	Transects	36	13	2.2	6
2014 Breeding	Apr – Jul (4)	Transects	24	7	2.7	6
2014 – 2015 Wintering	Oct – Mar (6)	Transects	36	7	2.4	4
2017 Wintering	Jan – Mar (3)	Transects	36	10	2.1	4
2017 Breeding	April – July (4)	Transects	48	17	3.0	6
2017 Breeding pursuit surveys	May – June (2)	VPs	37	107	2.3	10

4.4 Limitations of survey results

The survey methodologies for recording breeding and over-wintering birds in years 2009 to 2015 given above are designed to give estimates of bird density across a landscape by sampling bird communities. They are not intended for mapping accurately the total number of birds or individual territories within a given area. However, these data are considered valuable for assessing potential effects on chough arising from the Project. This is from their value in providing a picture of the locations used by chough and typical numbers.

Survey extents and sampling methods have varied between years as the scope of the project has evolved. This prevents direct comparisons between years. This constraint was identified following stakeholder engagement and was a reason why dedicated chough surveys were completed during 2017. With the addition of the results from dedicated surveys, including data gathered on chough habitat usage, the baseline information is consequently more robust.

5. Discussion

This section discusses the results and assessment implications of the desk study and surveys carried out between 2009 and 2017.

5.1 Chough populations

5.1.1 Regional context

The historical context for the Anglesey chough population is that the island was devoid of breeding chough, the species having gone locally extinct, prior to recolonisation in the 1960s (Johnstone *et al.*, 2007). The Wylfa Head population is likely to be one of a number of 'pioneer' populations that have formed on the coast of Anglesey during recent years. The data suggest that the Anglesey population is stable, but small and slow-growing, a trait typical of pioneer populations of chough (Johnstone *et al.*, 2007).

A study by Reid *et al.* (2006) of choughs on Islay showed that habitat quality at the location of natal origin had an effect on survival rates of chough both as sub-adults and adults. Choughs fledged from areas of high quality habitats had a higher rate of survival at both age classes than choughs fledged from lower quality habitats. Adult survival rate was better explained by natal region than the region in which the bird settled to breed. For Anglesey, the implication of this study is that birds fledged from the high quality habitats of the Holy Island / Glannau Ynys Gybi SPA are the individuals which have the highest likelihood of survival as sub-adults and adults regardless of where they settle to breed. Conversely, choughs fledged from other locations around Anglesey could have, on average, a lower likelihood of survival – a factor which would be applicable to the adult birds breeding at Wylfa Head (see 3.5.2), whose origins are outwith the SPA network.

5.1.2 Study area population between 2009 and 2017

The baseline data show that between November 2009 and June 2017, chough numbers within the study area have varied relatively little. The peak count is 10 birds in the breeding season (pursuit survey data) and six birds in the non-breeding season. Within the data up to 2017 there is no discernible pattern or trend showing an increasing or decreasing population. Within the breeding data up to 2017 there is also no pattern shown in the number of chicks that have been produced since 2009, the year in which monitoring started. More recently in 2016 and 2017, the number of breeding birds at Wylfa Head has reduced to one pair.

The results show that any assessment of impacts on the species should be based on a study area population comprising two breeding pairs and their offspring during the summer, and in winter the study area should be assessed based on its potential to support approximately six birds.

The peak counts of chough from desk study data and surveys suggest that the study area does not form one of the locations of non-breeding-season flocking by the species, which, as described by Stratford (undated), can be upwards of 80 birds. This would also suggest that the study area does not form a staging post on the regular routes taken by chough from North Wales to over-wintering sites 60 km away in Snowdonia (JNCC, 2015a).

5.1.3 Study area population with regard to SPA population thresholds

The maximum number of chough (six) recorded in the study area during the non-breeding season is below the threshold for SPA selection for non-breeding individuals (9) (JNCC, 2015a). The figure of two breeding pairs is also below the selection threshold of three pairs for SPA selection for breeding chough populations (JNCC, 2015b).

5.2 Chough distribution, movements and habitat use

5.2.1 Breeding season

Chough is a well-recorded species with data showing that the species has been recorded widely around the Anglesey coast. The ecology, and in particular the diet, of chough is also well understood (e.g. Whitehead *et al.*, 2005) with the provision of short grassland and suitable nesting sites being critical.

Whitehead *et al.* (2005) studied 15 different habitat types used by 14 pairs of choughs at four breeding sites during the breeding season. The results showed that habitats used preferentially by chough were those where grassland sward heights were less than 2 cm, and where present, bare earth paths and cloddiau were particularly strongly used. This is related to the ease with which choughs can walk on vegetation, and access their invertebrate prey within the soil. These habitats are often associated with agricultural land-uses, in particular stock grazing.

Whitehead *et al.* (2005) also showed that most foraging during the breeding season took place within 600 m of the nest site. Johnstone *et al.* (2011) found that foraging activity usually took place close to nests and was mainly within 300 m. The quality of habitat within 300 m has also been shown to directly influence breeding success. A study from Ouessant, Brittany found that fecundity was directly related to the ratio of foraging habitat with sward heights less than 5 cm and within 300 m (Kerbirou *et al.*, 2006). Thorpe and Young (2009) recommend a precautionary approach of 1 km as a typical foraging range for choughs during the breeding season, with grassland areas with swards less than 5 cm being the most valuable habitats.

The data presented in this report concur with these findings, with desk study and survey data showing chough recorded most frequently foraging in grazed short sward grassland associated with coastal habitats, and most frequently of all on Wylfa Head within 500 m of nesting sites.

Taking into consideration the breeding season, none of the suggested land management units of the possible SPA and amalgamated SPA populations referred to in Section 3.3 is close (within 1 km, the typical maximum foraging range of breeding chough) to the Wylfa Newydd Development Area. Based on this study there is no apparent functional link between habitats within the Wylfa Newydd Development Area study area and breeding chough which form part of the possible SPA network.

5.2.2 Non-breeding season

The distribution and movements of chough during the non-breeding season are more widespread than during the breeding season (e.g. Roberts, 1985). Choughs congregate at traditional roost sites outside of the breeding season and range / forage from these locations through the winter months. Thorpe and Young (2009) show that choughs exhibit fidelity to communal roosting sites during the non-breeding season, and suggest that a 6 km regular foraging range from such roosts can be used for determining potential boundaries for non-breeding SPAs. The distribution of foraging non-breeding chough at and around winter roosts can be influenced not only by available habitat quality, but also by a social overlay effect whereby young choughs learn from older choughs the location of potentially suitable foraging habitats (Adrienne Stratford, *pers. comm.*). Maintaining the integrity of non-breeding season roost sites and foraging habitats is therefore an essential component of chough conservation.

Baseline data from surveys and records show a maximum of six choughs within the study area during the non-breeding season, but generally no more than four birds have been recorded (see Appendix E). Based on these values there are no substantial non-breeding season roosts in the study area, with numbers recorded rarely exceeding the resident two pairs and their offspring..

5.3 Sensitivity to disturbance

In recent years there have been a number of changes to the habitats within the Wylfa Newydd Development Area as a result of a cessation of grazing in some areas to facilitate ground investigation and archaeological trial trenching. These activities have taken some land out of habitat management methods ideal for chough, and have potentially had the effect of displacing chough via disturbance during operation. The Wylfa Newydd

Development Area is also subject to a number of other disturbance operations above that considered normal in an agricultural environment. There are vehicle movements in association with site security, ecological surveys and noise associated with the Existing Power Station, including loud fire alarm tests and stack venting. Choughs in the study area are therefore currently exposed to many short-term disturbance impacts.

Chough are considered to be generally resilient to disturbance as long as the disturbing factors are regular and present prior to breeding attempts, or occur later in the breeding period after the initial setting up of breeding territories (Adrienne Stratford / RSPB *pers. comm.*). A 'new' disturbance event during the early stages of the breeding season can cause birds to desert the nest site for the season, whereas a similar level of disturbance taking place further in to the breeding season is much less likely to have an adverse effect.

5.4 Linkages with the UK SPA network

This section discusses the two potential pathways via which the study area could affect the chough SPA network.

5.4.1 Dispersal of Wylfa Head chough to the SPA network

Young chough, fledged from nests within the study area could disperse as far as the Holy Island / Glannau Ynys Gybi SPA and potentially, when of breeding age, be recruited into the SPA population, thereby creating a functional link between the study area and the SPA network. Choughs breed at a minimum age of two years old, more commonly three or four years (Roberts, 1985).

The total number of breeding pairs of chough present within the region (as described in 3.6.2) is of the order of 96. The 40 km theoretical recruitment catchment of the Holy Island / Glannau Ynys Gybi SPA could therefore yield up to this number of broods of chough per year. The productivity of up to two breeding pairs from Wylfa Head could therefore represent a maximum of approximately 2% of the total potential yearly fledgling cohort supporting its population. This percentage is not considered to represent a significant functional link with the Holy Island / Glannau Ynys Gybi SPA or the wider SPA network.

It is also considered that nest sites further away from the Holy Island / Glannau Ynys Gybi SPA are likely to contribute fewer birds than those closer to the SPA. This is based on typical bird dispersal patterns, with uneven distributions across the maximum range of recorded dispersal, whereby numbers of birds decrease as distance increases. This has been shown in blackbirds (*Turdus merula*), lesser black-backed gull (*Larus fuscus*) reed warbler (*Acrocephalus scirpaceus*) and wood pigeon (*Columba palumbus*) (Paradis *et al.*, 1998). This has also been seen in chough by Stratford (undated) which shows an uneven distribution in chough dispersal from the Llyn Peninsular (see Figure 3.3). This showed that the numbers of chough steadily decreased within each bracket as the distance from natal sites increased. The approximate distribution of breeding pairs in the region is presented diagrammatically in Figure 5.1. The number of fledglings that would go on to nest within the Holy Island / Glannau Ynys Gybi SPA or the wider SPA network is therefore likely to only be a fraction of the total fledged.

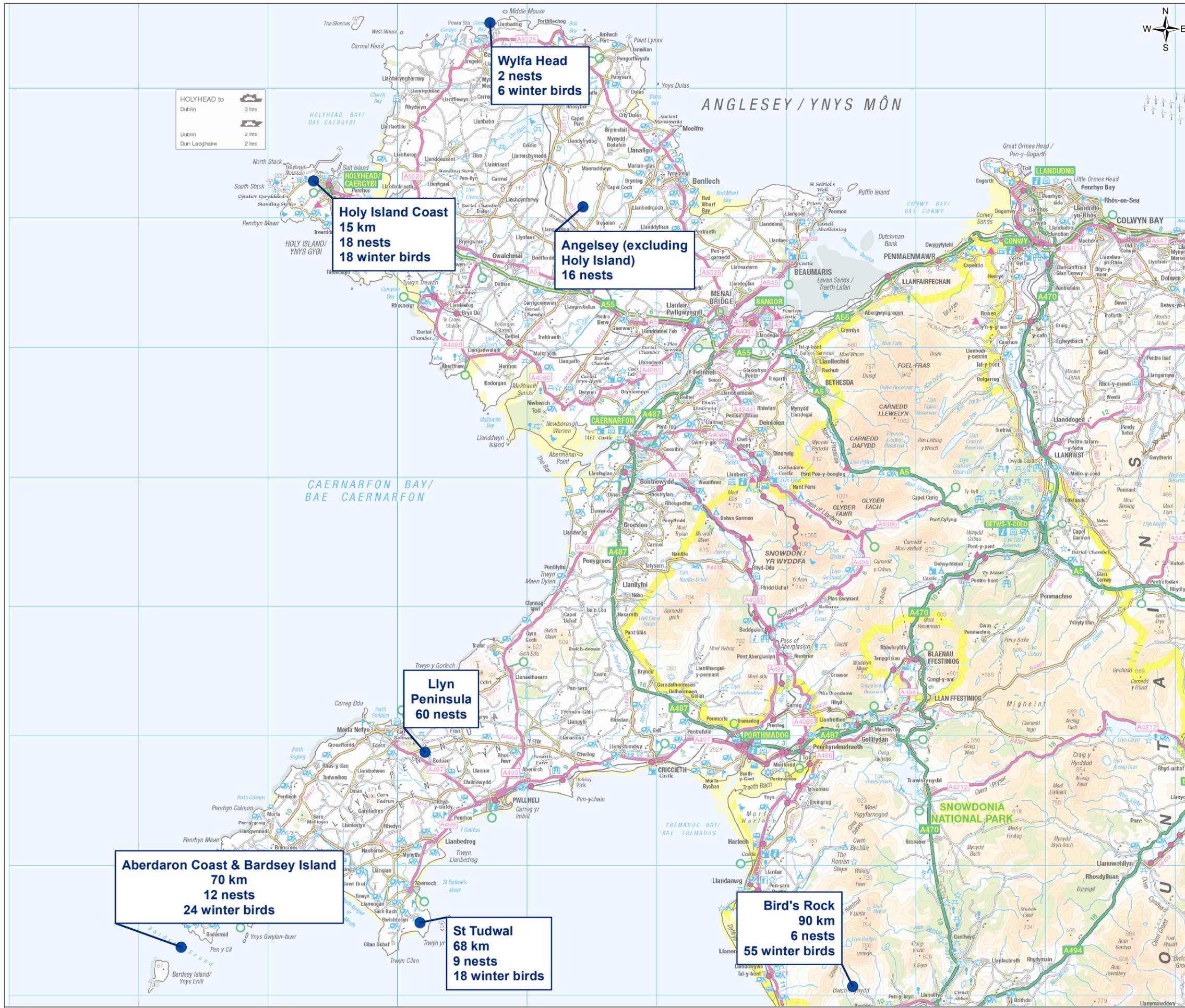
Based on the contribution that the two pairs from Wylfa Head could have to the SPA in terms of fledglings, and the low probability of chough fledglings dispersing as far as the Holy Island / Glannau Ynys Gybi SPA to breed, it is therefore suggested that the two pairs of nesting chough from Wylfa Head would contribute less than the maximum of 2% of the fledgling cohort supporting the SPA network. This would therefore not represent a significant proportion.

FIGURE 5-1

Legend

● Chough record

HOLYHEAD to
Dublin
3 hrs
Dublin
2 hrs
Dun Laoghaire
2 hrs



0	JUL 17	Initial Issue	RM	JJ	PS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Client
HORIZON
NUCLEAR POWER

Project
WYLFA NEWYDD PROJECT
ENVIRONMENTAL STATEMENT

Drawing Title
REGIONAL DISTRIBUTION OF
BREEDING PAIRS OF CHOUGH

Scale @ A3	1:285,500	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.		
Drawing No.	60PO8077_DCO_VOL_D_APP_09_14_05_01	

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5.4.2 Use of study area habitats by SPA chough

The habitats within the study area could potentially support foraging chough from SPAs in the breeding season and / or the non-breeding season, thereby creating a functional link between the study area and the SPA network.

The Holy Island / Glannau Ynys Gybi SPA, at 15 km from the study area, is beyond the typical maximum range of foraging chough in the breeding season (section 5.2.1) and so any choughs breeding within the SPA will not use the habitats within the study area for foraging during the breeding season.

Prior to 2017, the provenance of chough observed in the study area during the non-breeding season was unknown – birds could have been the resident breeding pairs or potentially birds from further afield, or both. There are study area chough records throughout each period of non-breeding season surveys, generally indicating four birds foraging within habitats during winter months, with a peak count of six birds. This would seem largely consistent with the breeding pairs roaming the area, with the occasional addition of small numbers of other birds, such as their offspring or roaming immature birds. Colour ring data gathered during the 2017 winter surveys provide positive identification of two individual choughs. One bird (Right leg: Blue / Red, Left leg: Red / BTO) is the individual which originated from the Holy Island / Glannau Ynys Gybi SPA in 2015 (Section 3.6.3), the other (Right leg: Yellow / Black, Left leg: Red / BTO) is the 13 year old female originally from Church Bay (Section 3.5.2). Therefore, at least for the 2017 winter period, choughs foraging within the study area are shown to include individuals from the study area breeding pairs and one confirmed record of a sub-adult bird from as far afield as the Holy Island / Glannau Ynys Gybi SPA.

The review of possible chough SPAs in Wales (Thorpe and Young, 2009) identifies the Church Bay / Carmel Head possible SPA, described in section 3.3 (Figure 6.6, Figure 6.7 and Figure 6.8, Appendix C), situated on the limit of the typical non-breeding season foraging range of choughs from their traditional winter roosts. The chough fledged in 2015 from the Holy Island Coast / Glannau Ynys Gybi SPA (described above) has also been recorded at Church Bay and Carmel Head and is therefore an indicator that birds using the Church Bay winter roost can reach the study area in the non-breeding season. A link between the study area and the possible SPA network therefore exists. However, the following factors would suggest that this link is marginal and would not form a significant and functional link to the possible SPA network:

- the low numbers of chough recorded in the study area in the non-breeding season;
- the availability of alternative foraging habitat closer the Church Bay / Carmel Head compared to those within the study area; and
- the distance of the study area from the Church Bay roost,.

The occurrence of the 2015-born SPA bird within the study area during winter 2017 means an indirect link also exists between the study area and the existing SPA network. However, this individual chough is not one of the breeding adult pairs which form the qualifying feature of the SPA and it was not recorded during the breeding period. This is therefore not considered to be significant as this would be within the normal dispersal distance of chough.

Beyond the single bird recorded in 2015, there is no further evidence of SPA birds in the study area. Whilst it is therefore recognised that the study area is within chough dispersal distances, and a bird has visited the site, what are probably more important for chough from the Holy Island Coast / Glannau Ynys Gybi SPA are habitats much closer to the SPA itself. This would include all habitats within the Anglesey Coast amalgamated possible chough SPA, as illustrated in Figure 6.5.

The habitats within the study area are therefore not considered to be of significant importance to chough from the SPA network and in consequence, not to have a significant functional link with the SPA network.

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Appendix A. Legal protection and conservation status of chough

Chough is afforded the highest degree of legal protection through its inclusion on Schedule 1 of the Wildlife and Countryside Act 1981 and Annex I of the Birds Directive.

Chough is also listed as a priority species in accordance with Section 7 of the Environment (Wales) Act 2016, as well as being listed on Anglesey Local Biodiversity Action Plan.

Appendix B. Project consultation

Table 6.1: Section 61Z consultation responses on the Project regarding chough

Stakeholder	Stakeholder response to section 61Z consultation	Action taken by Jacobs presented in this report
Natural Resources Wales	Chough and barn owls are protected under Schedule 1 of the <i>Wildlife and Countryside Act 1981</i> (as amended). The proposed works have the potential to disturb these Schedule 1 birds. NRW advise that a Method Statement should be prepared detailing the works that will be restricted, and / or mitigation measures to be employed, to avoid disturbing Schedule 1 listed birds during the breeding period. The Method Statement should be approved by the local authority in consultation with Natural Resources Wales.	This comment relates to activities likely during construction phase of the Project, and is not relevant in the context of the basis for assessment provided in this report. However, throughout all construction phases good practice mitigation will be in operation to prevent any breaches in the legislation protecting chough and their nests.
North Wales Wildlife Trust	The environmental statement does not include a full suite of necessary data to assign evaluation and importance to features in national, regional, local context (e.g. fungi, chough, great crested newt, marine mammals).	The data from an enhanced background data search and full presentation of surveys to date, including those most recently commissioned specifically for chough are considered appropriate for addressing the concerns raised in this comment.
North Wales Wildlife Trust	Chough – no systematic targeted surveys for foraging use across the seasons – despite early evidence identifying the species as a key receptor.	Systematic targeted surveys of chough have now been completed between January and June 2017. When combined with all other data, the empirical basis for assessment is considered to be robust.
RSPB	Insufficient chough data provided.	Gathering and presenting all data available from the study area with data from additional surveys completed between January and June 2017.
RSPB	Consideration of chough in the environmental statement is very limited.	The basis for assessment presented in this report is more comprehensive than used in previous consultation documents.
RSPB	<p>The desk study is incomplete in terms of chough usage of the site, as acknowledged by the consultants.</p> <p>Field study results are insufficient. Although, we acknowledge that part of the study area is supplemented by ongoing monitoring of chough nest sites conducted by the Welsh Chough Project. The use and reliance of generic breeding bird and winter bird surveys pre-dates the scoping advice for SPC works provided by the RSPB on 2nd March 2016. We are concerned that the retro fitting of data from the generic surveys is inadequate and is not sufficient in terms of recording chough usage of the site.</p>	<p>Chough data requested by Jacobs from the RSPB is included in this report and forms part of the basis for assessment.</p> <p>The full field study results available for the study area have now been included, not just data gathered during surveys by Jacobs. Overall the dataset represents information from 47 months of survey between 2009 and 2015 that was not included previously due to different methodologies being used between years making comparisons difficult.</p> <p>Jacobs has also undertaken species-specific surveys using methods proposed by the RSPB with the intention of establishing a more robust baseline for the species. The results from these surveys are also included in this report</p>

Stakeholder	Stakeholder response to section 61Z consultation	Action taken by Jacobs presented in this report
		and form the basis of assessment.
RSPB	The assessment overlooks habitat degradation through the cessation of grazing in areas outside the SPC Application Site Boundary, including key foraging areas around Wylfa Head that are 300 m from nest locations.	A management plan for Wylfa Head to ensure grassland habitats are appropriately managed is currently being prepared by Horizon with the express intention of maintaining and enhancing foraging areas for chough. This report highlights the importance of habitat quality parameters e.g. grazing pressure, to distribution and success of chough.
RSPB	We are concerned that the Glannau Ynys Gybi / Holy Island Coast SPA has been screened out by a premature HRA without sufficient data. We recommend that further consideration is made to the relationship between the study area and the SPA. We would also like to add that consideration is given to the JNCC third review of the UK SPA network which has very recently been published.	This report provides additional information in support of our professional opinion that there are no significant functional linkages between the study area populations and the Glannau Ynys Gybi / Holy Island Coast SPA. Included in the additional background data information used to form the basis for assessment is information from the JNCC third review of the UK SPA network and the 2009 review of chough SPAs in Wales.
RSPB	It is important that the condition of foraging habitat at Wylfa Head is enhanced and grazing is modified to manage the site for chough, a feature of the proposed candidate Wildlife Site. Enhancement could be achieved through mechanical means such as flailing to remove the longer grass sward and open up areas to grazing animals. In addition a grazing plan needs to be devised to help restore the condition of the habitat. The grazing plan should also include the grassland along the coastal strip outside the development area between Wylfa Head and Porth y Wylfa.	A management plan for Wylfa Head to ensure grassland habitats are regularly cut is currently being prepared by Horizon with the express intention of maintaining and enhancing foraging areas for chough. This report highlights the importance of habitat quality parameters e.g. grazing pressure to distribution and success of chough.

Appendix C. Desk study figures

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FIGURE 6-1

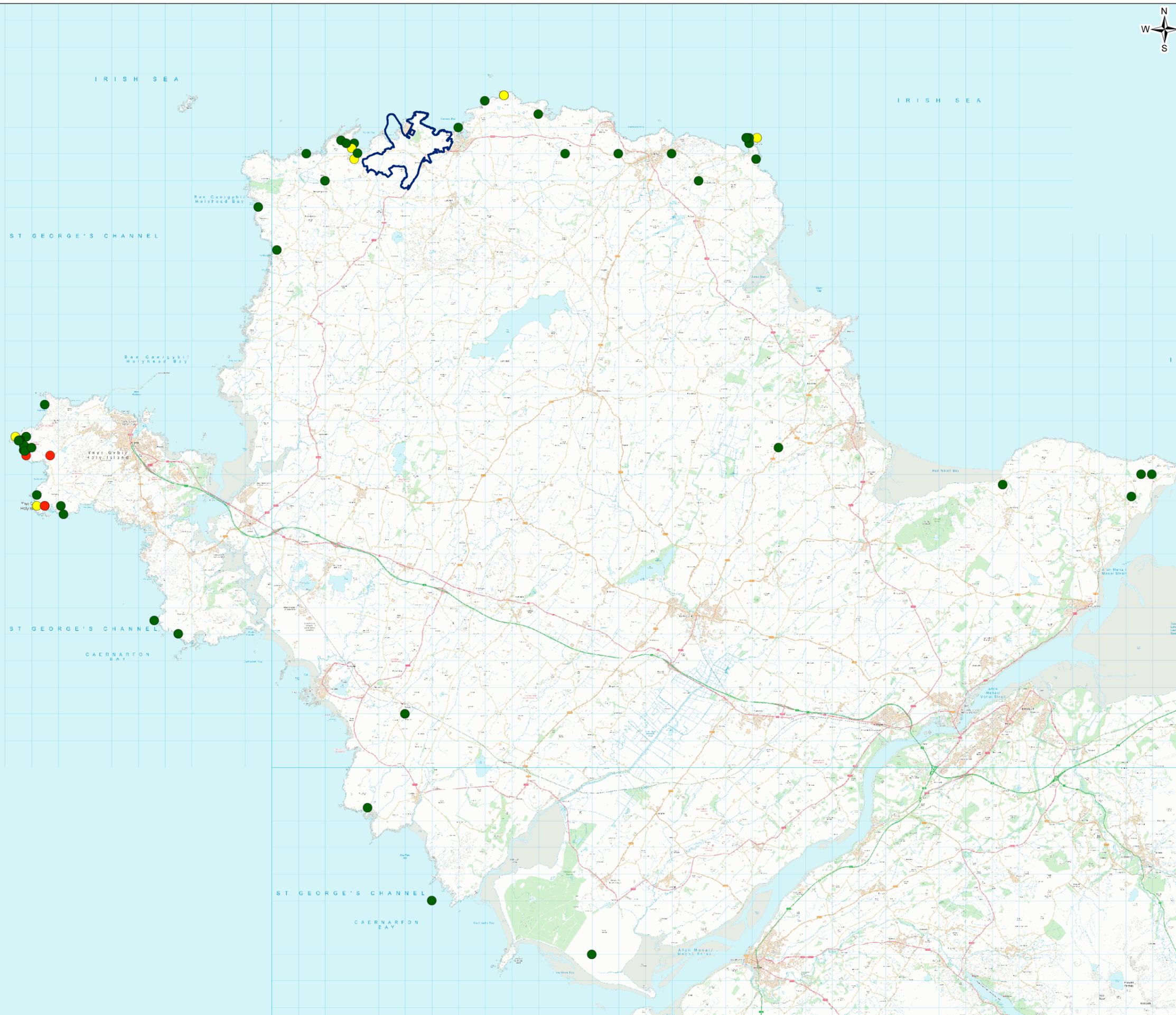


Legend

Wylfa Newydd Development Area

Number of breeding birds

- 1 - 5
- 6 - 10
- 11+



0	JUL 17	Initial Issue	RM	JJ	RS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Client
HORIZON
 NUCLEAR POWER

Project
 WYLFA NEWYDD PROJECT
 ENVIRONMENTAL STATEMENT

Drawing Title
 RECORDS OF CHOUGH IN THE BREEDING SEASON
 (01 APRIL TO 31 JULY) FOR THE WHOLE OF ANGLESEY
 FROM COFNOD

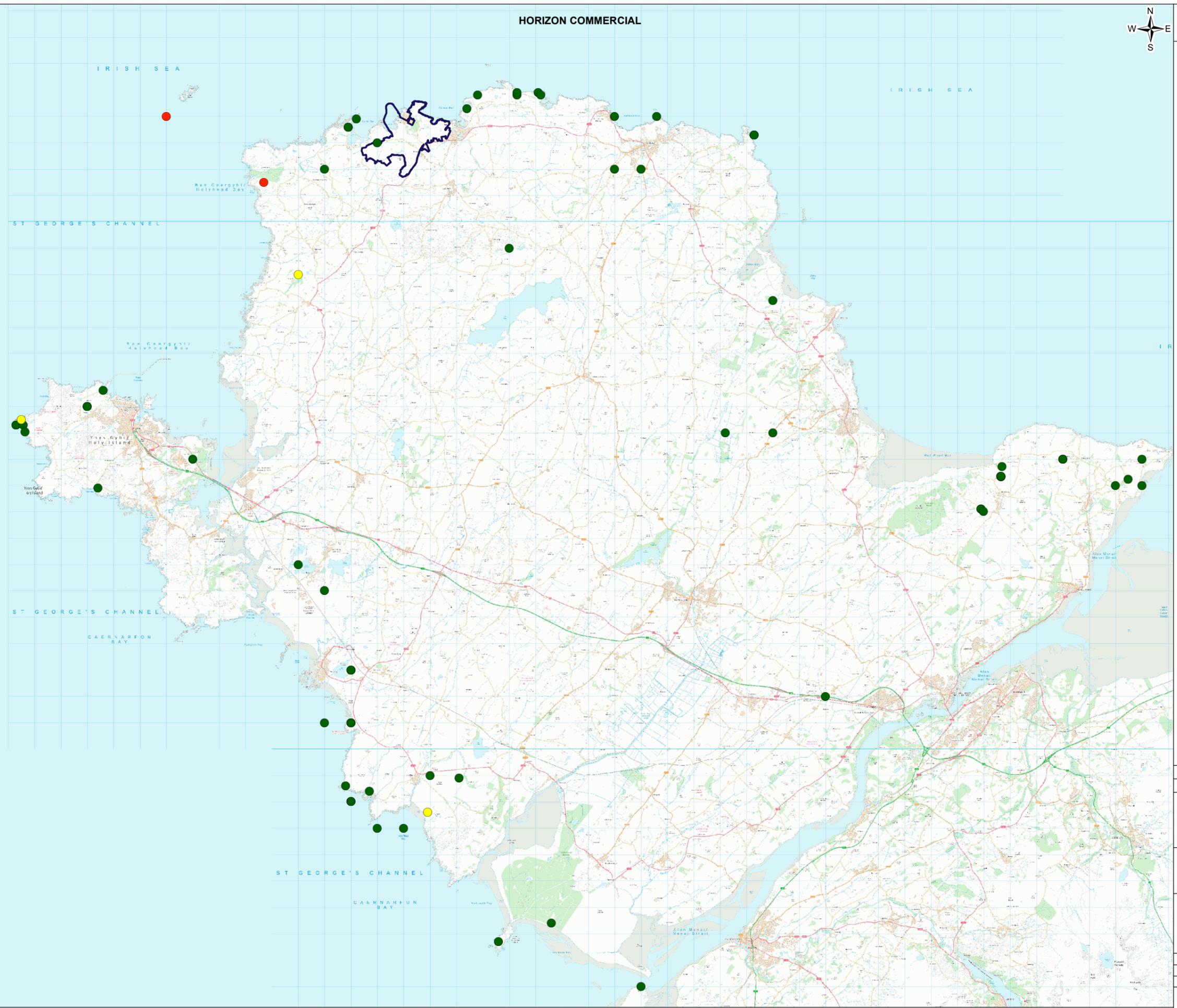
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Jacobs No. 60PO8077

Drawing No. 60PO8077_DCO_VOL_D_APP_09_14_06_01

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Legend

Wylfa Newydd Development Area

Number of birds recorded outside breeding season

- 1 - 5
- 6 - 10
- 11+



0	MAY 17	Initial Issue	RM	PS	PS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
Client						
Project		WYLFA NEWYDD PROJECT				
Drawing Title		NON-BREEDING SEASON CHOUGH RECORDS - ANGLESEY COFNOD DATA				
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Client No.						
Drawing No.	60PO8077_TSR_CF_06_02					

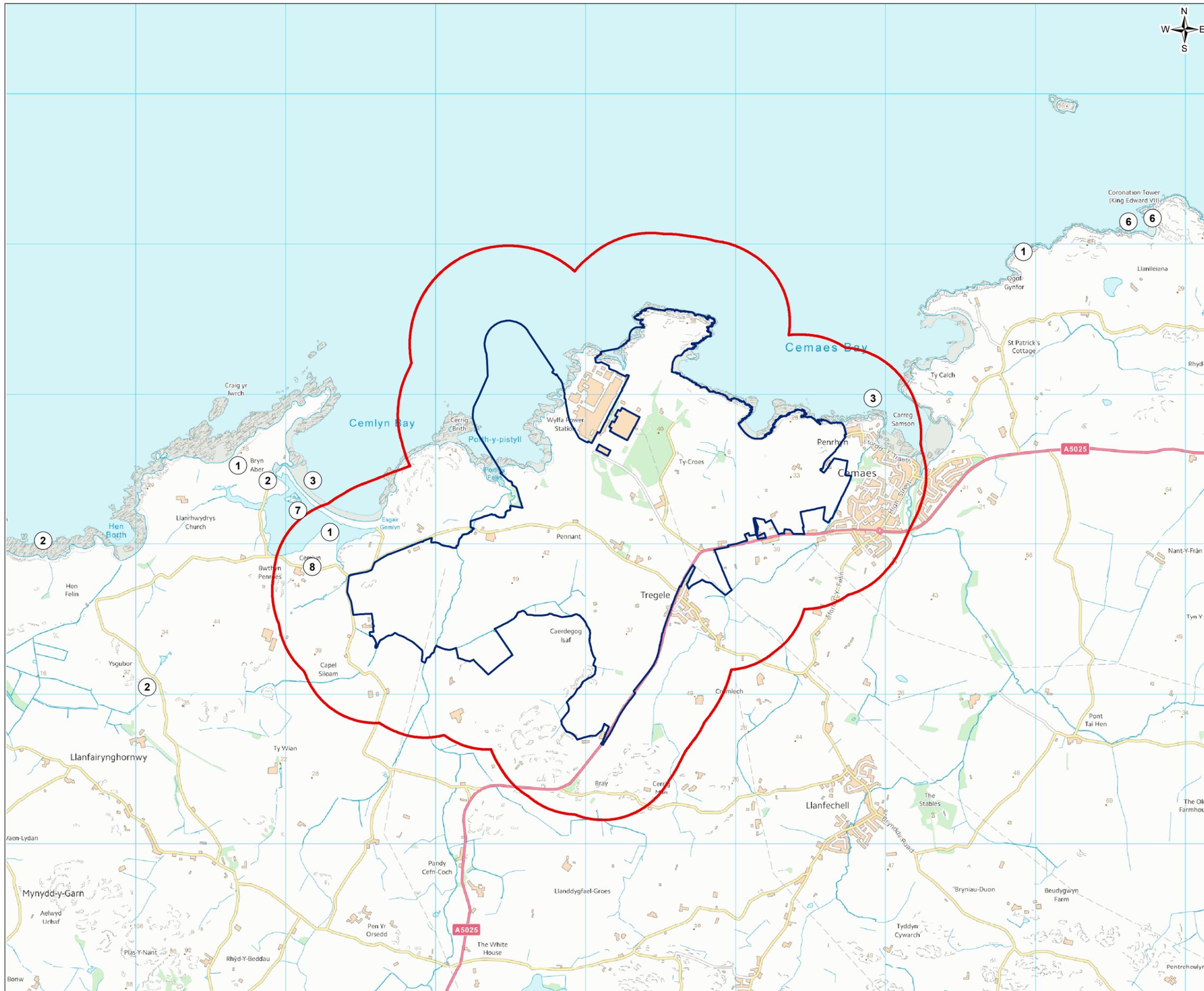


FIGURE 6-3



Legend

- Wylfa Newydd Development Area
- Buffer of 500m of WNDA boundary
- 1 Number of breeding birds



0	JUL 17	Initial Issue	RM	JJ	RS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Client
HORIZON
 NUCLEAR POWER

Project
 WYLFA NEWYDD PROJECT
 ENVIRONMENTAL STATEMENT

Drawing Title
 RECORDS OF CHOUGH IN THE BREEDING SEASON
 (01 APRIL TO 31 JULY) FOR THE STUDY AREA
 FROM COFNOD

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Client No.		

Drawing No.
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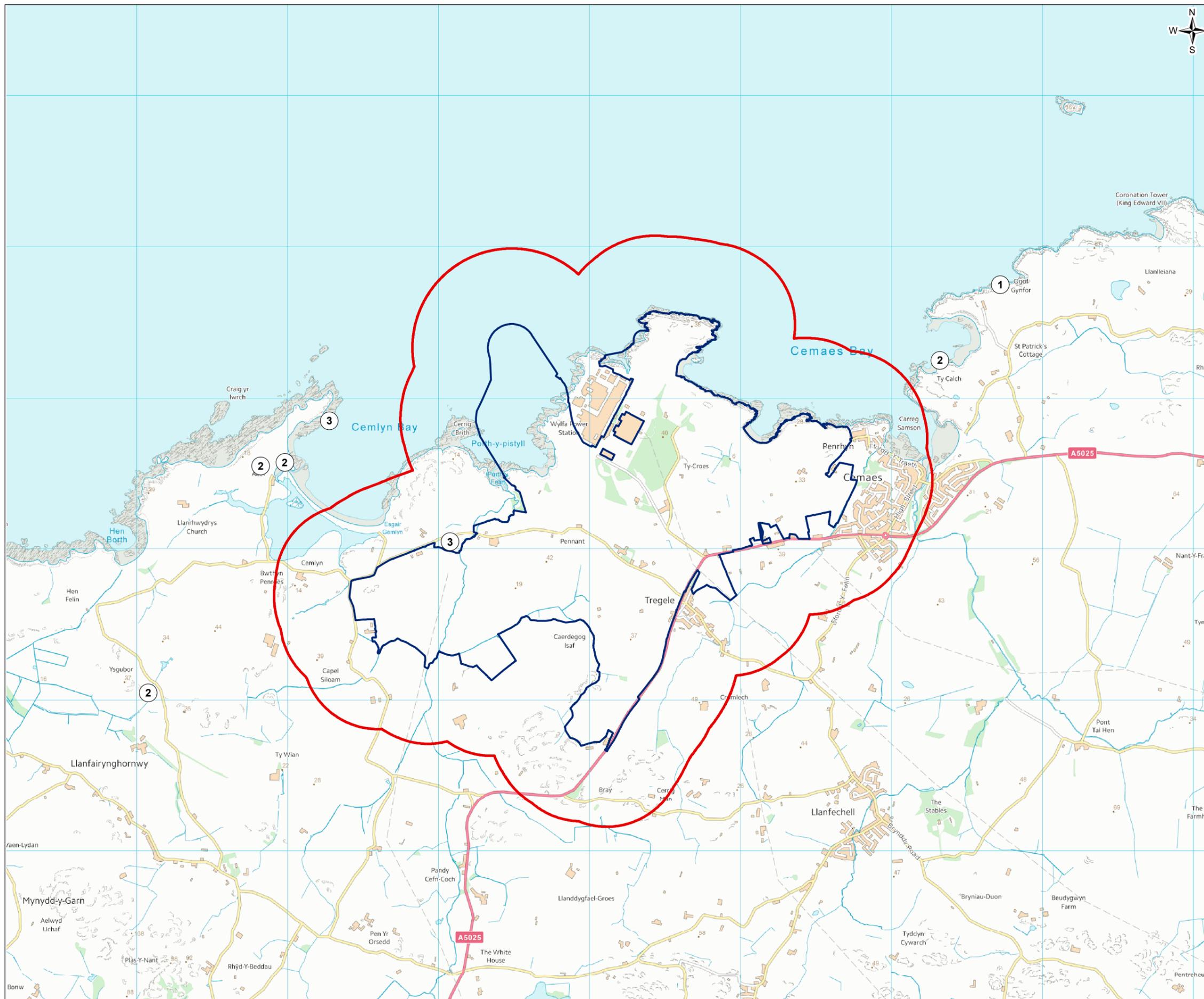


FIGURE 6-4



Legend

- Wylfa Newydd Development Area
- Buffer of 500m of WNDA boundary
- 1 Number of non-breeding birds



0	JUL 17	Initial Issue	RM	JJ	RS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Client
HORIZON
 NUCLEAR POWER

Project
 WYLFA NEWYDD PROJECT
 ENVIRONMENTAL STATEMENT

Drawing Title
 RECORDS OF CHOUGH IN THE NON-BREEDING SEASON
 (01 AUGUST TO 31 MARCH) FOR THE STUDY AREA
 FROM COFNOD

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Client No.		

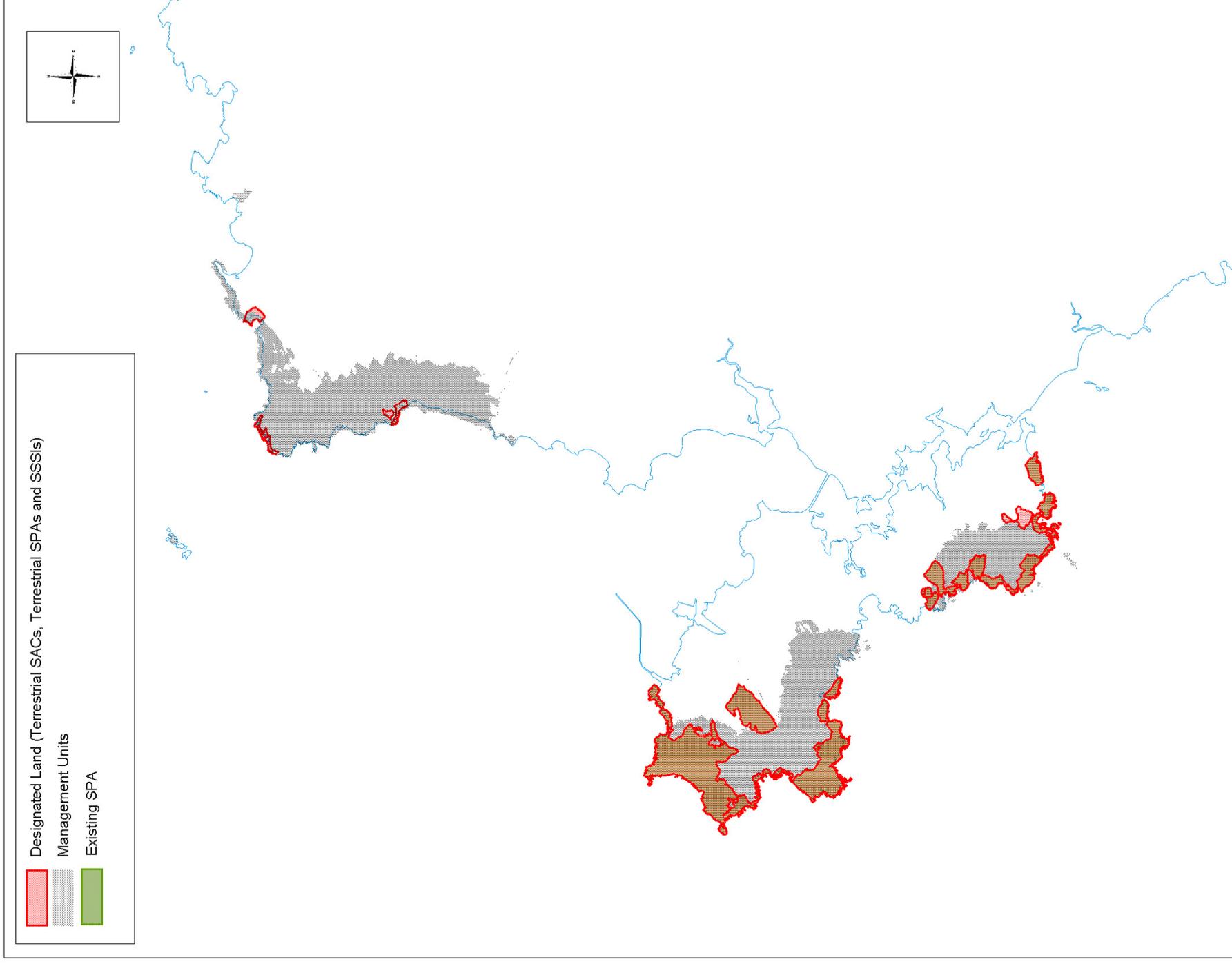
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Possible Amalgamated Chough SPA - Anglesey Coast



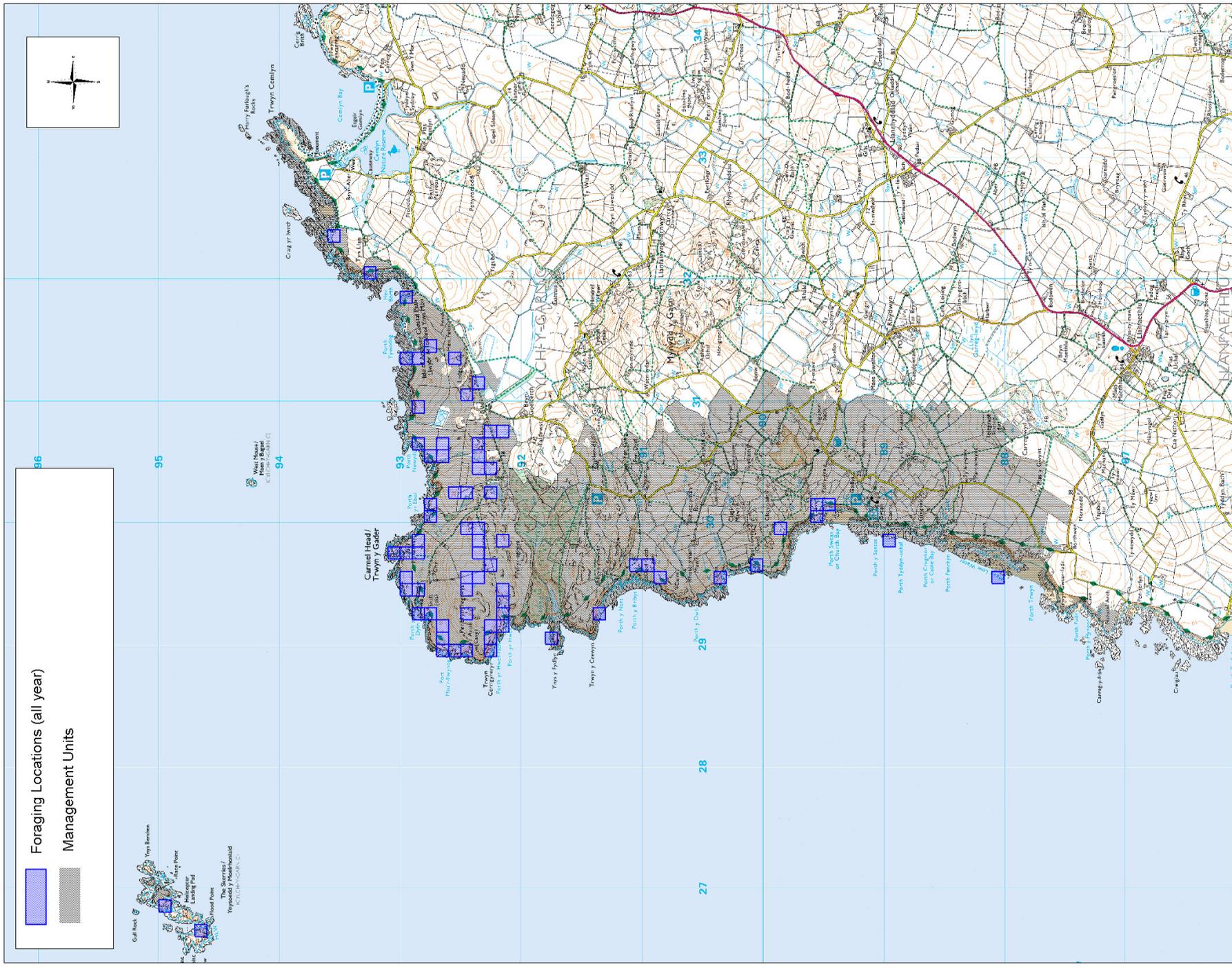
Produced by RSPB Cymru

Scale 1cm = 1.20km

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Possible Chough SPA (breeding and non-breeding) - Church Bay/Carmel Head



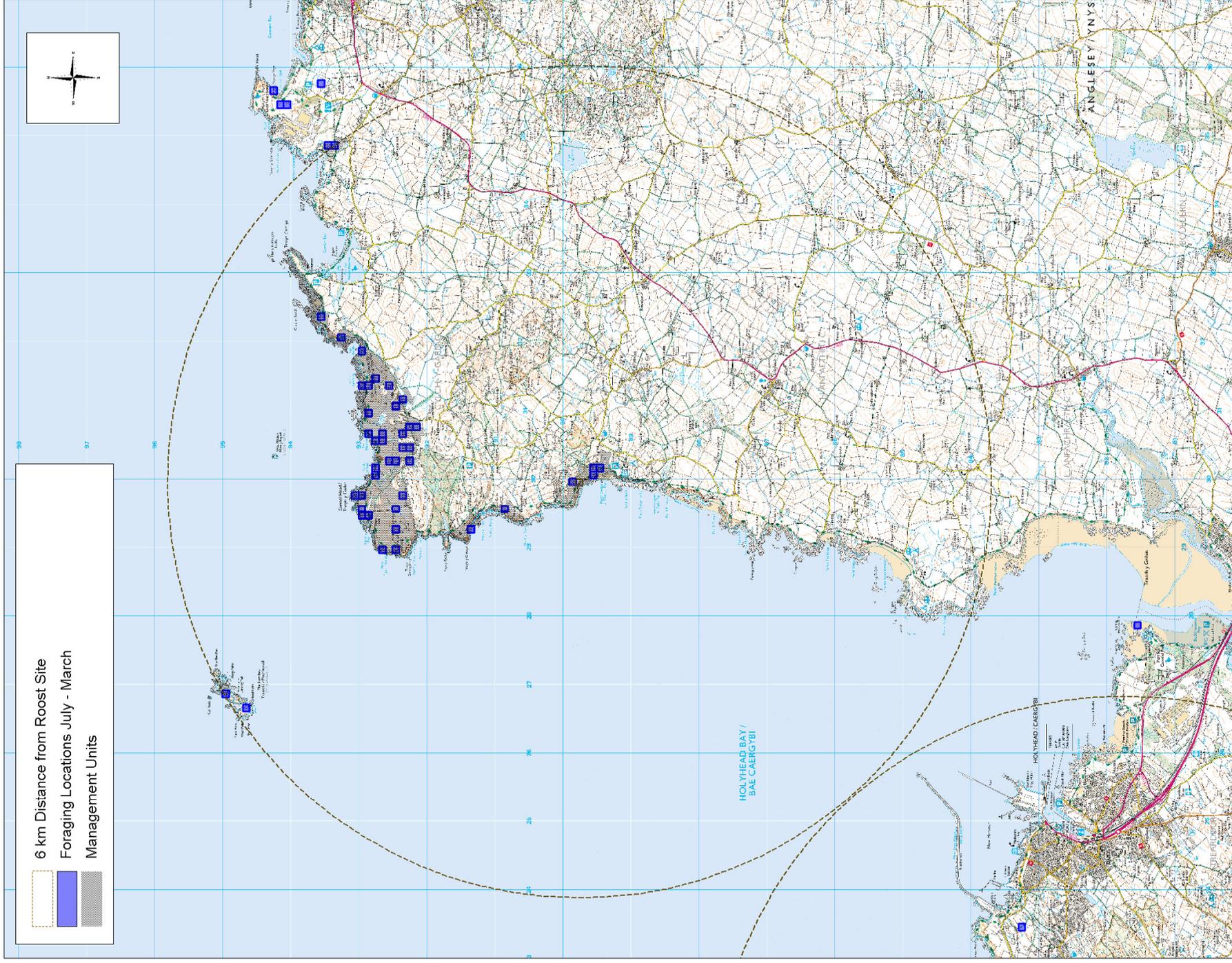
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Scale 1 cm = 0.43km

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Possible Chough SPA (non-breeding) - Church Bay/Carmel Head



Produced by RSPB Cymru

Scale 1 cm = 0.76km

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Appendix D. Breeding season survey results

Breeding bird survey results 2010

For the breeding bird survey season 2010, Figure 6.9 shows the area surveyed as illustrated by the green line and Table 6.2 shows the dates for the eight transects completed. Figure 6.10 shows the locations of chough sightings during the surveys (depicted by blue stars) and the surveyed area is illustrated by the green line. The numbers of chough recorded during each sighting was not included in the report.

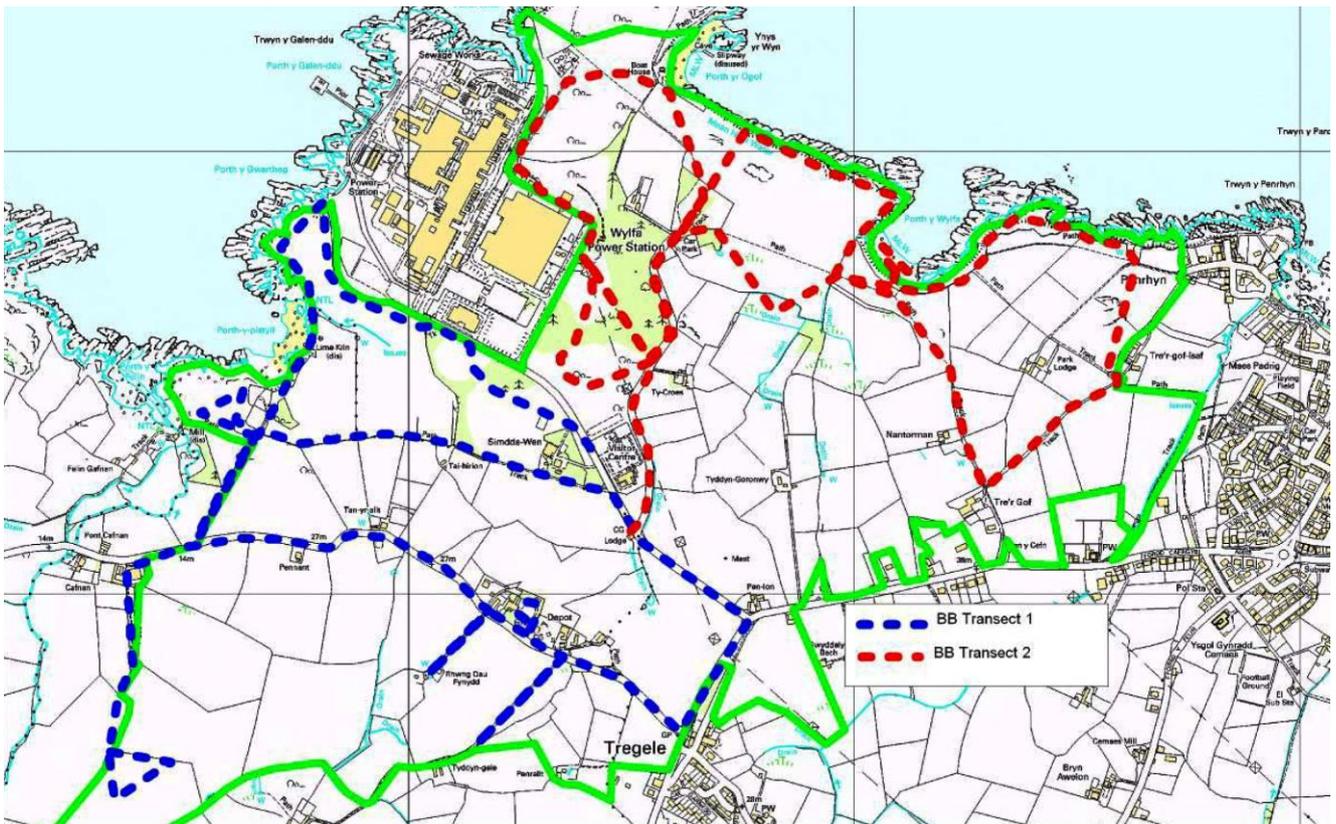


Figure 6.9: 2010 breeding bird surveys transect routes (from Arup, 2012a)

Table 6.2: 2010 breeding bird surveys transect dates (from Arup, 2012a)

Date	Transect No.	Date	Transect No.
30/03/2010	1	27/04/2010	1
31/03/2010	2	28/04/2010	2
15/04/2010	1	19/05/2010	1
16/03/2010	2	20/05/2010	2

Breeding bird survey results 2011

For the breeding bird survey season 2011, Figure 6.11 shows the study area as illustrated by the green line and Table 6.3 shows the dates for the eight transect surveys completed. Chough sightings during the 2011 breeding season are included on Figure 6.10 depicted by red stars. The numbers of chough recorded during each sighting was not included in the report.

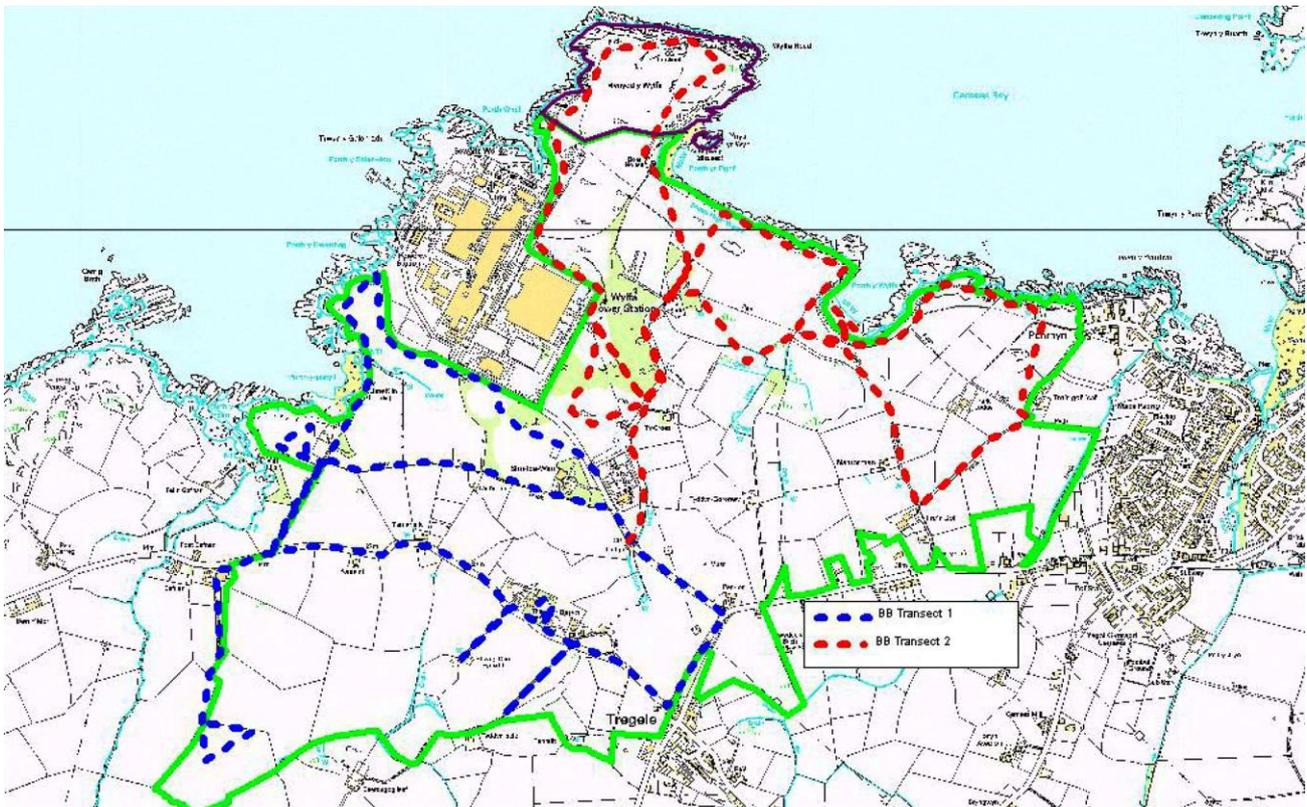


Figure 6.11: 2011 breeding bird survey transect routes (from Arup, 2012a)

Table 6.3: 2011 breeding bird survey transect dates (from Arup, 2012a)

Date	Transect No.	Date	Transect No.
22/03/2011	1	26/04/2011	1
23/03/2011	2	27/04/2011	2
05/04/2011	1	17/05/2011	1
06/04/2011	2	18/05/2011	2

Breeding bird survey results 2012

For the breeding bird survey season 2012, Figure 6.12 shows the study area and Table 6.4 shows the dates for the transect surveys completed. Chough sightings during the 2012 breeding season are included on Figure 6.13.

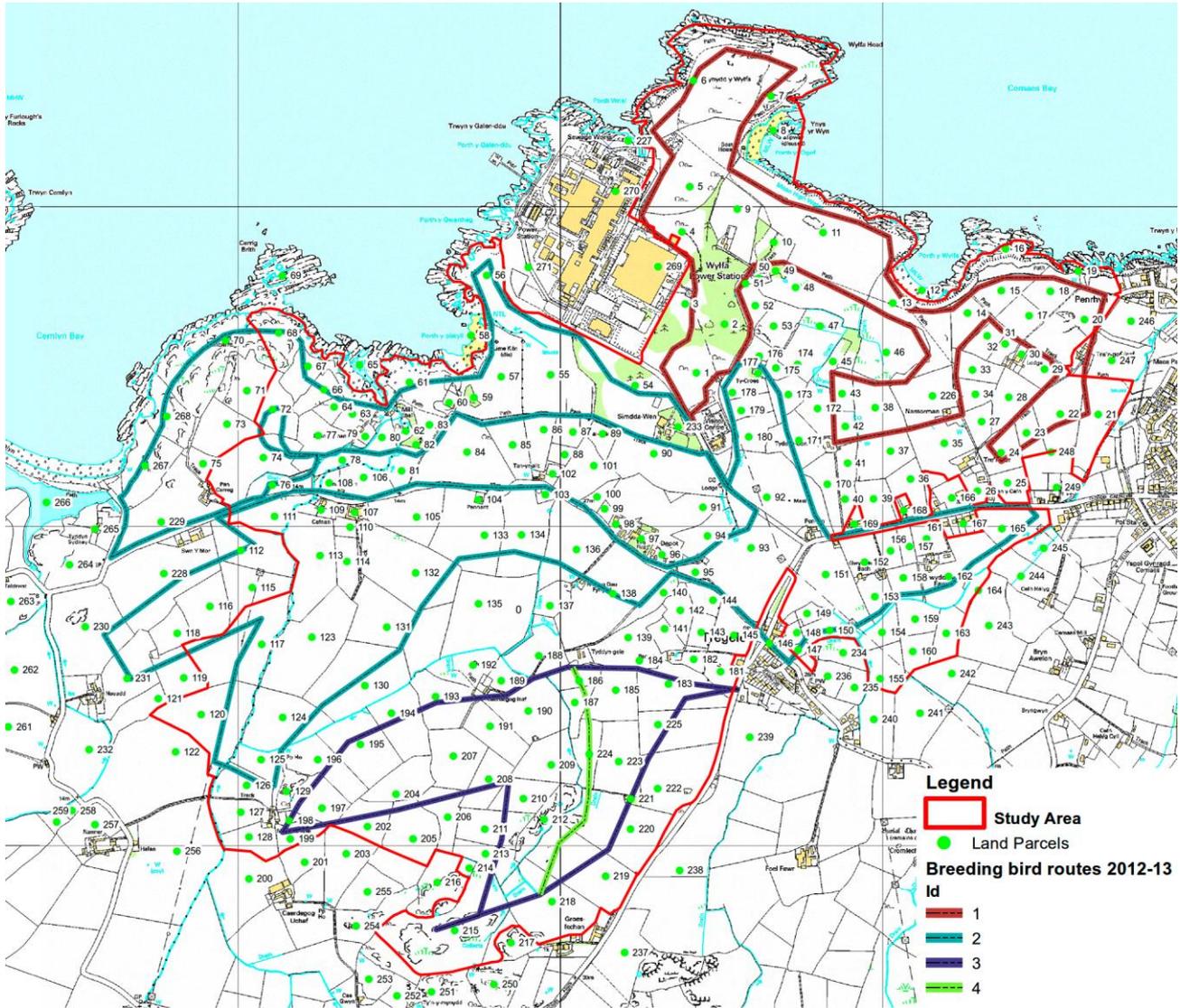


Figure 6.12: 2012 breeding bird surveys transect routes (green circles and associated numbering represent field numbers) (from Arup, 2013a)

Table 6.4: 2012 breeding bird survey transect dates (from Arup, 2013a)

Date	Transect No.	Date	Transect No.
17/04/2012	1	13/06/2012	1
18/04/2012	2	14/06/2012	2
15/05/2012	1	10/07/2012	1
16/05/2012	2	11/07/2012	2

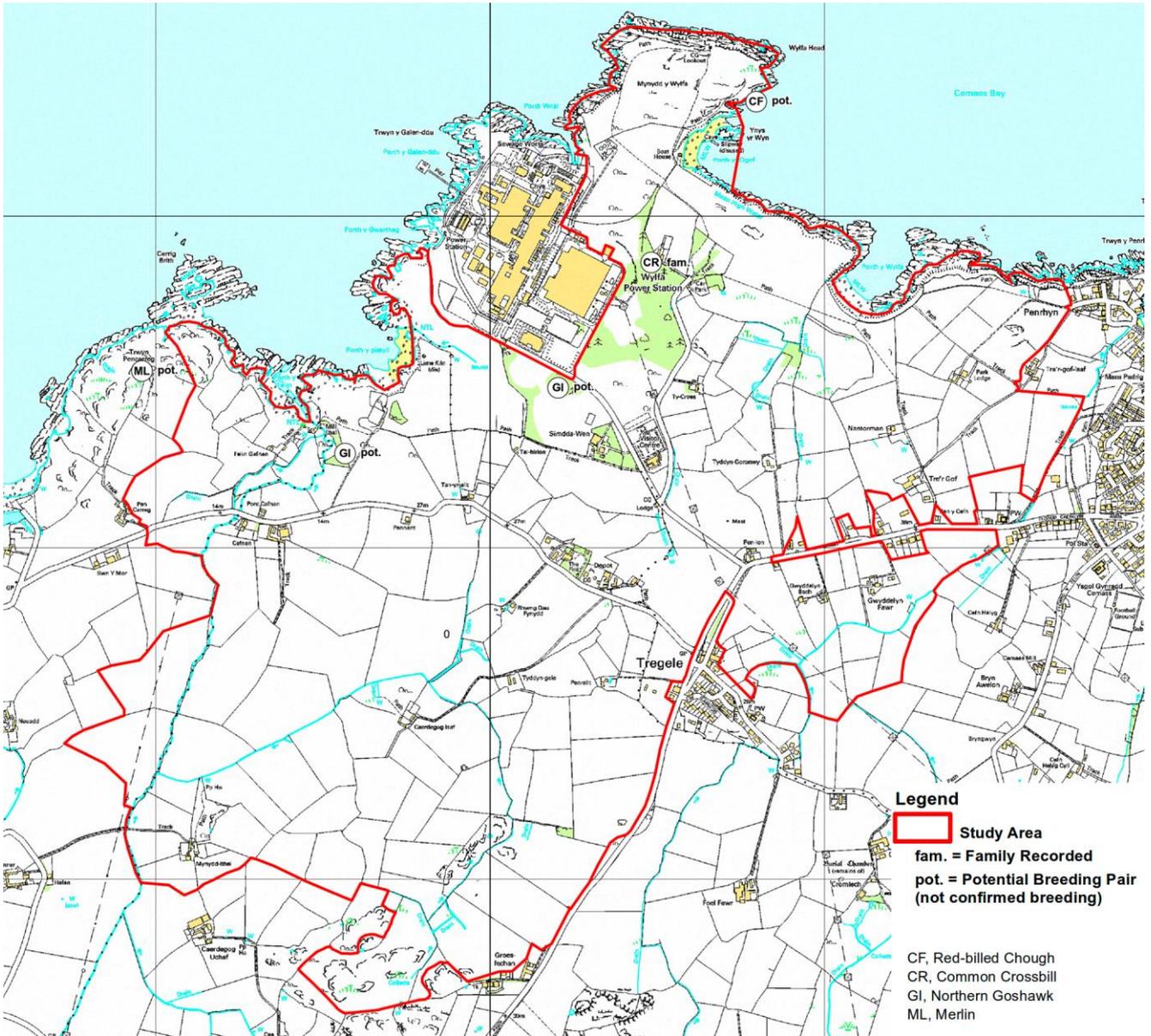


Figure 6.13: 2012 breeding bird survey chough sightings (from Arup, 2013a)³

³ CF (British Trust for Ornithology code for chough) location identified on east side of Wylla Head, pot. relates to potential nesting behaviour being recorded.

Breeding bird survey results 2013

The breeding birds survey in 2013 comprised six transect routes walked between one and three times for a total of 21 surveys and seven vantage point surveys, as shown in Figure 6.14. Transects in April and May were completed by Arup, with data provided to Jacobs who completed the survey. It was not possible to differentiate between birds recorded in April and May in these data, therefore they have been grouped together, as shown in Table 6.6.

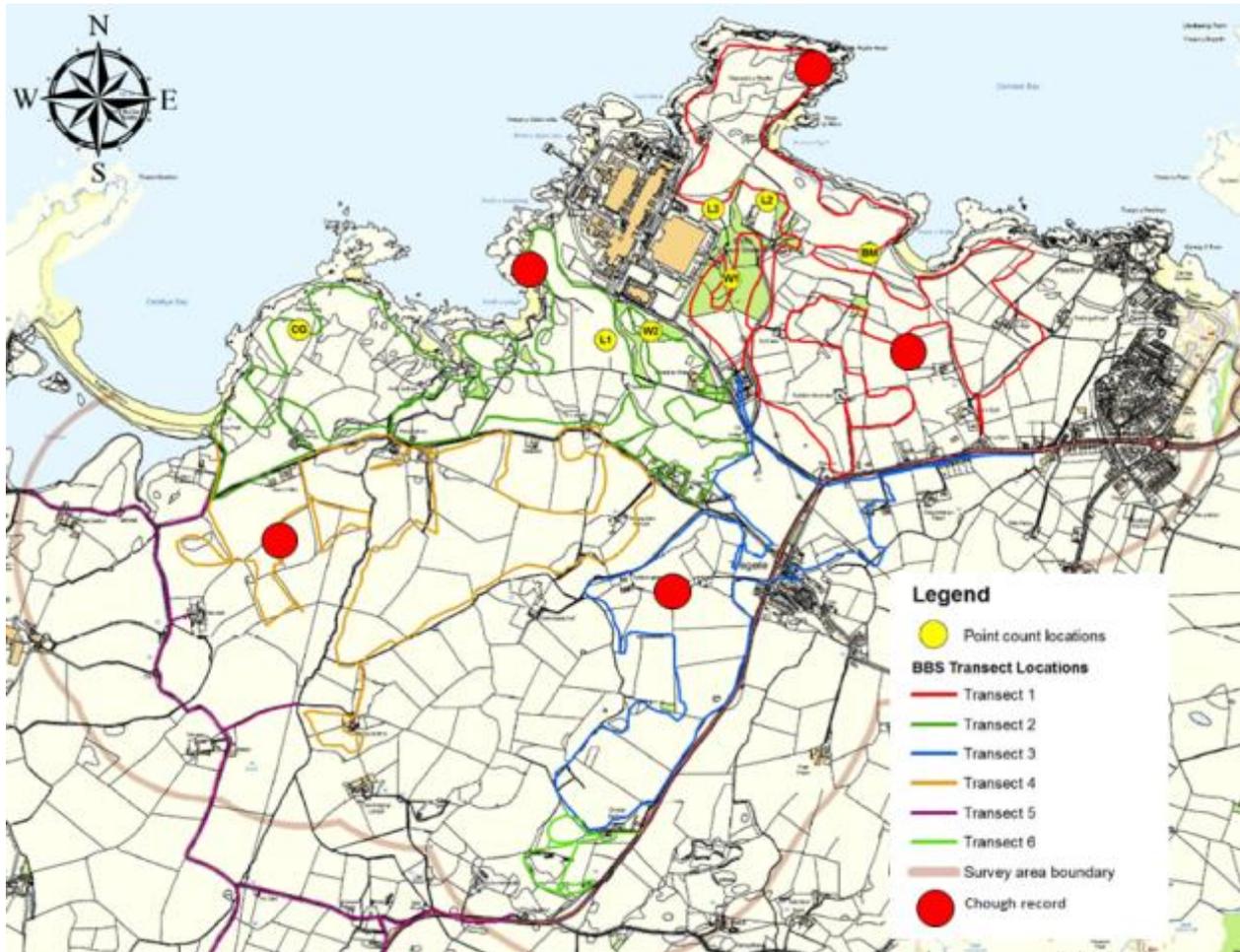


Figure 6.14: 2013 breeding bird survey transect routes and vantage point locations (from Jacobs, 2014a)

Table 6.5: 2013 breeding bird survey transect dates and chough sightings (from Jacobs, 2014a)

Date	Transect No.	Chough sighted	Date	Transect No.	Chough sighted
April and May	1	4	April and May	4	2
18/06/2013	1	0	25/06/2013	4	0
09/07/2013	1	2	12/07/2013	4	0
April and May	2	1	April and May	5	0
20/06/2013	2	0	26/06/2013	5	0
10/07/2013	2	0	30/06/2013	5	0
April and May	3	2	05/05/2013	6 ⁴	0

⁴ Only one transect was completed for Transect 6.

Date	Transect No.	Chough sighted	Date	Transect No.	Chough sighted
19/06/2013	3	0	-	-	-
11/07/2013	3	0	-	-	-

Table 6.6: 2013 breeding bird survey dates of the vantage point surveys (from Jacobs, 2014a)

Date	Point count	Chough sighted	Date	Point count	Chough sighted
17/06/2013	L1	0	08/07/2013	W2	0
28/06/2013	L1	0	16/07/2013	W2	0
18/06/2013	L2	0	27/06/2013	BM	0
09/07/2013	L2	0	18/07/2013	BM	0
10/07/2013	L3	0	19/06/2013	CG	0
20/07/2013	L3	0	26/06/2013	CG	0
25/06/2013	W1	0	11/07/2013	CG	0
17/07/2013	W1	0	30/07/2013	CG	0

Breeding bird survey results 2014

The breeding bird survey in 2014 comprised six transects, as shown in 23, Appendix H. Note there is no separate figure presented for 2014 breeding season results. Each transect was walked once a month between April and July, the date ranges for which and chough sightings are shown in Table 6.7.

Table 6.7: 2014 breeding bird survey transect dates and chough sightings (from Jacobs, 2014b)

Date	Transect No.	Chough sighted	Date	Transect No.	Chough sighted
7-17/04/2014	1	1	7-17/04/2014	4	0
2-12/05/2014	1	2	2-12/05/2014	4	0
16-27/06/2014	1	0	16-27/06/2014	4	6
14-25/07/2014	1	2	14-25/07/2014	4	1
7-17/04/2014	2	0	7-17/04/2014	5	0
2-12/05/2014	2	0	2-12/05/2014	5	0
16-27/06/2014	2	5	16-27/06/2014	5	0
14-25/07/2014	2	0	14-25/07/2014	5	0
7-17/04/2014	3	0	7-17/04/2014	6	0
2-12/05/2014	3	0	2-12/05/2014	6	0
16-27/06/2014	3	0	16-27/06/2014	6	0
14-25/07/2014	3	0	14-25/07/2014	6	2

Appendix E. Non-breeding season survey results

Wintering bird survey results 2009-2010

For the wintering bird survey season 2009-2010, Figure 6.15 shows the transect routes walked, Table 6.8 shows the dates for the 20 transects completed and Figure 6.16 shows the locations of chough sightings during the surveys.

The location for the vantage point surveys was at National Grid Reference SH 35182 93031, as shown in Figure 6.17 by the blue square. In Figure 6.17 the area surveyed is shown by the green line. The blue lines on Figure 6.17 show the visible area from the vantage point location. The red lines on Figure 6.17 show potential power line routes being considered at the time of survey and are not relevant to this report. The dates for the 10 vantage point surveys are provided in Table 6.9.

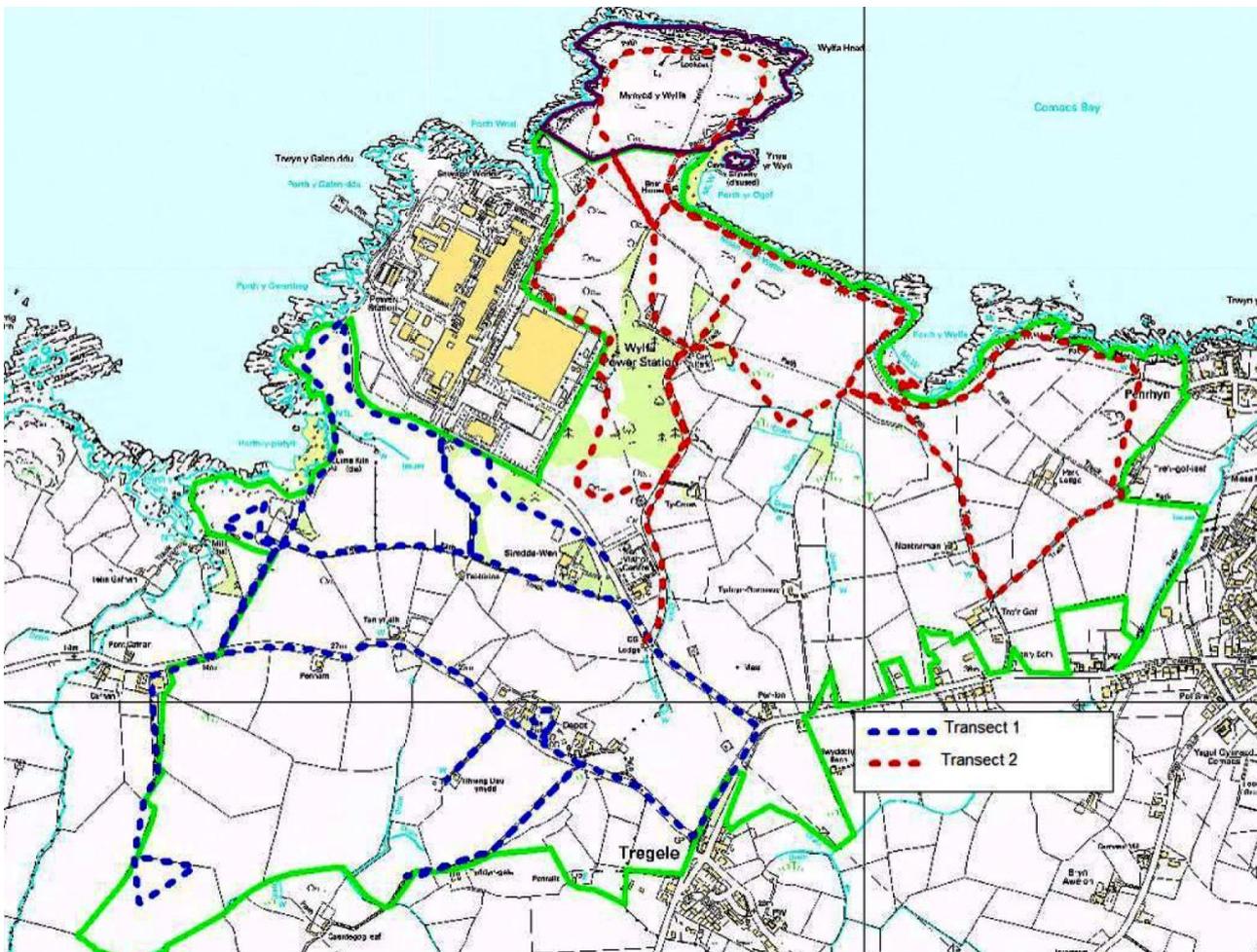


Figure 6.15: 2009-2010 and 2010-2011 wintering bird transect survey routes (from Arup, 2012b)

Table 6.8: 2009-2010 wintering bird survey transect dates and chough sightings (from Arup, 2012b)

Date	Transect No.	Chough sighted	Date	Transect No.	Chough sighted
09/11/2009	1	0	18/02/2010	1	0
10/11/2009	2	0	19/02/2010	2	0
23/11/2009	1	0	11/02/2010	1	0

Date	Transect No.	Chough sighted	Date	Transect No.	Chough sighted
24/11/2009	2	0	12/02/2010	2	0
07/12/2009	1	0	24/02/2010	1	0
08/12/2009	2	0	25/02/2010	2	0
22/12/2009	1	0	01/03/2010	1	0
23/12/2009	2	0	08/03/2010	2	0
04/01/2010	1	0	22/03/2010	1	0
05/01/2010	2	0	23/03/2010	2	4

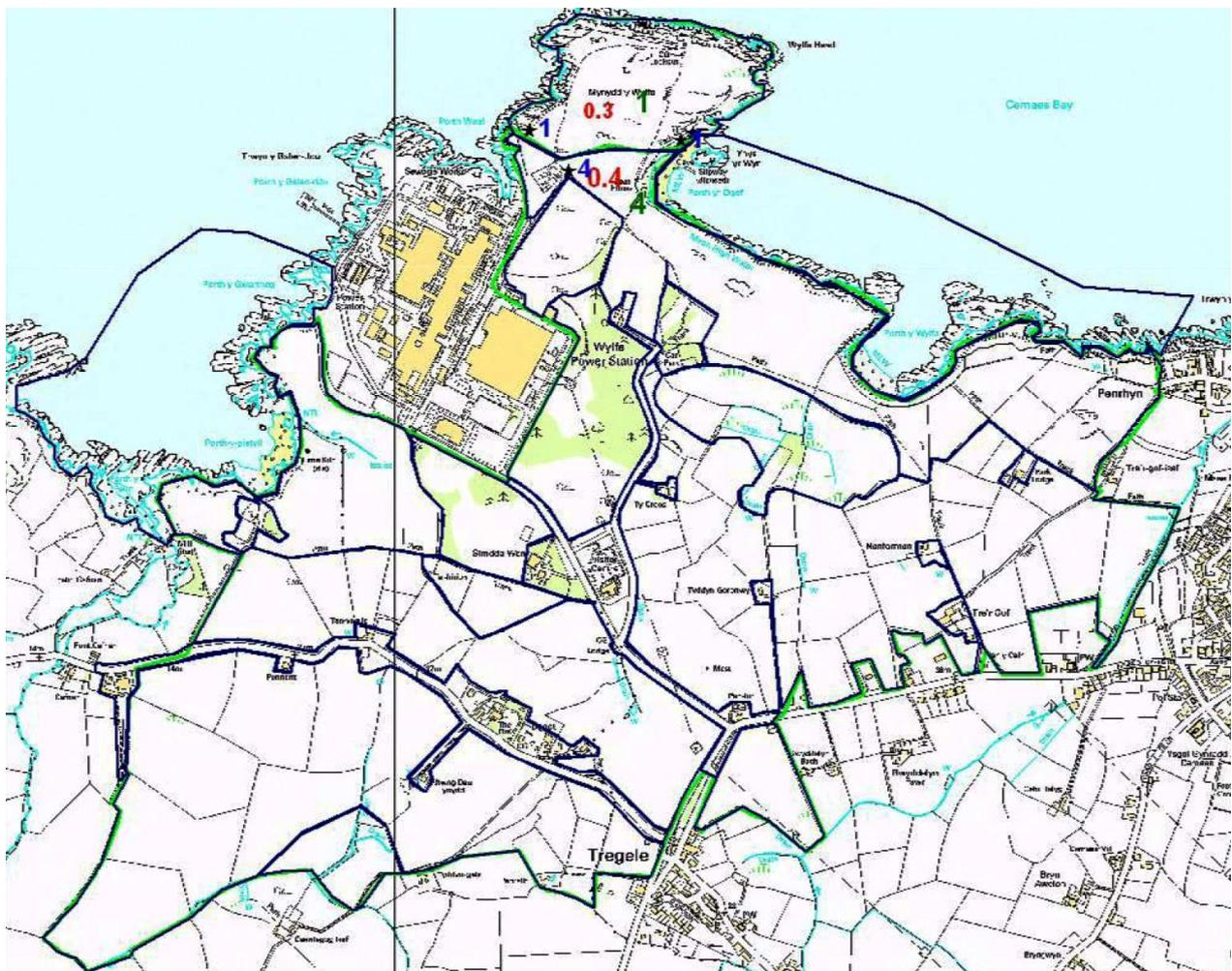


Figure 6.16: 2009-2010 wintering bird survey chough sightings (from Arup, 2012b)⁵

⁵ Blue numbers refers to numbers of chough in flocks sighted, green refers to peak numbers of chough sighted and red relates to average seen per transect visit. The blue lines relate to arbitrary divisions of the study area used in 2009-2010. These divisions were not taken forward in interpreting use of the Wylfa Newydd Development by chough in this report and so are not relevant.

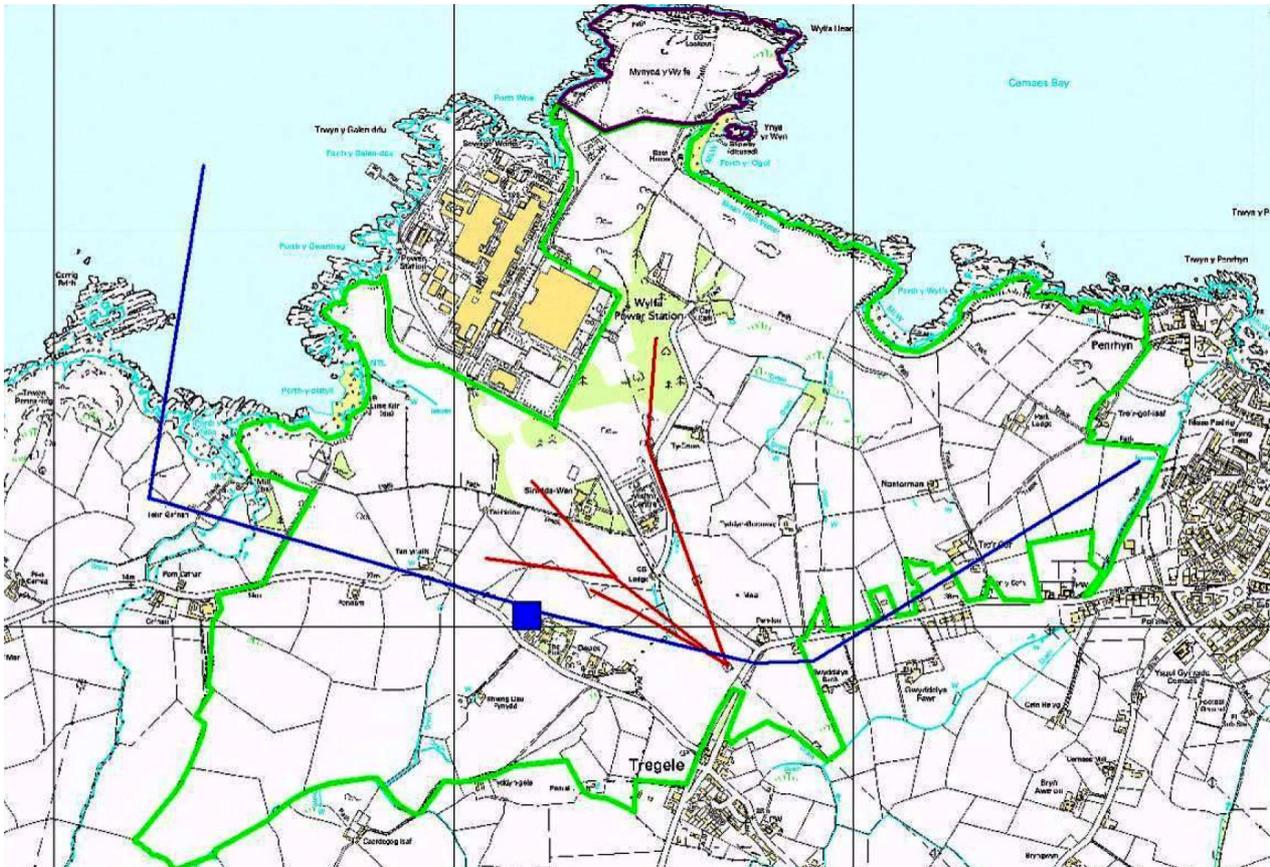


Figure 6.17: 2009-2010 and 2010-2011 vantage point survey location (blue square) (from Arup, 2012b)

Table 6.9: Vantage point survey dates 2009-2010 (from Arup, 2012b)

Date	Chough sighted	Date	Chough sighted
09/11/2009	0	19/02/2010	0
23/11/2009	0	11/02/2010	0
07/12/2009	0	09/03/2010	0
04/01/2010	0	23/03/2010	0

Wintering bird survey results 2010-2011

For the wintering bird survey season 2010-2011, Figure 6.15 (above) shows the transect routes walked, Table 6.10 shows the dates for the 24 transects completed and Figure 6.18 shows the locations of chough sightings during the surveys. The location for the vantage point survey is provided in Figure 6.17 with dates for the 12 surveys provided in Table 6.11.

Table 6.10: 2010-2011 wintering bird survey transect dates and chough sightings (from Arup, 2012b)

Date	Transect No.	Chough sighted	Date	Transect No.	Chough sighted
05/10/2010	1	2	04/01/2011	1	0
06/10/2010	2	0	06/01/2011	2	0
25/10/2010	1	0	19/01/2011	1	2
29/10/2010	2	0	20/01/2011	2	2
11/11/2010	1	0	02/02/2011	1	0
12/11/2010	2	2	03/02/2011	2	0
23/11/2010	1	0	14/02/2011	1	0
24/11/2010	2	2	15/02/2011	2	0
06/12/2010	1	0	02/03/2011	1	0
07/12/2010	2	1+1 (different sections on transect)	03/03/2011	2	2
29/12/2010	1	0	16/03/2011	1	0
30/12/2010	2	0	17/03/2011	2	4

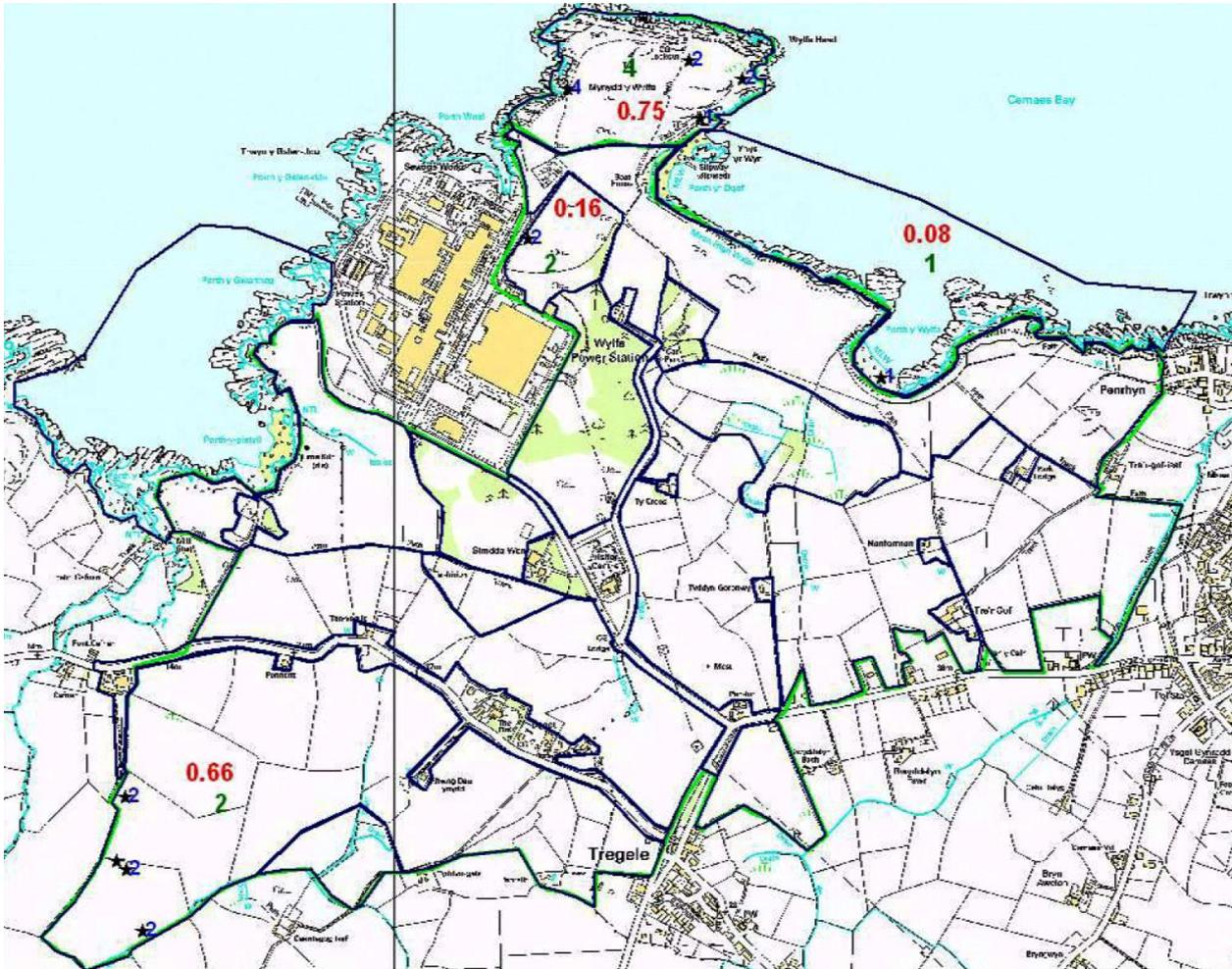


Figure 6.18: 2010-2011 wintering bird surveys chough sightings (from Arup, 2012b)⁶

Table 6.11: 2010-2011 wintering bird survey dates of the vantage point surveys (from Arup, 2012b)

Date	Chough sighted	Date	Chough sighted
06/10/2010	0	04/01/2011	0
29/10/2010	0	19/01/2011	0
04/11/2010	0	02/02/2011	0
23/11/2010	0	14/02/2011	0
07/12/2010	0	02/03/2011	0
29/12/2010	0	16/03/2011	0

⁶ Blue numbers refers to numbers of chough in flocks sighted, green refers to peak numbers of chough sighted and red relates to average seen per transect visit. The blue lines relate to arbitrary divisions of the study area used in 2009-2010. These divisions were not taken forward in interpreting use of the Wylfa Newydd Development by chough in this report and so are not relevant.

Wintering bird survey results 2012-2013

For the wintering bird survey season 2012-2013, Figure 6.19 shows the visible land parcels during the transect route walked (Arup, 2013b). The transect route itself was not provided. Table 6.10 shows the dates for the 12 transects completed (assuming the whole site was walked over two days). The average number of chough per visit within each land parcel is provided in Figure 6.20.

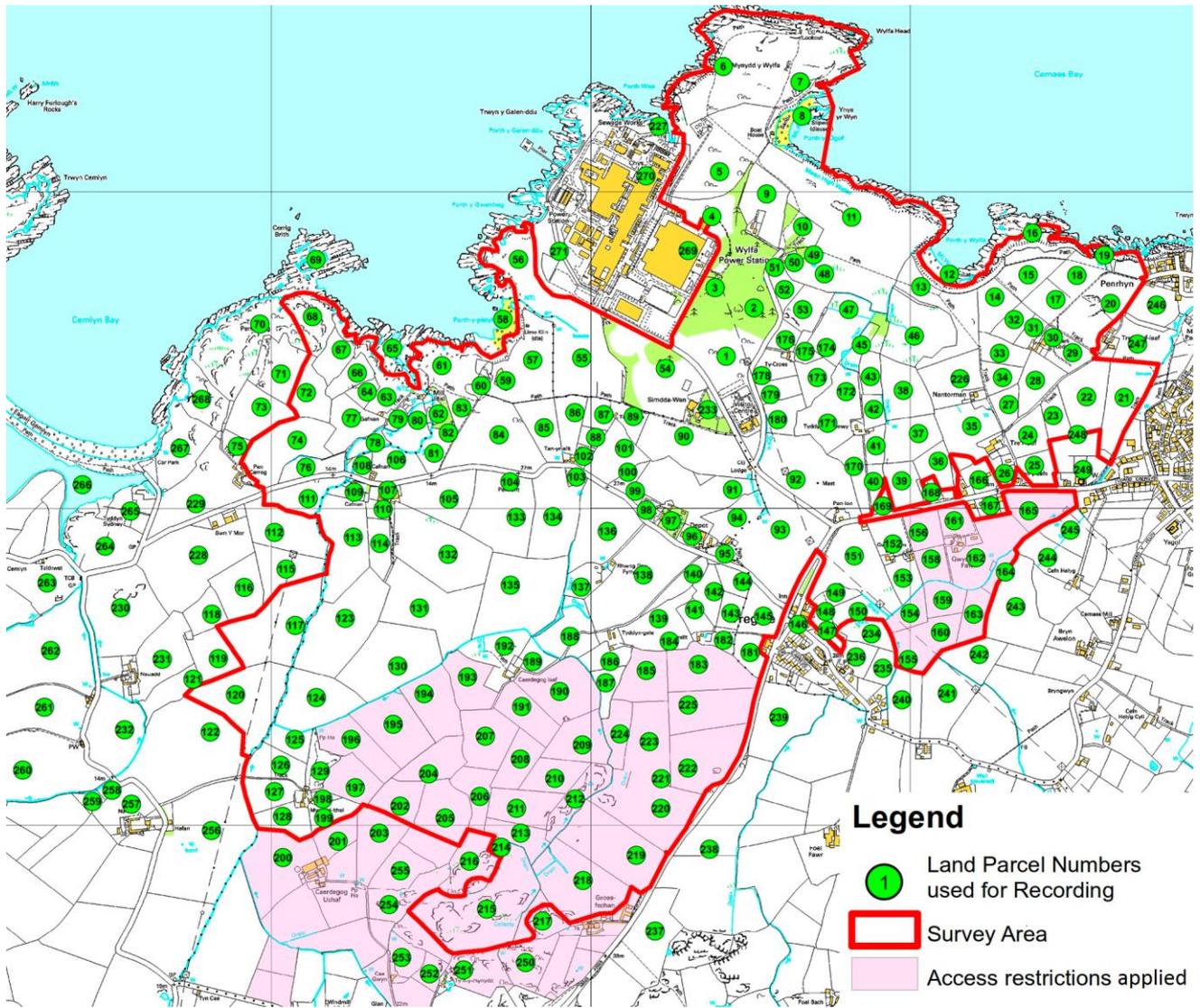


Figure 6.19: 2012-2013 wintering bird surveys visible land parcel references (from Arup, 2013b)

Table 6.12: 2012-2013 wintering bird surveys transect dates (from Arup, 2013b)

Date	Date	Date	Date
09/10/2012	29/11/2012	14/01/2013	26/02/2013
10/10/2012	30/11/2012	15/01/2013	27/02/2013
22/10/2012	04/12/2012	28/01/2013	12/03/2013
23/10/2012	05/12/2012	29/01/2013	13/03/2013
14/11/2012	12/12/2012	11/02/2013	25/03/2013
15/11/2012	13/12/2012	12/02/2013	26/03/2013

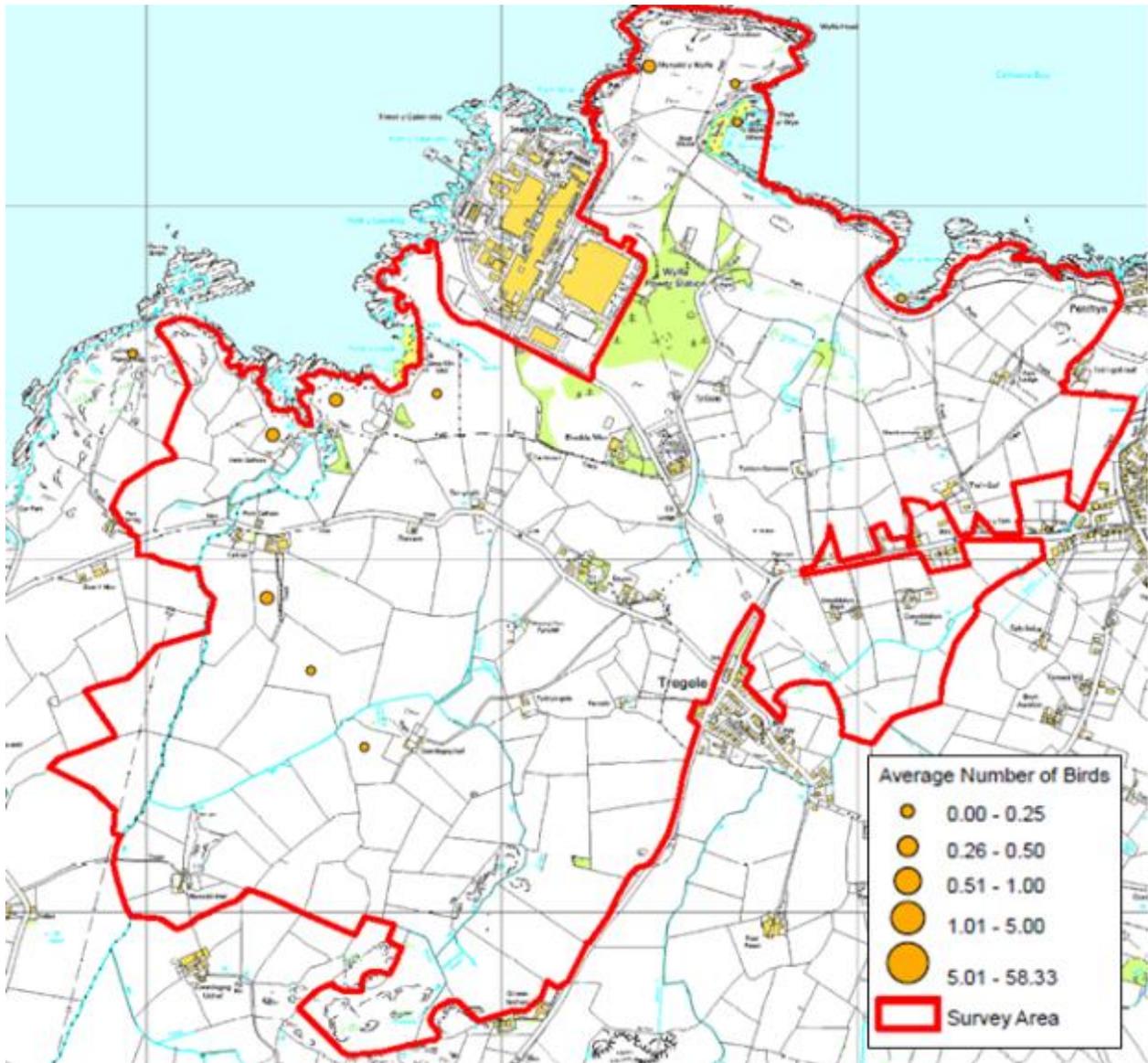


Figure 6.20: 2012-2013 wintering bird surveys average number of chough within each land parcel (n= 12) (from Arup, 2013b)

Wintering bird survey results 2013-2014

The six wintering bird transect routes and records of chough are provided in 23. Note there is no separate figure presented for winter 2013-14 results. The transect date ranges within each of the six months of survey and numbers of chough sighted are provided in Table 6.13.

Table 6.13: 2013-2014 wintering bird surveys transect dates and chough sightings (from Jacobs, 2014c)

Date	Transect No.	Chough sighted	Date	Transect No.	Chough sighted
14-17/10/2013	1	3	14-17/10/2013	4	3
18-26/11/2013	1	1	18-26/11/2013	4	4
2-12/12/2013	1	0	2-12/12/2013	4	2
13-21/01/2014	1	0	13-21/01/2014	4	0
10-18/02/2014	1	4	10-18/02/2014	4	0
11-18/03/2014	1	1	11-18/03/2014	4	0
14-17/10/2013	2	6	14-17/10/2013	5	0
18-26/11/2013	2	0	18-26/11/2013	5	2
2-12/12/2013	2	2	2-12/12/2013	5	0
13-21/01/2014	2	2	13-21/01/2014	5	0
10-18/02/2014	2	2	10-18/02/2014	5	0
11-18/03/2014	2	2	11-18/03/2014	5	0
14-17/10/2013	3	0	14-17/10/2013	6	0
18-26/11/2013	3	0	18-26/11/2013	6	0
2-12/12/2013	3	0	2-12/12/2013	6	0
13-21/01/2014	3	0	13-21/01/2014	6	0
10-18/02/2014	3	0	10-18/02/2014	6	0
11-18/03/2014	3	0	11-18/03/2014	6	0

Wintering bird survey results 2014-2015

The six wintering bird transect routes and records of chough are provided in . Note there is no separate figure presented for winter 2014-15 results. The transect date ranges within each of the six months of survey and numbers of chough sighted are provided in Table 6.14.

Table 6.14: 2014-2015 wintering bird survey transect dates and chough sightings (from Jacobs, 2015b)

Date	Transect No.	Chough sighted	Date	Transect No.	Chough sighted
14-17/10/2014 21-22/10/2014	1	2	14-17/10/2014 21-22/10/2014	4	0
11-13/11/2014 25-26/11/2014	1	0	11-13/11/2014 25-26/11/2014	4	4
9-11/12/2014 15-16/12/2014	1	0	9-11/12/2014 15-16/12/2014	4	0
20-22/01/2015 26-27/01/2015	1	1	20-22/01/2015 26-27/01/2015	4	0
10-12/02/2015 17-18/02/2015	1	0	10-12/02/2015 17-18/02/2015	4	0
9-11/03/2015 16-18/03/2015	1	4	9-11/03/2015 16-18/03/2015	4	0
14-17/10/2014 21-22/10/2014	2	3	14-17/10/2014 21-22/10/2014	5	0
11-13/11/2014 25-26/11/2014	2	0	11-13/11/2014 25-26/11/2014	5	0
9-11/12/2014 15-16/12/2014	2	0	9-11/12/2014 15-16/12/2014	5	0
20-22/01/2015 26-27/01/2015	2	0	20-22/01/2015 26-27/01/2015	5	1
10-12/02/2015 17-18/02/2015	2	0	10-12/02/2015 17-18/02/2015	5	2
9-11/03/2015 16-18/03/2015	2	0	9-11/03/2015 16-18/03/2015	5	0
14-17/10/2014 21-22/10/2014	3	0	14-17/10/2014 21-22/10/2014	6	0
11-13/11/2014 25-26/11/2014	3	0	11-13/11/2014 25-26/11/2014	6	0
9-11/12/2014 15-16/12/2014	3	0	9-11/12/2014 15-16/12/2014	6	0
20-22/01/2015 26-27/01/2015	3	0	20-22/01/2015 26-27/01/2015	6	0
10-12/02/2015 17-18/02/2015	3	0	10-12/02/2015 17-18/02/2015	6	0

Date	Transect No.	Chough sighted	Date	Transect No.	Chough sighted
9-11/03/2015 16-18/03/2015	3	0	9-11/03/2015 16-18/03/2015	6	0

Appendix F. Wintering and breeding chough survey results 2017

Wintering chough survey results 2017

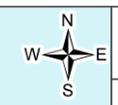
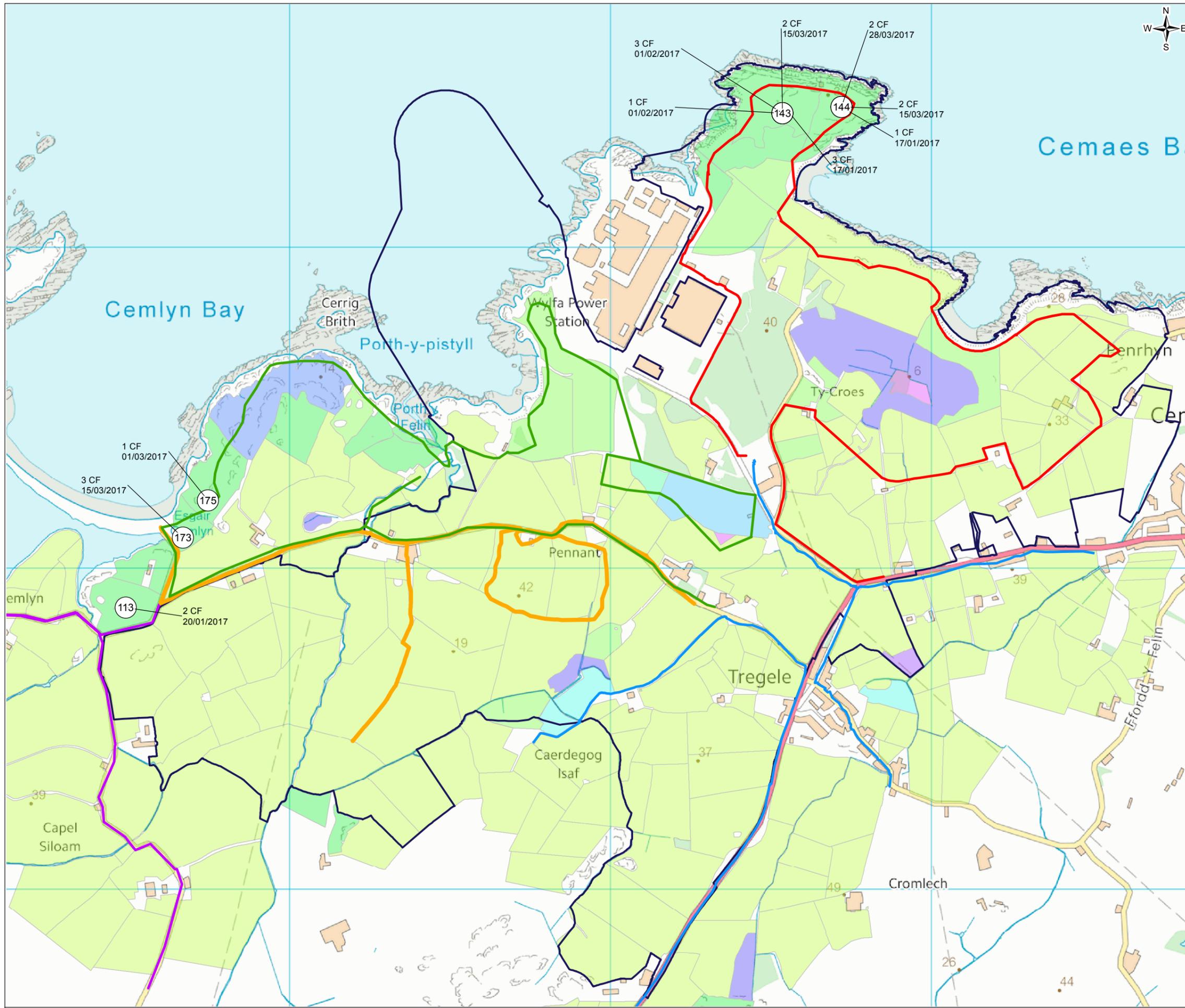
Surveys were undertaken fortnightly from 17 January to 28 March 2017 (six survey visits in total).

In total, 10 sightings of chough were made across all surveys. A peak count of three birds was made in Field 173, located near Cemlyn Bay. Chough distribution during the visits was predominantly around Wylfa head with seven records from this location and three records from the Cemlyn Bay area (Figure 6.21). Details of observations are presented below in Table 6.15.

The ten sightings of chough originate from only five fields (Table 6.15), all of which supported short sward heights (0-1 category). The dominant habitat in all five of these fields was grassland with scrub and rocky outcrops (Figure 6.21). The fields used by chough on Wylfa Head were grazed by low numbers of sheep during the winter period, and are also grazed by rabbits. Of the three fields used by chough near Cemlyn Lagoon, only Field 173 was grazed (by cattle, in March).

Other fields within the study area which supported similar habitats to the fields within which chough were recorded were primarily located on the headland between Cemlyn Bay and Porth-y-pistyll (Figure 6.21), and are likely to support foraging chough. Of those fields surveyed, a small number of fields inland also supported similar habitats, although these were small and isolated. The majority (84%) of the remaining fields within the study area supported improved or semi-improved grassland, primarily of sward heights 0 and 1 as shown in Figure 6.21.

FIGURE 6-21



Legend

- Wylfa Newydd Development
- Chough records
- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Dominant habitat(s)

- Grassland
- Grassland with scrub
- Grassland with scrub and rocky outcrop
- Grassland, marsh/marshy grassland and scrub
- Grassland and marsh/marshy grassland
- Grassland, marsh/marshy grassland and bare ground
- Heathland
- Marsh/marshy grassland
- Marsh/marshy grassland with scrub
- Scrub



0	JUL 17	Initial Issue	AF	JJ	PS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
Client		HORIZON NUCLEAR POWER				
Project		WYLFA NEWYDD PROJECT ENVIRONMENTAL STATEMENT				
Drawing Title		2017 WINTERING CHOUGH SURVEY DATA				
Scale @ A3	1:11,500	DO NOT SCALE				
Jacobs No.	60PO8077					
Client No.						
Drawing No.	60PO8077_DCO_VOL_D_APP_09_14_06_21					

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Table 6.15: Wintering chough 2017 survey results

Land Parcel No.	Survey date	Visit no.	Number of choughs seen	Behaviour	Colour band/ring	Livestock type	Livestock number	Sward height category	Habitat Dominant habitat type	Notes
113	20/01/2017	1	2	Preening/loafing and feeding, only present briefly and then flew off north-east	One bird apparently unringed other bird with silver on right leg but details uncertain for both birds	None	N/A	1 = 5-10 cm	Grassland with scrub and rocky outcrops	-
143	17/01/2017	1	3	Feeding on headland near lookout hut	<ul style="list-style-type: none"> Yellow on right leg, red over silver on left leg Orange and silver on right leg Blue and red on right, red and silver on left leg 	None	N/A	1 = 5-10 cm	Grassland with scrub and rocky outcrops	-
143	01/02/2017	2	3	Not recorded	<ol style="list-style-type: none"> No rings Yellow ring on right leg Left=silver right=blue on top of pink 	None	N/A	1 = 5-10 cm	Grassland with scrub and rocky outcrops	Birds foraging and visiting freshwater pools -
143	01/02/2017	2	1	Not recorded	Did not get good enough view	None	N/A	1 = 5-10 cm	Grassland with scrub and rocky outcrops	
143	15/03/2017	5	2	Loafing	Very brief glimpse of bird indicates no rings (too distant to observe)	Sheep	5	1 = 5-10 cm	Grassland with scrub and rocky outcrops	-
144	17/01/2017	1	1	Feeding separately from three CF at 143	Unringed	None	N/A	1 = 5-10 cm	Grassland with scrub and rocky outcrops	-
144	15/03/2017	5	2	Foraging, mobbing raven, seemed to be in a pair	Too distant and long grass, one bird appeared to have yellow ring on right leg	None	N/A	1 = 5-10 cm	Grassland with scrub and rocky outcrops	4 CF calling & undulating display flight (2 pairs likely) Yo-yoing

Land Parcel No.	Survey date	Visit no.	Number of choughs seen	Behaviour	Colour band/ring	Livestock type	Livestock number	Sward height category	Habitat Dominant habitat type	Notes
144	28/03/2017	6	2	Pair mobbing BZ before flying off over 145. Returned and mobbed raven near to previous nest site.	One bird appeared to have yellow ring on right leg. Difficult to determine as in flight.	Sheep	3	0 = 0-5 cm	Grassland with scrub and rocky outcrops	3 raven chicks in nest
173	15/03/2017	5	4	One flew NE over 173 and 175 but did not land, one feeding then flew N, two on rocky outcrop flew over	Feeding bird: left - red/BT0, right - blue/red. One bird on rocky outcrop had a white or yellow ring on right leg (very brief view)	Cows	6	1 = 5-10 cm	Grassland with scrub and rocky outcrops	-
175	01/03/2017	4	1	Foraging	Right - blue over pink, left - red over silver	None	N/A	0 = 0-5 cm	Grassland with scrub and rocky outcrops	-

Breeding chough survey results 2017

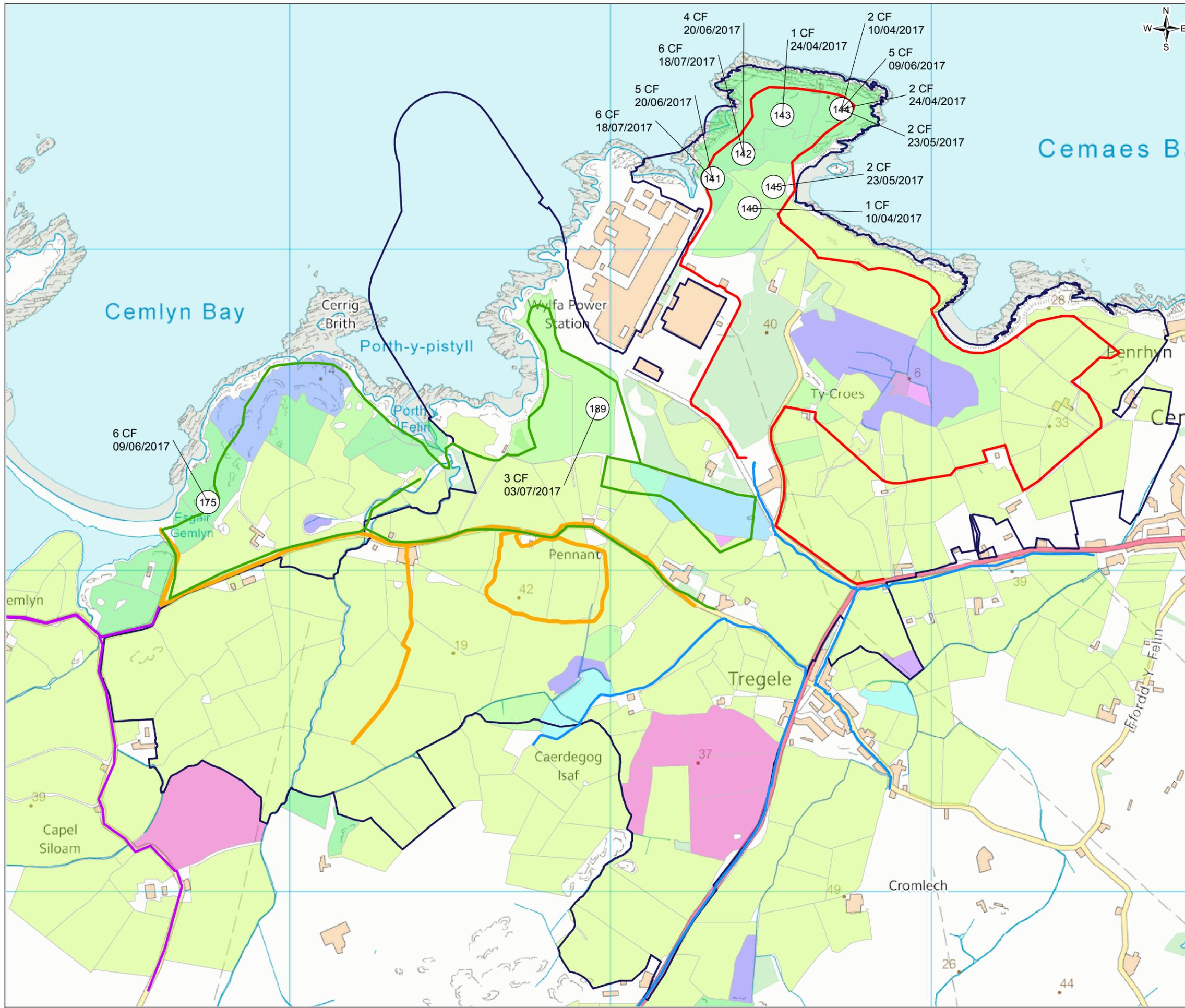
Surveys were undertaken fortnightly from 10 April to 18 July 2017 (eight survey visits in total).

In total, 17 sightings of chough were made across all surveys, of which 13 were of birds using the habitats within the survey area (the other four were of birds flying over). The peak count from surveys was six birds on three occasions. These were at Land Parcel 175, located near Cemlyn Bay, and from Land Parcel 141 and 142 east of the existing power station. Chough distribution during the visits was predominantly around Wylfa Head: 11 of the 13 records of birds on the ground were from this location, with the remaining records from Land Parcel 175 near Cemlyn Bay and Land Parcel 189 west of the existing power station (Figure 6.22). Of the records of birds flying over, one involved a single bird mobbing a raven on Wylfa Head. The remaining three were made between Cemlyn Lagoon and the existing power station, and involved pairs of birds flying in the direction of Wylfa Head. Details of observations are presented below in Table 6.16.

The ten sightings of chough using land parcels within the survey area originate from only four land parcels (Table 6.16), all of which supported short sward heights (0-1 category) (see Figure 6.21). The habitat in all of the land parcels was grassland with scrub and rocky outcrops. The land parcels used by chough on Wylfa Head were grazed by sheep during the first half of the breeding period (April to May), and are also grazed by rabbits. The land parcels used by chough near Cemlyn Lagoon (175) was grazed by cattle in May.

Other land parcels within the study area which supported similar habitats to the land parcels within which chough were recorded were primarily located on the headland between Cemlyn Bay and Porth-y-pistyll (Figure 6.21), and are likely to support foraging chough. Of those land parcels surveyed, a small number of land parcels inland also supported similar habitats, although these were small and isolated. The majority of the remaining land parcels within the study area supported improved or semi-improved grassland, of varying sward heights.

FIGURE 6-22

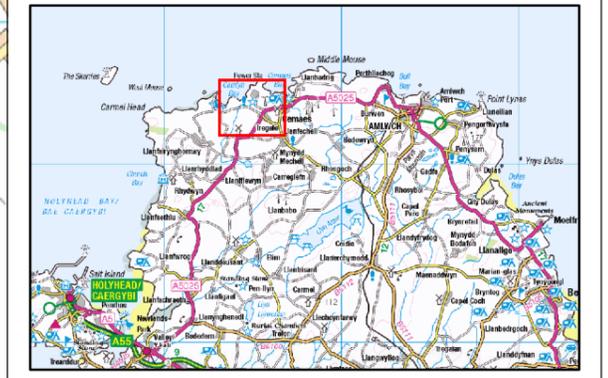


Legend

- Wylfa Newydd Development
- Chough records
- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Dominant Habitat(s)

- Grassland
- Grassland with scrub
- Grassland with scrub and rocky outcrop
- Grassland, marsh/marshy grassland and scrub
- Grassland and marsh/marshy grassland
- Grassland, marsh/marshy grassland and bare ground
- Heathland
- Marsh/marshy grassland
- Marsh/marshy grassland with scrub
- Scrub
- Arable



0	JUL 17	Initial Issue	AF	JJ	PS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
Client		HORIZON NUCLEAR POWER				
Project		WYLFA NEWYDD PROJECT ENVIRONMENTAL STATEMENT				
Drawing Title		2017 BREEDING CHOUGH SURVEY DATA - TRANSECT SURVEYS				
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Jacobs No.	60PO8077					
Client No.						
Drawing No.	60PO8077_DCO_VOL_D_APP_09_14_06_22					

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Table 6.16: Breeding chough 2017 survey results

Land Parcel No.	Survey Date	Visit no.	Number of choughs seen	Behaviour	Colour band/ring	Livestock type	Livestock number	Sward height category	Dominant habitat type	Notes
140	10/04/2017	1	1	Preening on fence post. Flew onto wall and preened	Adult female: yellow over black on right leg, red over silver on left leg	Sheep	5	1 = 5-10 cm	Grassland with scrub	-
141	20/06/2017	6	5	Foraging (pair feeding young)	1. Adult male: unringed 2. Adult female: yellow over black on right leg, red over silver on left leg 3. Juvenile: orange over silver on right leg, yellow over orange (inscribed 3T) on left leg 4. Juvenile: orange over silver on right leg, white over orange (inscribed 33) on left leg 5. Juvenile: yellow over silver on right leg, black over orange (inscribed 3P) on left leg	None	N/A	0 = >5 cm to 1 = 5-10 cm	Grassland with scrub and rocky outcrops	Moving between Land Parcel 141 and 142
141	18/07/2017	8	6	Foraging (pair feeding young)	1. Right - yellow, Left blue 2. Bird - Right leg, orange Four young	None	N/A	0 = >5 cm to 1 = 5-10 cm	Semi-improved grassland, gorse and rocky outcrop	Moving between Land Parcel 141 and 142.
142	20/06/2017	6	4	Foraging (pair feeding young)	1. Adult male: unringed 2. Adult female: yellow over black on right leg, red over silver on left leg 3. Juvenile: orange over silver on right leg, white over orange (inscribed 33) on left leg 4. Juvenile: yellow over silver on right leg, black over orange (inscribed 3P) on left leg	None	N/A	0 = >5 cm to 1 = 5-10 cm	Grassland with scrub and rocky outcrops	Moving between Land Parcel 141 and 142

Land Parcel No.	Survey Date	Visit no.	Number of choughs seen	Behaviour	Colour band/ring	Livestock type	Livestock number	Sward height category	Dominant habitat type	Notes
142	18/07/2017	8	6	Foraging (pair feeding young)	1. Right - yellow, Left blue 2. Bird - Right leg, orange Four young	None	N/A	0 = >5 cm to 2 = >10 cm	Semi-improved grassland, gorse and rocky outcrop	Moving between Land Parcel 141 and 142.
143	10/04/2017	1	1	In flight, chasing raven	Too distant and in flight to observe	None	N/A	0 = >5 cm to 1 = 5-10 cm	Grassland with scrub and rocky outcrops	-
143	24/04/2017	2	1	Foraging	Unringed	Sheep	2	0 = >5 cm to 1 = 5-10 cm	Grassland with scrub and rocky outcrops	-
144	10/04/2017	1	2	One bird flew in to nest, whilst the other flew off the nest	Impossible to observe due to angle of view	Sheep	2	0 = >5 cm to 1 = 5-10 cm	Grassland with scrub and rocky outcrops	Likely to have been the regular breeding pair: 1. Adult male: unringed 2. Adult female: yellow over black on right leg, red over silver on left leg
144	24/04/2017	2	2	Courtship (received by ringed bird)	Uncertain due to distant observation	Sheep	4	0 = >5 cm to 1 = 5-10 cm	Grassland with scrub and rocky outcrops	Likely to have been the regular breeding pair: 1. Adult male: unringed 2. Adult female: yellow over black on right leg, red over silver on left leg
144	23/05/2017	4	2	Flew from nest onto rocks nearby and wiped bill	Regular breeding pair: 1. Adult male: unringed 2. Adult female: yellow over black on right leg, red over silver on left leg	None	N/A	0 = >5 cm to 1 = 5-10 cm	Grassland with scrub and rocky outcrops	Two other surveyors present conducting vantage point watch for choughs
144	09/06/2017	5	5	Foraging on ants' nest	2 unringed birds, and three ringed: 1. Red over blue (inscribed 4P) on	None	N/A	0 = >5 cm to	Grassland with scrub and rocky outcrops	Considered likely to be the regular breeding pair (one of the unringed birds, and

Land Parcel No.	Survey Date	Visit no.	Number of choughs seen	Behaviour	Colour band/ring	Livestock type	Livestock number	Sward height category	Dominant habitat type	Notes
					right leg, red over silver on left leg 2. Light green over silver on right leg, light green over blue on left leg 3. Yellow over green on right leg, red over silver on left leg			1 = 5-10 cm		bird 3) with three 1 st -year birds (one of the unringed birds, bird 1 (originally from near Porth Dafarch) and bird 2). Bird 2 thought to be lime green over silver on right leg, lime green over blue (inscribed) on left leg (originally from Church Bay).
145	23/05/2017	4	2	Foraging on crane-fly larvae in grass	Regular breeding pair: 1. Adult male: unringed 2. Adult female: yellow over black on right leg, red over silver on left leg	None	N/A	0 = >5 cm	Grassland with scrub	-
175	09/06/2017	5	6	Feeding on grass	Regular breeding pair with four offspring	None	N/A	0 = >5 cm to 1 = 5-10 cm	Grassland with scrub and rocky outcrops	-
188	10/05/2017	3	2	Flying over	Birds were in flight and too distant to read	N/A	N/A	N/A	N/A	One bird flew high over Land Parcel 188 from the south, towards the existing power station, where it was joined by a second bird. Both appeared to drop down east of the power station.
189	03/07/2017	7	3	Two juveniles begging food from foraging adult female	Ad. Female: Lt: Red / BTO, Rt: Yellow/Black. Juveniles: Lt: Black / Orange#, Rt: Yellow / BTO; Lt: Yellow / Orange#, Rt: Orange / BTO.	None	N/A	2= >10 cm	N/A	Birds flew in from south (likely foraging on shoreline in Land Parcel 188 / 189), landed to forage, then flew on when flushed to forage on shore of Land Parcel

Land Parcel No.	Survey Date	Visit no.	Number of choughs seen	Behaviour	Colour band/ring	Livestock type	Livestock number	Sward height category	Dominant habitat type	Notes
										189.
206	08/06/2017	5	2	Flying over, calling	Birds were in flight and too distant to read	N/A	N/A	N/A	N/A	-
Cemlyn Lagoon	10/05/2017	3	2	Flying over	Birds were in flight and too distant to read	N/A	N/A	N/A	N/A	Flew east over lagoon, following the coastline towards the power station

Appendix G. 2017 Pursuit surveys

The full dataset gathered from the pursuit surveys are provided in Table 6.17 and Table 6.18. These are summarised in Table 6.19 where the percentage foraging time in each land parcel have been calculated based on the total number of chough minutes recorded during surveys of either Trwyn Pencarreg or Wylfa Head, depending on where they were. This is also presented in Figure 6.23 which shows the relative importance of each land parcel within either the Wylfa Head land parcels or those at Trwyn Pencarreg. Within Table 6.19 and Figure 6.23 it is not possible to make direct comparison between the proportion of time foraging in land parcels at Wylfa Head and Trwyn Pencarreg as there was more time spent at Wylfa Head (50 hours) compared to Trwyn Pencarreg (24 hours), and extrapolation of data or the inclusion of a statistical correction factor was not considered appropriate. Figure 6.25 presents the detailed foraging locations from pursuit survey. Whilst the core foraging area can be calculated by field area, the actual area of land that chough forage in is much smaller and focussed on small patches of very specific microhabitat patches.

The results show that there was almost ten-times the amount of chough minutes recorded at Wylfa Head (3365 minutes) compared to Trywn Pencarreg (345.9 minutes) when the total survey time was only increased by a factor of two. Wylfa Head habitats are therefore considered to be much more significant for foraging chough than habitats at Trywn Pencarreg.

The most important area was Land Parcel 146, a field of short grassland on the coast to the east of Wylfa Head. The time spent foraging here (2138 chough minutes) was over six times greater than that in any other land parcel at Wylfa Head, including Land Parcel 141 (305 chough minutes), Land Parcel 143 (265 chough minutes) and Land Parcel 144 (333 chough minutes), which were the next most frequently used.

Based on the habitats listed in Section 2.1.4, the habitat most frequently used by foraging chough was a mosaic of coastal grassland (ungrazed) with rock, cliff, scree, buildings and stone walls. Improved and semi-improved agricultural grassland (ungrazed) was the next most frequently used, followed by coastal grassland (ungrazed), both receiving approximately half the foraging effort of the mosaic of coastal grassland (ungrazed) with rock, cliff, scree, buildings and stone walls. However, it should be noted that all of the above habitats were grazed during the winter period, and generally had short sward heights. Other habitats used were mostly mixtures of the above habitats and paths (bare ground and worn swards associated with public rights of way). Cloddiau (traditional stock boundaries consisting of stone-faced earth banks) were used on two occasions, whilst improved and semi-improved agricultural grassland (grazed) was used on one occasion only.

The majority of observations made during the chough pursuit surveys involved the pair (and subsequently their juveniles) breeding on Wylfa Head, although other birds were occasionally observed, with a maximum of 10 birds observed together, on one occasion.

FIGURE 6-23



Trwyn Pencarreg Data Summary
 Total No. of VPs. – 12
 Total No. of minutes watched – 1440
 Total No. of chough minutes recorded – 345.9

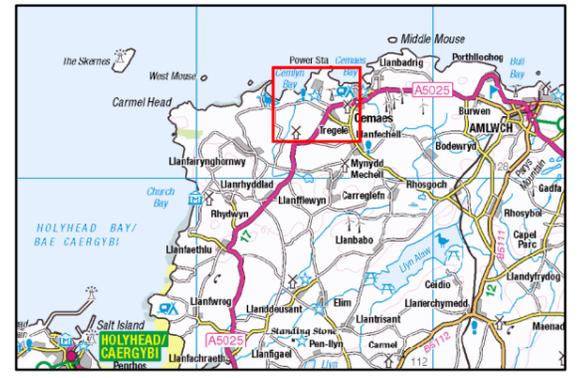
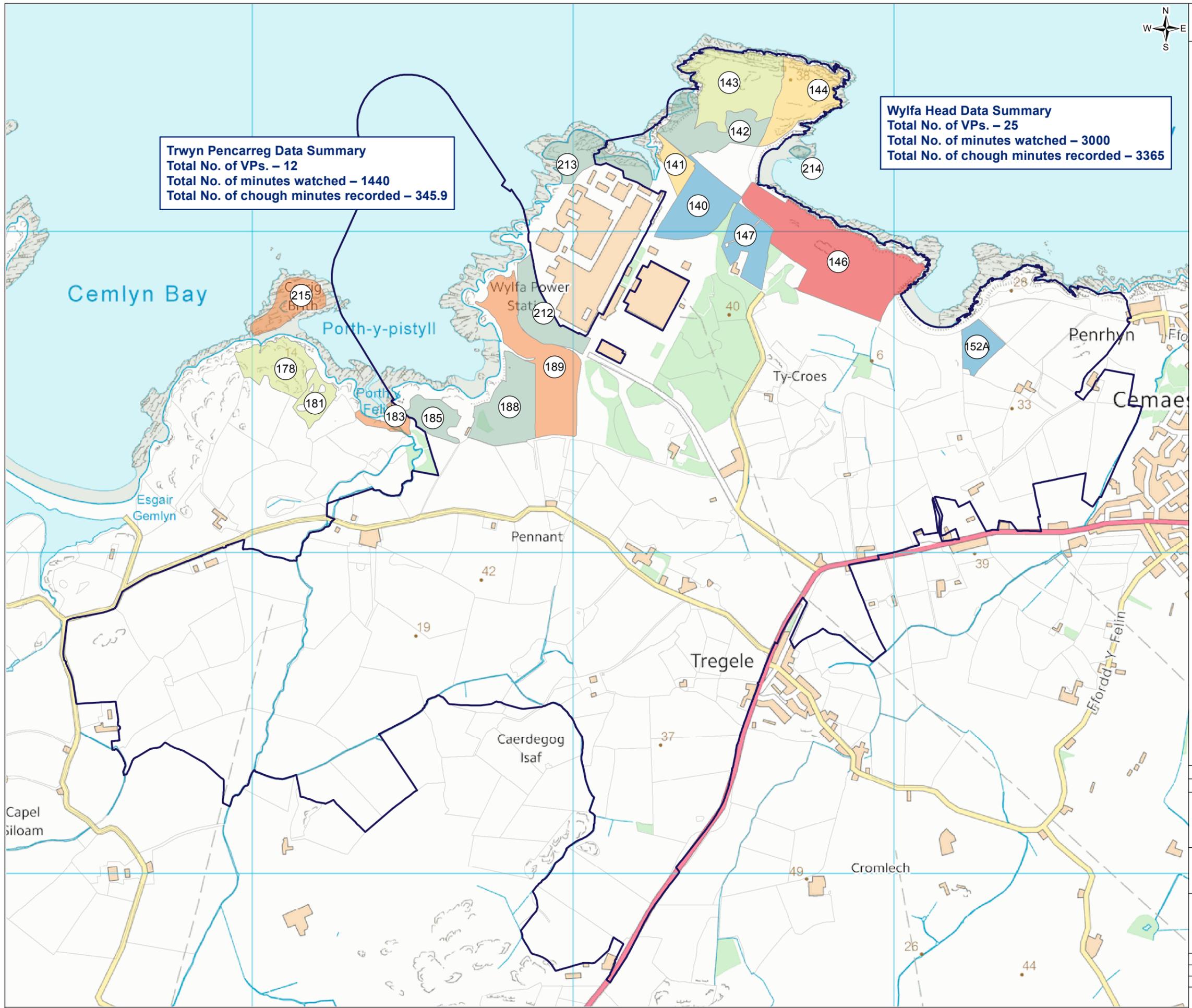
Wylfa Head Data Summary
 Total No. of VPs. – 25
 Total No. of minutes watched – 3000
 Total No. of chough minutes recorded – 3365

Legend

- Wylfa Newydd Development Area

Proportion of total foraging time spent in each land parcel

- <1%
- 2-4%
- 5-8%
- 9-16%
- 17-32%
- 33-64%



0	JUL 17	Initial Issue	AF	JG	PS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
Client						
HORIZON NUCLEAR POWER						
Project						
WYLFA NEWYDD PROJECT ENVIRONMENTAL STATEMENT						
Drawing Title						
2017 BREEDING CHOUGH SURVEY DATA - PURSUIT SURVEYS						
Scale @ A3	1:11,500		DO NOT SCALE			
Jacobs No.	60PO8077					
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Key to Table 6.17 and Table 6.18

The terms “Unknown” and “(?)” are used for incidents where the identification of individual birds was not possible, either due to a lack of rings, or the distance at which they were sighted.

Within Table 6.18 the raw data from the pursuit surveys includes the following abbreviations relating to habitat types as outlined in Section 2.1.4:

- C(tsb) – Cloddiau (traditional stock boundaries consisting of stone-faced earth banks);
- CG(ug) – Coastal grassland (ungrazed);
- I&SIAG(g) – Improved and semi-improved agricultural grassland (grazed);
- I&SIAG(ug) – Improved and semi-improved agricultural grassland (ungrazed);
- P(bg&proW) – Paths (bare ground and worn swards associated with Public Rights of Way); and
- RCSB&SW – Rock, cliff, scree, buildings and stone walls.

Within the column titled “Chough minutes”, this indicates the total number of minutes chough were observed during any one sighting and is the product of the number of chough multiplied by the total minutes they were observed in that land parcel.

Where chough were observed foraging in multiple fields during any single foraging event, the total time was recorded as being equal e.g. on 04-Jun at Trwyn Pencarreg, 10.3 minutes at Land Parcel 185, 188 and 189 represents a total of 31 minutes split between the three land parcels.

Table 6.17: Breeding chough 2017 pursuit chough survey results from Trwyn Pencarreg

Date	No. chough	Identification	Land Parcel No.	Habitat types used by chough	Minutes	Chough minutes
23-May	2	Wylfa Head pair (?)	189	CG(ug)	1	2
04-Jun	10	Unknown	181	I&SIAG(ug)	2	20
04-Jun	1	Unknown	178	RCSB&SW	5	5
04-Jun	1	Rt: poss Blue/BTO, Lt: White / poss Red	178	RCSB&SW	2	2
04-Jun	1	Unknown	189	RCSB&SW	10.3	10.3
04-Jun	1	Unknown	188	RCSB&SW	10.3	10.3
04-Jun	1	Unknown	185	RCSB&SW	10.3	10.3

Date	No. chough	Identification	Land Parcel No.	Habitat types used by chough	Minutes	Chough minutes
05-Jun	2	Wylfa Head pair	212	I&SIAG(ug) / RCSB&SW	6	12
05-Jun	4	Wylfa Head pair; unknown pair	215	RCSB&SW / CG(ug) / P(bg&prow)	8	32
05-Jun	4	Wylfa Head pair; unknown pair	178	RCSB&SW / CG(ug) / P(bg&prow)	2	8
05-Jun	4	Wylfa Head pair; unknown pair	183	CG(ug) / P(bg&prow)	16	64
05-Jun	2	Unknown (not Wylfa Head pair)	183	CG(ug) / P(bg&prow)	6	12
05-Jun	4	Wylfa Head pair; unknown pair	183	CG(ug) / P(bg&prow)	4	16
05-Jun	4	Wylfa Head pair; unknown pair	215	RCSB&SW / CG(ug) / P(bg&prow)	19	76
23-Jun	6	Wylfa Head family	189	CG(ug)	11	66
Totals	47				112.9	345.9

Table 6.18: Breeding chough 2017 pursuit chough survey results from Wylfa Head

Date	No. chough	Identification	Land Parcel No.	Habitat types used by chough	Minutes	Chough minutes
17-May	2	Wylfa Head pair	214	RCSB&SW / CG(ug)	10	20
18-May	2	Wylfa Head pair	144	CG(ug) / P(bg&prow)	5	10
18-May	1	Wylfa head male	144	CG(ug) / P(bg&prow)	2	2
19-May	2	Wylfa Head pair	146	I&SIAG(ug) / P(bg&prow)	3	6
19-May	2	Wylfa Head pair	145	I&SIAG(ug)	3	6
19-May	2	Wylfa Head pair	146	RCSB&SW	19	38
19-May	2	Wylfa Head pair	146	RCSB&SW / I&SIAG(ug)	41	82
22-May	2	Wylfa Head pair	214	RCSB&SW	4	8
22-May	2	Wylfa Head pair	146	I&SIAG(ug)	7	14
23-May	2	Wylfa Head pair	140	I&SIAG(ug)	14	28

Date	No. chough	Identification	Land Parcel No.	Habitat types used by chough	Minutes	Chough minutes
23-May	2	Wylfa Head pair	146	I&SIAG(ug)	34	68
23-May	2	Wylfa Head pair	146	I&SIAG(ug)	23	46
23-May	2	Wylfa Head pair	146	I&SIAG(ug)	9	18
23-May	1	Lt: Red/BTO, Rt: Orange/Blue#	144	RCSB&SW / P(bg&prow)	25	25
23-May	3	Wylfa Head pair; Lt: Red/BTO, Rt: Orange/Blue#	144	CG(ug) / P(bg&prow)	5	15
23-May	3	Wylfa Head pair; Lt: Red/BTO, Rt: Orange/Blue#	146	I&SIAG(ug)	6	18
23-May	3	Wylfa Head pair; Lt: Red/BTO, Rt: Orange/Blue#	146	RCSB&SW / I&SIAG(ug)	29	87
23-May	1	Lt: Red/BTO, Rt: Orange/Blue#	146	RCSB&SW / I&SIAG(ug)	5	5
23-May	2	Wylfa Head pair	144	RCSB&SW / CG(ug) / P(bg&prow)	2	4
24-May	2	Wylfa Head pair	144	RCSB&SW	14	28
24-May	2	Wylfa Head pair	146	I&SIAG(ug)	33	66
24-May	2	Wylfa Head pair	143	CG(ug)	8	16
24-May	2	Wylfa Head pair	146	I&SIAG(ug)	6	12
24-May	2	Wylfa Head pair	146	CG(ug)	2	4
24-May	1	Wylfa Head female	146	CG(ug)	34	34
24-May	2	Wylfa Head pair	146	RCSB&SW	25	50
24-May	2	Wylfa Head pair	146	RCSB&SW	9	18
25-May	1	Wylfa Head male	144	CG(ug) / P(bg&prow)	4	4
25-May	2	Wylfa Head pair	146	I&SIAG(ug)	22	44
25-May	2	Wylfa Head pair	143	RCSB&SW	29	58

Date	No. chough	Identification	Land Parcel No.	Habitat types used by chough	Minutes	Chough minutes
25-May	2	Wylfa Head pair	146	I&SIAG(ug)	10	20
26-May	2	Wylfa Head pair	146	I&SIAG(ug)	64	128
26-May	2	Wylfa Head pair	146	I&SIAG(ug) / C(tsb)	11.5	23
26-May	2	Wylfa Head pair	147	I&SIAG(ug) / C(tsb)	11.5	23
03-Jun	1	Wylfa Head male	144	RCSB&SW / CG(ug) / P(bg&prow)	8	8
03-Jun	1	Wylfa Head pair	143	CG(ug)	19	19
03-Jun	2	Wylfa Head pair	143	RCSB&SW / CG(ug)	17	34
03-Jun	2	Wylfa Head pair	144	RCSB&SW / CG(ug) / P(bg&prow)	3	6
04-Jun	2	Wylfa Head pair	146	I&SIAG(ug)	2	4
04-Jun	2	Unknown (not Wylfa Head pair)	144	CG(ug)	2	4
04-Jun	4	Wylfa Head pair; unknown pair	144	CG(ug)	9	36
04-Jun	2	Wylfa Head pair	143	CG(ug) / RCSB&SW	13	26
04-Jun	2	Wylfa Head pair	144	CG(ug)	29	58
06-Jun	2	Wylfa Head pair	144	RCSB&SW	19	38
06-Jun	2	Wylfa Head pair	143	CG(ug)	28	56
06-Jun	2	Wylfa Head pair	146	CG(ug)	4	8
06-Jun	2	Wylfa Head pair	146	I&SIAG(ug)	4	8
06-Jun	2	Wylfa Head pair	146	RCSB&SW	8	16
06-Jun	1	Wylfa Head female	146	RCSB&SW	5	5
06-Jun	2	Wylfa Head pair	146	CG(ug)	5	10
06-Jun	2	Wylfa Head pair	146	CG(ug)	14	28
06-Jun	1	Wylfa Head pair	146	CG(ug)	2	2

Date	No. chough	Identification	Land Parcel No.	Habitat types used by chough	Minutes	Chough minutes
06-Jun	2	Wylfa Head pair	146	RCSB&SW / CG(ug)	8	16
06-Jun	1	Wylfa Head pair	146	RCSB&SW / CG(ug)	2	2
06-Jun	2	Wylfa Head pair	146	RCSB&SW / CG(ug)	11	22
07-Jun	2	Wylfa Head pair	143	I&SIAG(ug)	5	10
07-Jun	2	Wylfa Head pair	144	I&SIAG(ug)	14	28
07-Jun	2	Wylfa Head pair	144	I&SIAG(ug)	2	4
07-Jun	2	Wylfa Head pair	144	P(bg&prow)	2	4
07-Jun	2	Wylfa Head pair	213	CG(ug) / RCSB&SW	11	22
07-Jun	2	Wylfa Head pair	144	CG(ug)	4	8
07-Jun	2	Wylfa Head pair	146	I&SIAG(ug)	10	20
07-Jun	1	Wylfa Head female	146	I&SIAG(ug)	3	3
07-Jun	2	Wylfa Head pair	146	RCSB&SW	9	18
07-Jun	2	Wylfa Head pair	143	CG(ug) / RCSB&SW	9	18
07-Jun	2	Wylfa Head pair	146	I&SIAG(ug)	7	14
12-Jun	1	Wylfa Head male	214	RCSB&SW / CG(ug)	5	5
12-Jun	1	Wylfa Head male	214	RCSB&SW / CG(ug)	4	4
12-Jun	2	Wylfa Head pair (?)	152A	I&SIAG(g)	4	8
12-Jun	1	Wylfa Head male (?)	146	I&SIAG(ug)	6	6
12-Jun	2	Wylfa Head pair	143	RCSB&SW	14	28
12-Jun	2	Wylfa Head pair	144	RCSB&SW	3	6
12-Jun	5	Wylfa Head family	144	CG(ug) / P(bg&prow)	3	15
12-Jun	2	Wylfa Head pair	144	CG(ug)	7	14

Date	No. chough	Identification	Land Parcel No.	Habitat types used by chough	Minutes	Chough minutes
12-Jun	2	Wylfa Head pair	144	CG(ug)	1	2
12-Jun	2	Wylfa Head pair	144	CG(ug) / RCSB&SW	7	14
20-Jun	3	Ad. and Juv.	146	RCSB&SW / I&SIAG(ug)	6	18
20-Jun	2	Ad. and Juv.	141	CG(ug) / RCSB&SW	90	180
20-Jun	1	Unknown	146	RCSB&SW	2	2
20-Jun	1	Unknown	146	I&SIAG(ug) / I&SIAG(ug)	88	88
22-Jun	4	1 Ad., 3 Juv. Partial details obtained for 3 birds - Lt: Red, Rt: Yellow; Lt: Yellow; Rt: Orange	213	RCSB&SW	17	68
22-Jun	4	1 Ad., 3 Juv. Partial details obtained for 3 birds - Lt: Red, Rt: Yellow; Lt: Yellow; Rt: Orange	213	CG(ug) / RCSB&SW	2	8
22-Jun	4	1 Ad., 3 Juv. Partial details obtained for 3 birds - Lt: Red, Rt: Yellow; Lt: Yellow; Rt: Orange	142	CG(ug)	17	68
25-Jun	1	Wylfa Head female	141	CG(ug) / RCSB&SW	11	11
27-Jun	5	Wylfa Head male and juveniles (?)	146	CG(ug) / RCSB&SW	34	170
27-Jun	6	Wylfa Head female. With Wylfa Head male and juveniles (?)	146	CG(ug) / RCSB&SW	7	42
27-Jun	5	Wylfa Head male and juveniles (?)	146	CG(ug) / RCSB&SW	79	395
27-Jun	1	Wylfa Head female	142	CG(ug)	56	56
27-Jun	1	Wylfa Head female	141	CG(ug) / RCSB&SW	114	114
27-Jun	5	Wylfa Head male and juveniles (?)	146	CG(ug)	9	45
27-Jun	5	Wylfa Head male and juveniles (?)	146	CG(ug) / RCSB&SW	26	130
27-Jun	5	Wylfa Head male and juveniles (?)	146	CG(ug) / RCSB&SW	57	285

Date	No. chough	Identification	Land Parcel No.	Habitat types used by chough	Minutes	Chough minutes
Totals	246				1486	3365

Table 6.19: Land parcel usage summary table at Trwyn Pencarreg and Wylfa Head

Trwyn Pencarreg Land Parcel No.	Total chough minutes at Trwyn Pencarreg	% of chough minutes at Trwyn Pencarreg	Wylfa Head Land Parcel No.	Total chough minutes at Wylfa Head	% of chough minutes at Wylfa Head
215	108.0	31.22	146	2138.0	63.54
183	92.0	26.60	144	333.0	9.90
189	78.3	22.65	141	305.0	9.06
181	20.0	5.78	143	265.0	7.88
178	15.0	4.34	142	124.0	3.68
212	12.0	3.47	213	98.0	2.91
185	10.3	2.99	214	37.0	1.10
188	10.3	2.99	140	28.0	0.83
Total	345.9		147	23.0	0.68
			152A	8.0	0.24
			Total	3365	

Table 6.20: Summary of habitat usage at Trwyn Pencarreg

Habitat type	Total chough minutes	% of total chough minutes
Rock, cliff, scree, buildings and stone walls / Coastal grassland (ungrazed) / Paths (bare ground and worn swards associated with Public Rights of Way)	116	33.5
Coastal grassland (ungrazed) / Paths (bare ground and worn swards associated with Public Rights of Way)	92	26.6
Coastal grassland (ungrazed)	68	19.7

Habitat type	Total chough minutes	% of total chough minutes
Rock, cliff, scree, buildings and stone walls	37.9	11
Improved and semi-improved agricultural grassland (ungrazed)	20	5.8
Improved and semi-improved agricultural grassland (ungrazed) / Rock, cliff, scree, buildings and stone walls	12	3.5
Total	345.9	

Table 6.21: Summary of habitat usage at Wylfa Head

Habitat type	Total chough minutes	% of total chough minutes
Coastal grassland (ungrazed) / Paths (bare ground and worn swards associated with Public Rights of Way)	1415	42.1
Improved and semi-improved agricultural grassland (ungrazed)	565	16.8
Coastal grassland (ungrazed)	468	13.9
Rock, cliff, scree, buildings and stone walls	381	11.3
Rock, cliff, scree, buildings and stone walls / Improved and semi-improved agricultural grassland (ungrazed)	192	5.7
Rock, cliff, scree, buildings and stone walls / Coastal grassland (ungrazed)	103	3.1
Improved and semi-improved agricultural grassland (ungrazed)	88	2.6
Coastal grassland (ungrazed) / Paths (bare ground and worn swards associated with Public Rights of Way)	46	1.4
Improved and semi-improved agricultural grassland (ungrazed) / Cloddiau (traditional stock boundaries consisting of stone-faced earth banks)	46	1.4
Rock, cliff, scree, buildings and stone walls / Paths (bare ground and worn swards associated with Public Rights of Way)	25	0.7
Rock, cliff, scree, buildings and stone walls / Coastal grassland (ungrazed) / Paths (bare ground and worn swards associated with Public Rights of Way)	18	0.5
Improved and semi-improved agricultural grassland (ungrazed)	8	0.2
Improved and semi-improved agricultural grassland (ungrazed) / Paths (bare ground and worn swards associated with Public Rights of Way)	6	0.2

Habitat type	Total chough minutes	% of total chough minutes
Paths (bare ground and worn swards associated with Public Rights of Way)	4	0.1
Total	3365	

Appendix H. Summary map of survey results 2014-17

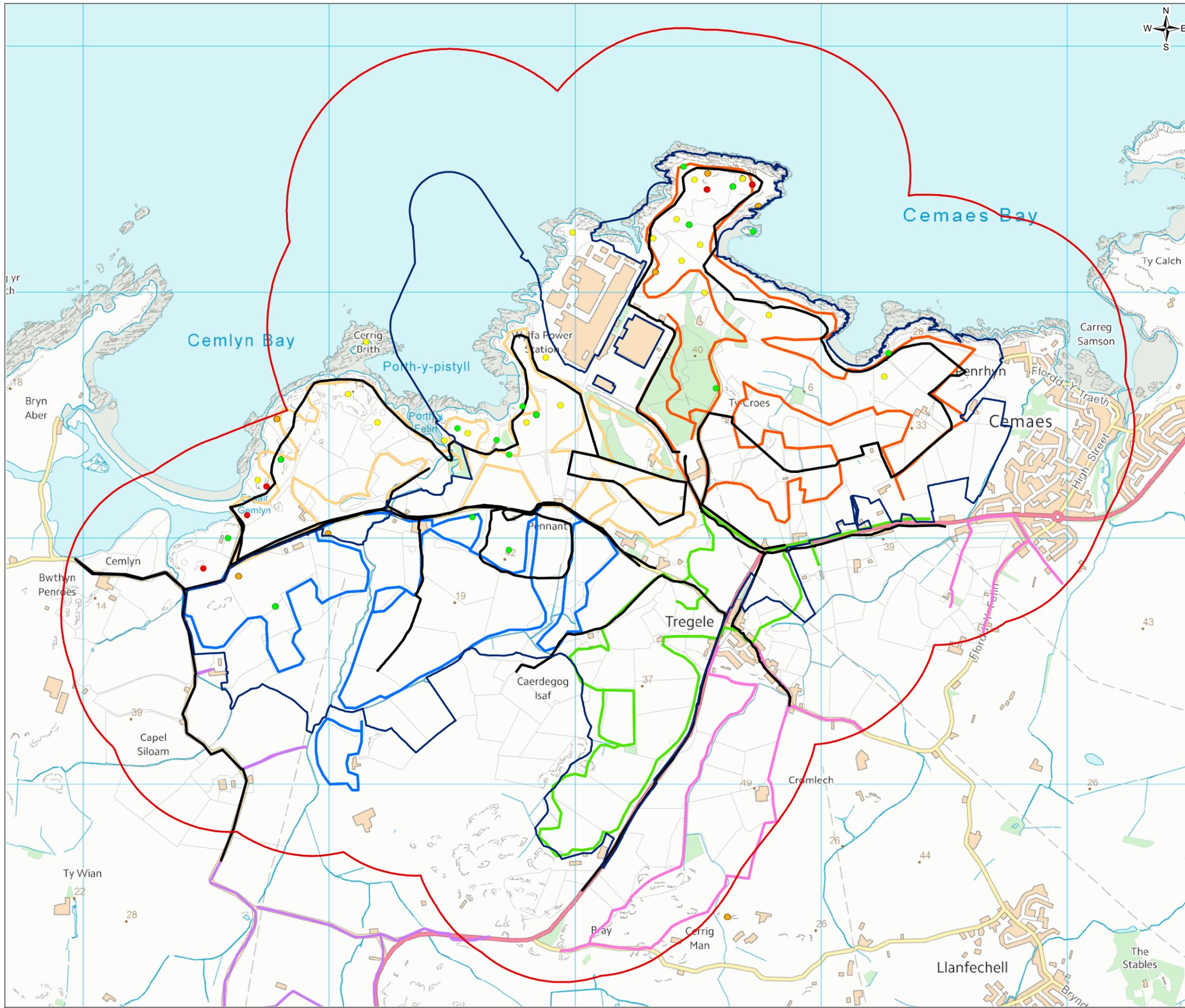
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FIGURE 6-24



Legend

- Wylfa Newydd Development Area
- Buffer of 500m of WNDA boundary
- Transect route 2017
- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5
- Transect 6
- Wintering bird surveys 2013-2014 - chough records
- Breeding bird survey 2014 - chough records
- Wintering bird survey 2017 - chough records
- Breeding bird survey 2017 - chough records



0	JUL 17	Initial Issue	AF	JJ	PS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Client
HORIZON
 NUCLEAR POWER

Project
 WYLFA NEWYDD PROJECT
 ENVIRONMENTAL STATEMENT

Drawing Title
 2014 - 2017 CHOUGH RECORDS SUMMARY
 FROM BREEDING AND NON BREEDING
 SURVEYS (WHERE MAPPED DATA ARE AVAILABLE)

Scale @ A3: 1:15,000 DO NOT SCALE

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FIGURE 6-25

Legend

Wylfa Newydd Development Area

Chough pursuit survey

Total feeding time (minutes)

- 0 - 10
- 11 - 30
- 31 - 60
- 61 - 120
- 121 - 285
- 286 - 600



0	AUG 17	Initial Issue	RM	NG	PS	RB
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

Client

HORIZON
NUCLEAR POWER

Project

WYLFA NEWYDD PROJECT
ENVIRONMENTAL STATEMENT

Drawing Title

DETAILED FORAGING LOCATIONS FROM 2017 PURSUIT SURVEY

Scale @ A3

1:7,000 DO NOT SCALE

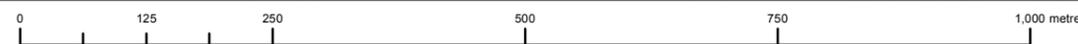
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If you have any questions or feedback regarding the Wylfa Newydd Project you can contact us on our dedicated Wylfa Newydd freephone hotline and email address, by calling on **0800 954 9516** or emailing **wylfaenquiries@horizonnuclearpower.com**

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