

Gareg Lwyd Hill potential wind farm site

Review of noctule bat data from 2006 and 2009 and assessment of potential impact of wind turbines

Surveys and report by Dr Sarah Cartmel

On behalf of Ecology Matters Ltd

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1. Introduction

- a) Bat surveys were carried out at Garreg Lwyd potential wind farm site in 2006. After the results of the ecological surveys had been presented to the developers (RES UK & Ireland Ltd (RES)) the area of the proposed wind farm was reduced in size and the number and location of turbines altered slightly.
- b) In June 2009 the wind farm company received a response from the local planning authority ecologist stating that there was insufficient data from the bat surveys, in particular the surveys had started at least 45 minutes after sunset and could have missed some noctule activity and the Anabat data was also insufficient.
- c) On request from RES further bat surveys were undertaken in 2009 to obtain this extra information and to determine the extent of use of the site by noctule bats.
- d) Results of these surveys have been submitted as SEI in February 2010 by RES .
- e) Comments have been received from CCW and the local planning authority requesting more information on the noctule bats that were detected on the site. In particular it was requested that the flight lines of the bats be displayed over aerial photographs with turbine locations shown.
- f) This report details findings of the bat surveys with regard to noctule bats and provides further visual information and comments on the likely impacts of the wind farm proposal on noctule bats.
- g) Consultees have stated that ‘the information provided within the ES and supplementary information does not fully address the requirements of the EIA in that there is no full assessment of impacts upon protected species supplied. An EIA should state impacts without mitigation, indicate relevant mitigation measures and the proposed impact of these measures on the protected species.’
- h) This report only considers the impact of the proposed scheme on noctule bats as impacts on other protected species relating to this proposed wind farm are addressed elsewhere. This report should be read in conjunction with other reports previously submitted to the local authority as part of the ES and SEI for the proposed Garreg Lwyd Hill wind farm.

2. Conclusions from 2009 work with regard to noctule bats

- a) The results of surveys in 2009 suggest there must be a noctule roost site nearby but not within the survey area as the bats appear on the wind farm site at least 25 minutes after sunset at the earliest, appearing from the east or south east direction. The median emergence time for noctule bats is 5 minutes after sunset (Jones & Rydell, 1994), which suggests the roost site could be somewhere in the wooded valley to the east of the proposed wind farm site. There are several broadleaved woodlands in the valley on the east side of the site (Figure 4), the nearest being: Square Wood at the bottom of Cwm yr Hob - the valley leading down from Ty'n y Ddol Hill and woodland just east of Killowent which is in the valley leading down from Trefoel Brook. There is also suitable woodland on the east side of the valley which Deuddwr Brook runs through.
- b) The majority of the noctules detected during the surveys were either commuting over the northern half of the wind farm site or feeding next to Trefoel Brook (Figure 4). They were also detected next to the woodland at Garreg Lwyd Hill and on the east side of Ty'n y Ddol Hill. In 2006 they were seen feeding along the west edge of the woodland on Garreg Lwyd Hill. No noctules were seen over the dawn period but during the August survey the Anabat located on the north edge of the woodland on Garreg Lwyd Hill recorded several noctule passes. On the occasions when the noctule bats were seen they were either flying at a height of approximately 10m whilst commuting or at approximately 2 to 3m whilst feeding over the grassland areas.
- c) The conclusion from these surveys is that a few noctule bats (up to 5) regularly cross over the site and at least two have been seen feeding on the site.

3. Assessment of impacts and mitigation

- a) Interim guidance for bats and onshore wind turbines was issued by Natural England in February 2009 (Technical Information Note TIN051). This guidance states that noctule bats are of high risk from wind turbines and that their populations are likely to be threatened due to impacts from wind turbines.
- b) Noctule bats are one of the largest UK species; they are strong fliers and will often fly high in open habitats, which could suggest why they are more at risk of collision with wind turbines.

They often feed over trees or high over areas of open pasture, but also have a strong affinity to water. Noctules generally roost in trees (often in woodpecker holes) although they will occasionally roost in buildings. They are also known to move roost sites on a regular basis. They tend to roost in broadleaved woodland rather than conifer woodland.

- c) A series of figures have been produced in this report to display locations and flight routes of noctule bats detected across the site in both 2006 and 2009 (Figures 1 to 6). The results of surveys are overlaid on an aerial photograph with turbine locations displayed and show detail of habitat use by the noctule bats.
- d) The aerial photograph indicates the predominant habitat on site is improved grassland although there are small patches of conifer to the north and one patch in the centre of the site next to the pool at Garreg Lwyd Hill.
- e) There are two stream valleys on the east side of the site: one leading directly west from Killowent (Cil-Owen Brook) and one just a little further south – Cwm yr Hob. The aerial photograph shows these two stream valleys as partially wooded, with Cwm yr Hob reaching as far as T7 and Cil-Owen Brook leading up to T14 and a southern fork leads to T11. It is possible that the noctules use these stream valleys to navigate into the site, particularly the northern valley of Cil-Owen Brook as this area has detected the most noctule activity.
- f) Noctule activity (including feeding) was detected close to the proposed locations of T11 and T14 – these two turbines being at the ‘end’ of the stream valleys and possibly the point at which noctules enter the site. There appears to be considerably more noctule activity close to T11 than T14 although neither site shows high levels of activity. For example, on the night of 29th August 2009 two noctule passes were recorded at T14 at 20:52 and 21:01 hours (two noctules were seen feeding just west of the proposed turbine location at 20:56 hours) which equates to a bat activity index of 0.22 bats per hour. At T11 a total of 14 noctule passes were recorded throughout the night: seven passes between 20:45 and 21:00 (likely to be a bat feeding), one at 21:30, one at 22:15, two at 04:05, two at 04:35 and one at 05:20. This equates to a bat activity index of 1.5 bats per hour.
- g) T11 is located very close to the conifer woodland where noctules forage. With no mitigation there is a greater chance for noctules to come into conflict with this turbine.
- h) Mitigation proposed for woodland by T11:

- 1) This woodland provides good sheltered feeding for pipistrelles and other species and a good deal of bat activity has been recorded here (including noctules). The Natural England guidance states that wind turbines should be located at least 50m from woodland and Eurobats guidance suggests 200m from woodland edge. According to the layout plan turbine T11 will be located within 10m of the woodland edge. However, it has been proposed in the habitat management plan (which has been agreed with the local Wildlife Trust and other relevant organisations and was submitted to the local authority in December 2008) to fell this woodland and allow it to convert to scrub. Clearly the instant removal of this woodland will result in the loss of sheltered feeding habitat for bats but ultimately it will revert to a habitat that could provide good feeding areas. Therefore it is recommended that this woodland is felled gradually, over three years starting at the north end closest to where turbine 11 will be located. Most sections that are felled would be re-planted with willow saplings and other scrub species, as natural regeneration of a previously conifer forested area could take many years and this will provide suitable habitat much sooner. The new woodland/scrub edge would be no nearer than 150m from the location of turbine 11.
 - 2) The scrub shall also be extended in a south and south west direction (towards the pool) to provide extra areas for sheltered feeding which will also link the bats up to the water body.
 - 3) All trees to be felled will be checked carefully to ensure there are no suitable bat roosting sites at least one month before work commences, as pipistrelles (and other species) will roost in trees. Any trees with bat roost potential will be marked and inspected by tree climbing to further assess their potential and if necessary will be felled in sections which are lowered carefully to the ground for inspection by a licensed bat worker to ensure no bats are present.
 - 4) Other bat species were found on woodland edges and along hedges. These areas will be unaffected by the development and hedges will be maintained as part of the mitigation.
- i) This mitigation should 'draw' any bats away from the turbine (T11) and therefore with mitigation the location of this turbine is acceptable and should have no significant impact on the noctule bats.

- j) Activity recorded at T14 appears to be from bats feeding in the area just west of the turbine location; visual observation during the transect surveys indicated the bats were flying much lower than turbine height (only 2 to 3m high). This activity was not detected on every survey and in general few noctules were detected here. If this area is only used as an occasional foraging location the indication is that the bats will be at little risk from the turbine.
- k) Noctules have also been detected close to the proposed locations of T23 and T21 but these are located in such an open landscape that the bats can navigate across the area easily avoiding these turbines. No mitigation is required for construction or operation of these turbines.

4. Conclusions of potential impacts on the noctule population

- a) In comparison to other proposed and existing wind farm sites that Ecology Matters have surveyed, the amount of noctule activity detected on this site is relatively low. The results indicate that perhaps 4 or 5 individual noctule bats are crossing the site either at dusk or dawn and that two noctules feed on the site. The habitat on the either side of the development area is far richer for noctules with good patches of broadleaved woodland and farmland next to rivers and this habitat could support several noctule colonies.
- b) In Britain the average size of a nursery colony of noctules is just 20 females and the estimated population size of noctules in Wales is 5,000 bats (*Altringham J., British Bats, 2003*). The relatively low number of noctule bats using the site (with a maximum bat activity index of 1.5 bats per hour) suggests there is likely to be minimal effect on the local noctule population from the installation and operation of these wind turbines.
- c) With reference to the EclA methodology in Chapter 6 of the ES, despite the high sensitivity of noctules, the low potential magnitude of effect means that it is not likely that there would be a significant effect on the local noctule population.

5. Pre-construction surveys and post construction monitoring

- a) Pre-construction surveys will be required within 2 years of construction to provide an up to date baseline – transect surveys will be undertaken to obtain data on bat activity throughout the active seasons once a month between May and October. In addition and in the light of new guidelines issued in May 2011 (BCT good practice guidelines 2nd ed.) vantage point surveys shall be carried out for five consecutive nights between July and end of August. These

will commence 30 minutes before sunset and continue until dark and will focus on locations where noctules have been sighted, with the intention to record the flight route and number of noctules passing (or feeding) over the site.

- b) Taking the precautionary principle there is a small possibility of wind turbines causing death to bats whether from direct contact or from barotrauma (Baerwald et al. 2008). Therefore, monitoring of the site post construction will be essential to inform of any potential issues in relation to deaths on site. The potential loss of a few bats may not be detrimental to the overall local noctule population; however, the loss of 20 bats could eradicate a whole colony and would be of great concern. Due to the lack of knowledge on the impacts of turbines on bat populations it is recommended that this site is monitored using methods which are currently being determined by scientists working under contract for Natural England (NE) and the Countryside Council for Wales (CCW). Draft methods are set out below.
- c) Post construction surveys will be undertaken in the first, second and fifth years following completion of construction work (guidance will be issued on this by BCT/NE/CCW in the near future). Transect and vantage point surveys using the same protocol as in the pre-construction surveys should be carried out to see if bats continue to use the site and whether they fly near the turbines.
- d) In addition corpse searches will be made for potential collision victims underneath turbines. Corpse searches comprise a thorough search underneath key turbines each morning (starting at first light) for 5 consecutive days in early May, August and early October. It is not reasonably practicable to search under every turbine, and it is proposed the area of search is restricted to the northern half of the development site, where most noctule activity has been detected. Turbines that would be searched are: T9, T11, T14, T16, T17, T21, T22, T23. An area of 50m² will be searched under each turbine by walking 6 transect lines each 50m long and 10m apart. Ideally the search area should be kept relatively clear, such as short grass (possibly by strimming the week before survey – or kept grazed) rather than crops or scrub.

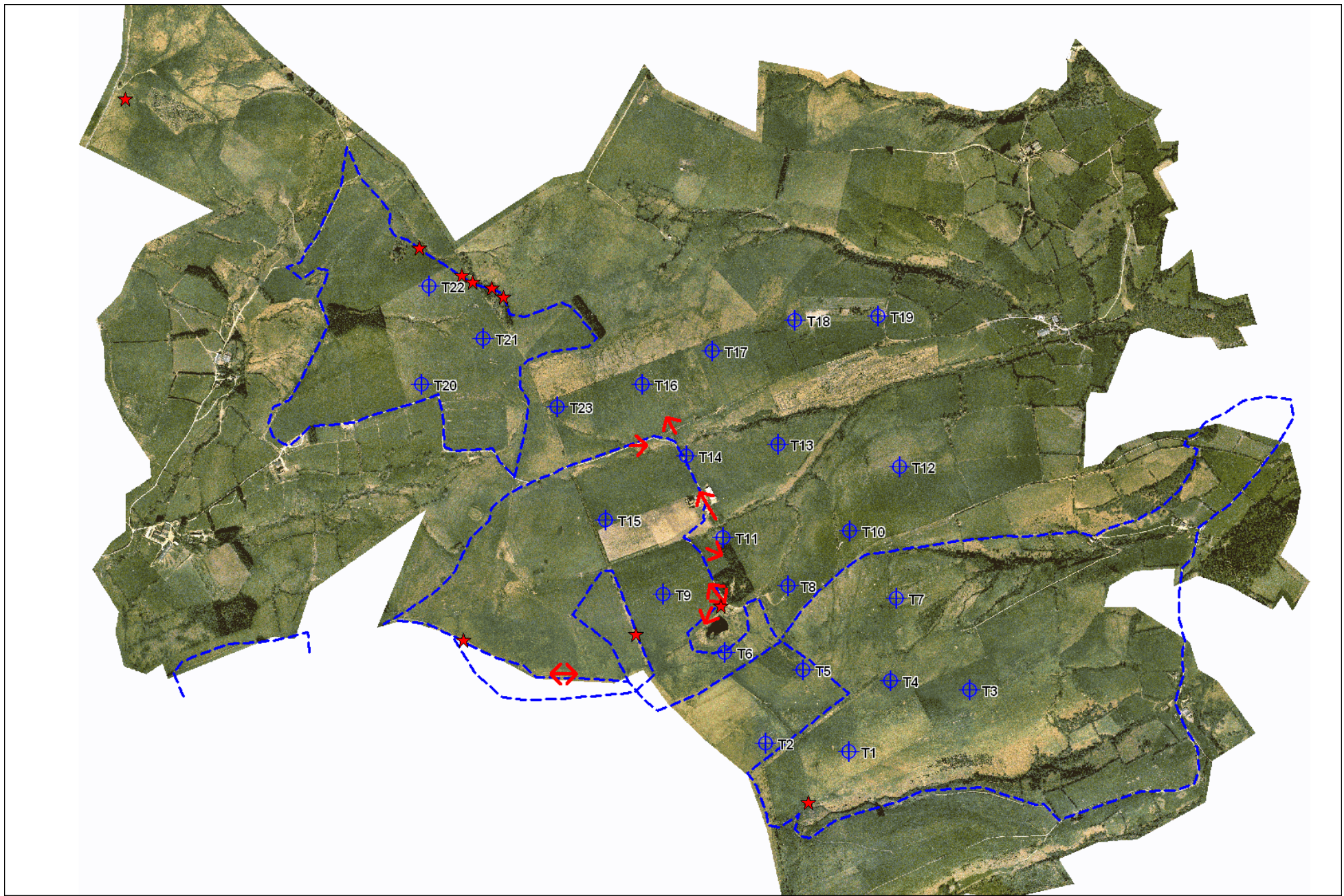


Figure 1 All noctule data 2006

(double ended red arrow = feeding area, single red arrow = commuting, red star = noctule recorded but not seen, blue dotted lines are transect routes)

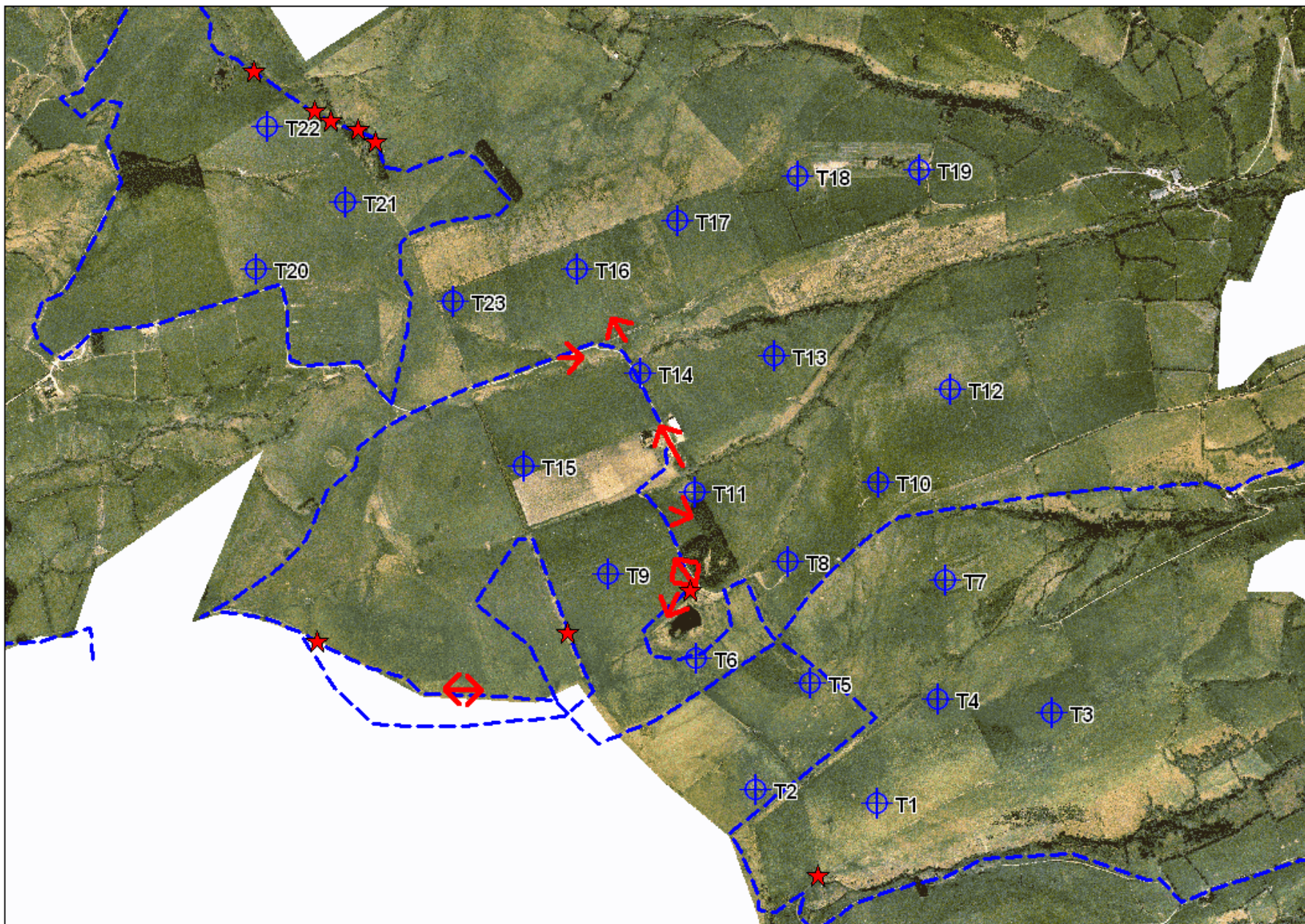


Figure 2 Close up view of noctule data for 2006
(double ended red arrow = feeding area, single red arrow = commuting, red star = noctule recorded but not seen, blue dotted lines are transect routes)

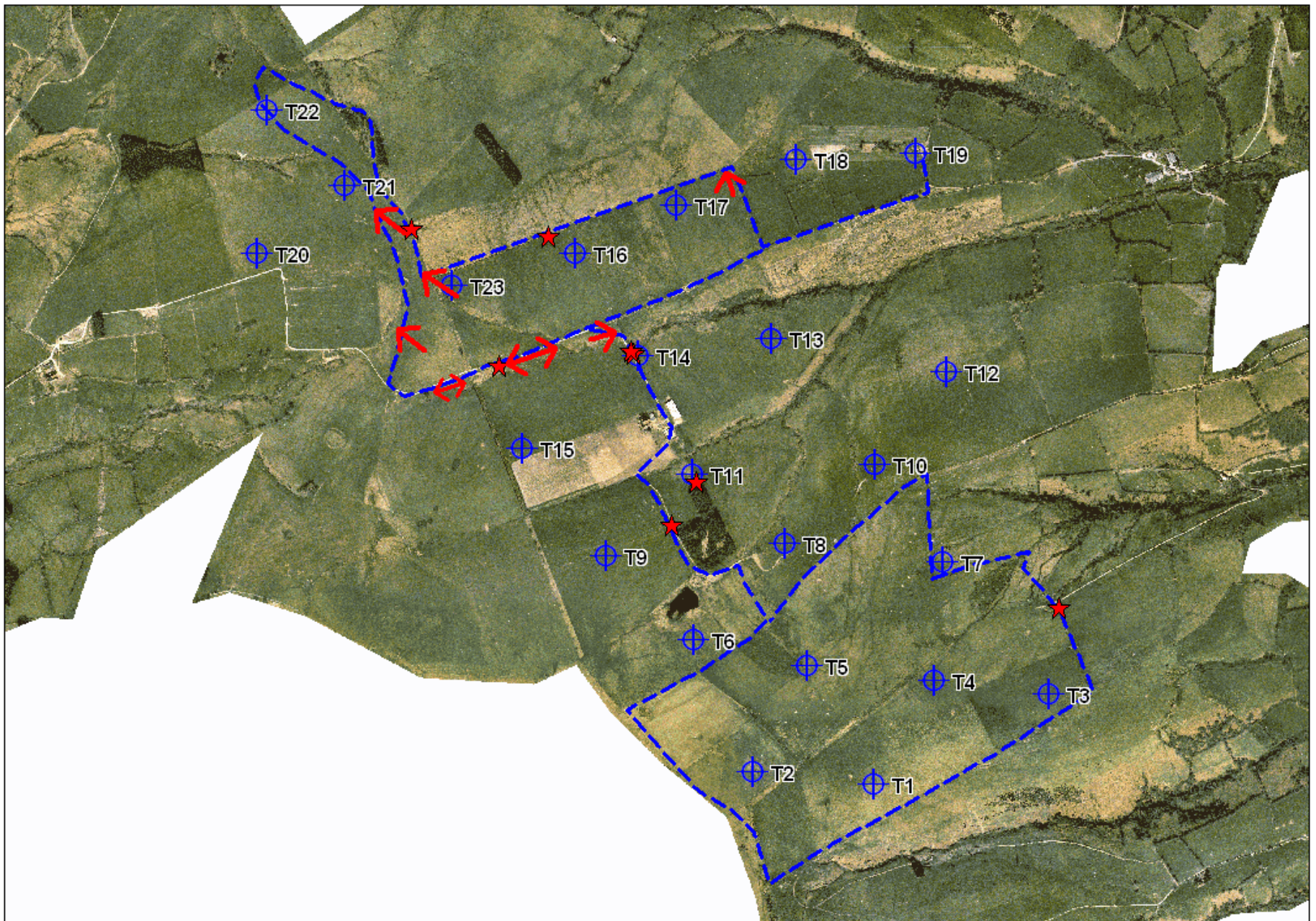


Figure 3 Noctule data 2009

(double ended red arrow = feeding area, single red arrow = commuting, red star = noctule recorded but not seen, blue dotted lines are transect routes)

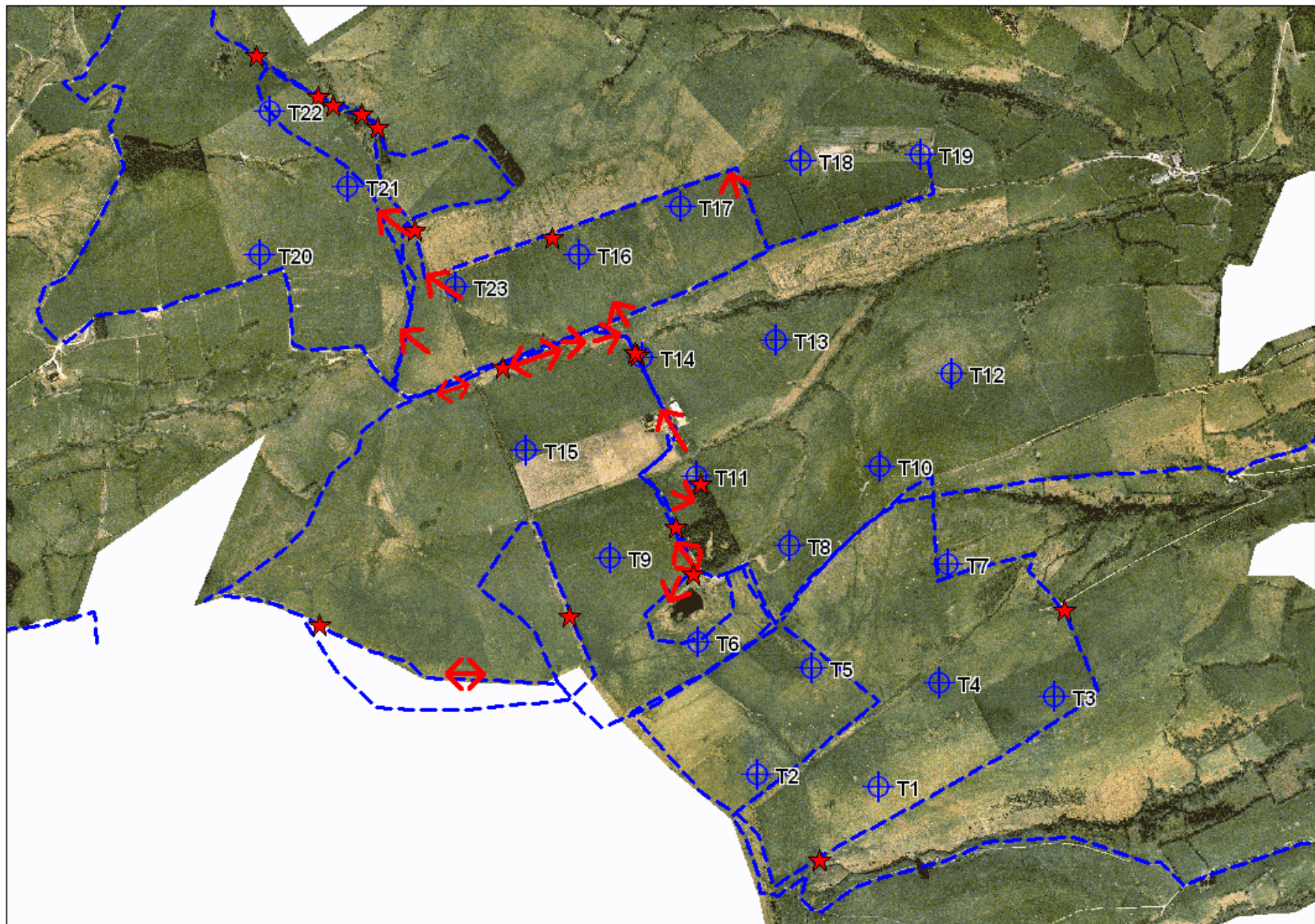


Figure 4 All noctule data and all transect routes 2006 and 2009
(double ended red arrow = feeding area, single red arrow = commuting, red star = noctule recorded but not seen, blue dotted lines are transect routes)

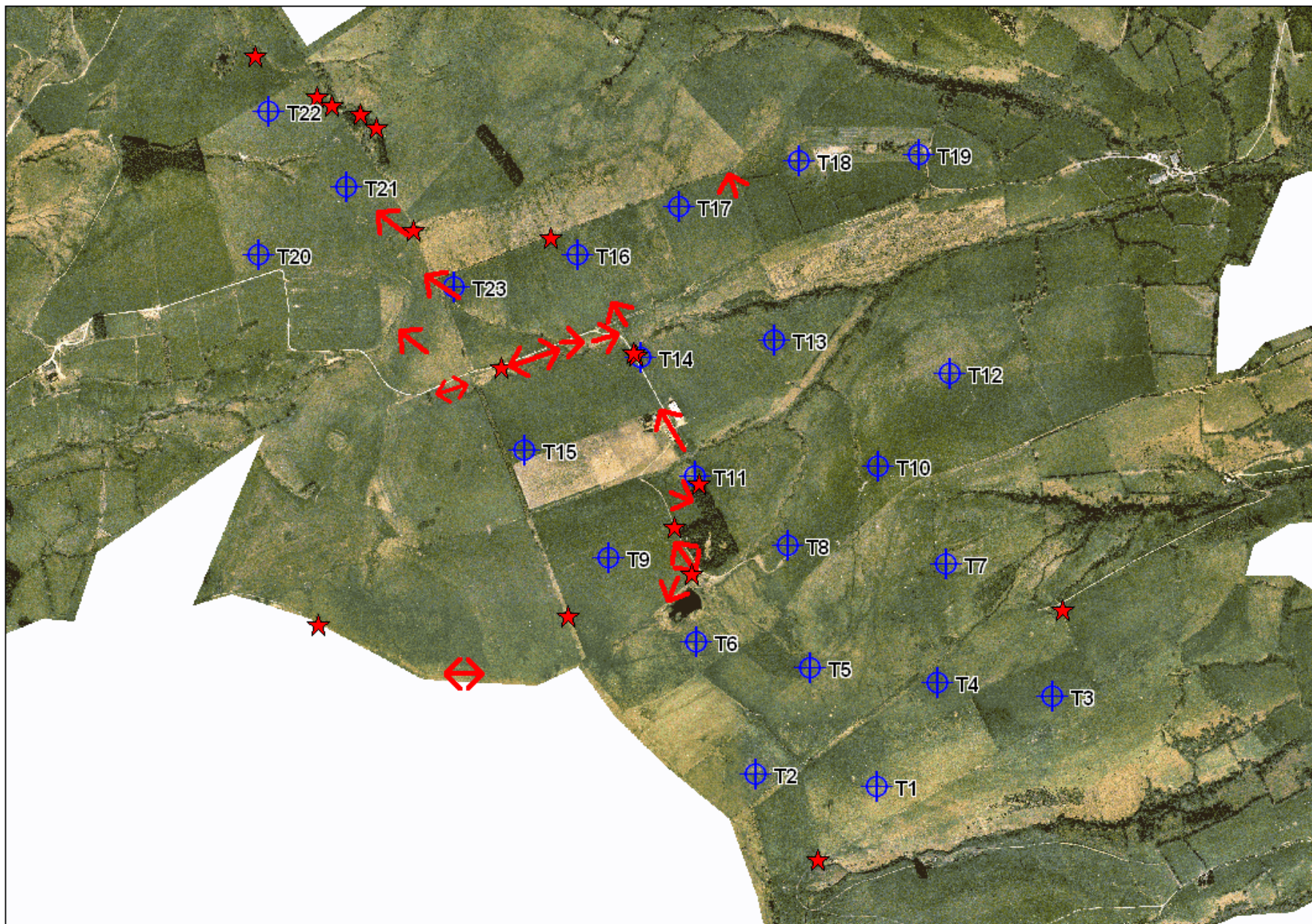


Figure 5 All noctule results and turbine locations (without transect routes)
(double ended red arrow = feeding area, single red arrow = commuting, red star = noctule recorded but not seen)

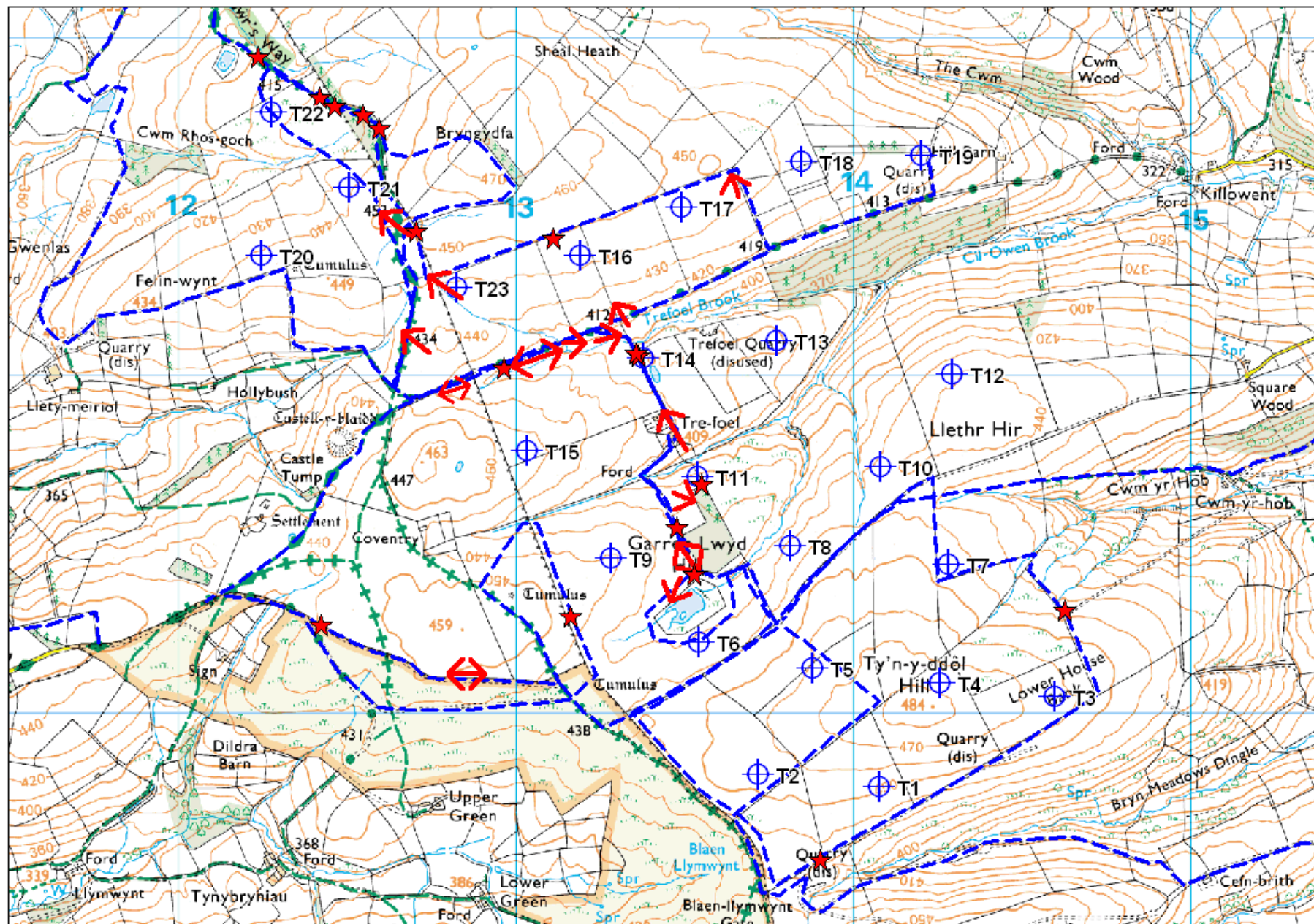


Figure 6 All noctule data (2006 and 2009) on OS map

(double ended red arrow = feeding area, single red arrow = commuting, red star = noctule recorded but not seen, blue dotted lines are transect routes)

References

Baerwald, E. F., D'Armours, G. H., Klug, B. J., and Barclay, R. M. R. (2008) Barotrauma is a significant cause of bat fatalities at wind turbines. *Current Biology* 18: R695-696

Jones, G. & Rydell, J. (1994). Foraging strategy and predation risk as factors influencing emergence time in echolocating bats. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* **346** (1318): 445-455

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