

**Mid Wales (Powys) Conjoined Public Inquiry
Session 2(SSA B).**

Application by RES UK & Ireland Limited dated 27 March 2009 for consent under Section 36 of the Electricity Act 1989 to construct and operate a 100MW wind turbine generating station in Powys, Mid Wales ('Llanbrynmair')

Electricity Act 1989 (sections 36, 37, 62(3) and Schedule 8)

Town and County Planning Act 1990

Rebuttal to NRW and PCC on Bats

Dr Peter Shepherd MCIEEM

Ref: RES/Bats/Rebuttal/Peter Shepherd/SSA-B

RES UK and Ireland Ltd

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1 Introduction

- 1.1 This document responds to the proof of evidence of Jean Matthews submitted to the inquiry on behalf of Natural Resources Wales (NRW), the supplementary proof provided by Mr Woodfield on behalf of Powys County Council (PCC) and the technical review of the Bat SEI by PCC. There is a great deal of overlap between the comments and observations made by NRW and PCC and to avoid duplication I first address Ms Matthew's proof and then when responding to Mr Woodfield's supplementary proof and the technical review I refer back to my response to Ms Matthews as necessary. This approach is logical as PCC defer to NRW on the issue of bats (see rebuttal evidence of Mr Woodfield on behalf of PCC.).
- 1.2 In their proof of evidence, NRW raise (essentially) two points:
- (i) The survey of the access route for bats is inadequate but can be remedied by further information (see 4.2.26.2); and
 - (ii) A condition requiring post construction monitoring is required on the site of the wind turbines (see 4.3.1.19).
- 1.3 In support of these two points, Ms Matthews raises a number of concerns in relation to the bat surveys undertaken and conclusions reached in the 2013 SEI on Bats submitted by RES on 15 October 2013. In the view of Ms Matthews *"insufficient evidence has been gathered to support the conclusion that there will be no detrimental impact to bats from the proposed works to the off-site access road or from the operation of the wind farm"*.
- 1.4 Ms Matthews concludes that the inadequacy of the surveys carried out to inform the assessment of effects for the road improvements for the access route (Llanerfyl to Talerddig) (referred to as the OHW in the Bat SEI) means that the applicant cannot demonstrate that the scheme will not have an effect on the Favourable Conservation Status (FCS) of bats. As a consequence the application is contrary to EU and national legislation and planning policy.
- 1.5 She also concludes that insufficient evidence has been provided to support the level of risk posed to bats through the operation of the wind farm proposal (WFP) and that appropriate conditions requiring monitoring and, if necessary, remedial measures should be attached to any consent.
- 1.6 In general Ms Matthew's proof is inconsistent with previous correspondence with NRW on this project and past work with NRW on a range of projects in Wales. I consider the arguments put forward by Ms Matthews to be disproportionate to the scale and nature of likely impacts identified in the Bat SEI and that her position that there is insufficient information to make an assessment of the likely impacts of the proposed scheme on the FCS of bats to not be supported by the information in front of this inquiry. If NRW are taking this approach to impacts of the scale identified in the Bat SEI as a matter of course then they should be requiring similar survey effort for all county road works undertaken by councils and highway authorities throughout Wales, which I would consider to be disproportionate and unnecessary in order to assess impacts on bats.

2 Background

- 2.1 In considering the detail of Ms Matthews' evidence and my response, I consider it is important to understand the background of the consultation that has taken place between NRW and RES throughout the life of the project. This is summarised in Section 5.1 of the Bat SEI and reviewed briefly here.
- 2.2 NRW (formerly CCW) responded to the 2008 ES on 11th November 2010. In this response NRW objected to the planning application raising a number of concerns in relation to bats. Further survey work on bats was carried out in 2011 and reported in the form of Supplementary Environmental Information (SEI) 2011. NRW responded to the new information in a letter dated 12th of October 2012 (CD/RES/LAN/001).
- 2.3 In this letter NRW maintained an objection and commented that in relation to bats the SEI 2011 *"lacks clarity and information previously requested by CCW (now NRW) has still not been provided"* (Paragraph 55). The information previously requested and listed in Annex 5 was:
- The assessment has not identified or surveyed roosts in the vicinity of the site. This is important to identify potential risk areas with high bat densities;
 - Figure 8.2 was not identified in the SEI and should be provided to NRW; and
 - Where trees are to be felled on off-site roads suitable mitigation measures should be included in planning conditions to avoid impacts on bats.
- 2.4 NRW also commented on the need for turbine blade tips to be at least 50m from woodland edge and watercourses as set out in the interim guidance TIN051 prepared by Natural England (Natural England, 2012). The letter also noted that Turbines 12 and 13 appeared to be closer to such features than 50m. NRW also proposed that pre-commencement surveys should be undertaken to inform avoidance and mitigation measures for bats during *"felling and construction periods"*. Survey is also required to provide a baseline for post-construction monitoring (Paragraph 58).
- 2.5 NRW also set out a range of post-consent requirements that are detailed in the response prepared by BSG Ecology on 18th July 2013 to the letter from NRW dated 12th of October 2012 (CD/RES/LAN/001). This response detailed in full the approach taken by BSG Ecology to surveying both the WFP and the access route in 2013 and detailed that the justification for the additional surveys in 2013 was twofold:
1. To address all of NRW's concerns as previously raised; and
 2. To ensure that the scope of the bat survey work is in line with new best practice guidance for bat surveys carried out at onshore windfarms published by the Bat Conservation Trust (BCT) in 2012 (Hundt, 2012).
- 2.6 Despite the consultation response being issued on 18 July, NRW did not respond until 11 August when Carol Fielding (the NRW respondent throughout the life of the project) sent an email explaining that she had not had time to finalise a response before going on leave and that NRW were likely to respond in line with the Statement of Case deadline in early September. Bats were not mentioned as being of any concern in the NRW Statement of Case or subsequently by NRW (a position repeated at the Opening of the Inquiry) until the proof of evidence was received.
- 2.7 Two phone calls were made to Carol Fielding, on 24 May 2013 and 27 September 2013. On the former date, the approach to further surveys was explained in detail and no issues were raised by NRW. During September, despite several attempts by BSG to contact Carol Fielding to discuss the consultation letter, it was not possible to speak to her until 27th of that month. On this date, the content of the consultation letter was discussed and again no issues were raised about the scope of the surveys or of the proposed methods (which were standard and in accordance with guidance). Carol Fielding also said that she would try to

issue a response the following week so that there would be a record of a response being received in the Bat SEI.

- 2.8 To summarise, none of the concerns with the scope or methods of the surveys carried out in 2013 were raised by NRW prior to the proof of evidence from Ms Matthews being received, despite NRW being aware of what was proposed. I am concerned that Ms Matthews may not have been aware of the detailed background to this project before preparation and submission of her proof.
- 2.9 Finally, the NRW proof does not provide a competing assessment. It seeks to identify deficiencies in the Bat SEI, rather than provide an assessment of likely impact. I set out below why I do not agree that the alleged deficiencies result in the conclusion that it is not possible to make an assessment of the impact of the proposed works on the FCS of bat species present along the access route.
- 2.10 For these reasons, I will endeavour to agree common ground with NRW in the light of this rebuttal proof.

3 Evidence regarding the bat assessment for the Access Route

- 3.1 I have taken each of Ms Matthews' concerns in turn and numbered them according to the paragraph they are detailed in her proof. In general terms the approach adopted to the survey and the assessment of impact on bats was based on a clear understanding that the WFP and the access route required equal consideration. Careful thought in light of the nature and scale of the likely impacts was given to the type and level of survey work to be undertaken. Preliminary assessments of the potential for bats were made and survey effort and design subsequently developed proportionate to the predicted impacts of the scheme. Attempts were also made to engage NRW in this process

Paragraph 4.22 – Additional trees requiring survey

- 3.2 Ms Matthews states that *"it is not clear from the SEI how many trees were surveyed as part of the preliminary survey"*. As detailed in section 5.8.5 of the SEI, all trees that would need to be removed or trimmed as a result of works were assessed, as part of the preliminary assessment. I acknowledge that detailed specifications of all the trees that were assessed were not provided in the Bat SEI. These were not provided as the preliminary assessment enabled us to scope out the need for additional surveys in all cases except one. I did not (and still do not) consider such a level of detail to be helpful or relevant for the SEI. I have nonetheless clarified our approach further below.
- 3.3 Trees were selected for assessment from drawings provided by RES that identified trees that would be affected by works along the access route. Full details on trees that would be affected, and that had some potential to support roosting bats (for which further survey would then be recommended) were collected. For the other trees that were assessed, photographs were taken and notes made to confirm species and that they did not support any potential features that could be used by roosting bats.
- 3.4 As a result of this sifting process full survey details were only collected for one tree, a single mature ash at Chainage 3950 (60283248-D-007). This was the only tree that was proposed to be removed that was assessed as having good potential to support roosting bats
- 3.5 Ms Matthews goes on to say in 4.2.2 that she considers that *"other trees will be affected by the scheme and that these should have been surveyed as part of the preliminary survey"*. This broad statement is not supported by a list of trees that will be affected or a justification or rationale for this opinion.
- 3.6 I have since been back through the design drawings with Mr Martin (AECOM) and visited the site with him and Mr Green on the 13th of November to check and confirm the proposed works and the impact they are likely to have on bats. I also surveyed the route again on the 18th of November with my colleague Mr Hobbs, who was involved in the preliminary assessment of the access route. I have not been able to identify any additional trees that will be adversely affected by the proposed works along the access route that are likely to support roosting bats arising from this review. I therefore consider that all relevant trees with potential bat roost potential have been surveyed A detailed response to Mr Woodfield's amended Appendix 8 has been prepared detailing these findings.

Paragraphs 4.2.3-4.2.5 – Potential roosts in bridges and scale and extent of surveys

- 3.7 Ms Matthews states (4.2.3) that *"there should have been at least a preliminary inspection of all bridges along the route, not simply the two surveyed by the applicant, unless these were demonstrably unsuitable either as bat roosts or foraging or commuting areas"*. The justification for this argument is provided in 4.2.2-4.2.5 and can be summarised in the judgement that *"Bridges can provide important roost sites for bats..."*; and *"Information about features that provide potential roost sites along the road is of use in determining the value of the area for bats and the likely impacts of a proposal."*; and finally that *"The information would also be pertinent to the assessment of the wind farm proposal, both in relation to the value of the habitat for bats and the possible distribution of species at the site."* Ms Matthews goes on to say that *"It is not clear why the surveyors chose to survey some bridges, but not others on the scheme"*.

- 3.8 The two bridges that were subject to detailed survey were identified from the initial road drawings, and in consultation with RES, as being directly affected by road works. As such bridges not being directly affected were scoped out of the assessment. The purpose of the surveys of the bridges was to determine if they were being used as roosts.
- 3.9 Although bridges have the potential to be important roost sites for bats, I do not consider it is necessary to survey all bridges if they are not going to be affected by the proposed works. Ms Matthews expresses the view that surveying all bridges regardless of whether they are to be affected or not would provide useful contextual information that will inform any assessment of the proposed scheme. I accept that understanding the broad nature of the distribution of bats and the value of habitats in an area is important to assessment of impacts. However, there is a need to apply a proportionate approach to survey effort which should be governed by the likely nature, scale and permanence of predicted impacts. I consider that the information gathered in relation to known and potential roosting habitat and foraging and commuting habitat is sufficient for a robust assessment of likely impacts of the proposed scheme to be undertaken. However, in response to Ms Matthew's concerns I have carried out a preliminary assessment of all bridges and culverts the details of which are provided in Appendix 1.
- 3.10 Ms Matthews proposes a much more extensive survey effort in terms of the features to be surveyed and the extent of the survey area. This includes surveys up to 500 metres from the road route (1 km wide survey corridor), surveys of an unspecified number of trees, bridges and buildings, regardless of whether or not they would be affected by the works. I do not consider the approach Ms Matthews has proposed is proportionate or necessary to understand the likely effects on bats and thus the likely effects on the FCS of bat species along the route of the access road.
- 3.11 In terms of the WFP our approach was derived with reference to standard guidance documents produced by Natural England (2012) and BCT (Hundt, 2012). The BCT guidance contains detailed methods for surveying onshore wind farm sites for bats and is the key reference that was used to guide the survey scope and methods for bats to inform the assessment of effects for the WFP. According to the BCT guidance:
- “At sites offering opportunities for roosting bats, the survey should include a daytime inspection of structures and trees within 200m of the developable area (where the turbines may be located) for evidence of roosting bats and to make a general assessment of potential roosting features within the survey area. Although it is not essential (and may be difficult) to locate roosts of individual or low numbers of bats, sites with evidence of roosting by medium and high-risk species and/or roosts of district importance and above (see Tables 10.1 and 10.2 for further details) that use the site may require additional surveys as outlined by SNCO and in Chapter 8. In addition, any roosts of medium and high-risk species identified from the data search should also be surveyed if bats from such roosts may cross or use the site”*
- 3.12 The reason for the 200m limit being applied to wind turbines is that the key effect of the operation of the turbines on bats is bats being killed through interaction with the blades, not loss of roosting habitat. It is also very difficult in almost all cases to ascertain whether bats flying across a wind farm have come from an identified roost, unless the roost is immediately adjacent to a wind farm, without radio-tracking them. Although it is useful to compare the species assemblage and general activity levels recorded during the activity surveys (driven transect and automated survey) carried out along the access route with that recorded in the WFP area, this is not essential and does not help to give greater confidence to the assessment of mortality risk. The data on bat activity (i.e. foraging and commuting) from the WFP survey area provide the data to enable this assessment to be made.

Paragraph 4.2.7-4.2.8

- 3.13 In 4.2.7 Ms Matthews claims that Powys County Council (PCC) requires further improvements to the road as a result of the access route and that this may result in several more bridges being affected, which in turn may necessitate further survey work on bats to be undertaken. The assessment and surveys have properly addressed the identified impacts of the proposed scheme before the inquiry and not one proposed or designed by PCC. However I have visited the route on the 18th of November and inspected all bridges and culverts in order to address the concern raised by Ms Matthews. I have provided in Appendix

1 a brief description of each bridge and culvert inspected on the 13th and 18th November in addition to those specifically raised by Ms Matthews in her proof. I describe these below.

3.14 In 4.2.8 Ms Matthews refers to bridges, in addition to the two that have been surveyed, that could be affected by the works and could provide roosting places for bats. These have been discussed below:

- **Glen Menial Bridge:** - I have undertaken a detailed endoscope survey of this bridge on the 18th of November. There are no cracks on the underside of the bridge which appears to have been re-pointed relatively recently. There are limited cracks in the facing stone on the bridge arch and parapet wall on the northern side of the bridge. On the southern side of the bridge there are a number of deeper horizontal and vertical cracks between the stone work on the bridge arch. The parapet wall is in good condition. On the northern side of the bridge the cracks are shallow and very narrow with no roosting potential. One crack extends through the northern parapet wall opening onto the road side at road level. Whilst this is a crevice of a size suitable for use by bats it is open to water seepage off the road and accessible to predators and as such I consider it very unlikely to be used. An old ivy stem is visible within the crevice and no evidence of use by bats was recorded from the endoscope survey undertaken. The cracks on the southern side of the bridge are mainly beneath the level of the wooden pedestrian bridge. They extend into the bridge arch and have potential to be used for roosting. The endoscope survey did not record any evidence of use by bats (droppings, scratch marks or smooth stone surfaces) I consider the underside of the bridge has no roosting potential, the northern arch and parapet wall has low potential (due to the condition of the one suitable crack) and the southern arch has good roosting potential. The lack of evidence of use by bats suggests that if being used by bats these cracks and crevices are unlikely to support significant roosts. The works to this bridge will include the removal of the wooden hand rail from the pedestrian footbridge on the southern side of the bridge which will not have any impact on roosting opportunities on the south facing arch of the bridge. The works to the north facing arch and parapet wall will result in the removal of the parapet wall and the slight widening of the bridge and re-construction of the parapet wall. This will result in the loss of the crack through the parapet wall which I consider to be of low roosting potential and unlikely to be used by bats. However, I recommend that the bridge would need to be re-surveyed closer to the start of any works to inform how the works should be undertaken. In addition I would recommend that a new purpose built roosting opportunity is built into the new arch and parapet wall as part of the detailed design work for the bridge. This would improve roosting opportunities for bats at this bridge.
- **Dolwen Isaf Bridge:** - The facing stone on the retaining walls, abutment walls and central pillar support are in good condition and do not have cracks that could be used by bats. The concrete span bridge has broad V shaped notches on the underside of the bridge span between concrete sections, but none are suitable for roosting being very shallow and open. Many are also covered in cobwebs indicating no recent use by bats. There are horizontal crevices between the underside of the bridge span and the abutment walls. These were inspected with an endoscope and no bats or signs of bats were found. A number were filled with cobwebs and other material indicating no use by bats and the gaps above the northern abutment wall are very wet with water seepage. Some of the gaps do however have potential to support bats. The crevices are about 20 mm wide and between 50 and 100 mm deep. No deep cracks or crevices were present. As such if bats were present at the time of the survey they would have been visible. The size and nature of the horizontal gap between the underside of the bridge and the abutment walls provides limited roosting potential for a significant bat roost (i.e. maternity roost) due to the relatively shallow and open nature of the crevice. However they could be used by small numbers of bats throughout the active season. The shallow exposed nature of the gap indicates the bridge is unlikely to be a winter hibernation site. Ms Matthews also claims a mature ash tree will be lost on the road verge to the south-east of the bridge but this was checked during the site visits and confirmed that it will not be lost. Some trimming of branches is likely to be required, but none support features likely to be used by

roosting bats and the tree as a whole has low roosting potential. The works to this bridge are likely to be limited to the replacement of the existing metal barrier on the eastern side of the bridge with a demountable barrier. These works would have no impact on roosting potential of the bridge. If the bridge has to be widened by up to 1 metre the existing abutments on the eastern side of the bridge would be extended and a new bridge deck added to the existing deck. This would have the potential to disturb bats if they were using the bridge at the time of the works, but would not result in the loss or damage of potential roosting locations. An extension of the bridge would provide an opportunity to install additional roosting features to this bridge increasing its potential to be used as a bat roost. I recommend that the bridge would need to be re-surveyed closer to the start of any works to inform how the works should be undertaken.

- **Dolwen Uchaf Bridge:** This will not be affected. Despite this I have undertaken a close examination of this bridge on the 13th and 18th of November. It is of a similar structure to the Dolwen Isaf bridge with no suitable roosting habitat on the underside of the bridge span, the retaining walls or the abutment walls. The horizontal gap between the underside of the bridge span and the top of the abutment wall is approximately 20 mm wide and between 50 and 100 mm deep. On both sides of the water course this gap was very wet and water seepage runs were evident reducing the potential for this gap to be used for roosting. I consider the bridge has no potential for roosting bats and I do not consider disturbance likely to arise, given the lack of works in proximity to the bridge.
- **Bridge at Talledigg junction:** This bridge will not be affected by proposed access works.. I have however inspected this bridge. It is of metal construct with support beams sitting on abutments. The retaining walls and abutments provide no roosting opportunities and the underside of the bridge span and the space above the abutment walls are lined with corrugated metal that is tight fitting and there are no roosting opportunities. This bridge has no potential for roosting bats.

Paragraph 4.2.10-4.2.17 – Survey of the Gosen bridge

- 3.15 In 4.2.10, Ms Matthews mentions that a plan of the potential roosting features is referred to in the text but has not been provided. This is now provided in Appendix 2 to this proof.
- 3.16 In response to the comments in 4.2.12 about further examination of an ivy-covered crack on the northeast face of the bridge, it was not possible to see the depth of this crack as it was too narrow to fit an endoscope into. It is considered, from use of a torch, that the crack is around an inch deep. Given this and the assessment that the bridge had potential to support bats it was considered the best approach was to undertake an presence/absence (emergence/re-entry) survey.
- 3.17 In 4.2.13 to 4.2.15 Ms Matthews raises a concern that there is no mention of the use of an endoscope at the Gosen Bridge and that this is essential for investigating cavities in a bridge. She also considers that a scaffold must be erected where it is not possible to closely examine crevices visible from the ground. In this case an endoscope was not used (although one was available) as there were no cavities that could be investigated with an endoscope as they were either too narrow or too high above the ground and inaccessible.
- 3.18 It is my experience that inspection surveys of bridges and other structures are rarely undertaken from a scaffold unless one is already present on the site as the erection of a scaffold may lead to disturbance of a roost, and is an expensive and in this case potentially dangerous (fast-flowing water and an uneven surface beneath the bridge) activity compared to other appropriate methods of determining use by bats. In this case I consider the application of roost emergence and re-entry surveys to be appropriate and proportionate to the potential identified during the preliminary assessment. The emergence surveys have also proven to be effective as a small pipistrelle roost was identified using the chosen survey methods. In addition an understanding of the relative use of the river corridor at this location was determined from the bat activity survey, which adds to our knowledge of the bat species using the river corridor at this location.

- 3.19 Observers carrying out the emergence/re-entry survey were positioned very close to the arch of the bridge and inspected the face and underside of the arch closely when trying to ascertain where the pipistrelle bats were roosting. Their assessment was that the pipistrelles had emerged from under a flimsy crevice created by some calcified deposits and that the feature was not extensive and possibly ephemeral (the deposits could easily be dislodged). They also concluded that none of the crevices under the arch were deep or substantial after examination with high powered torches and binoculars.
- 3.20 The arch of the bridge has very few roosting opportunities and overall it is very solidly constructed with shallow cracks. There are very few cracks that were not accessible from the ground and that might have merited further inspection with an endoscope to prove their depth and extent. Besides this point, the preliminary inspection led to the recommendation that further survey should be carried out to see if the bridge did support roosting bats.
- 3.21 We carried out emergence and re-entry surveys on the Gosen Bridge. This survey method is designed to prove presence or absence, i.e. the BCT guidelines state *"the preliminary roost assessment is an internal and external inspection conducted to assess the likelihood of bats being present and the need for further survey and/or mitigation. The presence/absence survey should establish where and whether bats are roosting at the site and the type of roost"* (Hundt, 2012: p54).
- 3.22 In 4.2.16 Ms Matthews argues that appropriate surveys were not undertaken. This is not the case. The surveys were undertaken using standard methods as specified in the BCT Guidance taking account of site conditions and they identified that two single common pipistrelle bats were seen to emerge from crevices under the arch of the bridge during one of the three surveys undertaken. The result of the survey supports the preliminary assessment that the bridge is unlikely to support a large or significant roost of bats. There is certainly no requirement for carrying out year-round surveys of the bridge as is suggested by Ms Matthews, but as with all the bridges and trees that might be affected we recommend update surveys are undertaken in the 12 months preceding any works. The suggestion by Ms Matthews that the survey was inadequate and therefore cannot be used to assess potential impacts on bats is not supported by the evidence especially when a low level of roosting was identified. It is also inconsistent with NRW's apparent satisfaction with the proposed survey method. The widening of Gosen bridge provides an opportunity to build in new roosting structures that will improve the extent and quality of roosting opportunities at this bridge.

Paragraph 4.2.18

- 3.23 Ms Matthews states in reference to the inspection of the Diosig Bridge that *"there is no reference in the survey of other possible crevices between stonework or whether the parapets or spandrels were inspected."* I can confirm the stonework was inspected and no roosting features were found to be present anywhere on the bridge except the very limited crevices found under the arch. In addition an emergence survey was undertaken and I consider a thorough survey of this bridge has been undertaken and the results are reliable. As with the other bridges and trees I would recommend that update surveys are undertaken nearer the start of the proposed works as occasional roosting cannot be ruled out.

Paragraph 4.2.20

- 3.24 In paragraph 4.2.20 Ms Matthews cites a BCT guidance recommendation to survey a strip 500m either side of a proposed linear route (section 9.5, p.66) (1 kilometre wide survey corridor) with the implication that this should have been applied to the access route. This guidance refers to survey work for major infrastructure and it is my opinion that it is not correct or appropriate to apply this guidance to small scale modifications to an existing county road. The approach proposed by Ms Matthews is a disproportionate application of the guidance which is aimed at major infrastructure projects. If NRW are taking this approach as a matter of course then they should be requiring similar survey effort for all county road works undertaken by councils and highway authorities throughout Wales. I am not aware this is the case and as such not only is the approach proposed by Ms Matthews disproportionate but also inconsistent.
- 3.25 Section 9.5 (page 66) of the guidelines - "Assessing the Need for a Survey" - guides the reader to Chapter 2. Section 2.2 of the guidelines sets out the general approach to

assessing the need for a survey. This establishes key principles for assessing the need for a bat survey which includes: is it reasonable to propose a survey, are the methods appropriate to meet the objectives of the survey and is the survey effort proportionate to the context and appropriate for the purpose of the survey? The approach proposed and methods adopted to the predicted impacts of the access route are set out in the Bat SEI and are in my view appropriate and proportionate to enable a robust assessment of likely impacts to be determined and are in line with the principles set out in the BCT Guidance. It is also worth noting that despite several attempts to engage NRW in the survey design and approach and a request for comment on the methods proposed no objection was received from NRW. In fact in relation to impacts arising from the road access NRW state in their letter of October 2012 that “*Where trees are to be felled on off-site roads suitable mitigation measures should be included in planning conditions to avoid impacts on bats*”. There is nothing in this statement to suggest the need for extensive surveys up to 500 metres from the road or even a need to survey for tree roosts.

Paragraph 4.2.21-4.2.22

- 3.26 Ms Matthews contends that night vision equipment should have been used to carry out surveys at the single ash tree and the two bridges. The BCT Guidance stipulates that night vision equipment “*can be used*” for activity surveys (p41) but that resolution is low and is limited by the quality of onboard infrared illumination (p.35). In the case of the surveys carried out here, the use of infra-red equipment was considered and discounted as a useful option. It is generally only possible to use night-vision cameras on known roost features or small areas due to the restricted field of view and the difficulty in adequately illuminating all potential roost features on a structure with infra-red light. In this case it would be necessary to illuminate all surfaces/aspects of a tree/bridge and use multiple video cameras to use this method. More importantly in the circumstances at the bridges and the ash tree the surveyors were confident that they could view all of the potential roosting features very well and did not need to use night-vision equipment, which is likely to have hampered their observations rather than enhanced them. The decision not to use infra-red survey equipment does not make the survey results unreliable as implied by Ms Matthews. This decision and the assessment made by the field workers that night vision equipment was not necessary has proven correct as bats were recorded leaving the Gosen Bridge. It should also be noted that the visual survey was also supported by bat detectors, which would register bat activity.
- 3.27 It is also argued that a negative survey here cannot be used to infer lack of use. Although it is true that a surveyor cannot have certainty that a tree is never used by roosting bats on the basis of carrying out preliminary and emergence surveys (proving a negative is generally considered impossible), following the survey guidance (as was done here) is intended to provide sufficient confidence in the assessment of whether bats are using a tree. No evidence from the visual or bat detector survey gave any indication that bats were using the tree. I accept that there is no guarantee that at some point between the survey and the start of works a bat could use the tree. However, this is true of any development affecting a tree with bat roost potential. For this reason because the tree has been identified as a Category 1* tree (containing multiple potential roost features), further survey would be undertaken closer to the time that the tree would be felled as an additional precaution and to update the survey work. This is a standard approach to dealing with trees and one proposed by NRW in their letter dated 12th of October 2012 (see paragraph 2.3 above).
- 3.28 Ms Matthews also stipulates that a climbing inspection should also have been carried out of the tree. Whilst this can provide greater confidence in the use of a tree and BSG Ecology regularly carries out tree climbing inspections, each tree should be assessed on its merits and I consider that this tree was adequately surveyed using emergence surveys. There is a clear line of sight to the main roosting features on the tree. Again further survey of this tree is recommended to update the existing survey prior to felling.

Paragraph 4.2.23

- 3.29 Ms Matthews refers to a lack of clarity with regard to the extent of the tree removal required by the scheme. We are not aware of lack of clarity as the number of trees to be removed have been identified and more recently confirmed by further survey on the 13th of November. I agree that if circumstances change or if time passes that additional survey may be required to inform licensing or just to update the baseline survey information.

Paragraph 4.2.24

- 3.30 Ms Matthews expresses her reservation that driven transects are limited for assessing activity of quiet species of bats. She also considers that *“targeted surveys should have been undertaken at locations where impacts might occur because of changes to habitat”*
- 3.31 I contend that driven transects with stopping points (30 per transect – 15 each way = 60 minutes of stationary recording time) is an appropriate survey method for such a long section of road and considering the localised loss of linear habitats within the immediate road corridor. As the BCT guidance states driven transects can *“provide additional survey data when surveying for proposed road widening schemes, or on large sites”* (pg. 47). For this scheme, with the exception of one location none of the hedgerow or scrub/ woodland losses of habitat represent likely significant breaches of flight paths or significant loss of habitat and the losses are dispersed along 8 kilometres of the road length. At one location (Section 1.29: Drawing no. 60283248-D-010) the loss of hedgerow would result in the road corridor temporarily losing a hedgerow on both sides of the road as the hedgerow north of the road comes to an end and is replaced by a post and wire fence. At this point an automated detector was placed in the hedgerow to be lost to determine if at this location the removal of all hedges either side of the road would affect a key flight path. The key concern in undertaking the automated survey was to identify potential impacts on lesser horseshoe bat (as explained in 5.8.4 of the Bat SEI). As explained in this section this species; *“generally requires continuous habitat structures/linear features for foraging/commuting. This species is not thought to cross wide gaps in hedgerows and, as such, it was considered that the loss of hedgerows along the access route had the potential to lead to fragmentation of potential habitat for this species.”* No lesser horseshoe bats were recorded during this survey or during any of the activity surveys along the access route and it is very unlikely that any impacts would occur. None of the other locations where hedgerow is proposed to be removed will result in a similar loss of continuity of linear habitat features and as such I do not consider a specific site survey is required as each is a minor loss in the context of the habitats along or adjacent to the road corridor. None of the proposed removal of hedges and trees will result in a severance of a flight path across the road as the road is itself a gap that bats would normally have to cross.
- 3.32 The proposed sections of habitat removal result in the temporary short gaps occurring along the immediate road route itself. In these circumstances habitat features on the opposite side of the road (e.g. hedgerows/hedgebanks, woodland, vegetated riparian corridors) will continue to provide foraging habitat and flight paths. As such loss or severance of flight paths will not occur.
- 3.33 I consider the use of driven transects is a standard and appropriate survey technique for this scheme given the dispersed and limited nature of impacts on hedgerows and scrub/woodland along the route. It should also be noted that the driven transect provides information on bat use along the whole length of the road providing a wider context of the extent and nature of bat use along the length of the road to be affected helping in the assessment of potential impacts on the FCS of bats using the road corridor and its immediate environs.
- 3.34 Driven transects are appropriate for detecting bats flying within a particular distance of the bat detector and this detection distance will vary between species as Ms Matthews suggests (see Table 1.1 in the Bat SEI Appendices for mean frontal detection ranges of selected bat species using SM2 detectors – based on a BSG/Bristol University research project). The frontal detection distance for lesser horseshoe bat is not included in the Appendices as the species was not recorded during site surveys, but is estimated at 5.5m (from the same research study but acknowledging that call intensity of this species has not been measured in the field). BSG Ecology and other consultants have recorded lesser horseshoe on driven transects when present. The frontal detection distances for SM2 detectors are not significantly different to detection distances at 90 degrees, i.e. to the right or left of the direction the microphone is pointed, given the omni-directional reception of the microphone used. It is likely, therefore, given that the road is generally <10m wide that most bats would be detected flying along the road or using hedgerows either side of the road.
- 3.35 Ms Matthews does not acknowledge that this limitation to surveys using bat detectors equally applies to any survey, including walked transect surveys and automated surveys and

depends chiefly on the species of bat and the bat detector used as well as the configuration applied to it. It also depends on the environmental conditions (particularly temperature and humidity), the direction the bat is facing when calling etc. By driving a car down the road and driving the road twice (in both directions) the likelihood of detecting bats is increased by using this survey method, not decreased as she suggests. Again it should be noted that the proposal to use driven transects was set out for comment by NRW and no objection to the proposed approach was received.

Paragraph 4.2.25

- 3.36 Ms Matthews mentions again that surveys should have been carried out on any potential roosts along the route of the road and uses the example of the chapel close to Gosen Bridge to make the point. I do not consider, given the nature and scale of the temporary impacts along the route that this would add significantly to the assessment of impacts and, whilst of interest, is not necessary or proportionate. In addition Ms Matthews does not give an indication as to where she might stop such detailed additional surveys of features along the route that will not be affected. Given her suggestion that consideration should have been given to a 500m wide corridor then logically Ms Matthews would contend that all potential roosting structures and trees should be surveyed? Even if Ms Matthews is of the view that the survey should have surveyed buildings and trees adjacent to the road then this would add a very significant additional survey effort that would be entirely disproportionate to the impact of the scheme on habitats and bats associated with the road corridor. I consider the approach adopted that focusses on potential roosting locations that are likely to be adversely affected by the proposed works is the correct and proportionate approach, that provides sufficient information to enable an assessment of impacts on bats to be made. Again, if NRW really wanted such a disproportionate level of survey effort, I would have expected this to have been specifically identified by them prior to the surveys being carried out, as it is a departure from standard practice.
- 3.37 Our understanding of the wider context of bats and roosts was informed by the results of the desk study. The aim of this study was to determine if there were any known significant roosts along the access route that might be affected by the works. However, Ms Matthews raises a question as to why no consideration was made of the identified roosts at Sychtyn and Ffrid Fawr in the Carnedd Wen 2008 ES. These roosts were not identified in the desk study request made to the local biological records centre and I can only assume were not known to them. I have reviewed the Carnedd Wen ES. The roost at Sychtyn was surveyed in late August 2006 and one pipistrelle bat was seen to enter one of the Farmyard buildings. At Ffrid Fawr the building was surveyed in early October 2006 and three common pipistrelle bats were recorded flying around farm buildings.
- 3.38 The farm at Sychtyn is located on the top of the hill and is surrounded by large open improved pasture farmland. The road between the farm and Gosen Bridge is lined on the western side by a closely trimmed hedge and on the eastern side by a fence. The proposed works will not affect the trees or hedges to the north of the farm. The western hedge along the road will be retained and a new hedgerow will be planted to the east, improving habitat and flight features within the immediate landscape of the farm. To the south of the farm sections of hedgerow will be lost and this is where an automated detector was placed to determine use of this possible flight route. I consider given the scale of impacts arising close to the farm there is no justification for further survey of a potential roost (one bat recorded) at this location.
- 3.39 Ffrid Fawr is located between the road route and the Afon Gam. The landscape here is open with no hedges or fences along the road. The key landscape feature and likely flight route that would be used by bats is the Afon Gam river corridor. There will be no loss of potential foraging or roosting habitat at this location and thus no impact on bats. As such I consider there is no need to survey the farm for roosting bats, as it will not inform the assessment of impacts on the access route.

Paragraph 4.2.26 – The Conclusion

- 3.40 Ms Matthews argues that she *“does not consider that the survey information provided so far rules out the possibility of other roosts being discovered that would be affected by the proposed works, and therefore consider that further survey work should have been*

undertaken to demonstrate that there will be no likely detriment to the favourable conservation status of the species.”

- 3.41 The assertion that other roosts may be discovered is very general in nature and is based on Ms Matthews belief (unsupported by any evidence) that there must be further impacts of the scheme other than those identified in the road design drawings. This requires a judgment to be made on the engineering drawings. NRW have not called any technical engineering evidence and I am not aware that Ms Matthews has any relevant engineering expertise to contest that presented by Kevin Martin (AECOM). I consider that Ms Matthews is basing her view on the evidence provided by Mr Wick of PCC as she references his evidence. It is not reasonable for NRW to expect surveys to take account of unpredicted impacts or impacts Ms Matthews or others speculate may occur. We have surveyed potential roosting locations that may be affected and the use of the access route by bats as well as undertaken a survey of bat use along the route of the road. This provides a clear understanding of the potential impacts of the scheme on bats and is a robust basis for assessment. Of course, as with all wildlife issues on any site, there is the potential for new discoveries or changes to occur over time. However, at this point in time I consider there is sufficient information to enable a robust assessment of the impacts of the scheme to be undertaken and this is set out in the Bat SEI and supported further by the clarification and information provided in this rebuttal proof. I also recommend that update surveys are undertaken of roosting sites affected by the road nearer the start of development works.
- 3.42 Ms Matthews states in her concluding section that owing to the deficiency in survey it is not possible to make an assessment of the potential impact of the access route on the FCS of bats. I firmly disagree with this position primarily because it appears to be based on unspecified potential future discoveries of roosts and the assumption that even if ‘discovered’ they will be affected by the proposed works in a manner that has not been identified in the proposed road design drawings. It also completely fails to consider the information that is provided in the Bat SEI and almost dismisses it as though it is of no relevance until all possible additional unspecified impacts are identified and surveyed to the extent and detail required by Ms Matthews in her proof. As stated above this is a disproportionate approach considering the scale, and nature of the predicted impacts of the access route.
- 3.43 The potential impact of the access route on bats is assessed in the SEI and it concludes there will be no significant effects. I have considered this assessment further in the context of the potential impact on Favourable Conservation Status of bats using the landscape along the length of the access route. I am of the view that the loss has to be assessed in the context of the overall availability of habitat for bats along the route of the road as bats will be using a wide range of habitats within the local area and will not be restricted to the access route. In addition the loss of hedgerow will be temporary. The loss of mature trees will not be replaced in the short or medium term, but replacement planting will also take place.
- 3.44 The extent of habitat loss is minor compared to the availability of foraging habitat along the line of the road route. Observation in the field and studies of aerial photographs give a very good indication of the nature of the landscape and the presence of bat foraging and roosting habitat. For the first 3km from Llanerfyl the road route runs parallel to the Nant Menial water course which is lined with mature trees for much of its length and in places narrow woodland strips abut the water course. Riparian habitats such as this and woodland are consistently shown in the research literature to be the preferred foraging habitat of most species of bat, providing high quality foraging and commuting habitat. Away from the road itself the valley is characterised by small pasture fields with invariably tall thick hedgerows and/or lines of mature trees. Mature trees are a common feature of the field boundaries and there are small blocks of semi-natural and plantation deciduous woodland and two small lakes. Tall, structurally diverse hedges provide better quality foraging opportunity for bats as a result of the protection from prevailing winds and the volume and diversity of insect prey items that they will generate. The access route moves north away from Nant Menial and at Gosen Bridge crosses the Cledan water course (a tributary of the Afon Gam) before generally following the Afon Gam water course to Dolwen and beyond. Up to Dolwen the landscape adjacent to the access route remains similar to that in the rest of the valley back to Llanerfyl. The majority of hedgerow and trees will be lost within this section of the access route and it is clear from this description that there is an abundance of good foraging habitat and that the proposed losses are collectively minor compared to the resource as a whole. The scale of

the impact is further reduced by the fact that losses are dispersed along the access route and not concentrated in any one particular location.

- 3.45 Beyond Dolwen the landscape becomes more open. Roadside hedgerows are replaced by fences and grass verges and there are fewer scattered mature trees. There are blocks of plantation coniferous forestry and the predominant land-use is sheep and cattle grazing. The access route follows the Afon Gam before heading up over higher rough pasture and down into Talerddig. Bat foraging and commuting habitat along this section of the road will be very minor.
- 3.46 In assessing impacts on FCS I have considered the scale, nature and duration of the likely impacts of the proposed works, the comparative use of the road route by bats, the wider availability of foraging habitat and the connectivity in the landscape, and the status of the species in the UK to assess likely impacts and whether these are likely to adversely affect the favourable conservation status of the species. To have an adverse impact on the FCS of the species of bat using the landscape along the proposed road route there would have to be a significant adverse effect on the population of bats such they significantly decline in the local area. Also such an assessment needs to take account of the relative population size of the species concerned both nationally and locally.
- 3.47 In considering potential impacts on populations I have taken into account the current knowledge of the status of the population of each species and the potential effect the scheme may have on the FCS of the species in terms of population viability and in terms of the natural range of the species. I do not consider the limited extent, dispersed nature and temporary loss of hedgerows, scrub /woodland is likely to result in the loss of a significant bat roost, a decline in bat activity, a decline in local bat populations or a reduction of bats in the area within their natural range. There may be temporary disturbance (one season) of a small roost of common pipistrelle associated with Gosen Bridge (if bats roost there during the works period), but no significant bat roost will be lost. There is the potential to mitigate temporary impacts on roosts in bridges and to enhance roosting opportunities through the final detailed design of the bridge works to include bespoke new roosting features that would increase roosting opportunities in the local area. In addition there will in the short to medium term (5 -10 years) be an overall increase in linear habitat along the route with additional hedgerow planting. I accept that mature trees and older woodland/coppice will take longer to mature, but the loss of mature trees has been kept to a minimum and new tree planting in the longer term will replace those that are to be lost. I do not consider the loss or the change in the maturity of vegetation will adversely affect bat populations along the route and as such there will not be an adverse impact on the FCS of bats.
- 3.48 Given the assessment in the Bat SEI and the considerations set out above I cannot see how it can be concluded that there will be a loss in the FCS of any of the bat species using the road route or that there is insufficient understanding or information to enable an assessment of the impact of the access route on FCS.
- 3.49 Ms Matthews indicates that she thinks a licence is likely to be required for works affecting the bridges. A licence would only be required if it was determined that there would be the loss of, or damage to, a place of rest or breeding or disturbance such that it would impair the ability of the species to survive, breed, reproduce or rear or nurture their young, hibernate, migrate or affect significantly the abundance or local distribution to which the species belongs.
- 3.50 I consider it is too early to confidently state that a licence will be required especially if the potential offence was one of disturbance, not destruction/loss of a roost. Much would depend on the use of the bridges at the time of the works, the timing of the work and the methods by which the works are implemented. I acknowledge however, that equally it is not possible to state categorically that a licence would not be required. The need for a licence would be determined in discussion with NRW closer to the time of the implementation of works, informed by updated survey information and a finalised method of working (including timing of the works).
- 3.51 In the light of the rebuttal proof, I remain firmly of the view that the Secretary of State has adequate information on the impact of access route on bats to enable an assessment of FCS to be made.

4 Evidence regarding the bat assessment for the WFP

- 4.1 The point raised in section 4.3 is that a condition requiring post-construction monitoring is required (see 4.3.1.19). I have set out in my evidence that a monitoring condition should be imposed and is acceptable to RES (in principle). I have therefore sought to agree the detailed wording of such a condition with NRW. This proof does not contain the suggested wording of a condition as this is still to be agreed.
- 4.2 Instead, a large number of comments are raised which I address below:
- 4.3 In 4.3.1.1 and 4.3.1.2 Ms Matthews quotes Countryside Council or Wales' 2012 letter to DECC [CD/RES/BAC/006], where CCW noted that *"the information currently available on bat behaviour in the UK is not sufficient to assess the risks to bats and that research is currently underway"*. She then cites a 2012 presentation from the National Bats and Wind Turbines Research Project (CD-CON-003-ECO-006) that concludes; *"the risks to different bat species are in line with the risk categories used in Natural England's technical note on bats and onshore wind turbines (TIN051) [CD-CON-003-ECO-007] and the Bat Survey Guidelines"*. Ms Matthews also states that another finding of this project is that *"risks to bats at wind farm sites cannot currently be predicted"*.
- 4.4 These two points raise concerns. Firstly, if it is not possible to assess the risks to bats then one would have to question why there is any justification in carrying out baseline surveys and assessments of effects at wind farm sites in the UK. There is not a moratorium on wind farm development because of the potential for impact to bats. This is not the position of NRW or DECC. Secondly, it is not possible to infer from the presentation slides that are provided that the author is making the arguments that Ms Matthews has attributed to them. I do not think that a great deal of weight should be given to a presentation that presents very limited results and does not present firm conclusions, except that dogs are better than humans at finding dead bats. I would be surprised if the author of this presentation would agree to their tentative observations being presented as firm conclusions before their research is concluded and the findings are published and peer reviewed.
- 4.5 In 4.3.1.4 Ms Matthews describes the population status of noctule bat in the UK and concludes that they are at *"high risk at the population level because of their relative rarity"*. It should be noted here (as it is in 7.1.8 in the Bat SEI) that there is a low level of confidence in population estimates for this species due to the difficulty in locating their preferred tree roosts
- 4.6 In 4.3.1.5 it is observed that the 2011 and 2013 surveys are not summarised in the same fashion and that it is difficult to compare noctule activity between years. This is true and there are good reasons for not comparing the data too closely. In 3.1.2 in the Bat SEI it states that: *"A summary of the 2006 and 2011 surveys are included as background contextual information but the results of these surveys are not relied upon to inform the assessment."* The reason for this are that the results of the 2011 and 2013 surveys should not be compared to indicate if noctule activity was different between years, i.e. there was meaningful change between years. In 2011, the locations for the bat detectors were not chosen to quantify bat activity at turbine locations and near to them (following the methods described in the BCT guidance). In addition, the locations were different and the number of locations sampled (five in 2011 and 35 in 2013) and the number of detector/nights for which data were gathered (50 in 2011 and 498 in 2013) were far more numerous in 2013 and covering a much wider period of time (four months) compared to 10 days in August 2011. As such I do not think any weight can be given to the suggestion that somehow the 2013 data is unrepresentative or flawed. It is the most detailed set of data collected for the site over a significant part of the active season and provides the most complete data on how bats use the site and how they might vary their behaviour through the season.
- 4.7 In 4.3.1.6 Ms Matthews states that greater noctule activity was recorded at habitat features compared to turbine locations. Although this is true when taken at face value, it is also important to look at the detail of the where activity was recorded and when and thus to note that *"If R27A is removed then the relative activity levels would be 0.1 B/h for both (or one noctule recorded every ten hours)"* (6.4.16; Bat SEI). I suggest that it is more representative of bat activity overall and the behaviour of noctule bats to recognise that the activity is very

similar over open areas (turbine locations) and habitat features, not that it is concentrated at the latter (with the exception of R27A).

- 4.8 In 4.3.1.7 Ms Matthews claims that the risk assessment should have been adjusted as *“increased activity at one turbine location may be indicative of a higher level of risk at that location than over the site as a whole and that should have been given some weight in the assessment of the risk of the operation of the wind farm to noctule bats.”* The increased activity of what is likely to be one noctule bat (see 7.1.5 in the Bat SEI) constituted 45% of the recorded activity for noctule. This activity was recorded at the plantation edge adjacent to R27 and not at the turbine location, although some passes were recorded at the turbine location (R27) simultaneous to those recorded at R27A (implying that the same bat was flying between the two detectors, which were recording simultaneously). This localised activity is considered in the impact assessment but not in the way in which I think Ms Matthews is suggesting it should be. The effect of this localised activity and infrequent activity (for 4 nights) on the overall activity patterns serves to emphasise that the site is not of great importance to the species, that very low numbers of bats use the site and that the risk to them is also low. If this activity was sustained throughout the recording period or multiple bats were thought to be present regularly with elevated activity recorded at the other nearby recording locations (R26, R26A, R40, R40A) then it might be argued that these turbine locations might pose a greater risk of mortality to the species, but this argument should not be made just from the pattern of activity that was recorded at R27A.
- 4.9 In 4.3.1.11 Ms Matthews requests that further information should have been given on the reasons for variability in activity levels between different locations and on different nights suggesting that there may be a greater level of risk at some turbines at particular times. Although it might be desirable to look at patterns at the micro scale distribution of bats on the site, it would be inaccurate to speculate as to the very fine scale reasons for differences in distribution, which may be related to a number of different reasons for which we don't have accurate data, e.g. a localised emergence of a prey species, eddying along the edge of a plantation causing localised prey concentration due to particular wind conditions, or bats moving roosts and foraging in different areas night to night. What is emphasised in the patterns of bat distribution and occurrence were broad scale patterns, and in particular:
- Low bat activity in the cold spring (Table 6.3; Bat SEI);
 - Peaks in bat activity apparently coinciding with a marked emergence of midges (see 8.6.10: Bat SEI);
 - Where highest activity rates were recorded and whether there were clear differences between Survey Areas and individual locations (see Figures 2-10 and, e.g. 6.4.8 in the Bat SEI);
 - Differences between activity patterns at open turbine locations and adjacent habitat features (e.g. Figure 6.1 in 6.4.18 in the Bat SEI); and
 - Relative activity patterns in relation to sunset and sunrise to show how activity varied through the night (e.g. Figure 6.2 in 6.4.19 in the Bat SEI).
- 4.10 To provide clear reasons for small scale variation in bat activity would be speculative and potentially misleading if inaccurate. Given Ms Matthews comments about the difficulty in predicting the risk to bats from wind farms (see e.g. 4.3.1.11 and 4.3.1.2); I would assume that she would prefer that we did not make speculative assertions about the likely level of risk from individual turbines that we cannot justify.
- 4.11 Ms Matthews' assertions in 4.3.1.12 about *“there being no information on the number of bats associated with the higher level of activity at one turbine”* are incorrect. As is stated above it is asserted that (4.7 above) the activity at R27A (which is NOT a turbine location) in July is likely to be recorded from one bat due to the repeated pattern of behaviour and the fact that no more than one bat was recorded simultaneously and visible in any of the sound files generated (see 7.1.5 in the Bat SEI). In our experience of analysing hundreds of thousands of sound files over the last few years it is often possible to determine if there is more than one bat being recorded as overlapping calls, often at slightly different peak frequencies are recorded in the sound files. This makes it most likely that the repeated calls recorded at

R27A were made by a single bat on each of the 4 nights where high calls data were recorded. This is further reinforced by the fact that six bat detectors were operating in a relatively small area synchronously on every occasion that R27A was deployed (R26, R26A, R40, R40A), and that simultaneous noctule calls were only recorded from R27 and R27A; at two locations that were only a few metres apart.

- 4.12 In 4.3.1.18 Ms Matthews suggests that in the Bat SEI RES consider there is no justification for monitoring “*as they do not consider a significant impact has been predicted for any population of bat.*” There does seem to be some misunderstanding about whether or not monitoring would take place following consent. This issue should have been resolved through consultation, but there was no opportunity to do so as NRW did not respond to a consultation letter that requested clarification of what would be required as a monitoring condition. I consider that the confusion most likely arises from the assessment in the Bat SEI that the site is of low risk to bats and as such there is not a clear justification for monitoring in this case if one were to follow the limited guidance from Natural England (2012). The condition is not therefore “necessary”. However, RES has agreed to discuss this requirement with NRW further and is prepared to agree a monitoring protocol with NRW if the site is consented. The intention to implement a monitoring protocol is indicated in the Bat SEI which considers what the basis for monitoring should be and that monitoring should focus on the following elements:
- Bat activity in the vicinity of turbines (in particular noctule bat activity); and
 - Fatality searches for bats. It is likely to be necessary to use dogs for this given the difficult terrain for locating dead bats.
- 4.13 As such it is anticipated that agreement concerning the requirement for bat monitoring to be carried out at Llanbrynmair post-consent can be reached between NRW and RES and this matter will be discussed with Ms Matthews with a view to agreeing a statement of common ground on this point before the presentation of evidence. If there is agreement on the wording of a condition, the concerns in 4.3 of the proof are addressed.

5 Mr Woodfield's supplementary proof

- 5.1 Mr Woodfield has produced two rebuttal/supplementary proofs. The second proof in relation to bats primarily details continued areas of concern in an amended version of Appendix DW8. The response to DW8 from RES witnesses is provided as a separate document.
- 5.2 In his first supplementary/rebuttal proof Mr Woodfield sets out concerns in relation to a lack of assessment of potential bat roosting locations. The response to these specific locations is detailed in the response to the amended Appendix DW8.
- 5.3 Mr Woodfield expressly defers to NRW. He does not raise any issues regarding the impact on bats on the wind farm part of the site. This part of the development is considered to be acceptable. Mr Woodfield raises concerns about the survey methods applied to the access route, which are covered in my response above to Ms Matthews proof of evidence in section 3 of this document. These are not repeated.
- 5.4 Mr Woodfield comments on elements of my main proof of evidence and in particular expresses concern at my assessment that the loss of hedgerow is minor (para 7.9 of my proof) in relation to severance of flight paths and that there is no consideration of loss of foraging habitat. Severance and loss of foraging habitat are both considered in the Bat SEI (see 8.5.4). The SEI concludes that there will not be any significant impacts. This assessment was made in the context of the potential loss of commuting and foraging habitat for bats along the access route and its immediate environs. I remain of the view that this represents a minor impact in relation to severance of flight paths and loss of bat habitat.
- 5.5 There is only one location where the proposed removal of hedgerow will result in a potential severance of flight paths and this is addressed in section 3 above.
- 5.6 In terms of foraging habitat this is addressed in section 3 above.
- 5.7 Mr Woodfield expresses concern that the survey methods used are unlikely to record lesser horseshoe. This is not the case as I and a number of colleagues have direct experience of recording lesser horseshoe registrations during driven transect surveys. In addition the driven transect passed along the road in one direction and then returned back in the opposite direction with a number of stopping points incorporated into the survey route when the car was stationary. In addition an automated surveys and a number of emergence and re-entry surveys were also undertaken. I have responded to similar concerns expressed by Ms Matthews in section 3 above.

6 Powys County Council response to the Bat SEI

- 6.1 This section addresses the response to the Bat SEI by Powys County Council. The documents (letter and technical note) raise a number of concerns in relation to the bat surveys undertaken and conclusions reached in the 2013 SEI on Bats, submitted by RES on 15 October 2013. The summary response states that: *“The Council considers that likely significant effects on bats from the proposed highways works along the Llanerfyl to Talerddig Road have been inadequately assessed for the following reasons*
1. *Known roosting sites in buildings immediately adjoining the access route that are referenced in the Carnedd Wen ES are not referenced in the SEI and have not been subject to updated surveys. No assessment of indirect impacts on these roosts from habitat loss in their vicinity is provided.*
 2. *There are concerns about the spatial and temporal coverage of the limited activity surveys carried out and their use of non-standard methodologies, leading to concerns about the robustness of the conclusions reached in respect of lesser horseshoe and Myotis bats in particular.*
 3. *The surveys of potential roosting sites are limited to three locations. It is unclear why the many other locations where there are structures or trees with potential to harbour bat roosts and that will be impacted by the works have not been surveyed.*
 4. *The surveys of the three potential roosting sites (two bridges and one tree) are subject to significant limitations in respect of survey effort, methodology and coverage. This is not clearly stated in the SEI. The confidence in the conclusions offered is undermined by these limitations.*
 5. *The assessment offered of indirect impacts on bats from severance and habitat loss is evidently based on an incorrect understanding of the full magnitude of the land-take and hedgerow/tree loss that will arise.”*
- 6.2 PCC conclude by objecting to the Llanbrynmair access proposals by asserting that the assessment of likely significant effects on bats is inadequate and that no satisfactory alternatives have been investigated to potentially seeking derogation for an impact on a bat roost that has been identified during the surveys.
- 6.3 In general I consider the arguments put forward by PCC to be wholly disproportionate to the scale and nature of likely impacts identified on the access route in the Bat SEI and that PCC’s concluding position that there is insufficient information to make an assessment of the likely impacts of the proposed scheme on bats to be unjustifiable and not supported by the evidence in front of this inquiry.
- 6.4 In this section I respond to each of the points made by PCC either directly or by cross reference to my response to the proof submitted by NRW. I have arranged my response under the following headings:
- Desk study and Carnedd Wen information;
 - Survey methods;
 - Activity surveys;
 - Roost surveys;

- Assessment.

Desk Study and Carnedd Wen

- 6.5 In relation to desk study, PCC contends that (i) there is no evidence of an updated desk study being undertaken for the Bat SEI, and (ii) that “no data is provided to indicate the results of the desk study” and then (iii) that these results do exist but have “not been properly documented”.
- 6.6 This is not the case. The methods follow the BCT Guidance 2012 (Hundt, 2012) and are described in the Bat SEI at 5.7.6-7. The results of the desk study are described in 6.1 and include a summary of the bat records returned from within 10km (for high-risk species) and 5km for all other bat species. The 10km (also for statutory sites) and 5km buffers were applied to both the development boundary of the Wind Farm Proposal (WFP) and the access route. Although there was no requirement for such a large search area for the access route it was decided that the additional background provided by an extended search area may be useful.
- 6.7 PCC suggest that roosts identified from surveys for the Carnedd Wen site that are close to the access route should have been surveyed. I consider this to be unnecessary and have addressed this point in my response to NRW in section 3 of this document.
- 6.8 PCC also suggest that the results of the desk study “should not have influenced the choice of methods used”. In general, the desk study results do not influence survey design unless they indicate that there are roosts or populations of bats of particular concern that might be affected by the proposal, i.e. they identify specific locations where additional survey may be considered. In this case the desk study results did not lead to the possible presence of noctule or lesser horseshoe bat being dismissed (as suggested). It was considered that noctule would inevitably be present given previous surveys at Llanbrynmair and that lesser horseshoe bat may be present and affected by proposals. The surveys were designed accordingly (more details are provided below).
- 6.9 With regard to additional bat records from Carnedd Wen, we approached these with some caution as serotine is rare in mid-Wales and Leisler’s bat has not been recorded in Powys and it is very difficult to distinguish from both noctule and serotine (with echolocation call parameters of Leisler’s bat overlapping between these two species). The positive identification of Leisler’s bat may well be erroneous and weight should not be given to it in the absence of other evidence. Frequency-modulated calls of serotine are generally identifiable and less caution was applied to this identification. In addition, the specific identification of *Myotis* bats is inadvisable (e.g. Hundt, 2012) but this has been carried out with confidence at Carnedd Wen. This may be partly due to surveys at Carnedd Wen being carried out over six years ago, before current guidance and published information gave more clarity to the process of bat call identification.
- 6.10 If these species were accurately recorded at Carnedd Wen, then single bats were apparently recorded, which would indicate that they are not regularly present and should not be a significant issue in determining bat survey methods and frequency for the Llanbrynmair site. In addition both species produce loud calls comparative to other smaller bat species and as such would be readily recorded by the survey methods applied to the site. No such calls were recorded despite the significantly greater level of survey effort more recently expended on bats at Llanbrynmair compared to Carnedd Wen. This strongly indicates that these species are either not present or present at such low levels that they are unlikely to be affected by the proposals.

Survey methods – overall survey effort

- 6.11 PCC contend that a greater survey area should have been included along the access route suggesting the BCT guidance indicates this should have been up to 500 metres either side of the road. I consider this to be unnecessary and have addressed this point in my response to NRW in section 3 of this document.

Survey methods – driven transects

- 6.12 PCC argue that driven transects are not an appropriate “stand-alone” survey method and that they are non-standard. I consider this to be a misinterpretation of the BCT survey Guidance and have addressed this point in my response to NRW in section 3 of this document.
- 6.13 PCC consider that driven transects are “far less likely to pick up ‘quieter’ or fast-flying species, and may struggle to detect bats with high frequency and directional calls such as lesser horseshoe bats”. I address this point in general terms in section 3 above, but PCC in addition list a series of technical arguments taken from the BCT guidance about the difficulties of recording lesser horseshoe bats with bat detectors and particularly SM2 bat detectors. I have addressed these technical points (not made in detail by NRW) below.
- 6.14 PCC may not be aware that BSG Ecology carried out the research (in collaboration with Bristol University) that informs this section of the BCT guidance and include details of this in the Appendices to the Bat SEI (see 1.1.4 and Table 1.1). The text of the guidance PCC quotes was, in fact, written by the author of the Bat SEI who is well placed to understand this issue.
- 6.15 While PCC are correct in quoting the BCT guidance as evidence of the difference in detectability of different species of bats, their other points attacking the validity of the driven transect methods used along the access route are based on a misunderstanding of several admittedly complex and technical issues. I have responded to this point in section 3 above.
- 6.16 In relation to *Myotis* species and lesser horseshoe bats, PCC suggest that using other survey methods will increase recordings of these species. This is not true for the reasons cited above. The reason why more *Myotis* bats were recorded during emergence/re-entry surveys is that these surveys were undertaken in reasonable habitat for bats, e.g. by a sheltered river corridor and under mature trees in contrast to large parts of the driven transect route, which are in open moorland edge habitats (particularly between Dolwen-Isaf bridge and just short of Tallerdigg), which is the same reason why relatively low *Myotis* bat activity was recorded within the WFP area, which is upland with scattered plantation. For lesser horseshoe bats both full spectrum and zero crossings recordings were analysed for all activity surveys (except for some of emergence surveys were not carried out using full spectrum detectors) along the access route. The SM2 detector data is recorded as full spectrum data and then converted to zero crossings data to improve speed and efficiency of analysis. No recordings of lesser horseshoe bats were made using either format.
- 6.17 PCC also claims that the SM2 detectors only have a maximum recording frequency of 100 kHz and are incapable of recording the weaker harmonics of these bats. Unfortunately this is also not correct and indicates a lack of understanding of the characteristics of this bat detector. Firstly the lesser horseshoe bat’s call is only heard as a harmonic (that is produced through the nose) at c.110kHz. The fundamental frequency is c.55kHz and is only heard if the bat calls with its mouth open (like most other bat species). Secondly the maximum recordable frequency of the SM2Bat+ used (not the out-dated model he is referring to, which could record to 96 kHz) has a maximum frequency range of 192kHz, well above the frequency range of this species.
- 6.18 It is also incorrect to say that the SM2 detectors used need to be calibrated above car and road noise. In this case there was no car noise (this is sometimes evident with loud diesel engines with strong ultrasonic components) from the vehicles used and there was very little noise from other traffic. Noise is usually more of a problem on walked transects due to the rustling of grass and other vegetation, which often comprise the majority of recordings. In any case the SM2 detectors use an algorithm that will record above the level of background noise (we use 6dB above, based on our research) but will not filter out intense narrowband sound which is not wind/rain and may have a biological origin (or alternatively comes from a car engine).
- 6.19 PCC raises another point of the longer gaps between stopping point 10-12. The reason for this is that this part of the route is very open and poor habitat for bats and there are very few significant modifications to the route along this stretch. The transect stops were located (where safety allowed) to take in areas where higher bat activity was likely to be recorded

and/or where impacts were to be expected, such as areas where hedgerows were to be removed/replaced or by affected bridges. There was no need to “get out of the car” and carry out supplementary surveys as the bat detector attached to the car was recording all the time and providing valid baseline data. As such the stopping points were targeted to areas where bats were more likely to be present based on the quality of habitat.

- 6.20 The date of the third driven transect was 6 August 2013, not 16 July as detailed in the Appendix. This is an error.

Survey methods – automated detector survey and lesser horseshoe bats

- 6.21 PCC contend that the method used for selecting a single automated survey location is not clear and that, as a result, the scale of impact on lesser horseshoe bat has not properly been assessed. I have responded to this point in section 3 of this document above.
- 6.22 PCC raise questions regarding the positioning of the automated detector. Such a concern is based on a misunderstanding of how best to place detectors to record this species. The detector was positioned 0.5m above the hedge so that it was close to vegetation but elevated above it so as not to mask or distort recordings with echoes from vegetation. The detector microphone is omni-directional and was positioned to record bats from both sides of the hedgerow. If the microphone was on one side or the other it may not record bats flying on the other side of the hedgerow or over the top of the hedgerow, which lesser horseshoe bats certainly will do at low elevation. Given that the road level was only 3-4m below the detector at this point (the hedge is only 2-3m high) and the detection distance for lesser horseshoe bats is around 5m, the detector was ideally (and quite deliberately) positioned to optimise recordings of bats of this species (and any other species) that were flying along the hedge.
- 6.23 PCC also suggest that impacts on lesser horseshoe have not been robustly assessed given the potential impacts on habitats that might be suitable for this species. There are certainly habitats that are suitable for this species along the Cwm Nant yr Eira, which I describe in my response to NRW in section 3 above. However, this suggestion is based on a false premise that insufficient surveys have been carried out for this species. As I have explained, appropriate surveys have been carried out to provide a robust sample of bat activity along the access route through driven transect survey and the single automated detector. This is also supplemented by the emergence and re-entry surveys at three different locations over several nights, where all observers were recording general bat activity as well as records of bats entering or leaving roosts. The lack of records of this species indicates two possible scenarios; that the species is not present along the road or that activity is at such a low level that the road is not of any importance to the species, therefore negating the need for further detailed assessment of impacts on this species.

Roost surveys

- 6.24 PCC raise a concern that some areas of the route have not been surveyed correctly and that structures or features that may be used by roosting bats have not been considered. I have addressed this point in my response to NRW in section 3 of this document. However, PCC noticed that there is an error in the dates in Table 2.6 in the Appendices. The second batch of surveys was undertaken during 16-17 July, not 16-17 June, as is correctly shown in Table 6.6 of the Bat SEI.

Assessment

- 6.25 PCC identifies a number of concerns regarding the impact assessment relating to bats. These are dealt with in large part in my response to NRW in section 3 of this document. However, PCC make specific additional comment on impacts on *Myotis* species of bat and noctule, which I consider below.
- 6.26 PCC argue that the *Myotis* and noctule activity at the single automated detector location on the hedge are presented in the Bat SEI as “relatively low”, although they are higher than at the WFP and that these conclusions contrast with those in the Carnedd Wen ES which indicate that bat activity in the valleys surrounding that wind farm site (including Nant yr Eira) is proportionately much higher. I contend that the activity at the single automated detector

location is not presented as representative of the wider valley and it is “relatively low” considering that the activity at the WFP is also low. The Carnedd Wen surveys were undertaken almost exclusively using driven transects (this survey method apparently being acceptable to PCC at this location) at least six years ago. Although it is likely that there are more bats in the valleys, comparing relative activity rates can be misleading as they are not a measure of abundance and only general descriptions and observations can be made using such data (e.g. “relatively low”). In addition PCC appear to be seeking to compare activity rates generated from two different bat detector systems used in two different survey periods seven years apart.

- 6.27 PCC also make the erroneous assumption that our comments about noctules using the WFP area as a peripheral foraging area means that there is an implication that the access route must be a primary foraging area because it contains more suitable habitat for noctule and that it is near the WFP. That is not the implication and is not evidenced by survey data which demonstrates that low noctule activity was also recorded during surveys of the access route. It may be that noctules using the wind farm site may come from other areas in a wide circle around the WFP given the distance they can commute. PCC has no justification for stating that habitual commuting across the access route has been recorded (for noctule) and it is not clear what the reasoning is. Even if noctule are regularly occurring in the valley and flying across the road route I do not consider there will be an adverse effect on this species from the access route as they are not confined to linear features, fly regularly high across roads of all sizes and the loss of hedgerow, woodland/scrub and other habitats is minimal compared to the extent of habitat available within the valley and the moorland areas as a whole.

7 Appendices

Appendix 1 – Details of additional culverts and bridges along the access route

Structure	Nature of impact	Chainage	Plan No.	Roosting Potential	Notes
Pipe culvert	Structural strength TBC.	6950-7000	60383248-D-011	No	Single 900mm diameter pipe. The pipe was not damaged or displaced with no Potential roosting features (PRF). It was partially buried and filled with running water.
Pipe culvert	Minimal earthworks.	7950-8000	60383248-D-013	No	Single 900mm diameter pipe. The pipe was not damaged or displaced with no PRF.
Pipe culvert	Structural strength TBC.	8250-8300	60383248-D-015	No	Double pipes of 900mm diameter. The pipe was not damaged or displaced with no PRF.
Pipe culvert	Structural strength TBC.	8300-8350	60383248-D-015	No	Double pipes of 900mm diameter. The pipe was not damaged or displaced with no PRF.
Box culvert	Culvert to be extended to the north and tied into new land drain.	10600-10650	60383248-D-019	No	Dimensions, 300mmx1m. Structure is smooth with no PRF.
Bridge and pipe culvert	To be widened and lengthened on north side.	10750-10800	60383248-D-019	No	Triple 900mm pipes not damaged or displaced with no PRF. Abutting walls no PRF.
Pipe culvert	Extended and strength checked post-planning.	11900-11950	60383248-D-021	No	Single 300mm diameter pipe. Was blocked with north end submerged.
Pipe culvert	Extended and strength checked post-planning.	11950-12000	60383248-D-021	No	Double 300mm diameter pipes, not damaged or displaced with no PRF.
Pipe culvert	Extended and strength checked post-planning.	12050-13000	60383248-D-021	No	Double 900mm diameter pipes, not damaged or displaced with no PRF.
Bridge	None	12400-12450	60383248-D-022	Low	Low potential roosting opportunities at junction between side wall of bridge and underside of span bridge span (as Dolwen Isaf Bridge). Bridge not affected by works
Pipe culvert	None	12750-12800	60383248-D-022	No	Single 900mm diameter pipe. The pipe was not damaged or displaced with no PRF.
Pipe culvert	Extended to suit	13100-13150	60383248-D-024	No	Single 300mm diameter pipe. The pipe was not damaged or displaced with no PRF.
Pipe culvert	Extending under grass reinforcement area	15780	60383248-D-027	No	Single 900mm diameter pipe. The pipe was not damaged or displaced with no PRF.

Appendix 2 – Plan of roosting features at Gosen Bridge

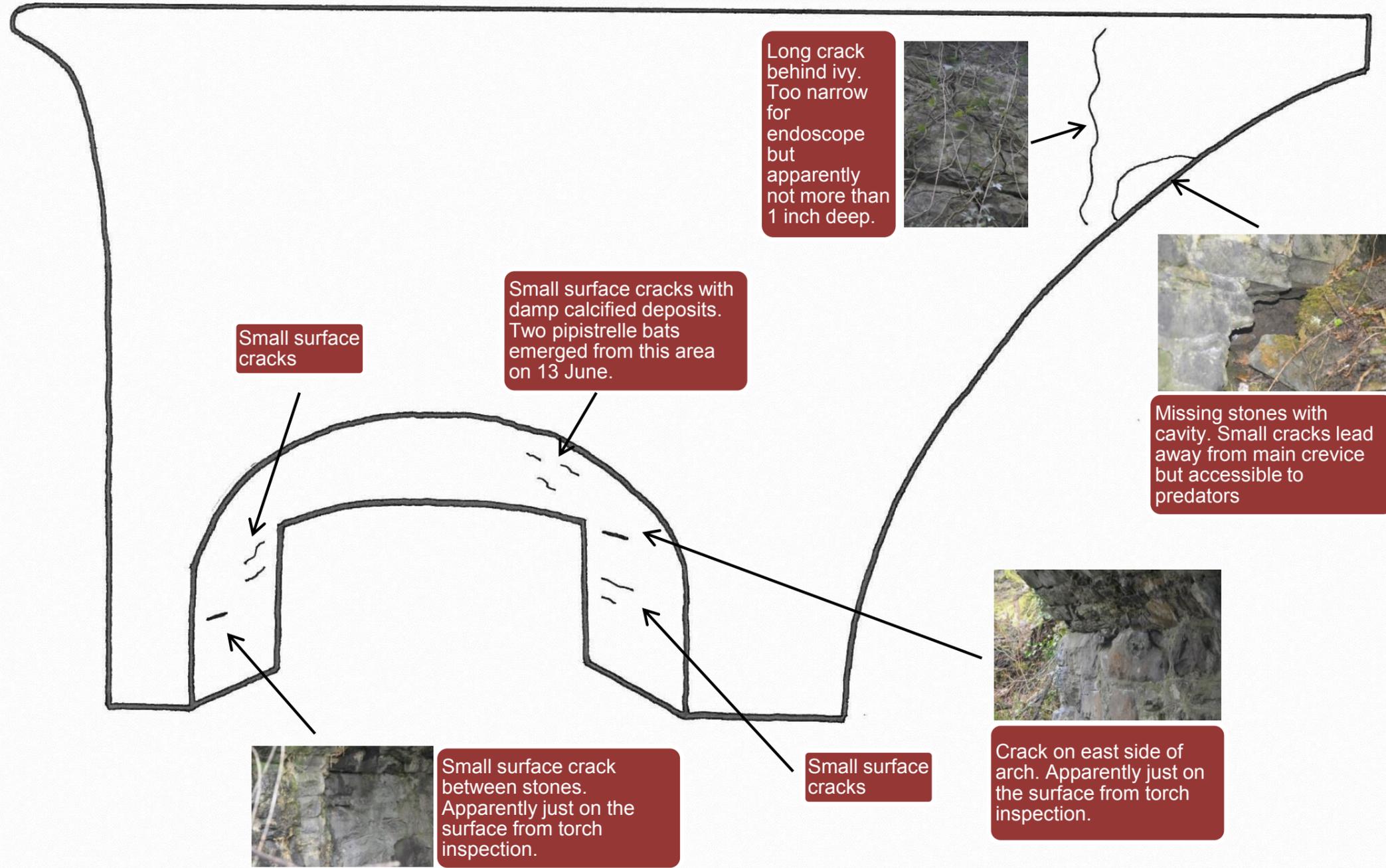
N:\Contracts\6668_Llanbrynmair_wind_farm_P1\Mapping\6668_Llanbrynmair_BatRoostGosenBridge.indd

Inspection of Gosen Bridge

18/04/2013

MH and ED

Plan shows south-east facing abutment of bridge. No potential roosting features for bats were observed on the north-west facing abutment



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JOB REF: 0000.00

PROJECT TITLE
LLANBRYNMAIR WIND FARM AND ACCESS ROUTE

DRAWING TITLE
Annotated bat roost inspection plan of Gosen Bridge

DATE: 25.11.2013	CHECKED: MH	SCALE: NTS
DRAWN: SJN	APPROVED: PS	STATUS: FINAL

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No dimensions are to be scaled from this drawing. All dimensions are to be checked on site. Area measurements for indicative purposes only.

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