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Sizewell C

Review of Bat Impact Assessment

Second Review: March 2021

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Contents

1 Executive Summary

1.1 This report provides a second independent critical review of the effects of the proposed Sizewell C Nuclear Power Station on bats.

1.2 The focus of this second review has been the assessment of impacts of the Main Development Site on bats, which has been substantially updated in response to stakeholder comment and analysis and reporting of survey data collected in 2020.

1.3 This report concludes that changes to site design since the Development Consent Order (DCO) was submitted are likely to be, in principle, positive for bats. It also concludes, however, that update work completed in 2020 has failed to build effectively on the baseline due to methodological limitations and a lack of appropriate focus on key bat populations (i.e. those of barbastelle and Natterer's bat). In addition to this, the foraging and roosting value of Goose Hill (an area of plantation woodland largely within the development footprint) to these bat populations has not been robustly assessed as a result of the work. In the light of this continued lack of clarity it would appear reasonable to conclude (on a precautionary basis) that there will be a short to medium term significant effect due to habitat loss for these species.

1.4 The conclusion of the bat assessment, which remains that there will be a significant effect on barbastelle due to habitat fragmentation, is not subject to further qualification. The professional opinion of the ecologists as to whether the species is likely to become extinct on the Estate or to simply decline, or whether the most likely outcome is that the colony will relocate are important in understanding what the conclusions of the assessment mean.

1.5 The lack of a mitigation and monitoring protocol to accompany the report is a key concern with regard to the updated assessment. As a result stakeholders simply need to have faith that adaptive mitigation required if there are unforeseen or more extensive impacts of noise or light on bats than anticipated will be informed by practical and effective monitoring. This is a significant omission, as it is unclear how further effective controls will be identified or feasibly delivered.

1.6 It remains unclear how, given the limitations of the data set collected for the site, will allow for robust monitoring and the identification of the factors driving change. These limitations include the lack of a reliable population estimate for barbastelle and the inability to infer bat numbers or behaviour from static recordings alone (the principal aim of the static work in 2020 was to inform monitoring). The inability of female or newly-volant bats to access foraging resources are among the factors with the potential to drive changes in productivity and survival that will result in changes in populations over time. In this context it is concerning that there is a clear indication in the assessment and baseline reports that monitoring of impacts on bats populations will concentrate on the bat assemblage as opposed to the species for which the EDF Estate is of principal ecological importance. It is the latter which have been the focus of the assessment and of consultee concern; the conclusion of the assessment is that there will be a significant effect on the nationally important barbastelle population as a result of habitat fragmentation. This species, as well as the county-level important Natterer's bat population, therefore seems a more appropriate focus to EIA-led monitoring work than the wider assemblage of bat species using the EDF Estate.

1.7 The key points of the first critical review that have not been fully addressed by the updates to the bat assessment are summarised in Table 1 (overleaf):

Table 1. Points not (Fully) Addressed from First Critical Review

Topic	Issue Identified
The importance of Goose Hill to bats (including barbastelle and Natterer's bat)	The assessment in the ES contains apparently contradictory information with regard to the roosting resource available. The information presented does not present a clear analysis of the value of the plantation to foraging bats, which is of particular importance in the context of the assessment for barbastelle and Natterer's bat.
Linkage between Ash Wood and Kenton Hills	The inclusion of new dark corridor linking Ash Wood and Kenton Hills is welcome. A figure showing the route it will take, and further information on the width, planting strategy and lighting plan for the corridor should be provided in order to provide confidence that it is likely to be functional.
Adaptive Controls to Mitigate Lighting and Noise Impacts	It remains unclear how, in practical terms, unacceptable levels of noise and light will be defined and mitigated during construction. There appear to be potential conflicts between health and safety and further controls being implemented. At present there is nothing presented that could be easily adapted to provide the basis for a Working Method Statement for an Ecological Clerk of Works (team).
Lighting Impacts on Retained Features: Roosts, Foraging Areas and Commuting Routes	Reference continues to be made to keeping areas as dark as is 'reasonably practicable.' This does not provide confidence that bats will be a key driver in terms of limiting / controlling light during construction.
Assessment of Significance of Interactive Effects	Without further information on mitigation and monitoring (i.e. the Terrestrial Ecology Mitigation / Monitoring Plan referred to at various points in the bat assessment), it is not possible to independently conclude (with confidence) that interactive effects will not be significant.
Assessment of Significance of Residual Effects	No conclusion is drawn on what the predicted significant residual effect of habitat fragmentation on barbastelle will mean for the population. Understanding how the population is likely to respond is key to understanding the likely outcome for the species and in formulating a monitoring strategy. The same point applies to Natterer's bat, albeit here the key aspect is to provide a supporting rationale for the conclusion that the population is unlikely to decline.
Monitoring Strategy	No monitoring strategy is provided. While there is a commitment to monitoring, and it is noted that a Terrestrial Ecology Mitigation / Monitoring Plan is in preparation, there are indications of a lack of focus to the scope of EIA-led (as opposed to licencing-led) monitoring work (from the 2020 baseline reports and the updated bat assessment). The EDF Estate supports a nationally important barbastelle and county important Natterer's bat population. The only predicted significant residual effect is on barbastelle. Goose Hill appears to be of importance to the populations of both species. They should therefore be the logical focus of monitoring. Sizewell C presents a unique opportunity to understand more about how these species respond to light, noise and habitat disruption, to test the conclusions of the assessment and provide a basis for other projects to learn from.
Sizewell Link Road	No further information has been provided to date to address the points from the first critical review. Questions have been raised with regard to the basis for the conclusion that barbastelle activity on hedgerows along the road is very low, the potential impact of road fatality on the population, the incomplete data set presented and the in-combination effect of the development with the Main Development Site.

2 Introduction

Purpose of this Report

2.1 BSG Ecology was instructed by East Suffolk Council, Suffolk County Council and the Suffolk Wildlife Trust (the commissioning parties) to complete an initial critical review of the Bat Impact Assessment for the Sizewell C Nuclear Power Station (NPS) in autumn 2020. The review was issued in October 2020[1].

2.2 The review considered predicted impacts on bats from the Main Development Site, the Sizewell Link Road and the Sizewell Rail Link schemes, all of which are subject to separate ecological impact assessments within the Development Consent Order (DCO) application for the scheme. Addition information considered as part of the review included a bat mitigation plan, lighting strategy and baseline technical reports.

2.3 This first review identified a number of issues with regard to the bat assessment work, and requested further information and clarification be provided to inform the responses of the commissioning parties to the application.

2.4 The Bat Impact Assessment for the Main Development Site has now been updated by EDF's consultants (Arcadis) to take account of and respond to elements of the critical review and other stakeholder comments[2]. This has, in part, drawn on further survey completed in 2020, some of which focussed on providing additional baseline information pertinent to the assessment, and some of which was conducted primarily as a precursor to European Protected Species licence applications[3].

2.5 A Terrestrial Ecology Monitoring Plan referred to at various points in the bat assessment has currently not been produced. This will be critical to understanding how residual effects will be mitigated. It also remains unclear how / whether comments on the Sizewell Link Road ES contained in the first critical review will be addressed, as documents relating to the road do not appear to have been subject to any revision.

2.6 The commissioning parties have requested that a second review is completed in order to determine the extent to which issues identified in the first review have been addressed. This review has focussed on evidence provided with regard to barbastelle and Natterer's bats, as the bat impact assessment has concluded that the EDF Estate supports populations of these species that are important at the national and county levels respectively.

2.7 A summary of and comment on the 2020 bat survey work and associated technical reports is provided in Section 3 of this document. Comment on the extent to which updates to the bat assessment have addressed the points raised in the first review are contained in Section 4.

2.8 The purpose of this second review document is to inform the (separate) written representations of the commissioning parties with regard to the scheme.

Changes to Scheme Design

2.9 Changes to the scheme design since the submission of the Development Consent Order (DCO) application, some of which have implications for the bat assessment, include:

- The relocation and reconfiguration of the water resource storage area.
- The Site of Special Scientific Interest (SSSI) crossing design becoming a single span bridge with embankments.

[1] BSG Ecology. (2020). Sizewell C: review of bat impact assessment. Report to Suffolk County Council, East Suffolk Council and Suffolk Wildlife Trust.

[2] The bat assessment for the Sizewell Link Road has not been updated in response to comments at this stage, and it is unclear whether it is intended to do this.

[3] The scope of this report does not extend to commenting on whether work completed is appropriate to secure European Protected Species mitigation licences. Natural England will determine this.

- Revisions to tree / vegetation retention on the main development site.

2.10 Changes to the configuration of the water resource storage area will allow the creation (effectively the retention / partial relocation) of a bat commuting route. The commuting route will be a north-south corridor linking Kenton Hills and Ash Wood. It will comprise lines of semi-mature trees either side of the water management zone. Ground levels will need to be reprofiled, but it is stated that it may be possible to retain part of the existing hedge along the northern part of the linking feature, that the area will not require night time maintenance and will be subject to minimal lighting.

2.11 The revised water management zone is shown on Figure 2.2.13 in Volume 2 (part 1) of the Environmental Statement Addendum figures. It is noted that currently the figure lacks clarity with regard to the location of the new linking corridor between Kenton Hills and Ash Wood (i.e. it is not clearly shown / labelled and there is no information regarding the content of the figure in the key).

2.12 There is a requirement to cross the Sizewell Marshes SSSI to allow access to the Main Development platform. The crossing will be at the narrowest point of the SSSI, towards its north-eastern corner. The crossing design within the DCO application comprised a solid, embanked structure with an inbuilt culvert following the route of the Leiston Drain, allowing the watercourse to remain intact and for bats to potentially commute through it. The proposed replacement design will comprise a single span bridge across the SSSI. The bridge will be 30 m in length and run between embankments. The Leiston Drain will pass under the bridge. The width of the haul road required for construction will be greater than that required during operation; the road will therefore be reduced in width, moved away from the eastern edge of the bridge / embankments and part planted with trees during the operational phase of the development[4] (for screening purposes).

2.13 Revisions to tree / vegetation retention on the main development site are very small-scale and are unlikely to be material to the bat assessment.

2.14 Other changes, such as (relatively minor) alterations to the frequency of use of the Sizewell Rail Link, are unlikely to have any significant impact on bats and are not considered further in this report.

[4] The submitted design would have also reduced in size and been planted up post construction.

3 Review of Further Baseline Information

Bat Survey Work in 2020

3.1 Back-tracking surveys, static detector surveys and tree inspections were completed in 2020 to add to the baseline data collected to inform the planning application for the Main Development site.

3.2 The overall aims of the 2020 bat survey updates are stated in Section 2.1.1 of the back-tracking survey report as to:

> *"Update the existing bat baseline survey data and provide a baseline for future monitoring.*
>
> *Establish the potential roost resource present within and adjacent to the proposed development site.*
>
> *Provide data to inform licensing and details of mitigation."*

3.3 The static survey report notes that informing future monitoring was the focus of that element of work.

Back-tracking Surveys

3.4 Back-tracking surveys focussed on the woodland at Goose Hills and Fiscal Policy. Back-to-back dusk and dawn surveys were completed in locations around the edges of these woodlands on a monthly basis between June and September 2020 inclusive[5]. Four surveyors completed each survey; surveyor locations varied between surveys to cover different areas of the periphery of the respective woodland blocks. Follow up checks of bat boxes were completed where backtracking surveys indicated these were likely to be the sources of observed bat activity.

3.5 The survey work found, with particular regard to barbastelle:

- Barbastelle were recorded flying along tracks through Goose Hill, and were noted in the report as appearing to originate from the south; particular note is made in the backtracking report of a north-south commuting route linked to the Sizewell Marshes. A barbastelle commuting route was also identified on the northern edge of Fiscal Policy (along the access track), and "*notable levels of barbastelle foraging"* were recorded along the track forming the boundary between Hilltop Covert and Goose Hill on 23/24 June 2020.
- No barbastelle roosts were recorded. The report concluded that the most likely roost locations for the species were in areas of woodland at Kenton Hills (these areas will be retained) or to the north of the area surveyed[6,7]. Evidence to support this conclusion is not clear from the figures contained in the report, and it not detailed in the text (it is assumed this is based on the judgement of the surveyors).

3.6 The survey work found, with particular regard to Natterer's bat:

- The species was recorded in both Fiscal Policy and Goose Hill during the work. No further information is provided in the report with regard to frequency of occurrence or direction of flights.
- Several Natterer's bat maternity roosts were present in boxes on the southern side of Goose Hill (in areas of woodland that will be retained); roosts numbered 30-40 individuals in two boxes and approximately 50 in a third, with smaller numbers present and evidence of former use of others. The report concludes there are a large number of potential roost features throughout the woodland areas and that it is likely that other roosts will be present (albeit without specific reference to Natterer's bat).

[5] There was one dawn / dusk back-tracking survey at the respective woodland blocks during each month. The surveys were completed on 22-24 June, 14-17 July, 03-06 August and 01-03 September respectively.

[6] It is unclear from the report as to whether this conclusion was based on the 2020 work alone or is a more general observation taking account of previous data.

[7] This observation does not appear to be reflected by the static survey data. The two detectors located in Kenton Hills (MS18 and MS15) did not record barbastelles close to published emergence times. The only detector that recorded bats on multiple occasions close to typical emergence times was MS20 on the southern edge of Goose Hill / the northern edge of Sizewell Marshes.

Static Detector Survey

3.7 Twenty-eight SM4 detectors were deployed over three months (between June and August inclusive). Four of these were at novel locations surveyed in response to stakeholder requests. These included Aldhurst Farm (one of the habitat creation areas), on the south side of Great Mount Wood (south-east of Ash Wood) and the central part of Goose Hill. The detectors were deployed fourteen at a time. The report indicates that there was an attempt to ensure good spatial coverage, collect data for representative habitats, and sample areas likely to be close to roost sites and commuting features as part of the work.

3.8 A number of locations for which data had previously been collected were not surveyed. The rationale for excluding these locations varied, and included the distance of some from the development area, previous low levels of bat activity, and proximity to other static survey locations of others. The report states that a number (Monitoring Stations 8, 10, 11, 16 and 32) were not subject to further survey as they were in areas to be lost to development (i.e. could not be used during future monitoring). These were in locations including a hedge line north of Kenton Hills, at the junction of Stonewall Belt and Hilltop Covert, slightly south of the central area of Goose Hill and in the approximate location of the bridge between Goose Hill and the Main Development platform (on the eastern edge of Goose Hill where it interfaces with Sizewell Marshes).

3.9 Five nights of data were analysed from each monthly deployment[8]. There were four detectors that failed and were not redeployed: at Aldhurst Farm (August); on the bridleway north of Upper Abbey Farm (MS09); on the western edge of Fiscal Policy (July); and on the interface between Nursery Covert and Sizewell Marshes (all in July). All other detectors successfully recorded data or initially failed and were redeployed.

3.10 The static survey work recorded a minimum of nine species of bat. Analysis of the overall data set showed that 72.95 % of bat calls could be attributed to common pipistrelle, 20.13 % to soprano pipistrelle, and 4.5 % to barbastelle[9]. Natterer's bat accounted for 0.79 % of calls, with a further 1.54 %[10] (many of which are likely to have been Natterer's bat) referring to *Myotis* bats that could not be determined to species level. Other species were recorded at lower levels.

3.11 Data are presented in the report in various different ways:

- Bat passes per month by species (across all static survey locations)
- Median bat passes per hour by static survey location by species (for the whole survey period)
- Cumulative (all species) bat passes per hour by static survey location
- Proportion of bat passes by species at each survey location
- Records of species at static survey locations with regard to published data on times of emergence.

3.12 The discussion of results that follows identifies areas the static survey data indicates have the greatest levels of use by the overall bat assemblage present, and to bat species other than common and soprano pipistrelle. The former is based on overall call volume, the latter on percentage of calls that do not refer to the two aforementioned pipistrelle species.

3.13 Further information on methods of data analysis, the results and discussion can be found in the static survey report.

[8] There is no indication as to how the nights were selected for analysis.

[9] The updated bat assessment states that 2.53 % of overall bat passes can be attributed to barbastelle in Section 5.3.23. Preceding paragraphs all concern 2020 data. It is therefore unclear whether this is a discrepancy in reporting of the 2020 static survey data or whether this refers to a different data set. Clarification would be useful.

[10] See section on points of clarification. These figures appear erroneous.

Ground Level Roost Assessment

3.14 Ground level assessments of trees in Goose Hill, Kenton Hills, Fiscal Policy, in small woodland pockets around Upper Abbey and Old Abbey Farms and on hedge lines as far north as Ash Wood (and to the west and slightly north-west of it) were completed between June and September 2020.

3.15 As a result of the work, a total of 332 trees were identified with low, medium or high bat roost potential.

- Of the high potential trees, 13 were in Kenton Hills, 7 in Goose Hill, two in Fiscal Policy and eight elsewhere in the survey area.
- Of the medium potential trees 46 were in Kenton Hills, 104 in Goose Hill, 24 in Fiscal Policy and 33 elsewhere.
- Most of the low potential trees were in Fiscal Policy (48) and Goose Hill (21).
- One bat roost was recorded (species unconfirmed) during the work. This was located in a copse east of Old Abbey Farm.

3.16 The majority of the trees with roost potential that will be directly lost to development are in Goose Hill, Fiscal Policy and in hedgerows north of Kenton Hills. Kenton Hills will be retained.

3.17 Mapping included in the report does not show the high potential trees in Goose Hill (one of the seven is illustrated and is towards the southern edge of the woodland). Tables contained in the report provide a commentary on all features identified, and indicate that six of the high potential trees within Goose Hill are pines, with the other being an oak. As Goose Hill is dominated by pine plantation, it is not possible to infer locations of these trees with confidence. However, trees with moderate roost potential are mainly shown as being located in the southern and south-eastern areas of Goose Hill.

3.18 The report concludes that further climbed inspections and/or dusk/dawn survey of trees with roost potential will be completed where these are to be removed. It also notes that the results confirm previous work that concluded Goose Hill to be a low value roost resource.

Comment on 2020 Bat Reports

Principal Comments

3.19 The importance of the Sizewell Estate to both barbastelle and Natterer's bat populations has been established through considerable survey work undertaken over many years; the species have both been important considerations within the Ecological Impact Assessments presented in the DCO application. It is therefore logical to conclude that residual effects on both will be the focus of population monitoring over and above monitoring completed in connection with licencing requirements. 2020 therefore provided an opportunity to consolidate all information regarding these species, and implement a survey protocol designed to provide a high resolution baseline against which to monitor their populations. This has not been demonstrably achieved for the following reasons:

- There is no attempt to justify how the level of work completed relates to the questions it seeks to answer[11].
- The specification of the work is not of high enough resolution to provide the basis for monitoring. June has been inadequately sampled, and the data set will not allow changes to behaviour that could lead to population level effects to be identified.
- The relative importance of the EDF Estate to different bat populations, and the extent to which they have been key considerations in the ecological impact assessment, does not appear to have substantively influenced how the data have been collected, analysed and reported. An example is Section 5.1.5[12] which states (when considering multi-species bat data from static detectors), "*Therefore, the most important areas around the main development site for foraging*

[11] For example, is one back-tracking survey covering one aspect of a woodland block due to be lost to development sufficient to understand how it is being used for roosting across the season by a variety of bat species?
[12] This assertion is repeated in the summary in section 5.1.12 of the static survey report.

bats[13] *are…*," without considering that the most important areas will be those that support the nationally and county-level important bat populations the site is of importance to (as opposed to the more ubiquitous species that dominate the data set).

- The inter-relationships between the different elements of work are not discussed over and above the link between back-tracking and bat box inspections; in particular it is unclear why back-tracking work and static detector survey did not cover consistent periods, as the former is typically undertaken in conjunction with other contextual survey, and it is stated in the static survey report that one of the factors considered in static detector placement was likely roost locations. The result of this is that conclusions between reports lack coherency. For example, it appears that the while the back-tracking report concludes the most likely barbastelle roost locations were in Kenton Hills or to the north of the area surveyed, the data illustrated by Plot 4 (page 40) in the static survey report indicates no evidence of early emergence of barbastelles from detectors around Kenton Hills, but a number of early records from a detector (MS 20) on the southern edge of Goose Hill (where the back-tracking report states no evidence of a roost was recorded). It is also unclear as to whether monthly static data was analysed ahead of subsequent back-tracking visits being completed, as it might then have been used to inform approach.
- There is no attempt to assess the limitations of the work in the context of the scarcer species, and the justification for those limitations that are acknowledged appears very weak without further context. Static survey covered a period of three months (June to August inclusive), albeit only half of the detectors were deployed in June. Table 2 of the static survey report indicates that previous static survey work found mean barbastelle activity levels to be highest in June. This suggests a substantial data gap.

3.20 In assessing bat activity levels, 3.1.16 of the static detector report sets out that low activity was defined as 7.5 bat passes per hour or less, medium activity as between 7.5 and 15 passes per hour, and high activity as more than 15 passes per hour. It is noted that this categorisation is based on "*professional judgement after review of data, in the absence of any published guidance*." Section 4.1.5 of the report confirms that the thresholds / ranges referred to above concern cumulative multi-species encounter rates (as opposed to species encounter rates) at the site. These are what have been applied when assessing the relative importance of different areas of the EDF Estate to bats in the static survey report.

This approach to survey, data analysis and presentation has associated problems:

- Even where important populations of rare species are present, more ubiquitous species will invariably considerably outnumber them. This is reflected in the data set presented, where despite a nationally important barbastelle population being present within the EDF Estate, calls of that species make up only 2.8 % to 5.1 % of overall call volume by month for the period surveyed and 4.15 %[14] overall (based on Table 14 of the static survey report). If the analysis therefore primarily considers activity of the bat assemblage when drawing conclusions as to whether recorded activity is low, medium or high at each location, it risks missing relative activity / key areas for rarer species such as barbastelle i.e. it is simply a reflection of encounter rates of ubiquitous pipistrelle species.
- This is illustrated by reviewing Table 9 in combination with Table 10. The former indicates that the highest median pass rates of barbastelle were at Aldhurst Farm (for which August data are lacking), south of Great Mount Wood, at Ash Wood (MS06) and at MS 35 (south-eastern Goose Hill) (range 1.79-2.21 passes per hour). The report concludes none of these four areas have high bat activity overall, but MS15 (where median common pipistrelle activity was 35.96 passes per hour and barbastelle activity only 0.19 passes per hour) is concluded to be 'high.'

3.21 Considering passes per hour (by species as opposed to assemblage) in the context of other sites within the UK or the region would be a more evidence-based approach to assigning relative activity

[13] Static data do not necessarily reflect foraging activity. Calls are also made by commuting bats.

[14] Cross reference earlier comment on apparent differences between the bat assessment and the baseline documents in terms of overall proportion of barbastelle calls.

levels for rare species or those for which regionally important populations may occur. As previously noted, the report states that the thresholds have been derived based on site data alone[15].

3.22 As the highest level of barbastelle activity at any detector location in 2020 was 2.2 bats per hour (on the edge of a relatively discrete area of woodland known to support a maternity roost of the species), it is clear that it is very unlikely that any detector location would be classed as having 'high activity' on the basis of barbastelle activity alone (without significant activity in other species) using the available criteria. Considering likely barbastelle population monitoring requirements, it is firstly unclear why the focus of reporting of results is skewed towards commoner species and the overall assemblage. Secondly, it is unclear why a similar system for assessing relative levels of barbastelle (and/or Natterer's bat / *Myotis* species) activity at different static survey locations has not been provided in the report; this would ideally take account of previous data sets for both the main site and the Sizewell Link Road as a minimum when defining parameters[16]. It might also consider habitat present at and close to the detector location, which is stated as influencing survey method, but is not commented on further in the report.

3.23 The report does comment on the relative levels of activity in "rarer species"[17] between section 5.1.6 and 5.1.8, but continues to consider these together, despite considerable differences in their foraging ecology. It also (cross reference 3.30 below) states that where these species cumulatively accounted for more than 10 % of recorded bat activity at a static survey location, this suggests the static detector was located in habitats of greater relative importance to these other species (as opposed to being less important to the commoner pipistrelle species). In order to draw out the most relevant information, comparing encounter rates on a species-by-species basis (with a focus on barbastelle and Natterer's bat as the principal considerations of the bat impact assessment for the site) might have been more useful. Such accounts could have demonstrably taken account of habitat type and inherent quality and proximity to known roosting locations, and included more detailed analysis of data for key species.

3.24 Without complementary observation e.g. the use of thermal imaging cameras or other appropriate methods, it is unclear whether activity levels relate to a single bat / small number of bats concertedly using an area for foraging or numerous animals commuting past a detector. This is recognised in Section 5.1.2 of the static survey report, which states.

"*The western edge of the existing Sizewell A and B nuclear power stations (MS27) has the highest level of activity of all of the monitoring locations (49.7 bat passes per hour), however it should be noted that as the activity recorded by the static detectors has no visual component, this could be one or a small number of bats foraging repeatedly close to the detector*."

This clearly draws into question how useful the data collected are in informing a future monitoring protocol assumedly designed to identify genuine evidence of change, and why this was not apparent at the survey design stage.

3.25 There is no attempt made in the static survey report to look at whether the results in 2020 were broadly comparable with those from previous static deployments. As static survey detector locations selected demonstrably took account of previous detector locations, this would seem a logical part of the work. It might also help to inform any monitoring strategy reliant on the work by indicating whether the way in which bats use the local landscape appears consistent between years or whether some areas appear habitually used.

3.26 It is unclear why the high potential trees in Goose Hill could not have been subject to climbed assessment or emergence / re-entry survey in 2020 if they are within the area that will be felled (their locations cannot be established from the report). While the work might have had to be repeated at a future time to inform licencing, this would have allowed greater confidence in the conclusion of the report, which is that the area has low potential for roosting bats.

[15] It is unclear whether this categorization of activity is based on the 2020 survey data alone or relates to the entire period across which data have been collected at the site.

[16] As these data have assumedly all been collected in the same way, all refer to the local area and may all refer to the same population.

[17] These are defined as all species other than common pipistrelle and soprano pipistrelle.

General Points of Clarification

3.27 It is noted in Table 5 of the backtracking report that "notable levels of barbastelle foraging" were recorded at a location stated to be the crossroads between Hilltop Covert and Goose Hill on 23/24 June 2020. However the Ordnance Survey Grid Reference provided for the activity is for a location on the track between Turf Pits and Nursery Covert. Given the relative importance of the record in the context of the work, the location of observed activity should be clarified.

3.28 Plot 4 within the static survey report provides data on published emergence times of bat species in relation to the times they were recorded at static detectors. However, only 25 of the 28 static locations are illustrated. Those omitted include MS06 on the north-eastern corner of Ash Wood, in which a barbastelle maternity roost is known to have been present from earlier work at the site. Previous survey data have indicated these roosting bats predominantly disperse along features connected to the eastern part of the woodland. It would therefore be very useful to be able to compare data from this detector to others such as MS20, as this would provide a site-specific indication of emergence time of barbastelle in 2020, and would also indicate whether the woodland continues to be used by the species for roosting. It is unclear why no data are presented for the three detectors omitted from the Plot.

3.29 The limitations provided in the bat static survey report could be usefully elaborated upon. In particular:

- It is stated in the report that static detectors could not be deployed before 18 June[18], but no reason is provided for this.
- It is unclear why the size of the site was an issue in terms of being able to deploy detectors and how risk of interference was addressed by having two separate deployments. It is also unclear what the 'other practical problems' are that are referred to.

3.30 Section 4.1.16 of the report states that "*Locations where the proportion of bats which were common or soprano pipistrelles was less than 90 % are highlighted to highlight areas where the assemblage of bats was richest*." This statement and Table 9, in which these locations are identified, are illogical. The best measure available for considering relative species richness is the number of calls of different species recorded at static detector locations, not the percentage of calls of those species in relation to common and soprano pipistrelle species. A high number of other species calls in relation to pipistrelle calls could simply indicate a location is not favoured by pipistrelles. The number of calls of the other species could still be far lower than at other locations where they make up proportionately less of the overall bat activity.

3.31 Image 1 on Page 19 of the static survey report could be usefully colour-coded red and blue in line with the text (to make it clearer which detectors were not deployed) as currently not all numbers are readable on this figure. Extraneous information could also be usefully removed for greater clarity.

3.32 Figures 1 and 2 of the Bat Static Monitoring Survey Report indicate 29 detector locations. The text of the report clearly states that 28 detector locations (and two deployments of 14 units) were used.

3.33 In Table 15 of the static survey report the number of barbastelle passes and the combined number of Natterer's bat and *Myotis* species passes are similar (1153: 1107), but the percentage of total passes recorded these represent is calculated as 4.15 % for the former and 2.33 % for the latter. This suggests that corrections need to be made to the table.

3.34 Of the seven trees in Goose Hill that were identified in the tree roost report as having high roost potential, only one is shown on **Figures 2** and **3** of the report. At present it is not possible to take a view on likely effects on the roost resource as a result of the felling of the majority of the woodland.

Further Survey

3.35 There is clearly an intention to complete some further bat survey work in 2021.

[18] It is unclear why, in this case, it was not possible to deploy all 28 detectors at one time in June or, given that only five nights of data were to be collected from each location each month, 14 detectors could not have been redeployed.

3.36 While it is outside the scope of this document to make detailed recommendations with regard to the specification of further work, given the importance of the crossing point on the Sizewell Marshes, the proposed dark corridor between Ash Wood and Kenton Hills and the developing wetland habitat at Aldhurst Farm might all benefit from the collection of further data collection to inform monitoring. There is also an opportunity to collect data that will allow a more robust assessment of the significance of the loss of (the majority of) Goose Hill to barbastelle and Natterer's bat.

Conclusions

3.37 The approach to data analysis and the extent of discussion of cumulative as opposed to single species bat activity in the static survey report suggests that the bat monitoring envisaged by the authors will involve broad comparisons of multi-species encounter data at static surveys points. The static work has not been designed in a way that will enable any between-year comparisons to be made other than overall call volume by species at each location (there has been no attempt to characterise the nature of the use of features or the numbers of bats using them as part of the 2020 work).

3.38 As acknowledged in the static survey report, there is no link between the number of bat calls and bat numbers, so unless future results are drastically different (i.e. some species increase exponentially or completely disappear) it is unclear how monitoring on this basis will be able to conclude anything useful about the effects of development, success of or need to revise mitigation. Anything other than extreme changes in commuting or foraging behaviour will certainly not be detectable.

3.39 This approach ignores the fact that the key species with regard to the bat impact assessment have been barbastelle and, to a lesser extent, Natterer's bat. Populations of national and county-level importance respectively occur. The static work has not been designed, analysed and reported in a way that will help in the design of the monitoring programme likely to be required for these species.

3.40 If the survey data are considered in isolation, as a baseline characterisation exercise, the failure to capture static detector at fourteen detector locations in June appears a significant limitation. Other limitations cited also appear unconvincing without further context.

3.41 The back-tracking work also lacks context; there is no attempt made to justify survey effort. One survey per month covering one aspect / relatively discrete areas of densely wooded habitat (which will be inherently challenging to survey) seems a relatively low effort, particularly during the barbastelle maternity period. It would also seem logical that the number of barbastelle flights recorded during the back-tracking survey on the south-western edge of Goose Hill (in combination with the data from static detector MS20[19]) might have led to an intensification of survey in this location to identify the likely roost location more precisely.

3.42 The work completed in 2020 has not done a great deal to advance the assessment of the importance of Goose Hill to bats. It would have been useful for more focussed follow up work on high potential trees to have been completed in 2020, potentially alongside intensive back-tracking work and the deployment of further static detectors in the area, to allow more confident conclusions to be drawn by the reader. It is also unclear, given the evidence from back-tracking and static detector MS20 what basis there is for concluding a barbastelle roost is not present within or close to the southern boundary of the woodland at Goose Hill, or in woodland to the south of it (also within the development footprint). These points and others could potentially be addressed through survey in 2021.

[19] This is particularly important as the Site Clearance Plan indicates that the vast majority of woodland to the north, south and east of this detector will be lost.

4 Review of Bat Assessment Updates

4.1 The updated bat impact assessment contained in Appendix 2.9 B of the revised and updated information addresses a number of the points made in the first critical review.

4.2 In particular:

- Further desk study information and a non-technical overview of results are included. This helps the reader to understand the context and history of work that underpins the evaluation of the importance of the EDF Estate to bat species.
- Site specific data on use of the Estate at different times of year by different species is available through the overview of results and through short summaries of e.g. barbastelle and Natterer's bat radio tracking work included in the text. Table 8.20 provides a particularly useful summary of seasonal activity patterns in barbastelle, and the appended figures illustrate the locations and types of all known barbastelle, Natterer's bat and other bat roosts.
- The reason for the incorporation of a bat barn into the proposals has been clarified. It is considered likely to represent enhancement (through the provision of an additional roosting resource), but is also included as it is recognised that some elements of construction phase work may lead to unforeseen impacts on roosting bats that could be mitigated by the proposed bat barn.
- A 15 mph on site speed limit will be observed. This will limit the potential for bat collisions to occur and seems entirely appropriate.
- The figures appended to the updated assessment are now far clearer and more useful. They illustrate all relevant data on roost data, key bat foraging and commuting areas / routes. These data are also overlaid onto figures showing noise levels during different phases of construction and retained dark corridors. This aids the reader in understanding how bats may move around the EDF Estate during the construction period.

4.3 The overall conclusions of the assessment remain consistent. These include:

- There will be a moderate (adverse) significant construction phase effect on barbastelle as a result of habitat fragmentation. The effects of habitat loss (for roosting and foraging), disturbance and displacement due to noise are all considered to be minor adverse in nature, but not significant in EIA terms.
- Construction phase effects on Natterer's bat will all be minor adverse and not significant in EIA terms.
- Construction phase effects on other bat species will generally be minor adverse and none are considered significant in EIA terms.
- Operational phase effects on bats will not be significant.

Evaluation of Importance of Habitats within the EDF Estate to Bats

Goose Hill

4.4 One of the principal issues raised in the first critical review was that the importance of Goose Hill, a considerable area of plantation woodland that lies largely within the development footprint, had not been robustly assessed. As a result it was difficult to understand potential effects of the scheme, the proportionality and likely success of proposed mitigation and whether the loss of the woodland would lead to a residual effect on bat species.

The information concerning the extent to which Goose Hill represents a potential bat roost resource within the revised bat assessment is as follows:

- Section 5.3.5. notes that potential roosts of barbastelle (and noctule) have been recorded in Goose Hill. It is additionally noted that Section 8.7.13 of the assessment suggests that there were thought to have been pipistrelle roosts within Goose Hill plantation in 2020.

- Section 5.3.6 states that, "*Several locations on and close to the site boundary have significant numbers of trees with roosting potential for bats, including ….. Goose Hill …. .*". The paragraph notes the principal locations of trees with potential for roosting within the plantation and comments on the lack of suitability of large parts of it due to the (young) age of the trees. This is restated (in part) in Section 8.3.13.
- In 5.3.7, however, it is stated that Goose Hill offers "*minimal roosting resource for bats*." The 2020 reports are cross referred in providing an evidence base for this assertion, which is not subject to qualification.
- Section 8.3.9 further notes that conifer plantation, such as that principally present within Goose Hill, is sub optimal for roosting barbastelle, providing, "*limited availability of roost features*."
- Figure 2.9.B.1 appears to show a barbastelle roost in Hilltop Covert, which forms the western block of the Goose Hill plantation (this is separated from Kenton Hills by an access track). However, this location is referred to as being in Kenton Hills in 8.3.50 of the bat assessment, and as being in Nursery Covert[20] in Table 8.21.

Ground level tree roost assessment completed by Arcadis in 2020 (and summarised in the previous section of this document) concluded that there were 104 trees within Goose Hill that offered medium roosting potential for bats, and a further seven with high roosting potential. The statement in Section 5.3.7 (*minimal roosting resource for bats*) does not appear readily defensible, and it is unclear what the quoted statement in 8.3.9 means in this context. The indicative roost location on Figure 2.9.B.1 is confusing in the context of other comments.

4.5 Evidence of the use of Goose Hill as a barbastelle commuting route and foraging area, and further commentary on its importance to both barbastelle and Natterer's bat is included in:

- 5.3.15, which refers to records from detector MS20 on the southern edge of Goose Hill during survey work in 2020, but does not provide further contextual information at this point. [*Information from the baseline static survey report for 2020 indicates that records of barbastelle from this detector were the earliest / latest recorded on site with regard to published data on emergence / re-entry times of the species*[21]].
- 5.3.16, which states, "*Movement recorded through Goose Hill from the north to south suggests this is a commuting and foraging route for bats, including barbastelle* …."
- 5.3.27 which also states that there is a commuting route of barbastelle through Goose Hill[22].
- Table 8.18 which indicates that in 2011 radio tracking work concluded that Goose Hill was a key foraging area for barbastelle in the context of the EDF Estate during the pre-lactation period, and in 2014 it was important for females post-breeding.
- Table 8.20 which states that a pre-lactation commuting route from Ash Wood through Goose Hill has been identified for barbastelle.
- 8.3.30 which notes that Goose Hill is known to be used by breeding female and newly-volant barbastelle.
- 5.3.28 which indicates that of four Natterer's bats radio tracked, two were found to be extensively using an area including Goose Hill. One of these bats was found to be largely confined to the area taking in Goose Hill, Hilltop Covert and a few adjacent fields for the period for which it was radio tracked.
- Table 8.24 which states that Goose Hill is of particular value to Natterer's bat "*later on in the season*," and indicates the track on the northern edge of the plantation is regularly used by the species.

[20] Nursery Covert is the eastern part of Kenton Hills, so these references are not necessarily incompatible. It is less apparent why the roost is shown north of the track, and where Kenton Hills is considered to extend to if the roost is considered to be in Kenton Hills.

[21] BSG Ecology insertion and italicization.

[22] NB. The text states this is the only barbastelle commuting route identified. However, Section 1.2.9 of the back-tracking report indicates a commuting route is also present along the northern edge of Fiscal Policy.

4.6 Overall, it is considered the assessment of bat (with an emphasis on barbastelle) roosting potential provided by Goose Hill lacks clarity, as apparently conflicting information is presented. It does not necessarily follow that the plantation provides an important roosting resource in the context of the EDF Estate, but the impression is that there is some work still to do to establish this both in terms of survey and assessment work.

4.7 The geographical location and importance of Goose Hill to foraging and commuting barbastelle and Natterer's bat, and the impact of the loss of much of the area will have been a consideration in concluding a significant adverse effect on barbastelle as a result of habitat fragmentation. However the evidence provided with regard to both species indicates it may well also comprise a locally important foraging area for the respective populations, particularly breeding female barbastelles. A precautionary response would be to conclude that it does; whether there is robust data to suggest that habitat creation has offset the reduction in foraging resource is something the bat assessment does not convincingly address at present. As a result it might be more robust to conclude a residual significant effect on both species than conclude a minor adverse (not significant) effect.

Ash Wood and Nursery Covert

4.8 Both Ash Wood and Nursery Covert (the eastern part of Kenton Hills) are outside of the development footprint, but close to it.

4.9 The initial critical review (BSG Ecology, 2020) concluded:

"*With regard to primary mitigation, perhaps the most effective means of mitigating impacts on barbastelle roosts in Ash Wood (which appears to be the most important area for barbastelle within the EDF Estate) would have been to put a perimeter exclusion zone around it during construction and retain the link (via Stonewall Belts) to Nursery Covert (another key area of the EDF Estate for the species). While there will be no physical removal of trees, Ash Wood will be affected by light spill and construction noise, as the construction area abuts its southern, western and northern edges. The effects on roosting bats are uncertain. There is no statement in the ecology ES Chapter with regard to why this was not possible*."

4.10 In (apparent) response to this the design of the scheme has been modified to include a new connecting route between Kenton Hills (the eastern part of which is Nursery Covert) and Ash Wood. This will use two lines of newly-planted semi-mature trees / scrub and potentially incorporate part of a retained hedge line[23]. A 5 m hording will also be provided around the northern, western and southern edges of Ash Wood and an earth bund or hording along the northern edge of Nursery Covert.

4.11 This addresses one of the main connectivity concerns. The effectiveness of the hording and bunding in mitigating noise impacts on bats will need to be established via monitoring work. Further detail and commitment with regard to the width and character of the corridor would be useful in order to have confidence it will be implemented as planned and as effective as possible.

Lighting

Design Alterations

4.12 The initial critical review concluded that clearer information was required regarding the proposed lighting of the bat culvert that was to be incorporated into the Main Platform approach road where it crosses the Sizewell Marshes. It was also noted, however, that there was a potential conflict between internal lighting of the tunnel to make it more attractive / less of a potential barrier to the movement of water vole, and its use by light sensitive bats.

4.13 The proposals now include a clear span bridge, which will replace the previously proposed culvert. The bridge will be 30 m wide (north-south), 40 m wide (east-west) and will not have any lighting beneath the span. Lighting on the bridge deck will be designed to minimize light spillage away from

[23] As noted elsewhere in this document, the dark connecting corridor that will result could be usefully shown and labelled on plans in ES Addendum Volume 2 part 1A and in figures appended to the bat assessment.

the bridge / road. With reference to the supporting information provided, it is reasonable to conclude that this is more likely to be used by light sensitive bats than the previous culvert design.

Construction Phase Lighting

4.14 In Section 4.1.6 of the updated bat assessment, it is stated that '*Subsequent to the submission of the ES an additional commuting route is proposed within the construction phase design*'. The assessment states that there will be 'minimal lighting' of this area but provides no further explanation of where this lighting will be required, and what design it will be. Whilst it may be the case that lighting impacts on bats may also be minimal, an evidence base has not been provided to support this.

4.15 It is unclear why detailed modelling of light levels has only been completed for parts of the site. An example would be whether the entrance plaza might have a greater impact on Bridleway 19 than the campus (which is modelled in detail).

4.16 The first critical review noted that the proposals included a mitigation commitment to keep certain sensitive areas as dark as is 'reasonably practicable'; however, it was not clear what this meant in practice. It is noted that Section 8.2.85 of the updated assessment has retained this commitment but without further explanation, stating '*Parts of Goose Hill and Sizewell Marshes SSSI will be within the construction footprint, and all retained areas adjacent to the site boundary shall be kept as dark as reasonably practicable*'. This still requires clarification for the reasons set out below.

4.17 In Section 8.2.121 the assessment states that monitoring of light levels will be undertaken. Although no justification for this monitoring requirement is provided at this point, in Section 8.3.75 it is stated that '*It is not possible to accurately predict the impact from lighting once the mitigation measures proposed (as outlined in The Bat Mitigation Strategy (Volume 2, Appendix 14C1A of the ES (Doc Ref 6.3) [APP-253])) are applied*.' The requirement to monitor therefore appears to be driven by uncertainty about the ability to achieve the specified light levels at key locations, and what effect light spillage might have on the behaviour of bats. This uncertainty is reflected in Table 1.5 in the Volume 2 Appendix 2B Lighting Management Plan for Construction and Operational Sites, which presents information extracted from 'Bats and Lighting – Overview of Current Evidence and Mitigation' (Stone, 2013). The information in this table does not provide the evidence base that would allow a confident assessment to be made of potential lighting impacts on different species.

4.18 The commitment to keep certain sensitive areas as dark as is 'reasonably practicable' at the outset implies that a de-minimis approach has been adopted for the lighting mitigation, i.e. the objective of the mitigation measures is to achieve the lowest light levels possible whilst taking into account other requirements, such as health and safety. This is supported by Section 1.2.66 in the Volume 2 Appendix 2B Lighting Management Plan for Construction and Operational Sites, which states '*lighting should be designed under the principal of Ultra Efficient Lighting (UEL) which means that the right light will be provided at the right time, in the right place, controlled by the right system*'. It therefore follows that if a situation arises where monitoring finds that light spillage is greater than expected, it is unclear what additional mitigation measures can be implemented. This needs to be clarified.

Crossing Points

4.19 The previous review identified that "*Very limited information is provided on how crossing points within retained features will be designed to encourage bat use*." The updated bat report states that this point is addressed in The Lighting Management Plan for Construction and Operational sites (Volume 2, Appendix 2B of the ES), which demonstrates how the crossings would be kept dark throughout the development. The Lighting Management Plan advises that three areas where bat activity is known to occur have been selected and indicative lighting models have been produced to illustrate the level of lighting that is likely to occur on these areas if the mitigation measures are followed (other modelling has not been completed).

4.20 One of the modelled areas is the SSSI crossing (referred to in the Lighting Management Plan as Area 3). The results of the modelling work are summarised in Table 1.9. This indicates that a maximum light level of 18.4 lux is predicted to occur; however, there is no discussion about where this might occur and its potential significance in terms of impacting on bat behaviour. Plate 1.20 is

reported to show how the SSSI marshes area can be maintained as an intrinsically dark area; however, it is difficult to interpret this figure and compare it to the bat survey data. Whilst it is possible that the conclusion is correct that the SSSI can be maintained as an intrinsically dark area, further justification is required taking into account the maximum light level presented in Table 1.9 and the areas of light spillage shown on Plate 1.20.

Operational Phase Lighting

4.21 The basis for the assessment of operational phase lighting on bats is the description of lighting provision presented in Sections 9.2.1 and 9.2.2. This concludes by stating '*no part of the site would be subject to ambient light levels above 30 lux, and there would be no lighting between the Upper Abbey Bridleway and Goose Hill*.' No information is provided about the extent of light spillage beyond the operational areas and the light levels that might be experienced at sensitive locations.

4.22 In Section 9.3.1 it is reported that thirteen barbastelle tree roosts have been identified on the edge of, or in close proximity to, the site boundary and of these the closest is located approximately 130 m from the nearest operationally lit area (R4 located to the west of main platform). Whilst the assessment then goes on to say that barbastelle do not show high inter-annual roost fidelity[24], the possibility of roost re-use does not appear to have been considered. Lighting impacts have not specifically been described for the thirteen identified roosts.

4.23 Whilst the assessment conclusions may be correct, it is difficult to determine the extent of operational lighting impacts in the absence of lighting plans. Other than a few illustrative plans for specific areas, no operational lighting plans seem to have been made available at this stage.

4.24 The mitigation approach that will be adopted during the operational phase of the development is based on the same broad principle as stated for the construction phase, which is set out in Section 1.4.16 of Volume 2 Appendix 2B Lighting Management Plan for Construction and Operational Sites: '*All habitats adjacent to the operational site, notably but not limited to Sizewell Marshes SSSI should be kept as dark as reasonably practicable*'. This requires further explanation for the reasons set out previously.

4.25 In Section 1.4.17 it is implied that lighting in the proximity of a bat roost or commuting routes / flightpath will be avoided 'where reasonably practicable'. Section 1.4.18 then sets out additional mitigation measures that will be adopted if lighting is necessary; however, these measures will only be adopted 'where reasonably practicable', which implies that the mitigation may not be adopted in certain (unstated) situations. Consequently this raises doubts about the effectiveness of the mitigation. No further discussion is presented about the potential impact on bats if these mitigation measures are not adopted. In the absence of sufficient certainty then lighting impacts should be considered on a precautionary basis to occur and the assessment changed to reflect this.

Interactive Effects

4.26 Inter-relationship effects are considered in Sections 8.2.122 et seq. This section focusses on noise and lighting. Specifically the assessment considers the potential for an inter-relationship between the loss of roosting habitat and foraging habitat, where:

- The loss of roosting habitat could result in the distant displacement of bats; and
- The loss of foraging habitat could make roosts unsustainable due to reduced food availability.

4.27 The assessment has not specifically considered the possibility that displacement could occur as a result of habitat fragmentation and adverse effects on commuting routes. For example, lighting and/or noise may deter bats from using established commuting routes that provide access to and from roosts and feeding areas. Unless suitable alternatives are available (that are acceptable to the bats) it is possible that bats may stop using these areas.

[24] It is unclear how much confidence can be placed in this conclusion. Trees have not been monitored across the season or consistently between years. Barbastelles are known to regularly move roosts and use different features at differ times of year for different purposes.

4.28 Section 8.2.124 notes that '*habitat fragmentation, either directly or through effective isolation by being surrounded with lighting, could potentially render roosts unviable*'. It is important to note that lighting may not have to 'surround' an area to have an effect – inappropriately placed or designed lighting at a single location may deter bats from, for example, using an established commuting route. This point is particularly relevant when considered alongside the uncertainties that have been highlighted previously with regard to the proposed mitigation for lighting-related impacts.

4.29 In Section 8.2.125 it is accepted that activities resulting in construction site noise may sometimes correlate with task-specific increased levels of lighting[25]. It is also noted that '*both impact pathways can therefore vary from background levels to the most intense proposed during construction*'. Whilst it is accepted that the inter-relationship between noise and lighting is complicated by the nature of the construction works, no attempt has been made to consider what a 'worst case' might entail, i.e. where the combined impacts of lighting and noise might be greatest, how long this might be expected to last and over what area an impact might be expected to extend.

4.30 This section concludes by stating that '*when increased levels of task-specific lighting do correlate with higher noise levels, these events are likely to be of short duration relative to the construction period and are unlikely to be more significant than either impact pathway in isolation*'. In light of the omission highlighted above, it is unclear how this conclusion has been reached.

Assessment of Significance of Residual Effects

4.31 The bat assessment concludes there will be a significant residual effect on barbastelle as a result of habitat fragmentation, but does not draw out what this could mean for the population.

4.32 For 9-12 years during construction connection of local landscape features known to be used by barbastelle will be affected, as some of these features and linking hedgerows will be within the footprint of the site and its construction area. The construction footprint will result in both east-west and north-south commuting features being lost. This is likely to result in barbastelles taking more circuitous routes to foraging areas: for males, which range considerable distances this may be sustainable; for females, which forage close to roost sites when breeding, and for volant young with limited ranging ability, this may prevent them reaching preferred areas for feeding.

4.33 If barbastelle continues to roost within the EDF Estate there is likely to be a population level effect on the species as a result of this effective displacement of females and young bats from foraging habitats due to the construction area representing a partial barrier to movement. Alternatively, the colony might relocate into the wider area, potentially competing with other colonies for resources. The extent of decline might be possible to model, but how populations will respond cannot be concluded with certainty. In this context it would be very useful for the ecologists to provide their professional view on the most likely outcome with regard to the species, so that the reader can interpret what a significant residual effect is likely to mean in reality.

4.34 It is also important that the bat assessment reaches a conclusion in this regard as it provides the basis for monitoring that should reasonably follow.

4.35 For Natterer's bat, the assessment concludes that due to the more generalist habitat preferences of the species, the colony is likely to adapt to habitat fragmentation impacts resulting from construction, but that it will become more 'vulnerable'. It is unclear in this context whether vulnerability could result in a population-level effect as a result of additional impacts arising from the Sizewell Link Road, for example. This, and inherent uncertainty in the conclusions regarding the magnitude of effect on the county-level important population should also be a focus for monitoring.

Monitoring Proposals

4.36 An outline approach to deriving an appropriate level of monitoring during the construction and operational phases of the proposed development was included as part of the first critical review.

[25] No figures have been located that clearly show areas in which impacts could coincide.

4.37 The revised bat impact assessment does not include monitoring protocols, and there is no evidence that the monitoring section of the critical review has been considered at this stage[26]. It is stated in the text of the bat assessment (at various points) that a Terrestrial Ecology Monitoring Plan is in preparation. Until this is produced it is not possible to comment on the likely effectiveness of the approach proposed.

There are commitments to providing further information on / monitoring the following (with regard to bats) under the auspices of the Terrestrial Ecology Monitoring Plan (this is not exhaustive list of references to the Plan).

- Light levels and associated spill into surrounding habitats used by bats (4.1.15)
- Bat activity in response to light levels (8.2.121)
- Bat boxes (annually) during construction (4.1.16). NB. There is no indication of the frequency of checks provided at this point.
- The "*extent of use of dark corridors*" in conjunction with bat box use (4.1.17).
- The effects of noise levels on bats (noting the confidence limits on the assessment of impacts) (8.3.60), with a view to determining whether construction activities were likely to require a licence (8.3.66).
- The use of "*roost locations*" (the implication is that this goes beyond bat boxes) and key foraging and commuting routes to investigate key impacts and quantify disturbance (8.3.61).

4.38 In the context of a commitment to monitoring foraging and commuting activity, it is concerning that the static survey work in 2020 was not complemented by other survey work designed to collect data on indicative bat numbers and behaviour[27]. This does not seem to be considered a limitation of the 2020 work, as the key stated aim of the static survey was to provide a basis for monitoring i.e. it was designed with this limitation built in.

4.39 Without an understanding of bat behaviour or an indication of the numbers of barbastelle and Natterer's bat involved in generating the data recorded at these static monitoring points, it is unclear how monitoring can be designed to detect changes in bat commuting and foraging likely to have resulted from the development. Implementing "*Monitoring of the bat usage of the site to determine any significant decline of the recorded assemblage of bats*" (as suggested in Section 8.3.5 and elsewhere) ignores the key features of the bat community (as assessed in the ES) and will not contribute usefully to assessing whether residual effects are impacting them. The reason to monitor these feature species would logically be to investigate whether population-level effects appear to be occurring (and measure these as far as it is possible to do so), and the role that disruption to commuting routes and foraging areas is playing in this. This would test and add evidence to the conclusions of the ES. Broadly comparing activity levels in the more common and widespread species that will dominate the bat community pre and during construction appears less relevant.

4.40 It is also noted that triggers for alterations to e.g. construction phase noise (8.3.64, 8.3.66) and lighting levels in areas that are considered important to bats remain undefined. In the first critical review it was recommended that " … *measurable, acceptable limits of noise and light intensity around[28] individual retained features during diurnal and nocturnal works are defined. These should be based on the best available information on likely effects, and set at a level appropriate for the most sensitive species present (likely to be barbastelle)*." Until there is some indication of how noise and lighting impacts will be practically controlled, it is difficult for the reader to rely on the conclusions of the report with regard to the effectiveness of the mitigation proposed.

4.41 Section 8.4.47 refers to identifying evidence of roost abandonment through monitoring, and using this as a measure of development-related impacts. For roost switching species this may prove challenging without e.g. radio tracking. There is no indication in the text of the report how this might be achieved.

[26] It is acknowledged that there is no requirement for the assessment to do so, although other comments from the initial critical review have been taken account of, and this does signpost an approach the commissioning parties have reviewed.

[27] Some back-tracking work was completed, but this was small-scale.

[28] Potentially at points on the edge of these features.

4.42 There are various references to work at Hinkley Point C potentially providing the evidence base for the success of proposed mitigation. These references need to be balanced by commentary on the extent to which the situations can be compared. The footprint of Hinkley Point C was largely dominated by intensively managed agricultural land likely to have supported relatively low levels of bat activity; the Sizewell Estate includes a wetland SSSI, numerous woodland pockets of varying size, age and species composition, is (locally) connected to an extensive wetland complex and ancient woodland around Minsmere and supports a nationally important barbastelle population and a county-level importance Natterer's bat population.

4.43 At least one bat flight corridor was identified across the Hinkley development footprint (a green lane that has been retained in part and partially re-routed) that had some use by barbastelle and a range of other species. Monitoring has established that the lane continues to be used by barbastelle. It is unclear whether the data collected is of high enough resolution to assess the extent to which the nature, frequency or number of barbastelle using it has changed however; Section 8.3.57 of the bat assessment indicates that barbastelle use of the feature declined during construction, while Section 8.2.47 states that monitoring has detected barbastelle have started using an alternative route (Benhole Lane) to navigate around the construction area[29]. Neither statement is subject to further qualification. It is also likely that the post construction situation at Sizewell will be a lot more complicated, as many more flight routes directly connecting roosts to high quality foraging habitat will be disrupted, and it is less clear how these might realign.

4.44 Overall, it is recommended that the purpose of monitoring should be clearly attributable to one or more of the following:

- It is required to address residual uncertainty with regard to impacts on key bat populations identified through the assessment work submitted in support of the planning application.
- It is required to understand whether licencing will be needed for specific elements of the work / to inform practical mitigation changes designed to minimise the potential to commit an offence / obviate the need for licencing.
- It is a licencing requirement.
- It is needed to understand the medium and long term success of habitat creation work in relation to key bat populations.
- It is part of or forms a precursor to structured long term research on bat populations on the EDF Estate that will extend beyond the period in which development-related impacts are likely to take place.

Other Comments

4.45 Figure 2.9.B.17 could be usefully updated to illustrate the dark corridor between Ash Wood and Kenton Hills that has been incorporated as a result of the recent design amendments.

4.46 Section 8.3.24 and Footnote 6 of the bat impact assessment have not been populated.

[29] Benhole Lane is a very well defined double-hedged north-south track along the western edge of the construction area that links to an east-west track / footpath that runs parallel to a watercourse (Bum Brooke) along the southern edge of the construction area. The track / footpath terminates at the north-south plant approach road, beyond which are a further network of minor, well-hedged roads. The stream is culverted under the road and continues east beyond it.

5 Conclusions

5.1 The main design changes that affect bats since the DCO application was submitted are both potentially very positive.

- The repositioning and reconfiguration of the water resource management area results in the establishment of a new dark corridor between Ash Wood and Kenton Hills. This potentially reduces habitat fragmentation and makes it easier to defend a conclusion that the scheme is not entirely engineering led. Figure 2.2.13 needs to be updated to show the connecting feature more clearly; the new dark corridor could also be usefully shown on one or more figures appended to the bat assessment. Further specific information on the nature of lighting of the feature, its width and character would also be useful in order to have confidence in the outcome.
- Similarly the replacement of the embankment and culvert with a single span bridge where the approach road crosses the Sizewell Marshes is a very positive change in terms of habitat connectivity for bats. There is now far greater certainty that the crossing point will not present a barrier to movement, albeit there remain some details to confirm with regard to lighting.

5.2 The update baseline survey work completed in 2020 appears to lack a clear strategy. As a result the extent to which the scope and focus of work builds on previous data and answers outstanding questions is limited. In particular:

- The survey work has substantial limitations that are not fully assessed. These include the deployment of only half of the static detectors used in subsequent months in June, a period when previous work has shown barbastelle activity on the EDF Estate to be highest.
- Survey, data analysis and reporting focus on the bat assemblage (which is dominated by common and relatively ubiquitous species) as opposed to the species for which the EDF Estate is most important. These species have required detailed consideration in the planning application, effects on them are to an extent uncertain, and they should logically become the focus of monitoring. This lack of focus is therefore unfortunate.
- There is no evidence to suggest the survey programme evolved iteratively. I.e. the reports do not indicate that static data were analysed on a monthly basis to inform the back-tracking, or that back-tracking results led to further work (other than box checks) designed to identify roost locations. An example is that the early / late records of barbastelle from the detector on the southern edge of Goose Hill that indicate the presence of a local roost do not appear to have been the trigger for further work; woodland in this area is to be largely lost to development. The conclusion that there was likely to be a barbastelle maternity roost in Kenton Hills in 2020 appears to be conjecture based on the data presented.
- Further work to establish the value of Goose Hill as a roosting and foraging resource does not appear to have substantively moved the assessment forward.
- The static work does not form a high resolution baseline against which relatively subtle changes in foraging and commuting behaviour in barbastelle and Natterer's bat are likely to be detectable. These changes (such as female barbastelle failing to access preferred foraging areas) could lead to population declines, however. Bat monitoring at Sizewell should focus on understanding the drivers for development-related population change in these key species, and should be of high enough resolution to achieve this.

5.3 The revised bat assessment lacks clarity and consistency with regard to the roosting potential of Goose Hill. The impression created is that there is some work still to do to establish the value of the area to roosting bats. It is also acknowledged in the assessment that there is considerable evidence of the importance of Goose Hill as a foraging area for both breeding female and newly-volant barbastelle, as well as to Natterer's bat. Given the fact the woodland will be largely lost and there is no comparable data for newly-created compensatory habitats, it would appear logical to conclude (on a precautionary basis) that there will be a short to medium term significant effect due to habitat loss for these species.

5.4 The lack of a mitigation and monitoring protocol as part of the assessment is a concern. It requires stakeholders review the information presented on bats a third time when the protocol is produced, which is a substantial undertaking. It also means that the reader needs to have faith that adaptive

mitigation required if there are unforeseen or more extensive impacts of noise or light on bats than anticipated will be informed by effective monitoring, which is difficult without understanding what might be practically done. This is a concern as reconciling reducing light levels (if these exceed thresholds likely to impact on bats) and other considerations such as health and safety of the workforce appear to be a potential issue when the wider principles of lighting for the construction area are considered.

5.5 There is also a clear suggestion in both the 2020 baseline reports and, to an extent the updated bat assessment, that monitoring of impacts on bats populations will focus on the bat assemblage as opposed to the species for which the Estate is of principal importance, and which have been the focus of the assessment and of consultee concern. While it will be challenging to determine how barbastelle and Natterer's bat populations respond to construction phase impacts, the nature, scale and the lack of certainty of predicted effects of development on them all indicate they should be the focus of monitoring.

5.6 Comments on the Sizewell Link Road ES Chapter included observations that while barbastelle activity was reported as 'very low,' the data collected indicated some of the highest rates of activity for the whole Sizewell C scheme were noted at points where the proposed road would sever hedgerows. In addition, summary data for the autumn period had not been presented in the appendices, while associated figures were unclear. The combined result of this was that it was very difficult to take a view on whether the impact assessment for the Link Road was likely to be defensible. There was also a question as to whether the barbastelle population of the Main Development Site was likely to also be impacted by the road. These issues remain to be resolved.