The Sizewell C Project

6.13 Additional Ecology Baseline Survey Reports Part 2 of 2

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ADDITIONAL ECOLOGY BASELINE SURVEY REPORTS PART 2 OF 2

Documents included within this issue are as follows:

- Northern Park and Ride Survey Report 2020
- Southern Park and Ride Survey Report 2020
- Sizewell Link Road Survey Report 2020
- Fish Surveys 2020
- Invertebrate Survey Report 2020
- Reptile Survey Report 2020
- Marsh Harrier Survey Report 2020
- Barn Owl and Nightjar Survey Report 2020
- Bat Backtracking Survey Report 2020
- Bat Static Monitoring Survey Report 2020

BAT BACKTRACKING SURVEY REPORT 2020

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TABLES

PLATES

None Provided.

FIGURES

APPENDICES

None Provided.

1 SUMMARY

1.1.1 This document provides the results of the 2020 bat backtracking surveys conducted on the Sizewell C main development site in 2020. To provide context a summary of previous surveys conducted to inform the Development Consent Order (DCO) application is provided, along with a summary of the bat species valuation and mitigation provided in the Sizewell C Project Environmental Statement (ES) [**APP-242**, **APP-243**, **APP-244**, **APP-245** and **APP-246** and **APP-224**] (Ref. 1 and Ref.10) submitted as part of the DCO.

1.1 Receptor Status - Submitted Baseline Summary Overview (for DCO)

1.1.1 Bat surveys were undertaken of land associated with the proposed Sizewell C main development site by Wood Group between 2007-2012 (**Table** 1) and by Arcadis between 2013 – 2019 (**Table 2**). These surveys were utilised to inform the Environmental Impact Assessment submitted in support of the DCO application and are summarised in this section of the report, to provide the context of the surveys conducted in 2020.

1.1.2 Summaries of the data utilised to inform the DCO application is provided in **Table 1** and **Table 2**.

Table 1: Summary of Wood Group bat survey results used to inform the DCO submission

Survey	Summary of Results.
Desk-study.	Confirmed extensive use of the site and the surrounding area and landscape by bats, largely from data gathered by Suffolk Wildlife Trust (SWT).
Habitat (landscape) appraisal.	Confirmed a high-quality mosaic of habitats suitable for foraging, commuting and roosting bat species. The habitats were considered to be well established and mature, diverse in species composition and habitat type, and to offer many local roosting opportunities in farm buildings and mature woodlands/scattered trees. Also confirmed that there is generally excellent connectivity between the proposal site and the wider landscape, especially through the hedgerow network, and that the area is largely undeveloped. The main build area of the proposed main platform was confirmed to contain habitats that were likely to be of limited value for barbastelle.
Building surveys.	Buildings within the Upper Abbey Farm complex at grid reference location TM 45319 64566 were considered to be of particular note, supporting brown long-eared bats (maternity roost), at least one common pipistrelle roost, a soprano pipistrelle roost and a Natterer's bat mating roost. Barbastelle were recorded within the barn, with call patterns suggesting presence in low numbers. Based on the data collected, this is considered to be summer non-breeding roost for barbastelle (there was no evidence of barbastelle using the barn for breeding). The fire-damaged farmhouse was considered unlikely to support bats other than small non-breeding roosts. Bats found hibernating included a single barbastelle, Daubenton's bat, Natterer's bat, and probable brown long-eared bat (no more than three bats in total recorded on any one occasion).

Survey	Summary of Results.
	At least 49 Natterer's bats were recorded using the western end of Leiston Abbey in August 2011 (but with far fewer bats present earlier in the month, indicating that other roost site(s) are in use).
Bat box surveys.	A high proportion of bat boxes showed evidence of use by bats. Two larger roosts of Natterer's bat and soprano pipistrelle were identified. Bat boxes present are not of a design preferred by barbastelle, and none were recorded using the boxes.
Tree surveys.	Over 500 trees were identified as having medium or higher potential for roosting bats. The areas with the highest numbers were: Fiscal Policy woodland (126); Ash Wood (74); the track along the northern edge of Kenton Hills (57); Goose Hill (51); and woodland at The Grove (37). Not all trees were considered suitable for all species and/or all roost types. Only limited emergence surveys were undertaken, during which the maximum number of barbastelle counted at any one time (including juveniles) was 31 individuals. Eleven trees were identified at Aldhurst Farm with limited potential to support roosting bats, along with four buildings considered to contain features of limited roost potential.
Transect surveys and automated detector surveys.	Activity recorded within open areas (on automated detectors) was low. The highest levels of activity were recorded at commuting/foraging areas close to Ash Wood, Upper Abbey Farm bridleway, Goose Hill, the perimeter track around Kenton Hills and Nursery Covert, Fiscal Policy woodland, and Leiston Old Abbey. The large majority of automated detectors recorded barbastelle activity, indicating that barbastelle are widespread and use almost all the habitats within the site and surrounding area (including Aldhurst Farm), although not to the same extent.
Radio-tracking surveys.	Barbastelle, Natterer's bat, and brown long-eared bat (breeding females only of Natterer's bat and brown long-eared bat) were radio-tracked in 2010 and 2011 (pre- and post-breeding). Attempts to catch and tag Nathusius' pipistrelle and Daubenton's bat (to locate roosts) were

Survey	Summary of Results.
	unsuccessful. Nine serotine bats were trapped but not tracked, as they were not covered by the licence. A total of 22 barbastelle roosts were identified through radio-tracking; all roosts used by females and juveniles were located within trees, while two males were recorded roosting in buildings. The results of the radio-tracking showed a close reliance on the EDF Energy Estate during these periods of time.
Upper Abbey Farm building inspections.	Six bats were found to be using Upper Abbey Farmhouse as an autumn/winter roost – two Natterer's bat (January, 2013), one probable Daubenton's bat (October 2012), one confirmed Daubenton's bat (November 2012), one probable brown long-eared bat (January 2013) and one bat of undetermined species (December 2012). All individuals were found within the farmhouse cellar which was considered to offer several potential roost sites and suitable conditions for roosting bats. The farmhouse more generally was considered to have the potential to support roosting bats with small numbers of bat droppings found throughout the property and, in one location, feeding remains[1]. A single outbuilding to the east of the farmhouse was considered to have some potential, primarily as a hibernation or feeding perch, although no evidence of recent use was identified.

[1] Note. extensive renovations have been undertaken at Upper Abbey Farmhouse since this survey work.

Table 2: Summary of Arcadis survey results between 2013 and 2019 to inform the DCO

Survey	Summary of Results.
Activity transect surveys.	Between six and seven bat species were recorded during activity transect surveys in 2014 and 2015. Common pipistrelle was the most frequently recorded species across all activity transects, followed by soprano pipistrelle. On the temporary accommodation campus transect route and green rail route transect route 3 (green rail route transect route 3), barbastelle was the third most frequently recorded species, but was absent from the Pillbox Field and Coronation Wood transects. On both the temporary accommodation campus transect route and green rail route transect route 3, activity peaked in May 2014, with noticeably lower activity levels in July 2014 (on the temporary accommodation campus transect, considered in part to be due to adverse weather conditions) and October 2014. Surveys of Pillbox Field and Coronation Wood were undertaken in September and October 2015 only, with activity in September 2015 found to be significantly higher. A single pass was recorded shortly after sunset at Upper Abbey Farm, where soprano pipistrelle have previously been recorded roosting. Early passes were recorded in the vicinity of the temporary accommodation campus transect route and along the green rail route transect route 3 (more so from common than soprano pipistrelle). During 2019 surveys of the sand pits at least five species were recorded. Common pipistrelle was the most frequently recorded species. While activity levels were higher in September 2019 than October 2019 activity levels remained low compared to activity transect results gathered elsewhere on the EDF Energy Estate in previous years.
Automated detector surveys.	Barbastelle activity was recorded at all monitoring stations across and out with the site and in both years (2013 and 2014) (though not in every location during every monitoring event). Mean activity for barbastelle and Nathusius' pipistrelle activity was greatest in June (the largely pre-lactation maternity period), while mean activity for Myotis spp. was lowest during this period. Mean activity for "big bats" was highest in July and lowest in September/October. However, the

Survey	Summary of Results.
	highly-skewed nature of the data required detailed analyses to detect patterns obscured by the raw means, with activity often differing between seasons/years in different locations. The data recorded indicated the likely absence of serotine and Leisler's bat roosts from the ZOI. The data also indicated the potential presence of barbastelle roosts within Goose Hill and in the vicinity of Broom Covert, and of noctule roosts near woodland at The Grove, eastern Goose Hill, and Leiston Old Abbey woodland. *Myotis* spp. roosts were indicated by the activity patterns, consistent with the locations of known roosts in woodland at The Grove, Leiston Abbey and Kenton Hills bat boxes.
Radio-tracking surveys.	Twenty-seven barbastelle were caught during the radio-tracking surveys, of which none were already ringed, and 18 were tagged for radio-tracking (three adult males, 12 breeding females and three non-breeding females). In addition, a single non-breeding female serotine was caught and tagged. Soprano pipistrelle, common pipistrelle, Daubenton's bat, Natterer's bat and noctule were also caught but not tagged. In total, 285 bats were trapped in 2014. Tracking confirmed that Minsmere (to the north of the site) supported breeding barbastelle, providing both roosting and foraging habitat, and that there was interchange of bats between Minsmere and the EDF Energy Estate. Tagged barbastelle were recorded moving between the two areas on several occasions throughout the 2014 radio-tracking survey. Of the seven female barbastelle trapped in Minsmere, four were confirmed to be active within the EDF Energy Estate, whilst of the seven females trapped within the EDF Energy Estate, at least six were confirmed to be active within Minsmere. All three of the male barbastelle trapped within the EDF Energy Estate were recorded within Minsmere (no adult males were caught within Minsmere). One tagged female was recorded roosting in both locations. A wider foraging area was thus identified in 2014 than in 2011, with greater levels of foraging over Minsmere and the Eastbridge area recorded.

Survey	Summary of Results.
	The areas within the identified home ranges of the tagged bats (as defined by 95% Minimum Convex Polygon analysis[2]) reached beyond Westleton to the north, beyond Middleton to the west, east to the coast and south to the south-east of Leiston. A further fifteen barbastelle roosts were identified, nine confirmed to be within trees. Roosts were located in both the EDF Energy Estate and Minsmere, with an additional three roosts located outside of these areas, at Saxmundham and Reckford Bridge/Eastbridge Marshes. None of the previously identified roosts were used again by tagged bats. The preference for oak (*Quercus* spp.) trees, and for roosting behind raised/loose bark, was consistent with previous years. However, the tree used most frequently, and by the highest number of tagged bats, was a dead Scot's Pine (*Pinus sylvestris*). The tagged serotine roosted for the duration of the radio-tracking surveys within the grounds of Theberton Farm (where access for the surveyors was not permitted), and was recorded foraging widely into the Royal Society for the Protection of Birds (RSPB) Minsmere Reserve, Minsmere Levels and around Goose Hill, woodland at The Grove, and Ash Wood, with further 'fixes' recording movement along the coastal edge.
Building inspection surveys.	Three building complexes were identified as possessing multiple features ranging from low to high potential to support bats (Ash Wood Cottages, Lower Abbey Farm and Upper Abbey Farm). Two buildings were identified as possessing features of low potential to support bats (Plantation Cottage and the Laboratory off Lovers Lane). A single building with no potential to support bats was identified (Walk Barn).

[2] The Minimum Convex Polygon enables the creation of a boundary around all fixes using the smallest possible convex polygon. This is a commonly used method but may overestimate the size of home ranges. (**Error! Reference source not found.**, **Annex 14A8.6** [APP-245].

Survey	Summary of Results.
	Six of the 12 buildings identified for assessment were not evaluated in 2015 due to a lack of access permission[3]. Surveys in 2019 reassessed Ash Wood Cottages (confirmed as a brown long-eared bat roost), Lower Abbey Farm (four structures with negligible suitability, three structures with none/low suitability, three structures with low suitability, two structures with moderate suitability, one structure with high suitability and one structure confirmed as a brown long-eared bat roost) and Upper Abbey Farm (one structure with no suitability, one structure with negligible suitability, one structure with no/low suitability, two structures with low suitability, three structures with high suitability and three structures confirmed as brown long-eared bat roosts).
Tree assessment surveys[4].	Tree surveys were undertaken in areas not previously assessed by Wood Group. A single tree, located within a wooded strip between Black Walks and Ash Wood, was identified as a confirmed roost, due to the presence of a small number of likely bat droppings at the base of the identified bat roost feature. Nineteen trees within the surveyed area were identified as having high or very high bat roost potential. Twenty-two trees were identified as having medium potential, including a group of trees to the south-west of the Round House which were considered to have features suitable for bats, but which, due to access restrictions, could not be fully assessed.
Corridor activity surveys.	West to east commuting was recorded at the crossroads of Fiscal Policy and Kenton Hills by common pipistrelle, soprano pipistrelle, “big bat” spp., and *Myotis* spp. with activity diminishing the further east into Kenton Hills surveyors were positioned, likely due to the dispersal of bats into the wider woodland.

[3] The Round House, Potters Farm, Birchwood Farm, Old Abbey Farm, Leiston Old Abbey Farm, World War II Bunkers. See Figures 14A8.6, Figure 14A8.7 and Figure 14A8.8 [APP-247] for locations.

[4] High level tree assessments were additionally undertaken of land to the east of Eastbridge Road during Phase 1 surveys. This area now falls outside the main development site boundary and therefore the results of this survey work are not included here.

Survey	Summary of Results.
	To the north, on the Upper Abbey Farm bridleway, commuting was recorded primarily by common and soprano pipistrelles with some *Myotis* spp. and some potentially commuting barbastelle. Commuting bats were primarily observed flying north to south along the bridleway. Overall, activity (including foraging) was notably lower at the northern end of the bridleway[5]. Several commuting barbastelle passes were recorded between 40 minutes and 1 hour after sunset at (grid reference TM 45319 64566) (which is a more open location within Goodrum's Fen) and commuting at Stonewall Belt primarily occurred on the more sheltered eastern side. Elsewhere, clear evidence of commuting (rather than foraging) was limited. Foraging activity from the bat assemblage known to be present on the site was recorded, to varying degrees, at all locations surveyed during corridor activity surveys.
Building emergence/re-entry surveys.	A maximum of 32 bats were recorded emerging from seven different emergence points at Ash Wood Cottages (June 2019), while between four and eight individuals emerged in May 2019. No bats were confirmed to have re-entered during the July 2019 survey, but it was considered likely, due to the degree of activity around known entrance points, that a proportion of the activity observed reflected re-entering bats. Although no echolocation calls were heard the presence of brown long-eared bats within the building during internal inspections means it is considered that this activity is likely to represent brown long-eared bats. At Lower Abbey Farm bats were observed emerging/re-entering from Building 1 (one confirmed re-entry and one possible re-entry in June 2019 (species unknown due to lack of echolocation calls) and one possible emergence from a common pipistrelle in July 2019), Building 2 (two confirmed re-entries and two likely re-entries in June 2019 (species unknown due to lack of echolocation calls)), Building 6 (one confirmed and one possible emergence in June 2019 (species unknown due to lack of echolocation calls)), Building 8 (one common pipistrelle re-entry

[5] Corresponding with the static detector results identified at this location (see **Error! Reference source not found.**).

Survey	Summary of Results.
	in June 2019 and one common pipistrelle emergence in July 2019) and Building 11 (between 12 and 14 emergences in April 2019, three confirmed re-entries and the possibility of a number of others based on activity levels in June 2019 and 17 emergences and four possible emergence in July 2019). None of these bats were heard echolocating and as such species could not be confirmed although brown long-eared bat dropping were found during internal inspection at Lower Abbey Farm). In addition, it was considered possible that small numbers of bats may have emerged from Buildings 7 and 10 although this could not be confirmed. At Upper Abbey Farm bats were observed emerging/re-entering from Building 1 (three common pipistrelle and one soprano pipistrelle emerged in May 2019, two common pipistrelle, one common or soprano pipistrelle and two unidentified bat re-entered in June 2019 and one common pipistrelle, one soprano pipistrelle and one unidentified bat emerged in July 2019), Building 5 (two identified bats re-entered in July 2019), Building 10 (one brown long-eared bat and one unidentified bat re-entered in June 2019) and Building 11 (two common pipistrelle were confirmed emerging in June 2019 along with a possible emergence of a soprano pipistrelle, two common pipistrelle and one identified bat re-entered in July 2019). The three low suitability and one confirmed roost building at Sizewell B relocated facilities proposed works were subject to between one and three emergence/re-entry surveys. No emergence was identified from the Temporary Visitor Centre or Technical Training Centre. One emergence (in July 2019) and one re-entry (in August 2019) of bats of an unknown species were recorded for the Operation Training Centre. During surveys at the Civil Workshop seven emergences (common pipistrelle, soprano pipistrelle and unknown bat species) were recorded in July 2019, two common pipistrelle re-entries were recorded in August 2019 and three soprano pipistrelle and six bats of unknown species were recorded emerging in September 2019.

1.2 Species Status 2020 Summary Overview – Bat Backtracking Surveys

1.2.1 Back-tracking surveys comprise visual observations of bat activity commuting away from their roosts at sunset or commuting back to their roosts at sunrise then attempting to track back to the roost based on these observations.

1.2.2 Bat backtracking surveys were undertaken of land associated with the proposed Sizewell C main development site by Arcadis in 2020. The surveys confirmed the continued presence of bats roosting within trees within the proposed development site along with foraging and commuting routes.

1.2.3 The 2020 backtracking surveys reported within this document were conducted alongside static detector surveys and tree inspections for bats. Conclusions on the usage of the site will be drawn using all available data from these surveys. The conclusions drawn within this report will be finalised once the analysis of the data from the other surveys is completed, and a combined assessment will be provided in a separate document.

1.2.4 Fiscal Policy was found to be supporting a brown long-eared maternity roost within a bat box and several potential pipistrelle roosts. One likely pipistrelle roost was located in the vicinity of the mast to the south of Fiscal Policy woodland. These were located within the areas of the woodland which are proposed to be retained.

1.2.5 In addition, bats were observed commuting away from Fiscal Policy to the east. Subsequent surveys identified that a number of bats appeared to be commuting from within Kenton Hills, including from a number of bat boxes in this area, to and from Fiscal Policy (to be retained).

1.2.6 Within the backtracking surveys at Goose Hill, no confirmed roosts within the trees proposed to be removed were identified. On 03/09/2020 one pipistrelle roost was considered likely to be located within the southern section of this woodland around TM 47014 64624, identified through bat behaviour, but the exact location of this roost was not identified. However, several Natterer's maternity roosts, and pipistrelle roosts were found within bat boxes to the south of Goose Hill, these were in locations where the trees are proposed to be retained.

1.2.7 During the surveys at Goose Hill, bats were observed commuting along tracks through the woodland. Surveys were modified to identify if these bats were roosting within Goose Hill. The barbastelles identified appeared to originate to the south. No evidence was recorded to indicate the presence

of a barbastelle roost within Goose Hill. Kenton Hills is thought to be the most likely location of the barbastelle maternity colony and this area is to be retained. There are a number of old mature English oak trees along the northern boundary (adjacent to the location of the proposed access road/railway) which appear to be suitable for roosts (from ground checks).

1.2.8 During a survey at the north of Goose Hill, a single pipistrelle roost was identified in Walk barns located along the northern edge of the woodland, to be retained.

1.2.9 A commuting route for pipistrelle species and barbastelle was identified along the northern edge of Fiscal Policy along the access track. Foraging was also noted along the access track and within the neighbouring arable fields.

1.2.10 Barbastelle foraging and commuting was recorded within Goose Hill/ Fiscal Policy and along the forest tracks. A commuting through Goose Hill from the north to south along the forestry track was identified, and was utilised by barbastelle.

1.2.11 However, whilst barbastelle were observed, no roosts were identified or confirmed as present during the 2020 surveys. All of the findings are shown on Figure 4.

1.2.12 The roosts/roost locations identified (containing Natterer's, brown long-eared, common pipistrelle and soprano pipistrelle bats) do not represent an exhaustive list of the roosts present. There are a large number of potential roost features throughout the woodlands surveyed. Notably, no serotine, noctule or barbastelle roosts were found.

1.2.13 Despite the large number of trees proposed for removal in Goose Hill, this woodland has been identified as offering minimal roost resource. The 2020 bat tree inspections found that a low proportion of the trees offered any suitability to support roosting bats and the findings of the backtracking surveys support this. The backtracking identified that the most likely location of the roosting barbastelle observed commuting through the woodland is within Kenton Hills or to the north of the woodland towards Minsmere.

1.2.14 The results of the 2020 bat backtracking survey support the DCO assessment based on the previous baseline survey data submitted in the Sizewell C Project ES (Ref 1). The proposed mitigation submitted for the Sizewell C Main Development Site DCO in the Bat Method Statement [**APP-252**] (Ref. 2) and Bat Mitigation Strategy [**APP-252**] (Ref. 3) and the residual effects would remain the same as that submitted in the Sizewell C Project ES [**APP-224**] (Ref. 10). The findings of these surveys will be used

to detail the mitigation required, inform licenses and to provide an updated baseline for future monitoring.

2 OVERVIEW

2.1 The Aims of the 2020 Survey Updates

2.1.1 The aims of the 2020 bat survey update were 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.

2.2 Site Description

2.2.1 The main development site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston and within the administrative boundary of East Suffolk Council (ESC). Once constructed, the Sizewell C nuclear power station would be located directly to the north of the existing Sizewell Power Station complex.

2.2.2 The site encompasses a number of wooded areas, including Goose Hill, areas along the north of Kenton Hills and Fiscal Policy, which are a combination of broadleaved woodland and coniferous plantation. In addition, there is a large area of intersecting drains to the south of these wooded areas.

2.3 Submitted Baseline

2.3.1 This section of the report provides a summary of the baseline status of the bats within the main development site as presented within the DCO application. The full results of the surveys to date can be found in the Volume 2, Chapter 14 of the Sizewell C Project ES [**APP-224**] (Ref. 10), the Bat Method Statement [**APP-252**] (Ref. 2) and Bat Mitigation Strategy [**APP-252**] (Ref. 3).

2.3.2 At least ten species of bat have been recorded within the EDF Energy estate boundary: barbastelle (*Barbastella barbastellus*); serotine (*Eptesicus serotinus*); Daubenton's bat (*Myotis daubentonii*); Natterer's bat (*Myotis nattereri*); Leisler's bat (*Nyctalus leisleri*); noctule (*Nyctalus noctula*); Nathusius' pipistrelle (*Pipistrellus nathusii*); common pipistrelle (*Pipistrellus*

pipistrellus); soprano pipistrelle (*Pipistrellus pygmaeus*); and brown long-eared bat (*Plecotus auritus*).

2.3.3 The EDF Energy estate supports: maternity colonies of barbastelle, Natterer's bat, brown long-eared bat, and soprano pipistrelle; non-breeding roosts of the breeding species and also noctule and common pipistrelle; and hibernation roosts for the majority of these species. The main development site boundary and ZoI consists of a mosaic of habitats suitable for commuting and foraging bats.

2.3.4 A number of roosts have been identified at:

- Upper Abbey Farm, including a brown long-eared bat maternity roost, a Natterer's bat mating roost, hibernating barbastelle, Daubenton's bat, Natterer's bat and probable brown long-eared bat, as well as occasional common pipistrelle, soprano pipistrelle and barbastelle roosts (to be retained).
- Brown long-eared bat roosts have also been identified at Ash Wood Cottages (to be retained).
- Brown long-eared bat roosts have also been identified at Lower Abbey Farm, with occasional roosting by common pipistrelle also identified (to be retained).
- A high proportion of bat boxes installed in Kenton Hills have shown signs of use by bats, including Natterer's bat, noctule and soprano pipistrelle roosts (to be retained).
- A Natterer's bat roost is present within Leiston Old Abbey, immediately adjacent to the site boundary (to be retained).
- Additional bat roost potential has been identified within Lower Abbey Farm, Plantation Cottage, and the Laboratory, off Lover's Lane.
- Activity suggests serotine and Leisler's bat are unlikely to be roosting within the site.
- Potential roosts have been noted but not identified for barbastelle in Goose Hill and Broom Covert.
- Potential roosts have been noted but not identified for noctule in The Grove, the eastern end of Goose Hill and Leiston Old Abbey.

- There is potential roosting for Myotis spp. at The Grove, Leiston Abbey and within bat boxes in Kenton Hills.

2.3.5 Several locations on and close to the main development site boundary have a large number of trees with roosting potential for bats, including Fiscal Policy woodland, Ash Wood (to be retained), the northern edge of Kenton Hills (to be retained), Goose Hill (large number of trees to be removed), and The Grove (to be retained). In addition, Minsmere and Ash Wood are considered to be key roost areas for barbastelle due to the high number of potential tree roosts present, as well as the presence of a number of identified roosts. These areas will be retained.

2.3.6 Not all trees with roosting potential were fully surveyed for bats during baseline surveys. Tree roost potential assessments were conducted on trees likely to be impacted by the works to inform the potential for impacts upon bats roosting within trees. Within this assessment groups of trees are treated collectively as a 'roost resource', with the potential impacts informed by the known roosts and the number of roosting features present within each woodland informing the baseline assessment.

2.3.7 West-east commuting at the crossroads of Fiscal Policy and Kenton Hills has been noted for common pipistrelle, soprano pipistrelle, "big bat" spp. and Myotis spp. and north-south commuting on the Upper Abbey Farm bridleway (bridleway 19) for common pipistrelle, soprano pipistrelle, Myotis spp., and potentially barbastelle. Barbastelle commuting has been noted with individuals commuting north to south (in the direction of Sizewell Marshes SSSI and Grimsey's and to the north (towards Goose Hill).

2.3.8 Activity surveys found barbastelle to be widespread and the species has been recorded within almost all habitats present within the main development site boundary, while common and soprano pipistrelle were the most frequently recorded species. Activity levels in open areas were low while higher levels of activity were recorded at Goose Hill, Upper Abbey Farm bridleway, Leiston Old Abbey woodland, Ash Wood, Nursery Covert, Fiscal Policy woodland and the northern edge of Kenton Hills.

2.3.9 Radio-tracking surveys have identified an interchange of bats between Minsmere and the EDF Energy estate as well as the use of the EDF Energy estate by bats throughout the bat active season.

2.3.10 All bat species in the UK are protected under Schedule 5 of the W&CA (Ref 4) and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 5). Five species (barbastelle, brown long-eared, lesser horseshoe, noctule and soprano pipistrelle bat) are listed as priority species on the Suffolk BAP (Ref 6); these and two species not normally present in Suffolk

(greater horseshoe and Bechstein's bat) are priority species in England under Section 41 of the NERC Act (Ref 7).

a) Ecological Receptor Status

2.3.11 **Table 3** provides a summary of the value of the receptors present within the main development site boundary as assessed in the Sizewell C Project ES [**APP-242**, **APP-243**, **APP-244**, **APP-245** and **APP-246** and **APP-224**] (Ref. 1 and Ref. 10).

Table 3: Summary of the importance of ecological receptors as assessed in the Main Development Site Environmental Statement

Species	Importance under CIEEM guidelines (Ref 8)	Importance under EIA-specific methodology
Barbastelle	National	High
Natterer's	County	Medium
Leisler's bat and Nathusius' pipistrelle	Local (District)	Low
Noctule and serotine	Local (Zol)	Low
Daubenton's bat, brown long-eared bat, common pipistrelle, and soprano pipistrelle	Local (Zol)	Low

2.4 2020 surveys

2.4.1 This report is one of three bat survey reports, detailing surveys undertaken at the proposed main development site during 2020. These reports are as follows:

- Bat tree assessment surveys (Arcadis 2020).
- Bat backtracking surveys.
- Bat static surveys (Arcadis 2020).

2.4.2 Woodland blocks to be affected by the works were subject to backtracking surveys in 2020 to identify key locations within the main development site boundary where bat roosts are present.

3 METHODS

3.1 Survey Methodology

3.1.1 The following section from the Bat Survey Guidelines (Collins 2016) outline the purpose and methodology of backtracking surveys.

3.1.2 "*Back-tracking surveys involve ecologists making visual observations of bats commuting away from their roosts at sunset or commuting back to their roosts at sunrise then attempting to track back to the roost based on these observations. Bat detectors are also used to record echolocation for identification of species, where possible. This technique was first developed in the Netherlands and is based on 4 principles:*

- *The earlier a bat is seen after sunset or the later it is seen before sunrise, the closer it is likely to be to its roost (the exact time depends upon the species).*
- *Bats fly away from the roost at sunset, so ecologists should move in the opposite direction as the bats at this time to locate the roost.*
- *Bats fly towards their roost at sunrise, so ecologists should move in the same direction as the bats at this time to locate the roost.*
- *At sunrise, some bats species swarm at roost access points for between 10 and 90 minutes before entering.*

3.1.3 The aim is to find roosts by making observations of commuting bats. These surveys are often used after a bat activity survey if numbers of bats were seen all commuting in one direction and follow-up is required or in situations with lots of potential roosts sites that are difficult to survey using alternative methods (e.g. in woodlands or highly urbanised areas)."

3.1.4 Backtracking surveys on Fiscal Policy and Goose Hill woodlands were conducted on four occasions, at both dusk and dawn in June, July, August and September. The dusk surveys started approximately 30 mins before sunset and ended approximately 2 hours after, the dawn surveys 2 hours before sunrise and ended when bat activity ceased, usually within 15 minutes after sunrise.

3.1.5 The purpose of these surveys was to identify the likelihood of bats roosting within these woodlands and if possible, identify the location of the roosts. **Table 4** below provides the dates that woodland backtracking was conducted.

3.1.6 The surveyors were positioned within open areas of the woodland and around the woodland to enable them to clearly view bat activity. Bats were then tracked along their flight path to locate indicative roosting locations. The data recorded on each survey was used to inform the surveyor positions for the subsequent surveys.

3.1.7 For example, in Fiscal Policy, during the initial surveys bats were seen commuting to and from the woodlands to the east (Kenton Hills). As a result, subsequent surveys were modified to position surveyors to the east of the Fiscal Policy woodland along the edge of Kenton Hills. This allowed an assessment of the likely locations of roosts to be made. During the initial surveys at Goose Hill, it was noted that bats were commuting to and from the north of the woodland. Subsequently surveyors were positioned to the north of the woodland.

Table 4: Dates of Woodland Backtracking

Survey Date	Woodland	Surveyors/Credentials	Sunset	Sunrise	Dusk Temp. ºC	Dawn Temp. ºC
Dusk 22/06/2020 Dawn 23/06/2020	Fiscal Policy	Duncan Sweeting Bat survey license number 2015-16145-CLS-CLS Henry Gunning, ACIEEM James Rowlands Nick Downs, MCIEEM, CEnv Bat survey license number 2015-11591-CLS-CLS	21:18	04:32	17	14
Dusk 23/06/2020 Dawn 24/06/2020	Goose Hill	Duncan Sweeting Bat survey license number 2015-16145-CLS-CLS Henry Gunning, ACIEEM James Rowlands Nick Downs, MCIEEM, CEnv Bat survey license number 2015-11591-CLS-CLS	21:18	04:33	19	14
Dusk 14/07/2020 Dawn 15/07/2020	Goose Hill	Duncan Sweeting Bat survey license number 2015-16145-CLS-CLS Ana Pino-Blanco Marielle James, MCIEEM 2019-39454-CLS-CLS Nick Downs, MCIEEM, CEnv Bat survey license number 2015-11591-CLS-CLS	21:08	04:50	14	11
Dusk	Fiscal Policy	Duncan Sweeting	21:07	04:52	15	14

Survey Date	Woodland	Surveyors/Credentials	Sunset	Sunrise	Dusk Temp. ºC	Dawn Temp. ºC
15/07/2020 Dawn 16/07/2020		Bat survey license number 2015-16145-CLS-CLS James Rowlands Marielle James, MCIEEM 2019-39454-CLS-CLS Nick Downs, MCIEEM, CEnv Bat survey license number 2015-11591-CLS-CLS				
Dusk 03/08/2020 Dawn 04/08/2020	Fiscal Policy	Duncan Sweeting Bat survey license number 2015-16145-CLS-CLS James Rowlands Marielle James, MCIEEM 2019-39454-CLS-CLS Nick Downs, MCIEEM, CEnv Bat survey license number 2015-11591-CLS-CLS	20:40	05:19	15	9
Dusk 05/08/2020 Dawn 06/08/2020	Goose Hill	Ana Pino-Blanco Duncan Sweeting Bat survey license number 2015-16145-CLS-CLS Marielle James, MCIEEM 2019-39454-CLS-CLS Nick Downs, MCIEEM, CEnv Bat survey license number 2015-11591-CLS-CLS	20:36	05:22	17	17
Dusk 01/09/2020 Dawn 02/09/2020	Fiscal Policy	Duncan Sweeting Bat survey license number 2015-16145-CLS-CLS James Rowlands Marielle James, MCIEEM 2019-39454-CLS-CLS Nick Downs, MCIEEM, CEnv Bat survey license number 2015-11591-CLS-CLS	19:40	06:07	14	6

Survey Date	Woodland	Surveyors/Credentials	Sunset	Sunrise	Dusk Temp. ºC	Dawn Temp. ºC
Dusk 02/09/2020 Dawn 03/09/2020	Goose Hill	Duncan Sweeting Bat survey license number 2015-16145-CLS-CLS Alister Fothergill GradCIEEM Nick Downs, MCIEEM, CEnv Bat survey license number 2015-11591-CLS-CLS Marielle James, MCIEEM 2019-39454-CLS-CLS	19:37	06:08	15	14

3.1.8 During the surveys, it was noted that bats appeared to be commuting to and from bat boxes known to be present around the wider Sizewell Estate. In order to identify if these features may be the source of the bats record during the surveys, these were examined by appropriately licensed surveyors. Following the August Survey at Goose Hill, bat boxes located within Kenton Hills were inspected by licensed ecologists (Nick Downs (MCIEEM, C): 2015-11591-CLS-CLS and Duncan Sweeting: 2015-16145-CLS-CLS). The presence of bats or signs of bat presence (i.e. bat droppings, odour and/ or staining) were recorded. The results of these inspections are also reported within this document.

3.2 Data Analysis Methodology

3.2.1 Following the surveys, the recordings from the Elekon Bat loggers were analysed within the Elekon propriety software (Bat Explorer). All outputs from Bat Explorer were manually reviewed and verified. The data from this analysis is utilised within the results tables assessing the bat assemblage data.

3.2.2 These analysed data were assessed alongside the manual 'in-the-field' notes from the surveyors, which contained visual observations to provide a more qualitative assessment of the data. This was used to infer information such as where bats are likely to be roosting, where foraging areas are, and where it is likely that bats are commuting.

3.2.3 Prior to mapping, the analysed Batlogger data was reviewed, and where a number of passes were likely attributable to a single foraging bat (from reviewing the field data), this was reduced to a single point for the mapping, to allow analysis of the findings of the data.

3.3 Survey Limitations

3.3.1 Within woodlands, due to their nature, it is difficult to observe bats returning to roosts and this is a constraint of finding roosts in trees. Therefore, where necessary, observations of activity (such as swooping behaviour indicative of a return to a roost) and recordings of activity early after sunset and early before dawn are recorded. This is used to determine the likelihood of roosts.

3.4 Analysis Limitations

3.4.1 For some of the bat passes, it was possible to determine the broad group (i.e. “big bat” (Leisler’s, serotine and noctule) or myotis), but not possible to definitively determine the species. Where this is the case, the broad group was utilised within the analysis and mapping. This is not a significant constraint as the differentiation of these calls is unlikely to impact upon the identification of roosts or the species / woodland valuation.

4 RESULTS

4.1.1 This section of the report outlines the results of the woodland backtracking surveys conducted at the Goose Hill and Fiscal Policy woodlands during 2020.

4.2 Woodland Descriptions

4.2.1 Goose Hill woodland is predominantly mature Black Pine (*Pinus nigra*) plantation, A sparse understorey predominantly comprising Bracken (*Pteridium aquilinum*) and Bramble (*Rubus fruiticosus* agg.), with some Elder (*Sambucus nigra*). Small areas of additional planting include Sweet Chestnut (*Castanea sativa*), English Oak (*Quercus robur*), Hazel (*Corylus avellana*), and Hornbeam (*Carpinus betulus*). Small areas of natural vegetation include English Elm (*Ulmus minor*), Blackthorn (*Prunus spinosa*), Silver Birch (*Betula pendula*), Sycamore (*Acer pseudoplatanus*), Alder (*Alnus glutinosa*) and Rowan (*Sorbus aucuparia*). This woodland is publically accessible. The bat species recorded within this woodland were Common pipistrelle, barbastelle, brown long-eared, soprano pipistrelle, Natterer's, serotine, Nathusius' pipistrelle, noctule and possibly another Myotis species.

4.2.2 Fiscal Policy woodland is predominantly semi-natural woodland (English Oak (*Quercus robur*), Sycamore (*Acer pseudoplatanus*) and English Elm (*Ulmus minor*)) with a reasonably developed understorey including Common Hawthorn (*Crataegus monogyna*) and Hazel (*Corylus avellana*). This woodland is also publicallly access. The bat species recorded within this woodland were Common pipistrelle, barbastelle, brown long-eared, soprano pipistrelle, Natterer's, serotine, Nathusius' pipistrelle, noctule and Myotis species.

4.2.3 **Table 6** and **Table 7** below, present the results of each of the four occasions that woodland backtracking was conducted. A map of the locations of surveyors and the approximate routes taken is presented in **Figure 1** (Fiscal Policy) and **Figure 2** (Goose Hill). **Figure 4** illustrates the foraging and commuting areas identified during the surveys.

Table 5: Results of the Goose Hill woodland backtracking surveys conducted

Survey Date (Dusk and Dawn)	Bat Roost Confirmed?	Potential Bat Roost Identified?	Bat Foraging Areas Identified?	Bat Commuting Routes Identified
23 - 24 /06/2020	No	No	Notable levels of barbastelle foraging around approx. location TM 46455 64502 (crossroads between Hilltop Covert and Goose Hill).	No
14 - 15 /07/2020	Walk Barn (TM 46630 65079) – two pipistrelle spp.	No	No	No
05 – 06 /08/2020	No	Single soprano pip roost approx. location TM 46078 64392. Bat repeatedly observed flying around a small area of trees at dawn, tracked back to a location along the north of Kenton Hills. Surveyors Did not see it enter roost. Similarly, two brown long-eared bats were recorded flying around a small area of trees at dawn (TM 46415 64569, an area in the south of goose hill proposed to be retained within the development) – but again, did not see bats enter roost.	No	Surveyors deployed in a line along the NW edge of Nursery Covert to the North edge of Turf Pits. Barbastelles were first recorded at dusk flying from the SW (Kenton Hills direction), and they flew the opposite direction back at dawn.
02 – 03 09/2020	No	At dawn, a single common pipistrelle repeatedly flew around a small group of trees (TM 47014 64624) – but we did not see it return to roost (must be within 50m of location).	No	Surveyors deployed in a line along the South/SW edge of Goose Hill. The eastern most surveyor recorded a barbastelle, but no other surveyors did.

Table 6: Results of the Fiscal Policy woodland backtracking surveys conducted

Date (Dusk and Dawn)	Confirmed Roosts Identified	Potential Roosts Identified	Foraging Areas Identified	Commuting Routes Identified
22 – 23 /06/2020	No	Common pipistrelle maternity roost very likely to be present within the 'Old Abbey' building complex (observed from a distance as did not have land access, hence did not see any bats leave or re-enter roost).	Common pipistrelles foraging along the track between Fiscal Policy and Upper Abbey Farm.	Common pipistrelle commuting line along the northern edge of Fiscal Policy/Leiston Carr.
15 – 16 /07/2020	TM 45626 63950. Bat box '2' (Leiston Carr) checked after dawn survey, contained at least 10 brown long-eared bats, including at least one baby.	A single swarming pipistrelle at dawn, around a group of mature pines near the mast. It is thought likely one of these trees is a roost, although the bat was not seen entering.	A serotine repeatedly foraged within the field along the northern boundary of Fiscal Policy (location of new access road).	No
03 – 04 /08/2020	No	Two soprano pipistrelles were recorded circling around a group of trees near the mast (field side) very early at dusk, and very late at dawn. Not seen leaving/entering roost, but it must be close.	No	No
01 – 02 /09/2020	No	Two bats were seen near the Leiston Carr bat box (TM 45626 63950) early in the dusk survey. They were flying around a distinct group of trees (probable roost location) – likely to be pipistrelle but not heard on detector.	A foraging barbastelle was recorded (and seen) within the sugar beet field east of the mast for a significant percentage of the dusk survey (was still present when we finished).	No

4.2.4 The following bat boxes were checked following the dawn back tracking survey carried out on 6th August 2020 at Kenton Hills, following the observations of bats flying towards this area (**Table 8**). The inspections were undertaken by a licensed surveyor (Nick Downs: 2015-11591-CLS-CLS): The locations of the bat boxes are illustrated on **Figure 4**.

Table 7: Bat box check Results

Grid Reference	Bat Box Number	Findings
TM 46250 64069	17	Empty
	18	Currently in use by birds
	19	Empty
TM 46200 64124	21	Small amount of pipistrelle droppings present (approx. 5g) – likely soprano
	20A	Moderate amount of pipistrelle droppings present (approx. 15g) – likely soprano
	20B	Bird droppings
TM 46106 64286	31	Birds Nest
TM 46083 64306	32	1x Natterer's bat (adult female)
TM 46060 64349	37	Bird droppings (also typical Natterer's bat smell)
TM 46128 64269	33	1 x male common pipistrelle
	24	6 x fresh pipistrelle droppings
	35	Empty
TM 46208 64137	22	30-40 Natterer's bats
	23	30-40 Natterer's bats
	24	Approx. 3 cm deep layer of old bat droppings
TM 46146 64216	28	Approx. 10 Natterer's bats. Not bats previously disturbed, as all semi-torpid
TM 46055 64347	One bat box	Empty
TM 46079 64315	Two bat boxes	Empty
TM 46108 64275	One bat box	Empty
TM 46122 64258	Three bat boxes	Empty
TM 46155 64220	One bat box	One dead Natterer's bat inside, plus approx. 13mm deep layer of droppings
TM 46132 64150	Two bat boxes	One empty, one containing 2 adult soprano pipistrelles (a male and a female)

Grid Reference	Bat Box Number	Findings
TM 46202 64133	Three bat boxes	Two empty, one containing approx. 50 Natterer's bats (SE facing)
TM 46213 64114	Three bat boxes	Two empty, one containing 1 adult male common pipistrelle

5 DISCUSSION

5.1.1 The 2020 survey results for bat backtracking surveys confirmed the continued presence of trees supporting roosting bats within and adjacent to the main development site.

5.1.2 Tree roosts are highly transitional (a strategy thought to be used by bats to reduce the likelihood of parasitism and predation) and therefore the chance of detection of a tree roost is reduced in comparison to other structures as the likelihood of presence during any one survey is reduced. In addition, it is possible the scheme will result in the loss of multiple trees with bat roost potential in any one particular area and therefore there is potential for a greater impact on the local population. It is therefore important to assume a proportion of potential roosts may be used by roosting bats at one time or another. This is an advantage of backtracking surveys, as they not only identify confirmed roosts, but also allow for the assessment of likely roosting use within a woodland and surrounding areas.

5.1.3 Fiscal Policy was found to be supporting a brown long-eared maternity roost within a bat box and several potential pipistrelle roosts. One likely pipistrelle roost was located in the vicinity of the mast to the south of Fiscal Policy. All of these were located within the areas of the woodland which are proposed to be retained.

5.1.4 Within the backtracking surveys at Goose Hill, no confirmed roosts within the trees proposed to be removed were identified. On 3 August 2020 one pipistrelle roost was considered likely to be located within the southern section of this woodland, around TM 47014 64624, identified through bat behaviour, but the exact location of this roost was not identified, though the southern extent of this woodland is to be retained.

5.1.5 Kenton Hills was found to be supporting several Natterer's maternity roosts, and pipistrelle roosts within bat boxes, and Goose Hill was found to be supporting potential pipistrelle roosts and two brown long-eared roosts. These were all in locations where the woodland will be retained.

5.1.6 During the surveys at Goose Hill, a number of bats were observed commuting along tracks through the woodland. Surveys were modified to

identify if these bats were roosting within Goose Hill. It was observed that the barbastelles identified appeared to originate to the south. No evidence was recorded to indicate the presence of a barbastelle roost within Goose Hill. Kenton Hills is thought to be the most likely location of the barbastelle maternity colony and Kenton Hills woodland will be retained.

5.1.7 During a survey at the north of Goose Hill, a single pipistrelle roost was identified in disused barns located along the northern edge of the woodland These barns are to be retained.

5.1.8 The roosts/roost locations found supported Natterer's, brown long-eared, common pipistrelle and soprano pipistrelle bats but do not represent an exhaustive list of the roosts present. This is due to the large number of trees and that bats roosting within trees are highly mobile. Additional surveys (bat tree inspections) are being undertaken to gain further insight into the roost resource present.

5.1.9 From the suite of surveys undertaken to date, no barbastelle roosts that have been identified will be directly lost to the proposed development. However, as outlined above, not all trees to be removed have been fully surveyed for roosting potential.

5.1.10 Based on the current survey results presented above, the overall assessment of impacts on bats presented at Section 14.13 in the Sizewell C Project ES [**APP-224**] (Ref. 10) has not changed.

5.1.11 The backtracking results support the conclusion that Goose Hill is a low-level roost resource, with minimal numbers of trees with roosting potential and limited evidence of bat roosting behaviour. Despite the high number of trees being lost, it is considered that the overall impact on roosting bats would be low.

5.1.12 The backtracking results indicate that Fiscal Policy is a moderate level roost resource, though only a small area of this woodland is proposed for clearance. The roosts identified to date are located in areas to be retained.

5.1.13 The results of the 2020 backtracking surveys do not change the overall assessment of impacts to bats in the Sizewell C Project ES [**APP-224**] (Ref. 10) are not considered to change the proposed mitigation detailed in the Bat Mitigation Strategy [**APP-252**] (Ref 3) and Bat Method Statement [**APP-252**] (Ref. 2) which will form the basis of a Licence Method Statement anticipating that there will be additional bat roosts in trees that will be required to be removed.

REFERENCES

1. EDF 2020. Sizewell C Project – Main Development Site: Volume 2, Chapter 14: Appendix 14A8 – Bats. [**APP-242**, **APP-243**, **APP-244**, **APP-245** and **APP-246**]

2. EDF 2020. Sizewell C Project – Main Development Site: Volume 2, Chapter 14: Appendix 14C1B – Bat Method Statement. [**App-252**]

3. EDF 2020. Sizewell C Project – Main Development Site: Volume 2, Chapter 14: Appendix 14C1A – Bat Mitigation Strategy. [**APP-252**]

4. Wildlife and Countryside Act, as amended. 1981. (Online) Available from http://www.legislation.gov.uk/ukpga/1981/69

5. Statutory Instruments 2017 No. 1012. The Conservation of Habitats and Species Regulations 2017.

6. Suffolk Biodiversity Partnership. Suffolk Local Biodiversity Action Plan. May 2012. (Online). Available from: https://www.suffolkbis.org.uk/sites/default/files/biodiversity/priorityspeciesh abitats/actionplans/Planning_BAP_Final%2018%20May%202012.pdf (Accessed 7 February 2019).

7. Natural Environment and Rural Communities Act. 2006. (Online). Available from: http://www.legislation.gov.uk/ukpga/2006/16/contents.

8. Chartered Institute of Ecology and Environmental Management. Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland. Terrestrial, Freshwater, Coastal and Marine. Winchester: CIEEM, 2018

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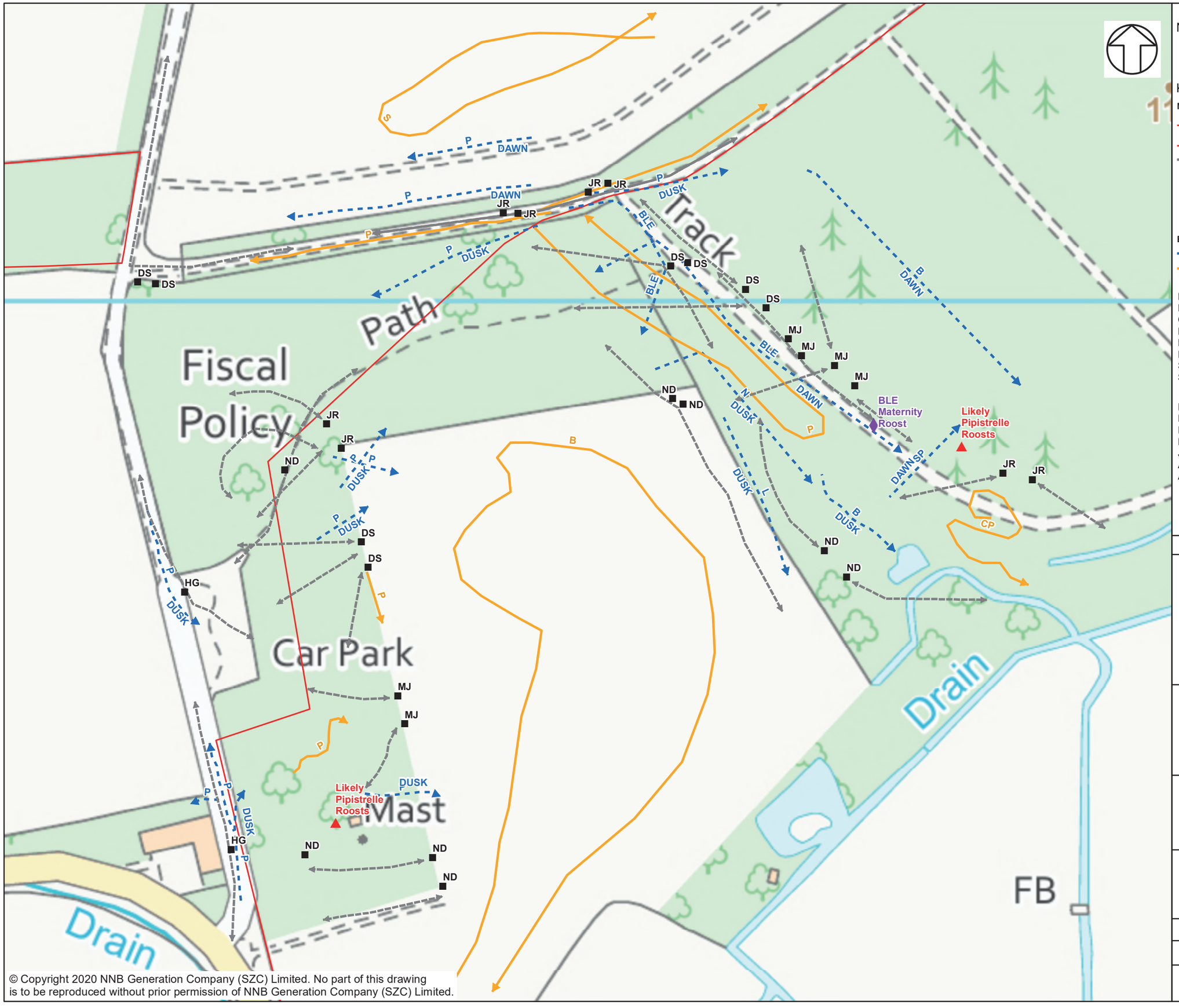
10. EDF 2020. Sizewell C Project – Main Development Site: Volume 2, Chapter 14: Terrestrial Ecology and Ornithology. [**APP-224**]



NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- INDICATIVE SURVEYOR MOVEMENTS
- SURVEYOR STARTING POSITION
- INDICATIVE PIPPISTRELLE ROOSTS
- LIKELY PIPPISTRELLE ROOSTS
- BAT ROOST

BEHAVIOUR

- COMMUTING
- FORAGING

KEY

B - BARBASTELLE
BLE - BROWN LONG-EARED
CP - COMMON PIPISTRELLE
L - LEISLER
N - NOCTULE
P - PIPISTRELLE SPECIES
S - SEROTINE
SP - SOPRANO PIPISTRELLE

KEY FOR SURVEYOR STARTING POSITION

DS - DUNCAN SWEETING
ND - NICK DOWNS
HG - HENRY GUNNING
MJ - MARIELLE JAMES
JR - JAMES ROWLAND
AK - ALISTAIR KILLINGSWORTH
AP - ANA PINO BLANCO

NOT PROTECTIVELY MARKED

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DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT BACKTRACKING SURVEY

DRAWING TITLE:
FISCAL POLICY – DUSK AND DAWN BAT BACKTRACKING RESULTS - OVERVIEW 2020

DRAWING NO:
FIGURE 1

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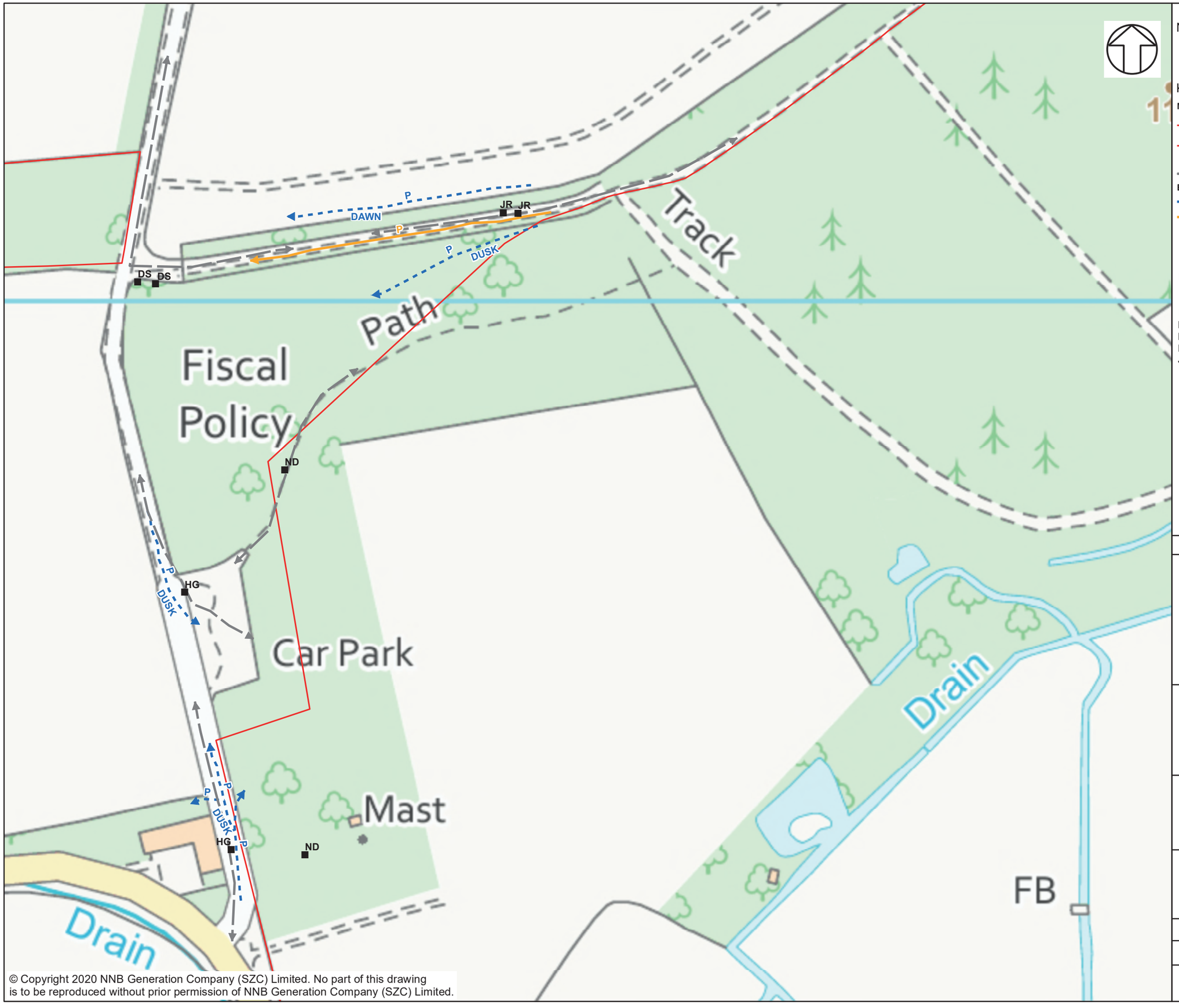

NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- SURVEYOR STARTING POSITIONS
- INDICATIVE SURVEYOR MOVEMENTS

BEHAVIOUR

- COMMUTING
- FORAGING

KEY

P - PIPISTRELLE SPECIES

KEY FOR SURVEYOR STARTING POSITIONS

DS - DUNCAN SWEETING
ND - NICK DOWNS
HG - HENRY GUNNING
JR - JAMES ROWLAND

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DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT TREE INSPECTION SURVEY

DRAWING TITLE:
FISCAL POLICY - JUNE DUSK AND DAWN
BAT BACKTRACKING RESULTS - JUNE 2020

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NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- SURVEYOR STARTING POSITIONS
- BAT BOX
- INDICATIVE SURVEYOR MOVEMENTS

BEHAVIOUR

- COMMUTING
- FORAGING

KEY

B - BARBASTELLE
BLE - BROWN LONG EARED
L - LEISLER'S
N- NOCTULE
P - PIPISTRELLE SPECIES
S - SEROTINE

KEY FOR SURVEYOR STARTING POSITIONS

DS - DUNCAN SWEETING
ND - NICK DOWNS
MJ - MARIELLE JAMES
JR - JAMES ROWLAND

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DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT TREE INSPECTION SURVEY

DRAWING TITLE:
FISCAL POLICY - JULY DUSK AND DAWN
BAT BACKTRACKING RESULTS 2020

DRAWING NO:
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NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- SURVEYOR STARTING POSITION
- INDICATIVE SURVEYOR MOVEMENTS
- LIKELY PIPPISTRELLE ROOST

BEHAVIOUR

- COMMUTING
- FORAGING

KEY

B - BARBASTELLE
P - PIPISTRELLE SPECIES

KEY FOR SURVEYOR

DS - DUNCAN SWEETING
ND - NICK DOWNS
MJ - MARIELLE JAMES
JR - JAMES ROWLAND

NOT PROTECTIVELY MARKED

DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT TREE INSPECTION SURVEY

DRAWING TITLE:
FISCAL POLICY - AUGUST DUSK AND DAWN BAT BACKTRACKING RESULTS 2020

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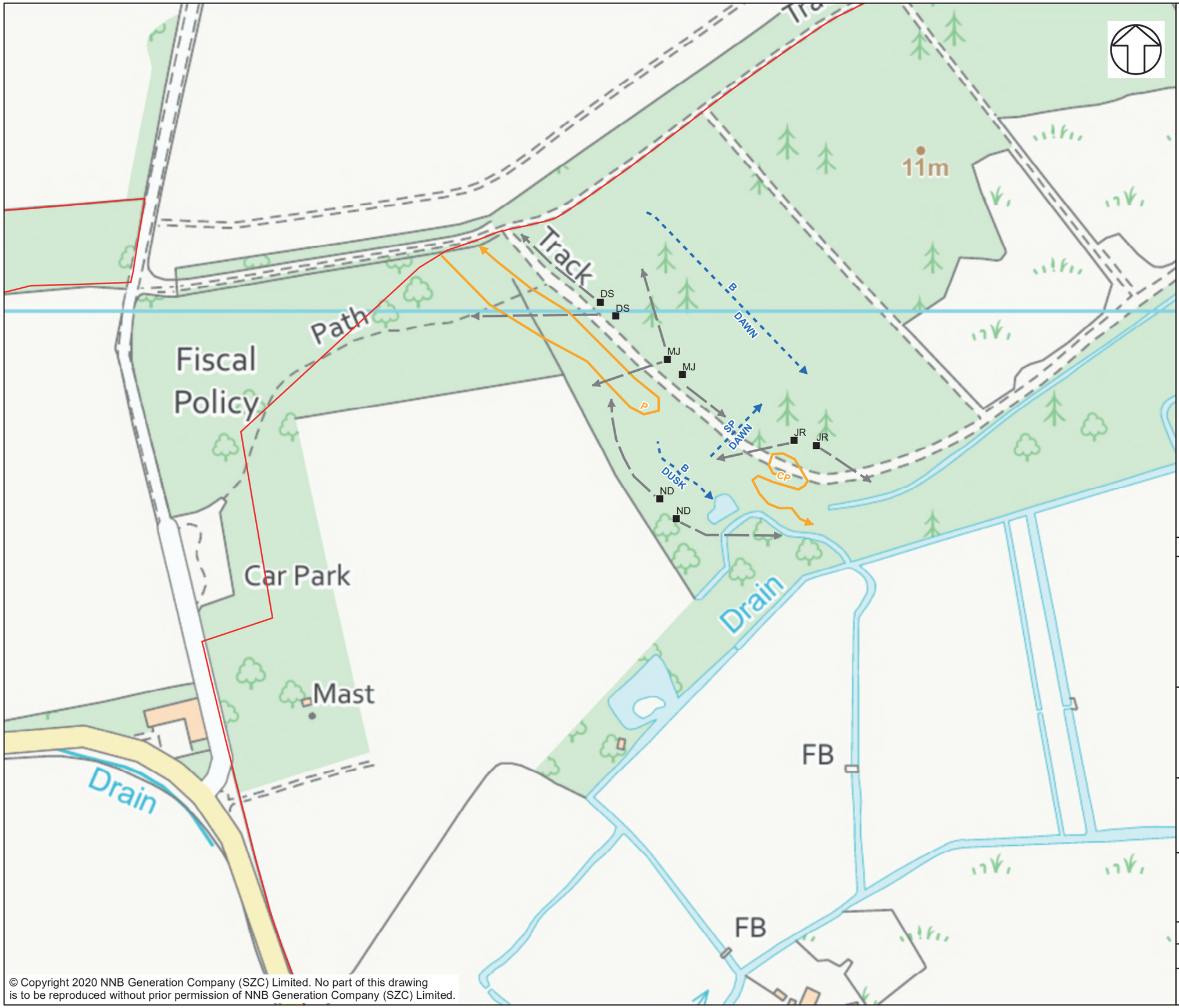

NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- INDICATIVE SURVEYOR MOVEMENTS
- SURVEYOR STARTING POSITIONS
- INDICATIVE PIPPISTRELLE ROOST

BEHAVIOUR

- COMMUTING
- FORAGING

KEY
B - BARBASTELLE
CP - COMMON PIPISTRELLE
P - PIPISTRELLE SPECIES
SP - SOPRANO PIPISTRELLE

KEY FOR SURVEYOR
DS - DUNCAN SWEETING
ND - NICK DOWNS
MJ - MARIELLE JAMES
JR - JAMES ROWLAND

NOT PROTECTIVELY MARKED

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DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT TREE INSPECTION SURVEY

DRAWING TITLE:
FISCAL POLICY - SEPTEMBER DUSK AND DAWN BAT BACKTRACKING RESULTS 2020

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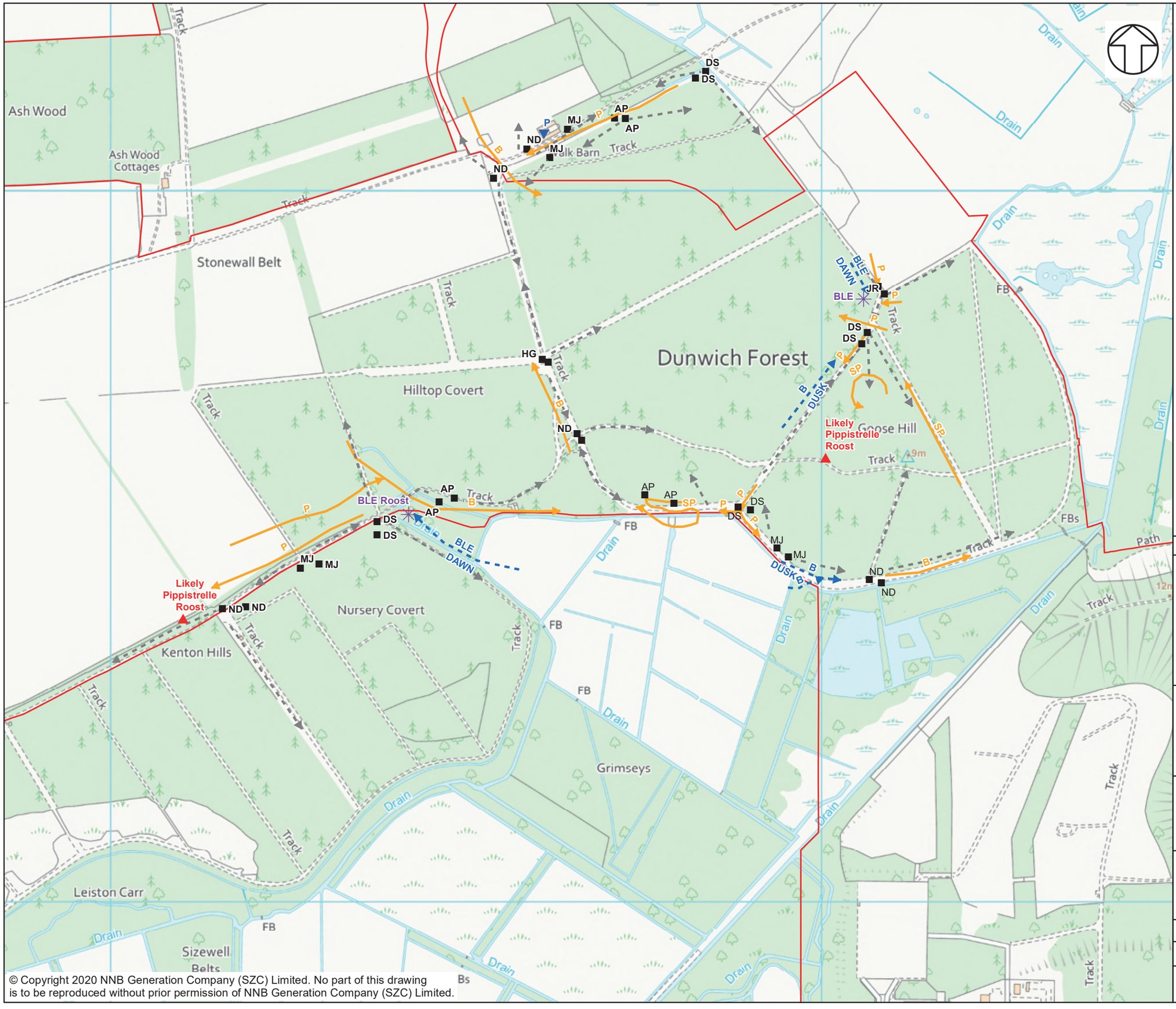

NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- SURVEYOR STARTING POSITION
- LIKELY PIPPISTRELLE ROOST
- BUILDING ROOST
- TREE ROOST
- INDICATIVE SURVEYOR MOVEMENTS

BEHAVIOUR

- COMMUTING
- FORAGING

KEY

B - BARBASTELLE
BLE - BROWN LONG-EARED
P - PIPISTRELLE SPECIES
SP - SOPRANO PIPISTRELLE

KEY FOR SURVEYOR

DS - DUNCAN SWEETING
ND - NICK DOWNS
HG - HENRY GUNNING
MJ - MARIELLE JAMES
JR - JAMES ROWLAND
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DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT BACKTRACKING SURVEY

DRAWING TITLE:
GOOSE HILL – DUSK AND DAWN BAT BACKTRACKING RESULTS - OVERVIEW 2020

DRAWING NO:
FIGURE 2

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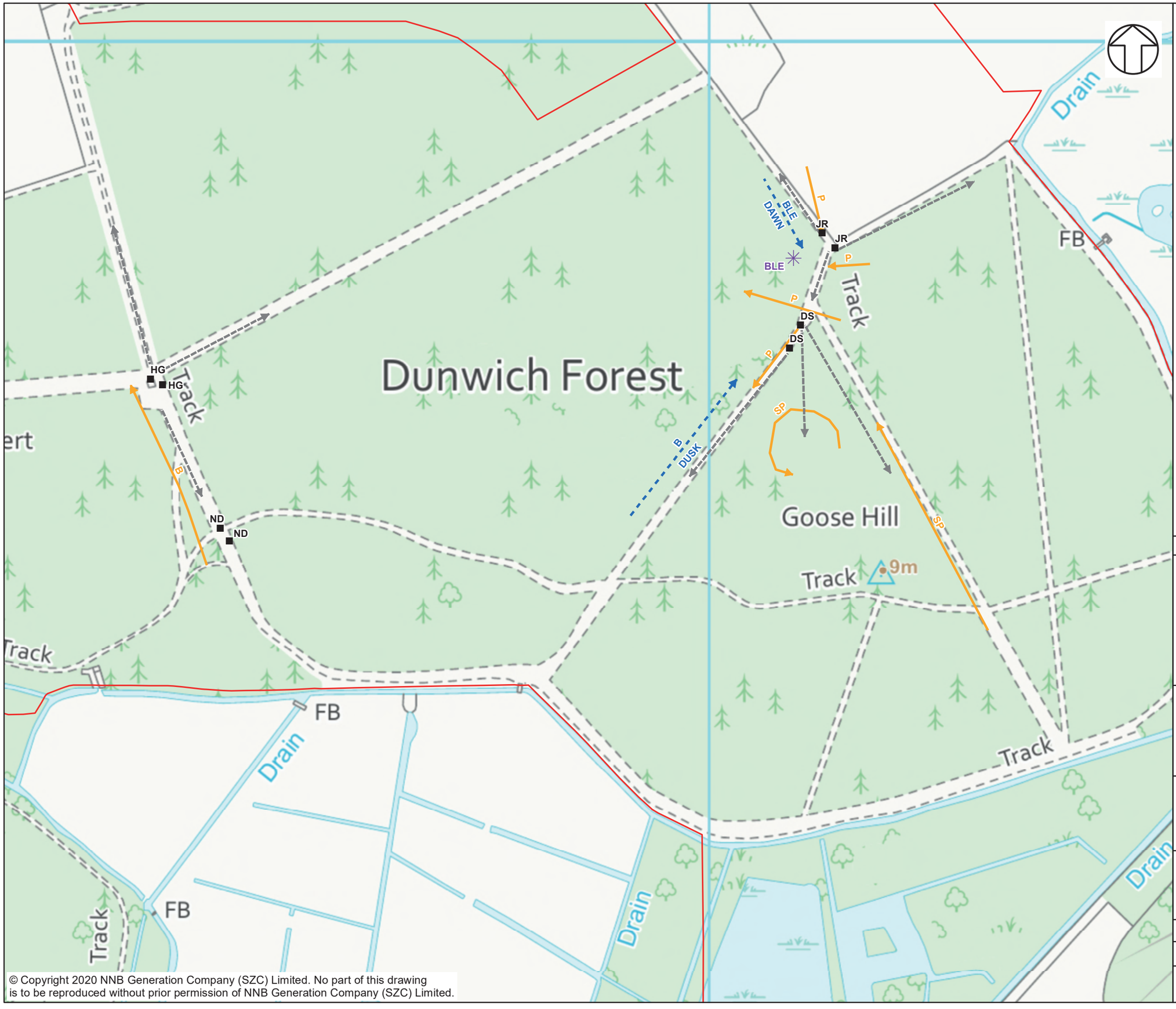

NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- SURVEYOR STARTING POSITION
- TREE ROOST
- INDICATIVE SURVEYOR MOVEMENTS

BEHAVIOUR

- COMMUTING
- FORAGING

KEY

B - BARBASTELLE
BLE - BROWN LONG-EARED
P - PIPISTRELLE SPECIES
SP - SOPRANO PIPISTRELLE

KEY FOR SURVEYOR

DS - DUNCAN SWEETING
ND - NICK DOWNS
HG - HENRY GUNNING
JR - JAMES ROWLAND

NOT PROTECTIVELY MARKED

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EDF CGN

DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT BACKTRACKING SURVEY

DRAWING TITLE:
GOOSE HILL - JUNE DUSK AND DAWN
BAT BACKTRACKING RESULTS

DRAWING NO:
FIGURE 2

DATE:	DRAWN:	SCALE :	REV:
SEPT 2020	Y.G.	1:2,500 @A3	01

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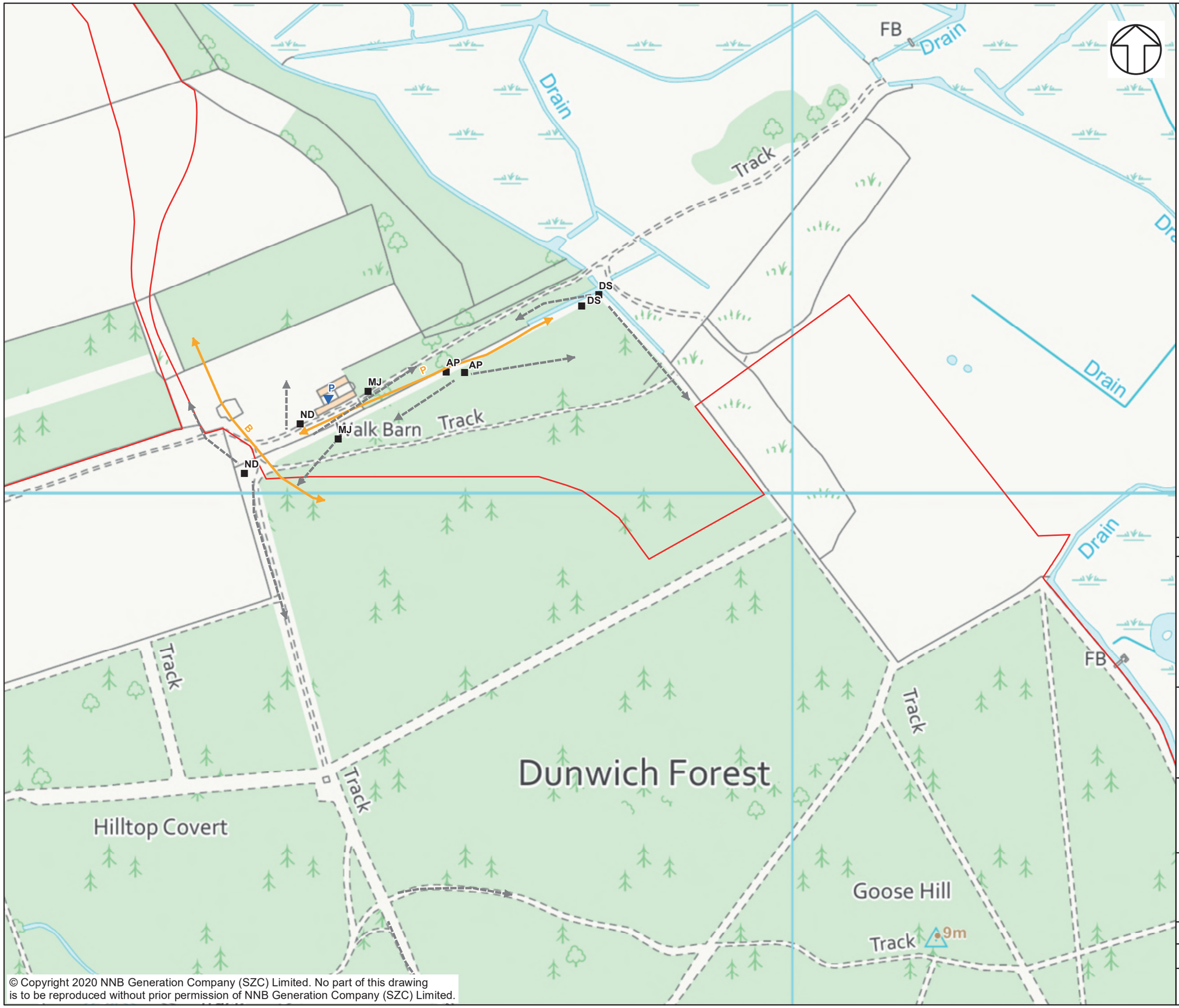

NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- INDICATIVE SURVEYOR MOVEMENTS
- SURVEYOR STARTING POSITION
- BUILDING ROOST

BEHAVIOUR

- FORAGING

KEY
B - BARBASTELLE
P - PIPISTRELLE SPECIES

KEY FOR SURVEYOR
DS - DUNCAN SWEETING
ND - NICK DOWNS
MJ - MARIELLE JAMES
AP - ANA PINO BLANCO

NOT PROTECTIVELY MARKED

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DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT BACKTRACKING SURVEY

DRAWING TITLE:
GOOSE HILL - JULY DUSK AND DAWN
BAT BACKTRACKING RESULTS

DRAWING NO:
FIGURE 2

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SEPT 2020	Y.G.	1:3,000 @A3	01

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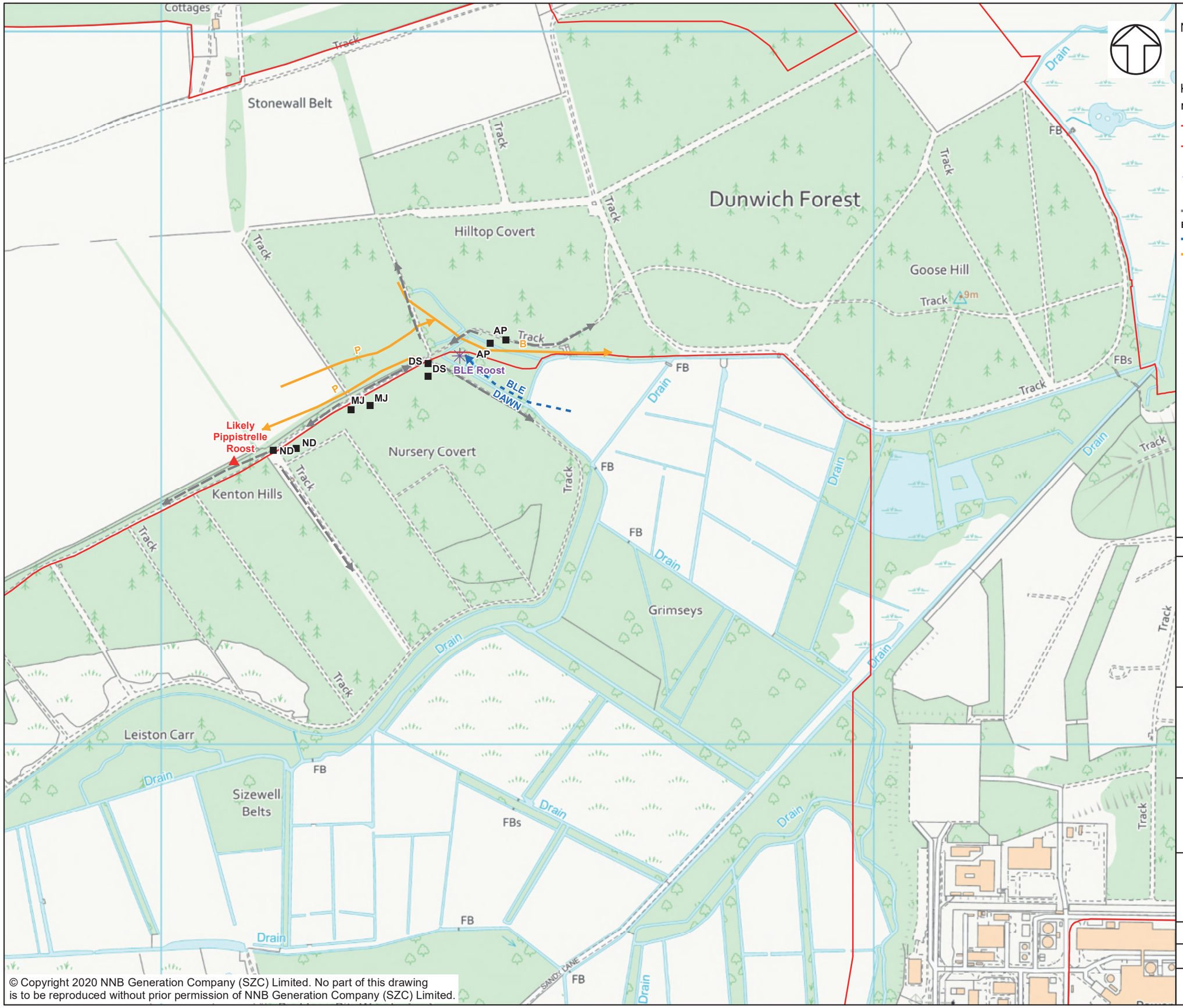

NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- SURVEYOR STARTING POSITION
- TREE ROOST
- LIKELY PIPPISTRELLE ROOSTS
- INDICATIVE SURVEYOR MOVEMENTS

BEHAVIOUR

- COMMUTING
- FORAGING

KEY

B - BARBASTELLE
BLE - BROWN LONG-EARED
P - PIPISTRELLE SPECIES

KEY FOR SURVEYOR

DS - DUNCAN SWEETING
ND - NICK DOWNS
MJ - MARIELLE JAMES
AP - ANA PINO BLANCO

NOT PROTECTIVELY MARKED

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DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT BACKTRACKING SURVEY

DRAWING TITLE:
GOOSE HILL - AUGUST DUSK AND DAWN
BAT BACKTRACKING RESULTS

DRAWING NO:
FIGURE 2

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SEPT 2020	Y.G.	1:5,000 @A3	01

SCALE BAR
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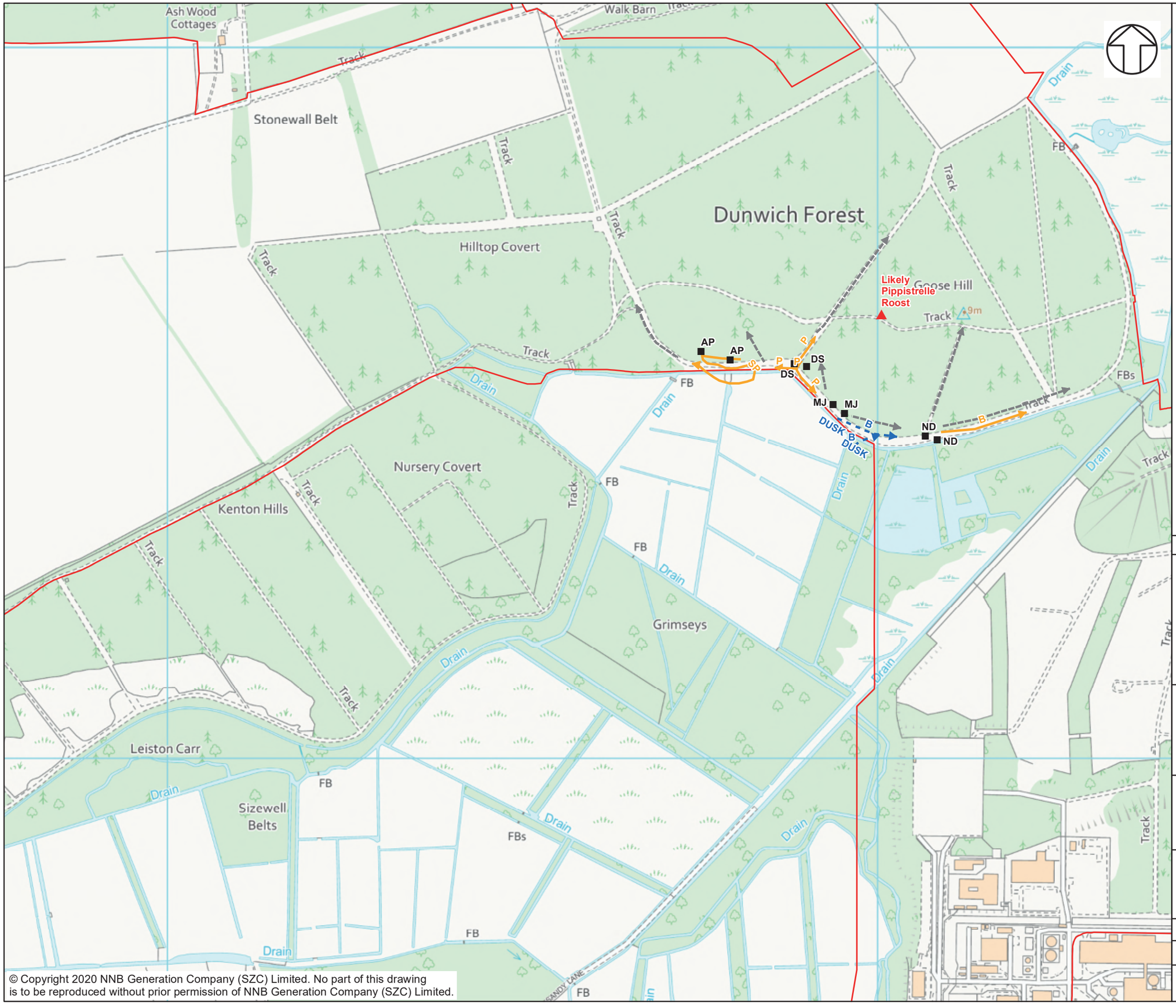

NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- SURVEYOR STARTING POSITIONS
- LIKELY PIPPISTRELLE ROOST
- INDICATIVE SURVEYOR MOVEMENTS

BEHAVIOUR

- COMMUTING
- FORAGING

KEY

B - BARBASTELLE
P - PIPISTRELLE SPECIES
SP - SOPRANO PIPISTRELLE

KEY FOR SURVEYOR STARTING POSITION

DS - DUNCAN SWEETING
ND - NICK DOWNS
MJ - MARIELLE JAMES
AP - ANA PINO BLANCO

NOT PROTECTIVELY MARKED

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DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT BACKTRACKING SURVEY

DRAWING TITLE:
GOOSE HILL - SEPTEMBER DUSK AND DAWN
BAT BACKTRACKING RESULTS

DRAWING NO:
FIGURE 2

DATE:	DRAWN:	SCALE :	REV:
SEPT 2020	Y.G.	1:5,000 @A3	01

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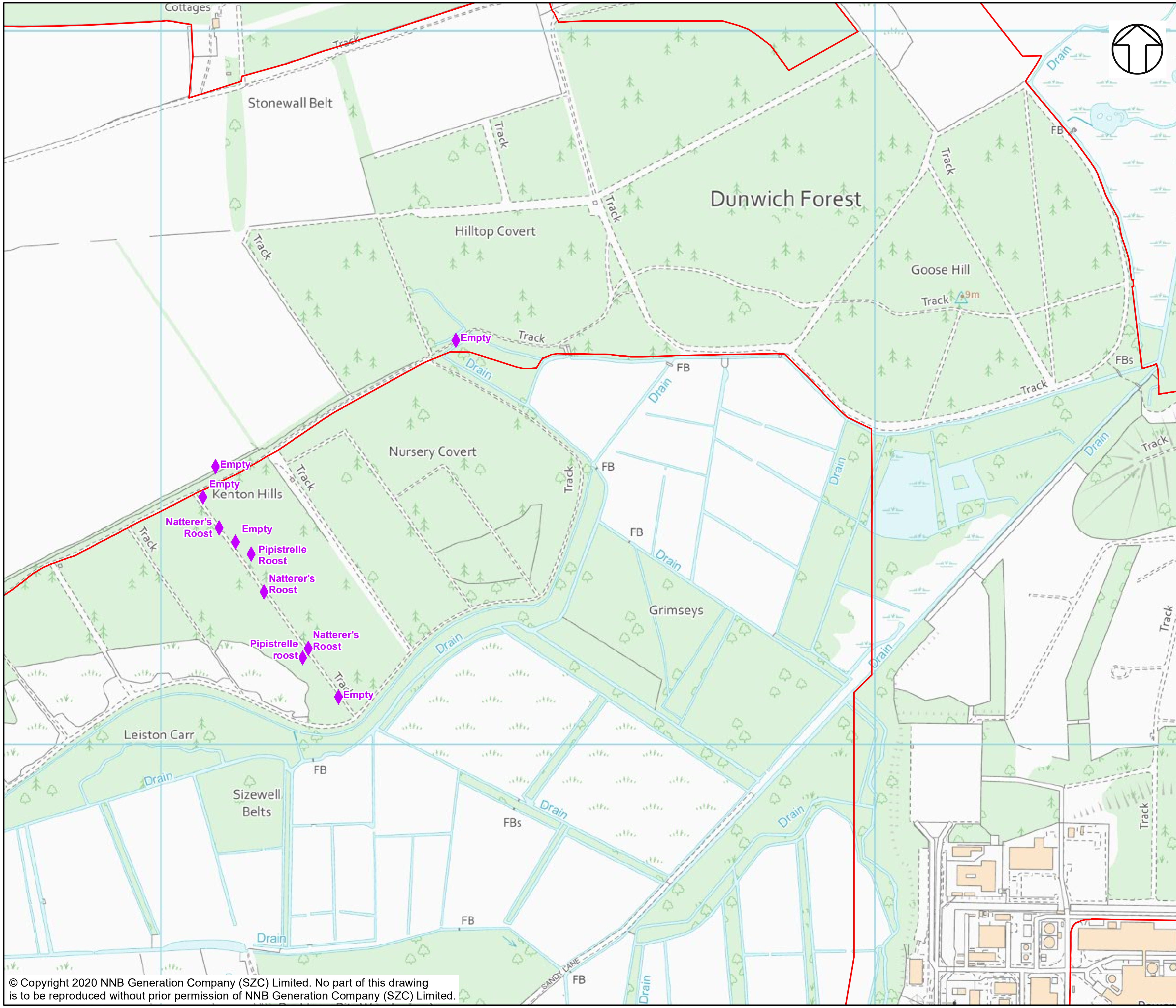

NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- BAT BOX

NOT PROTECTIVELY MARKED

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EDF CGN

DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT BACKTRACKING SURVEY

DRAWING TITLE:
KENTON HILLS BAT BOX INSPECTION RESULTS - AUGUST 2020

DRAWING NO:
FIGURE 3

DATE:	DRAWN:	SCALE :	REV:
SEPT 2020	Y.G.	1:5,000 @A3	01

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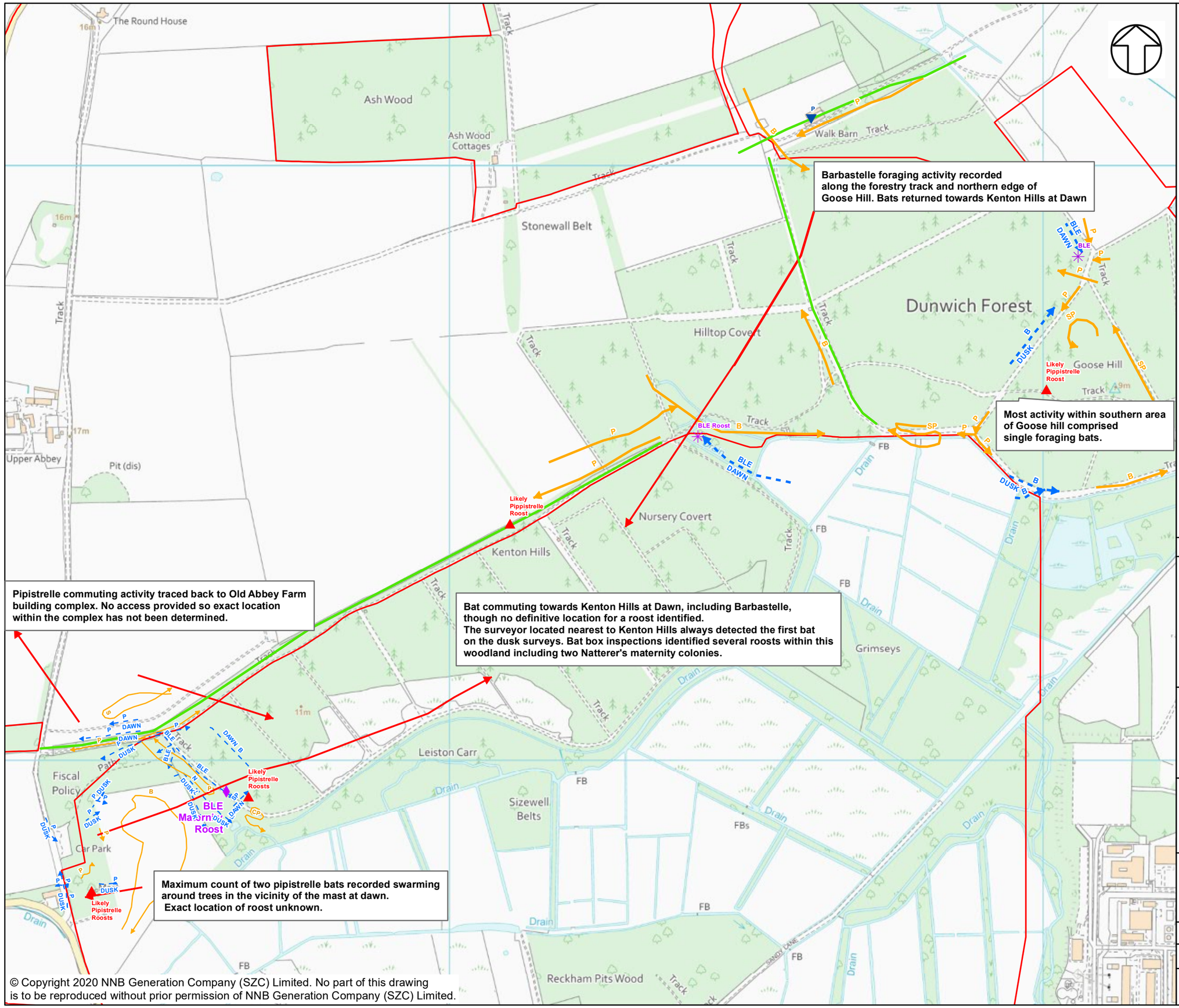

NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- TREE ROOST
- BUILDING ROOST
- BAT ROOST
- LIKELY PIPPISTRELLE ROOST
- KEY FORAGING AREA
- KEY COMMUTING ROUTE

BEHAVIOUR

- COMMUTING
- FORAGING

KEY FOR SPECIES

B - BARBASTELLE
BLE - BROWN LONG-EARED
CP - COMMON PIPPISTRELLE
L - LEISLER
N- NOCTULE
P - PIPISTRELLE SPECIES
S - SEROTINE
SP - SOPRANO PIPISTRELLE

NOT PROTECTIVELY MARKED

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DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT BACKTRACKING SURVEY

DRAWING TITLE:
BAT BACKTRACKING SURVEY
RESULTS 2020 SUMMARY

DRAWING NO:
FIGURE 4

DATE:	DRAWN:	SCALE :	REV:
SEPT 2020	Y.G.	1:6,000 @A3	01

SCALE BAR
0 60 120 180 240 300 M

BAT STATIC MONITOING SURVEY REPORT 2020

CONTENTS

TABLES

PLATES

None Provided.

FIGURES

APPENDICES

None Provided.

1 SUMMARY

1.1.1 This document provides the results of the 2020 bat static detector surveys conducted on the Sizewell C Main Development Site. To provide context a summary of previous surveys conducted to 2019 to inform the Development Consent Order (DCO) submission is provided, along with a summary of the bat species valuation and mitigation provided in the Sizewell C Project ES [**APP-224**] (Ref. 11).

1.2 Baseline Summary 2012-2019

1.2.1 Bat surveys were undertaken of land associated with the proposed Sizewell C Main Development Site by Wood Group between 2007-2012 and by Arcadis between 2013 - 2019. These surveys were utilised to inform the EIA submitted in support of the DCO application and are summarised in this section of the report, to provide the context of the surveys conducted in the 2020 surveys.

1.2.2 Summaries of the data used to inform the DCO application are provided in **Table 1** and **Table 2** respectively.

Table 1: Summary of Wood Group bat survey results.

Survey	Summary of Results.
Desk-study.	Confirmed extensive use of the EDF Energy Estate and the surrounding area and landscape by bats, largely from data gathered by SWT.
Habitat (landscape) appraisal.	Confirmed a high-quality mosaic of habitats suitable for foraging, commuting and roosting bat species. The habitats were considered to be well established and mature, diverse in species composition and habitat type, and to offer many local roosting opportunities in farm buildings and mature woodlands/scattered trees. Also confirmed that there is generally excellent connectivity between the proposal site and the wider landscape, especially through the hedgerow network, and that the area is largely undeveloped. The main build area of the proposed main platform was confirmed to contain habitats that were likely to be of limited value for barbastelle.
Building surveys.	Buildings within the Upper Abbey Farm complex at grid reference location TM 45319 64566 were considered to be of particular note, supporting brown long-eared bats (maternity roost), at least one common pipistrelle roost, a soprano pipistrelle roost and a Natterer's bat mating roost. Barbastelle were recorded within the barn, with call patterns suggesting presence in very low numbers (there was no evidence of barbastelle using the barn for breeding). The fire-damaged farmhouse was considered unlikely to support bats other than very small non-breeding roosts. Bats found hibernating included a single barbastelle, Daubenton's bat, Natterer's bat, and probable brown long-eared bat (no more than three bats in total recorded on any one occasion).

Survey	Summary of Results.
	At least 49 Natterer's bats were recorded using the western end of Leiston Abbey in August 2011 (but with far fewer bats present earlier in the month, indicating that other roost site(s) are in use).
Bat box surveys.	A high proportion of bat boxes showed evidence of use by bats. Two larger roosts of Natterer's bat and soprano pipistrelle were identified. Bat boxes present are not of a design preferred by barbastelle, and none were recorded using the boxes.
Tree surveys.	Over 500 trees were identified as having medium or higher potential for roosting bats. The areas with the highest numbers were: Fiscal Policy woodland (126); Ash Wood (74); the track along the northern edge of Kenton Hills (57); Goose Hill (51); and woodland at The Grove (37). Not all trees were considered suitable for all species and/or all roost types. Only limited emergence surveys were undertaken, during which the maximum number of barbastelle counted at any one time (including juveniles) was 31 individuals. Eleven trees were identified at Aldhurst Farm with limited potential to support roosting bats, along with four buildings considered to contain features of limited roost potential.
Transect surveys and automated detector surveys.	Activity recorded within open areas (on automated detectors) was low. The highest levels of activity were recorded at commuting/foraging areas close to Ash Wood, Upper Abbey Farm bridleway, Goose Hill, the perimeter track around Kenton Hills and Nursery Covert, Fiscal Policy woodland, and Leiston Old Abbey. The large majority of automated detectors recorded barbastelle activity, indicating that barbastelle are widespread and use almost all the habitats within the EDF Energy Estate and surrounding area (including Aldhurst Farm), although not to the same extent.
Radio-tracking surveys.	Barbastelle, Natterer's bat, and brown long-eared bat (breeding females only of Natterer's bat and brown long-eared bat) were radio-tracked in 2010 and 2011 (pre- and post-breeding).

Survey	Summary of Results.
	Attempts to catch and tag Nathusius' pipistrelle and Daubenton's bat (to locate roosts) were unsuccessful. Nine serotine bats were trapped but not tracked, as they were not covered by the licence. A total of 22 barbastelle roosts were identified through radio-tracking; all roosts used by females and juveniles were located within trees, while two males were recorded roosting in buildings. The results of the radio-tracking showed a close reliance on the EDF Energy Estate during these periods of time.
Upper Abbey Farm building inspections.	Six bats were found to be using Upper Abbey Farmhouse as an autumn/winter roost – two Natterer's bat (January, 2013), one probable Daubenton's bat (October 2012), one confirmed Daubenton's bat (November 2012), one probable brown long-eared bat (January 2013) and one bat of undetermined species (December 2012). All individuals were found within the farmhouse cellar which was considered to offer several potential roost sites and suitable conditions for roosting bats. The farmhouse more generally was considered to have the potential to support roosting bats with small numbers of bat droppings found throughout the property and, in one location, feeding remains[1]. A single outbuilding to the east of the farmhouse was considered to have some potential, primarily as a hibernation or feeding perch, although no evidence of recent use was identified.

[1] Note. extensive renovations have been undertaken at Upper Abbey Farmhouse since this survey work.

Table 2: Summary of Arcadis survey results between 2013 and 2019.

Survey	Summary of Results.
Activity transect surveys.	Between six and seven bat species were recorded during activity transect surveys in 2014 and 2015. Common pipistrelle was the most frequently recorded species across all activity transects, followed by soprano pipistrelle. On the temporary accommodation campus transect route and green rail route transect route 3 (green rail route transect route 3), barbastelle was the third most frequently recorded species, but was absent from the Pillbox Field and Coronation Wood transects. On both the temporary accommodation campus transect route and green rail route transect route 3, activity peaked in May 2014, with noticeably lower activity levels in July 2014 (on the temporary accommodation campus transect, considered in part to be due to adverse weather conditions) and October 2014. Surveys of Pillbox Field and Coronation Wood were undertaken in September and October 2015 only, with activity in September 2015 found to be significantly higher. A single pass was recorded shortly after sunset at Upper Abbey Farm, where soprano pipistrelle have previously been recorded roosting. Early passes were recorded in the vicinity of the temporary accommodation campus transect route and along the green rail route transect route 3 (more so from common than soprano pipistrelle). During 2019 surveys of the sand pits at least five species were recorded. Common pipistrelle was the most frequently recorded species. While activity levels were higher in September 2019 than October 2019 activity levels remained low compared to activity transect results gathered elsewhere on the EDF Energy Estate in previous years.

Survey	Summary of Results.
Automated detector surveys.	Barbastelle activity was recorded at all monitoring stations across and out with the EDF Energy Estate and in both years (2013 and 2014) (though not in every location during every monitoring event). Mean activity for barbastelle and Nathusius' pipistrelle activity was greatest in June (the largely pre-lactation maternity period), while mean activity for Myotis spp. was lowest during this period. Mean activity for "big bats" was highest in July and lowest in September/October. However, the highly-skewed nature of the data required detailed analyses to detect patterns obscured by the raw means, with activity often differing between seasons/years in different locations. The data recorded indicated the likely absence of serotine and Leisler's bat roosts from the ZOI. The data also indicated the potential presence of barbastelle roosts within Goose Hill and in the vicinity of Broom Covert, and of noctule roosts near woodland at The Grove, eastern Goose Hill, and Leiston Old Abbey woodland. *Myotis* spp. roosts were indicated by the activity patterns, consistent with the locations of known roosts in woodland at The Grove, Leiston Abbey and Kenton Hills bat boxes.
Radio-tracking surveys.	Twenty-seven barbastelle were caught during the radio-tracking surveys, of which none were already ringed, and 18 were tagged for radio-tracking (three adult males, 12 breeding females and three non-breeding females). In addition, a single non-breeding female serotine was caught and tagged. Soprano pipistrelle, common pipistrelle, Daubenton's bat, Natterer's bat and noctule were also caught but not tagged. In total, 285 bats were trapped in 2014. Tracking confirmed that Minsmere (to the north of the ESF Energy Estate) supported breeding barbastelle, providing both roosting and foraging habitat, and that there was interchange of bats between Minsmere and the EDF Energy Estate. Tagged

Survey	Summary of Results.
	barbastelle were recorded moving between the two areas on several occasions throughout the 2014 radio-tracking survey. Of the seven female barbastelle trapped in Minsmere, four were confirmed to be active within the EDF Energy Estate, whilst of the seven females trapped within the EDF Energy Estate, at least six were confirmed to be active within Minsmere. All three of the male barbastelle trapped within the EDF Energy Estate were recorded within Minsmere (no adult males were caught within Minsmere). One tagged female was recorded roosting in both locations. A wider foraging area was thus identified in 2014 than in 2011, with greater levels of foraging over Minsmere and the Eastbridge area recorded. The areas within the identified home ranges of the tagged bats (as defined by 95% Minimum Convex Polygon analysis[2]) reached beyond Westleton to the north, beyond Middleton to the west, east to the coast and south to the south-east of Leiston. A further fifteen barbastelle roosts were identified, nine confirmed to be within trees. Roosts were located in both the EDF Energy Estate and Minsmere, with an additional three roosts located outside of these areas, at Saxmundham and Reckford Bridge/Eastbridge Marshes. None of the previously identified roosts were used again by tagged bats. The preference for oak (*Quercus* spp.) trees, and for roosting behind raised/loose bark, was consistent with previous years. However, the tree used most frequently, and by the highest number of tagged bats, was a dead Scot's Pine (*Pinus sylvestris*). The tagged serotine roosted for the duration of the radio-tracking surveys within the grounds of Theberton Farm (where access for the surveyors was not permitted), and was

[2] The Minimum Convex Polygon enables the creation of a boundary around all fixes using the smallest possible convex polygon. This is a commonly used method but may overestimate the size of home ranges. (**Error! Reference source not found.**, **Annex 14A8.6**).

Survey	Summary of Results.
	recorded foraging widely into the Royal Society for the Protection of Birds (RSPB) Minsmere Reserve, Minsmere Levels and around Goose Hill, woodland at The Grove, and Ash Wood, with further 'fixes' recording movement along the coastal edge.
Building inspection surveys.	Three building complexes were identified as possessing multiple features ranging from low to high potential to support bats (Ash Wood Cottages, Lower Abbey Farm and Upper Abbey Farm). Two buildings were identified as possessing features of low potential to support bats (Plantation Cottage and the Laboratory off Lovers Lane). A single building with no potential to support bats was identified (Walk Barn). Six of the 12 buildings identified for assessment were not evaluated in 2015 due to a lack of access permission[3]. Surveys in 2019 reassessed Ash Wood Cottages (confirmed as a brown long-eared bat roost), Lower Abbey Farm (four structures with negligible suitability, three structures with none/low suitability, three structures with low suitability, two structures with moderate suitability, one structure with high suitability and one structure confirmed as a brown long-eared bat roost) and Upper Abbey Farm (one structure with no suitability, one structure with negligible suitability, one structure with no/low suitability, two structures with low suitability, three structures with high suitability and three structures confirmed as brown long-eared bat roosts). Further surveys in 2019 inspected 15 buildings associated with Sizewell B relocated facilities proposed works. Of these, 11 were assessed as having negligible or no bat

[3] The Round House, Potters Farm, Birchwood Farm, Old Abbey Farm, Leiston Old Abbey Farm, World War II Bunkers. See **Figures 14A8.6, Figure 14A8.7** and **Figure 14A8.8** for locations [APP-247].

Survey	Summary of Results.
	roost suitability, three were assessed as of low suitability and one building was confirmed as a bat roost following the DNA analysis of droppings which identified common pipistrelle.
Tree assessment surveys[4].	Tree surveys were undertaken in areas not previously assessed. A single tree, located within a wooded strip between Black Walks and Ash Wood, was identified as a confirmed roost, due to the presence of a small number of likely bat droppings at the base of the identified bat roost feature. Nineteen trees within the surveyed area were identified as having high or very high bat roost potential. Twenty-two trees were identified as having medium potential, including a group of trees to the south-west of the Round House which were considered to have features suitable for bats, but which, due to access restrictions, could not be fully assessed. The reassessment of trees within Coronation Wood was undertaken in 2019 and where possible trees identified as having bat roost potential were climbed and where no evidence of use by bats found features were filled with expanding foam. Three trees of moderate suitability were identified, climbed and, following no evidence of use by bats filled with expanding foam. A further tree and three groups of trees were identified as requiring further survey before removal.
Corridor activity surveys.	West to east commuting was recorded at the crossroads of Fiscal Policy and Kenton Hills by common pipistrelle, soprano pipistrelle, “big bat” spp., and *Myotis* spp. with

[4] High level tree assessments were additionally undertaken of land to the east of Eastbridge Road during Phase 1 surveys. This area now falls outside the main development site boundary and therefore the results of this survey work are not included here.

Survey	Summary of Results.
	activity diminishing the further east into Kenton Hills surveyors were positioned, likely due to the dispersal of bats into the wider woodland. To the north, on the Upper Abbey Farm bridleway, commuting was recorded primarily by common and soprano pipistrelles with some *Myotis* spp. and some potentially commuting barbastelle. Commuting bats were primarily observed flying north to south along the bridleway. Overall, activity (including foraging) was notably lower at the northern end of the bridleway[5]. Several commuting barbastelle passes were recorded between 40 minutes and 1 hour after sunset at Goodrum's Fen and commuting at Stonewall Belt primarily occurred on the more sheltered eastern side. Elsewhere, clear evidence of commuting (rather than foraging) was limited. Foraging activity from the bat assemblage known to be present on the EDF Energy Estate was recorded, to varying degrees, at all locations surveyed during corridor activity surveys.
Building emergence/re-entry surveys.	A maximum of 32 bats were recorded emerging from seven different emergence points at Ash Wood Cottages (June 2019), while between four and eight individuals emerged in May 2019. No bats were confirmed to have re-entered during the July 2019 survey, but it was considered likely, due to the degree of activity around known entrance points, that a proportion of the activity observed reflected re-entering bats. Although no echolocation calls were heard the presence of brown long-eared bats within the building during internal inspections means it is considered that this activity is likely to represent brown long-eared bats.

[5] Corresponding with the static detector results identified at this location (see **Error! Reference source not found.**).

Survey	Summary of Results.
	At Lower Abbey Farm bats were observed emerging/re-entering from Building 1 (one confirmed re-entry and one possible re-entry in June 2019 (species unknown due to lack of echolocation calls) and one possible emergence from a common pipistrelle in July 2019), Building 2 (two confirmed re-entries and two likely re-entries in June 2019 (species unknown due to lack of echolocation calls)), Building 6 (one confirmed and one possible emergence in June 2019 (species unknown due to lack of echolocation calls)), Building 8 (one common pipistrelle re-entry in June 2019 and one common pipistrelle emergence in July 2019) and Building 11 (between 12 and 14 emergences in April 2019, three confirmed re-entries and the possibility of a number of others based on activity levels in June 2019 and 17 emergences and four possible emergence in July 2019). None of these bats were heard echolocating and as such species could not be confirmed although brown long-eared bat dropping were found during internal inspection at Lower Abbey Farm). In addition, it was considered possible that small numbers of bats may have emerged from Buildings 7 and 10 although this could not be confirmed. At Upper Abbey Farm bats were observed emerging/re-entering from Building 1 (three common pipistrelle and one soprano pipistrelle emerged in May 2019, two common pipistrelle, one common or soprano pipistrelle and two unidentified bat re-entered in June 2019 and one common pipistrelle, one soprano pipistrelle and one unidentified bat emerged in July 2019), Building 5 (two identified bats re-entered in July 2019), Building 10 (one brown long-eared bat and one unidentified bat re-entered in June 2019) and Building 11 (two common pipistrelle were confirmed emerging in June 2019 along with a possible emergence of a soprano pipistrelle, two common pipistrelle and one identified bat re-entered in July 2019).

1.3 2020 Summary Overview

1.3.1 This section of this report provides a summary of the survey presented within this report.

1.3.2 Bat Static Monitoring surveys were undertaken of land associated with the proposed Sizewell C Main Development Site by Arcadis in 2020. The surveys confirmed the continued presence of the bat assemblage within the proposed development site along with the continued presence of important foraging and commuting routes.

1.3.3 The analysis of the results suggests that certain areas (and habitats) present on the main development site have higher levels of activity for bats. The areas of highest activity appeared to be the following (locations shown on **Figure 1**):

- The North-east edge of Goose Hill woodland (MS12)
- The Bridleway adjacent to Upper Abbey Farm (MS14)
- The Northern edge of Kenton Hills woodland (MS15)
- The southern edge of Goose Hill woodland adjacent to the SSSI triangle (MS20)
- The Bridleway adjacent to Fiscal Policy woodland (MS22)
- The Western edge of the existing Sizewell A and B power stations (MS27)
- The Western edge of Reckham Pits Wood (MS33)

1.3.4 Other areas with high levels of activity were the middle of Kenton Hills woodland (MS18) and the Southern edge of the EDF Energy Estate at the Sizewell gap (MS28).

1.3.5 The assessment of activity from the static detectors was reviewed alongside the habitats within which detector was placed to determine the habitats which support the highest levels of bat activity. It was assessed that the most important areas around the main development site for foraging bats are:

- Woodlands throughout the EDF Energy Estate; and
- The tree lined bridleway (Bridleway 19) from Lover's Lane to the north.

1.3.6 In addition to reviewing the activity levels at each detector position, the proportion of 'rarer' bats (i.e. not common pipistrelle or soprano pipistrelle) at each location was assessed. These locations may not have the highest level of activity but may support the populations of rarer bats on the site. Two monitoring locations had a notable higher proportion of the rarer bat species. These locations were:

- MS03 – In a small patch of woodland south of Lower Abbey Farm
- MS06 – North-east corner of Ash Wood

1.3.7 In these areas, calls by 'rarer' bats made up more than 10% of the overall calls. This suggests that these areas have importance for rarer bats. These areas were of particular value for Nathusius pipistrelle and Barbastelle bats.

1.3.8 The results of the 2020 bat static monitoring survey support the DCO assessment based on the previous baseline survey data submitted in the Sizewell C Project ES [**APP-242**, **APP-243**, **APP-244**, **APP-245** and **APP-246**] (Ref. 1). The proposed mitigation submitted for the Sizewell C Main Development Site DCO in the bat method statement [**App-252**] (Ref. 2) and bat mitigation strategy [**APP-252**] (Ref. 3) and the residual effects would remain the same as that submitted in Sizewell C Project ES [**APP-224**] (Ref.11).

2 OVERVIEW

2.1 The Aims of the 2020 Survey Updates

2.1.1 The overall aims of the 2020 bat survey update (including the bat static survey) were to:

- Update the existing bat baseline survey data and provide a baseline for future monitoring (the focus of the bat static survey).
- Establish the potential roost resource present within and adjacent to the proposed development site.
- To support the required European Protected Species Licenses to permit development to proceed.

2.2 Site Description

2.2.1 The Main Development Site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston and within the administrative boundary of East Suffolk Council

(ESC). Once constructed, the Sizewell C nuclear power station would be located directly to the north of the existing Sizewell A and B power station complex.

2.3 Submitted Baseline (2013-2019)

2.3.1 This section of the report provides a summary of the baseline status of the bats within the main development site as presented within the DCO submission. The full results of the surveys to date can be found in the Sizewell C Project ES [**APP-242**, **APP-243**, **APP-244**, **APP-245** and **APP-246**] (Ref. 1), the bat method statement [**App-252**] (Ref. 2) and bat mitigation strategy [**APP-252**] (Ref. 3).

2.3.2 At least ten species of bat have been recorded within the main development site boundary: barbastelle (*Barbastella barbastellus*); serotine (*Eptesicus serotinus*); Daubenton's bat (*Myotis daubentonii*); Natterer's bat (*Myotis nattereri*); Leisler's bat (*Nyctalus leisleri*); noctule (*Nyctalus noctula*); Nathusius' pipistrelle (*Pipistrellus nathusii*); common pipistrelle (*Pipistrellus pipistrellus*); soprano pipistrelle (*Pipistrellus pygmaeus*); and brown long-eared bat (*Plecotus auritus*).

2.3.3 The main development site supports: maternity colonies of barbastelle, Natterer's bat, brown long-eared bat, and soprano pipistrelle; non-breeding roosts of the breeding species and also noctule and common pipistrelle; and hibernation roosts for the majority of these species. The main development site boundary and Zol consists of a mosaic of habitats suitable for commuting and foraging bats.

2.3.4 A number of roosts have been identified at:

- Upper Abbey Farm including a brown long-eared bat maternity roost, a Natterer's bat mating roost, hibernating barbastelle, Daubenton's bat, Natterer's bat and probable brown long-eared bat, as well as occasional common pipistrelle, soprano pipistrelle and barbastelle roosts.
- Brown long-eared bat roosts have also been identified at Ash Wood Cottages.
- Brown long-eared bat roosts have also been identified at Lower Abbey Farm, with occasional roosting by common pipistrelle also identified.
- A high proportion of bat boxes installed in Kenton Hills have shown signs of use by bats, including Natterer's bat, noctule and soprano pipistrelle roosts.

- A Natterer's bat roost is present within Leiston Old Abbey, immediately adjacent to the main development site boundary.
- Additional bat roost potential has been identified within Lower Abbey Farm, Plantation Cottage, and the Laboratory, off Lover's Lane.
- Activity suggests serotine and Leisler's bat are unlikely to be roosting within the main development site.
- Potential roosts have been noted for barbastelle in Goose Hill and Broom Covert.
- For noctule in The Grove, the eastern end of Goose Hill and Leiston Old Abbey.
- There is potential roosting for Myotis spp. at The Grove, Leiston Abbey and within bat boxes in Kenton Hills.

2.3.5 Several locations on and close to the main development site boundary have significant numbers of trees with roosting potential for bats, including Fiscal Policy woodland, Ash Wood, the northern edge of Kenton Hills, Goose Hill, and The Grove. In addition, Minsmere and Ash Wood are considered to be key roost areas for barbastelle due to the high number of potential tree roosts present, as well as the presence of a number of identified roosts.

2.3.6 Clear evidence of commuting activity within the main development site boundary is limited, although west-east commuting at the crossroads of Fiscal Policy and Kenton Hills has been noted for common pipistrelle, soprano pipistrelle, "big bat" spp. and Myotis spp. and north-south commuting on the Upper Abbey Farm bridleway (bridleway 19) for common pipistrelle, soprano pipistrelle, Myotis spp., and potentially barbastelle. Barbastelle commuting has been noted.

2.3.7 Activity surveys found barbastelle to be widespread and the species has been recorded within almost all habitats present within the main development site boundary, while common and soprano pipistrelle were the most frequently recorded species. Activity levels in open areas were low while higher levels of activity were recorded at Goose Hill, Upper Abbey Farm bridleway, Leiston Old Abbey woodland, Ash Wood, Nursery Covert, Fiscal Policy woodland and the northern edge of Kenton Hills.

2.3.8 Radio-tracking surveys have identified an interchange of bats between Minsmere and the EDF Energy estate as well as the use of the EDF Energy estate by bats throughout the bat active season.

2.3.9 All bat species in the UK are protected under Schedule 5 of the W&CA (Ref. 4) and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref. 5). Five species (barbastelle, brown long-eared, lesser horseshoe, noctule and soprano pipistrelle bat) are listed as priority species on the Suffolk BAP (Ref. 6); these and two species not normally present in Suffolk (greater horseshoe and Bechstein's bat) are priority species in England under Section 41 of the NERC Act (Ref. 7).

a) Ecological Receptor Status

2.3.10 **Table 3** provides a summary of the value of the receptors present within the proposed development site boundary as assessed in the Sizewell C Project ES [**APP-242**, **APP-243**, **APP-244**, **APP-245** and **APP-246**] (Ref. 1).

Table 3: Summary of the importance of ecological receptors as assessed in the Main Development Site Environmental Statement

Species	Importance under CIEEM guidelines (Ref. 8)	Importance under EIA-specific methodology
Barbastelle	National	High
Natterer's	County	Medium
Leisler's bat and Nathusius' pipistrelle	Local (District)	Low
Noctule and serotine	Local (Zol)	Low
Daubenton's bat, brown long-eared bat, common pipistrelle, and soprano pipistrelle	Local (Zol)	Low

2.4 Update surveys in 2020

2.4.1 The surveys undertaken at the proposed main development site receptor during 2020 were as follows:

- Bat tree assessment surveys
- Bat backtracking surveys
- Bat static surveys (this report)

3 METHODS

Survey Methodology

3.1.1 The deployment of static detectors was based upon the prescriptions present within the relevant Bat Survey Guidelines (Ref. 9). The survey was conducted between June and August 2020. This period was selected as it is a period of high bat activity and can be utilised to compare the 2020 results against the static results utilised to inform the ES and the application for development consent. At each static detector position, five nights of data were analysed for each deployment. Static detector positions were selected according to the following criteria:

- Where static data collected would allow comparison with data collected previously to identify changes in the baseline status;
- Areas where impacts are foreseen and which have not previously been subject to static monitoring; and
- Where static data collected in 2020 could be used to inform monitoring throughout the construction of the proposed scheme.

3.1.2 Further details of the rationale behind the detector positioning are provided below and in **Table 4**.

a) Static Detector Positioning and Placement

3.1.3 The initial placements from which the 2020 survey locations were based were positioned according to judgemental positioning employed the following assessment considerations:

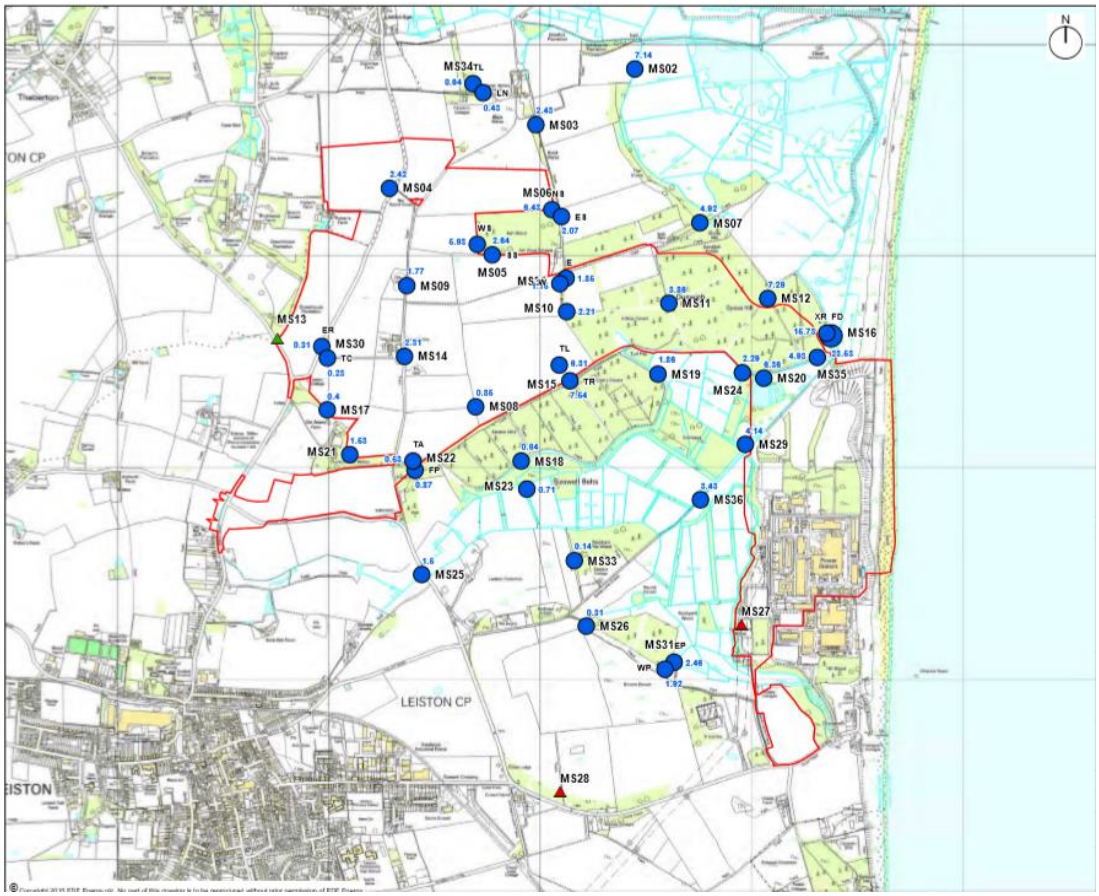
- Distributed across the main development site to gain maximum area coverage;

- Positioned where static data could be utilised to infer the presence of roosting bats;
- Positioned within or adjacent to a range of habitats present on and around the main development site, ensuring that all broad habitats received coverage from the detectors; and
- Positioned where information on bats moving between key locations could be obtained.

3.1.4 A subset of the detectors was positioned on linear features considered likely to be of value for bats (in particular where fragmentation may arise during construction of Sizewell C) and within proposed mitigation areas;

3.1.5 The detector microphones were positioned at 1 - 2m above the ground where possible, attached to landscape features (fence posts, trees, structures) with the microphones in a 45 degree downwards position. Where the microphones were positioned in linear features, the microphones were positioned at 90 degrees to the direction of the feature. Positioning of the microphones was selected to be in areas where vegetation etc would not interfere with the microphone.

Image 1: Previous Monitoring Locations



3.1.6 The monitoring locations used in previous surveys are shown on Image 1 above and the rationale behind their inclusion / exclusion (where previous monitoring locations were omitted from the 2020 surveys) from the 2020 monitoring is detailed in **Table 4** below.

Table 4: Rationale behind the selection of different detector deployment locations

Monitoring Station utilised to inform the DCO submission and new submissions	Reason for inclusion in previous surveys	Reason for inclusion / exclusion in surveys 2020 onwards
MS01, MS2; MS3	Potential commuting routes north (based on a concern raised by RSPB)	MS2, MS3 – to monitor effect on Minsmere MS01 – was not surveyed in 2016 so there is no baseline for comparison
MS4; MS9; MS14	Upper Abbey track: north-south bridleway (important	MS9, MS14 – to monitor important commuting route

Monitoring Station utilised to inform the DCO submission and new submissions	Reason for inclusion in previous surveys	Reason for inclusion / exclusion in surveys 2020 onwards
	commuting route; location of proposed environmental corridor/buffer)	MS4 – further away from the impact area since scheme design changes.
MS5; MS6; MS10	On the edge of Ash Wood and on commuting route south from here	MS6, MS5 – To monitor commuting and activity within woodland. MS10 – will be lost beneath construction footprint therefore this is not an appropriate location to assess against future construction impacts
MS7	Track between the Grove and Goose Hill; potential north-south and east-west corridor (subject of concern raised by NE)	MS7 – Monitor corridor between Grove and Goose Hill
MS8; MS15	On tree-line / hedge leading into arable fields north of Kenton Hills	MS15 – Monitor tree line MS8 – will be lost beneath construction footprint therefore this is not an appropriate location to assess against future construction impacts
MS11; MS12; MS16	Crossroads within Goose Hill (subject of concern raised by NE); M16 north of new site access bridge	MS12 – Monitor crossroads within goose hill MS11 and 16 – will be lost beneath construction footprint therefore this is not an appropriate location to assess against future construction impacts
MS13; MS17	Potential commuting route adjacent to southern boundary of Campus Option 1 [Access restrictions currently prevent	MS13 and MS17 – No important commuting route identified

Monitoring Station utilised to inform the DCO submission and new submissions	Reason for inclusion in previous surveys	Reason for inclusion / exclusion in surveys 2020 onwards
	deployment at M13 further to the west; replaced by M30]	
MS21; MS22	Strong east-west commuting corridor, both west and east of Upper Abbey track. Focus on bats arising from Leiston Old Abbey / Fiscal Policy and crossing proposed rail/ road junction (concern raised by several consultees)	MS22 – Monitor crossing point of important commuting routes (Fiscal Policy) M21 – Low levels of activity recorded previously
MS18; MS19	Commuting corridor along peripheral ride	MS18, MS19 – Monitor commuting corridor
MS20; MS24	Junction between northern Sizewell Belts and Goose Hill	MS20 – Monitor junction between Sizewell Belts and Goose Hill MS24 – Duplication of M20
MS23	Edge of Sizewell Belts (area used for foraging)	MS23 – Duplication of M18
MS25; MS26; MS28; MS31	Fields to the south (less intensively surveyed previously); M28 will also monitor use of new reptile habitat by bats as it develops	MS25, MS26, MS28; MS31 – Fields to the south including reptile mitigation area
MS27	On the edge of Coronation Wood, which may be affected by the proposals	MS27 – Monitor Coronation Wood
MS29	Junction between SSSI and Grimsey's; corner of SSSI to be lost, but bat movement corridor to be maintained under proposed bridges	MS29 – Monitor junction between SSSI and Grimsey's Corner
MS30	Eastbridge Road and lane to Upper Abbey Farm	MS30 – Monitor Eastbridge Road and lane to Upper Abbey Farm
MS32	Stonewall Belt, running south from Ash Woods.	MS32 – will be lost beneath construction footprint therefore this is not an

Monitoring Station utilised to inform the DCO submission and new submissions	Reason for inclusion in previous surveys	Reason for inclusion / exclusion in surveys 2020 onwards
		appropriate location to assess against future construction impacts
MS33	Consultees requested monitoring at Reckham Pits.	MS33 – Monitor Reckham Pits
MS34	Replaced MS1 due to access restrictions	MS34 – Monitor activity at Lower Abbey Fam
MS35	Proposed SSSI bridge location.	MS35 – Monitor proposed SSSI bridge location
MS36	SSSI	MS36 – To monitor SSSI
N/A new position Aldhurst Farm	N/A	To monitor the mitigation area
N/A new position Lover's Lane Entrance	N/A	To monitor the Aldhurst farm mitigation area and the new rail crossing
N/A new position The Grove	N/A	To monitor the woodland and commuting route
N/A new position South of Great Mount Wood	N/A	To monitor the woodland and commuting route
N/A Middle of Goose Hill	N/A	Requested during consultation with Natural England in August

Static Detector Programming

3.1.7 The 2020 surveys used SM4 detectors rather than the SM2 detectors[6] that have been used previously. This was to ensure that the results of these surveys are future proofed by using the most up to date detectors.

3.1.8 The detectors were programmed to commence recording 30 minutes prior to sunset and continue recording throughout the night until 30 minutes after sunrise, in line with good practice guidelines. Details of the programming of the detectors is presented in **Appendix A**.

[6] SM2 and SM4 are both static bat detectors manufactured by Wildlife Acoustics. The SM4 is an evolution of the SM2 and is considered more reliable, easier to secure and can store twice as much data as the SM2. Considering the microphones used on each are comparable, being omni-directional, the use of SM4s instead of SM2s is not considered to impact the results.

Table 5: Dates of Bat Static Monitoring

Month	Subset	Deployment Dates	Dates Analysed	Surveyors who placed / retrieved the detector
June	1	18th - 25th June	18th – 23rd June	Nick Downs, MCIEEM Bat survey license number 2015-11591-CLS-CLS Henry Gunning, ACIEEM
	2	9th – 14th July	9th – 14th July	Nick Downs, MCIEEM Bat survey license number 2015-11591-CLS-CLS Henry Gunning, ACIEEM
July	1	15th - 22nd July	17th – 22nd July	Henry Gunning, ACIEEM Rob Regan QCIEEM
	2	23rd – 30th July	25th – 30th July	Nick Downs, MCIEEM Bat survey license number 2015-11591-CLS-CLS Alex Ellis MCIEEM Bat survey licence number 2015-11399-CLS-CLS
August	1	5th – 11th August	5th – 9th August	Bethany Hasell QCIEEM Rory Roche
	2	13th – 20th August	13th – 17th August	Nick Downs, MCIEEM Bat survey license number 2015-11591-CLS-CLS Ana Pino Blanco

Data Analysis Methodology

3.1.9 Due to the large amount of data to be analysed, an automated detector analysis protocol was required. The most reliable data analysis software currently available is considered to be 'SonoChiro' (Arcadis in house study conducted by Paola Reason and Kathryn Skinner, summary in paper 'Recommendations for using automatic bat identification software with full spectrum recordings' (Reason et al 2016)). All data was therefore analysed using automated analysis software 'SonoChiro'.

3.1.10 SonoChiro provides three levels of identification to the calls recorded on the detectors.

- Species level identification (this is the software's assessment of the species)
- Group level identification (this assess the call to a 'Group' i.e. myotis sp., pipistrelle sp. etc.). This level of identification is less specific than the species level and the software has a higher level of confidence in this identification
- Overall identification (this is the identification from the two identifications above that the software is sufficiently confident in the assessment for this to be utilised in the analysis).

3.1.11 The three levels of identification provided by SonoChiro work on a confidence scale. Identification is provided for the potential species represented by a call (species level identification) and this identification is assigned a confidence level on a scale of 1 to 10; with 1 indicating the lowest level of confidence in the accuracy of the identification and 10 indicating the greatest level of confidence in the identification. A further identification is provided to the group level, and this identification is similarly provided with a confidence level on the same 1 to 10 scale.

3.1.12 As explained above, the overall identification is the identification that SonoChiro has the greatest level of confidence in being correct from the species and group identifications. Starting from the 'species level identification', a threshold value of 5 is enforced (i.e. a confidence of below 5 is considered insufficient to make a species identification). Where a 'species level identification' is greater than 5, this identification is considered robust and is then provided as the 'overall identification'. Where a 'species level identification' is less than or equal to 5 the species level identification is discarded, and subsequently the 'group level identification' is considered. In this scenario, the same threshold value of 5 is enforced on the 'group level identification'; where this is greater than 5 the 'group level

identification' is provided as the 'overall identification', where it is less than or equal to 5 the 'group level identification' is discarded and an 'overall identification' of Chiro sp. is used. An identification of Chiro sp. indicates that there is clearly a bat call present, but the auto identification software cannot derive sufficient information from the call to provide, to a suitably confident level, a species or group identification.

3.1.13 Subsequent to the automated data analysis, the resulting analysis was assessed by a bat specialist and information on the timing of the recording of the first / last bat of each species on each recording night was obtained. This data assessed over the season was utilised to determine the likelihood of a roost of a given species being in close proximity to the detector location. Information upon the average emergence / re-entry time of various species recorded on the main development site was used alongside this information to make a qualitative assessment of the potential for bat roosts to be present around the static detector positions.

b) Activity Normalisation

3.1.14 Subsequent to each set of static data being analysed, the data was 'normalised' to allow activity levels between positions to be compared. This was conducted by dividing the number of calls recorded by the number of hours that a detector was recording.

c) Activity assessment of deployments (within main development site)

3.1.15 To aid analysis of the results, the activity levels at each deployment location were given broad activity bandings. This assessment involved reviewing the calculated activity levels and banding the results in to low, medium and high. This gives a level of relative activity for different areas within the main development site.

3.1.16 The levels of activity have been split as follows:

- **low activity:** 7.5 passes per hour average or less;
- **medium activity:** between 7.5 and 15 passes per hour;
- **high activity:** greater than 15 passes per hour.

3.1.17 This split was based upon professional judgement after review of the data, in the absence of any published guidance.

d) Valuation of 'bat rarity'

3.1.18 Within the main development site in order to subdivide the bats into meaningful subsets, it was necessary to categorise the 'rarity' of species present (after Wray 2010, Ref. 10). This categorisation is based upon the rarity of each species within its range. This assess categorisation is further used within other valuation assessments associated with the project. **Table 6** lists the three bandings of rarity utilised within the assessment.

Table 6: Categorisation of Bats according to Wray 2010 (Ref. 10)

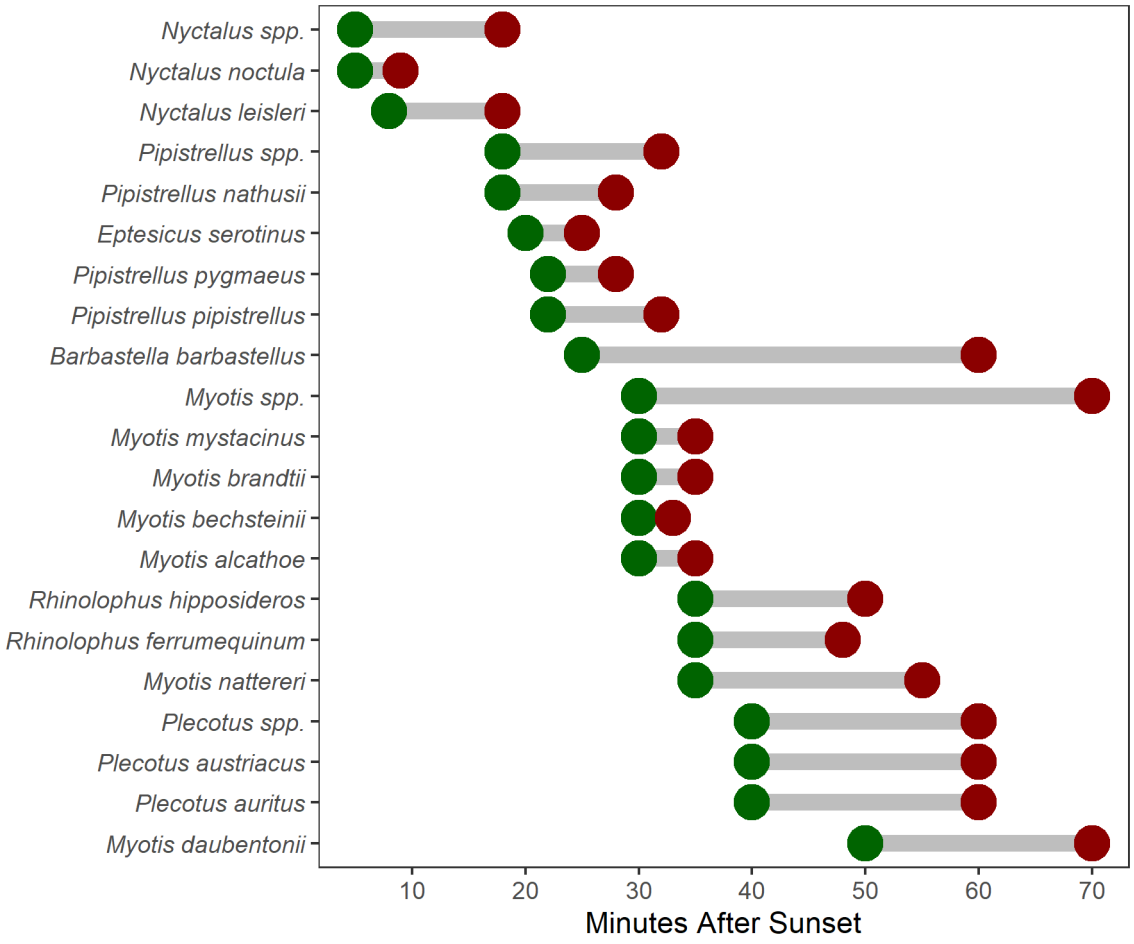
Rarity within range	Species	Notes on presence on main development site
Rarest (population under 10,000)	Greater horseshoe, Bechstein's, alcathoe, greater mouse-eared, barbastelle, grey long-eared.	Barbastelle recorded on the main development site.
Rarer (population 10,000 – 100,000)	Lesser horseshoe, whiskered, Brandt's, Daubenton's, Natterer's, Leisler's, noctule, Nathusius' pipistrelle, serotine.	Myotis bats, Leisler's, noctule, Nathusius' pipistrelle and serotine recorded on the main development site.
Common (population over 100,000)	Common pipistrelle, soprano pipistrelle, brown long-eared.	All of these species are present within the main development site

e) Assessment of likelihood of nearby roosts at each detector location

3.1.19 The static detector data were utilised to provide a quantitative assessment of the likelihood of a nearby roost being present. This assessment was able to identify where roosts were likely to be present but was not used to exclude the possible presence of nearby roosts (as bats may have left roosts and not passed the detector).

3.1.20 In order to conduct this assessment, the first and last bats recorded of each species were investigated. As bats emerge to forage etc around sunset, the amount of time after sunset that bats tend to emerge differs between species. The graph below (**Plot 1**) shows the average emergence time after sunset for each bat species recorded / likely to be present on the main development site.

Plot 1: Bat Emergence Times



3.1.21 The time after sunset and / or before sunrise that the first and last bat of each species was recorded was assessed. Where this was close to or before the average emergence / re-entry time of a species this was noted. This combined with an assessment of the roosting opportunities around a location were combined, along within the results from other surveys, to assess the likelihood of nearby roosts. It should be noted that his is a qualitative assessment only for risk assessment and was utilised as such.

f) Survey Limitations

3.1.22 Within the survey design, it was not possible to deploy detectors to all locations simultaneously, due to the size of the main development site, risk of interference by members of the public and practical considerations. The detectors were deployed in two sets of 14, ensuring both sets were undertaken on a monthly basis. However, due to the rotational deployment for the purposes of this study, considering the large amount of data

collected, and the normalisation calculations applied (assessing 'passes per hour'), this issue is unlikely to have affected the value of the data. The rotations utilised are presented in **Table 7**.

Table 7:Monitoring Location Deployment Subsets

Deployment Subset	Monitoring Locations	
1	MS02	South of Great Mount Wood
	MS03	MS09
	MS34	MS12
	The Grove	MS14
	MS06	MS30
	MS07	MS15
	MS05	MS22
2	Lovers Lane Entrance	MS29
	MS18	MS20
	MS25	MS35
	MS33	MS26
	Aldhurst Farm	MS31
	MS36	MS27
	MS19	MS28

3.1.23 It is difficult within automated survey data to determine a 'bat 'pass', as without visual observations, the same individual bat may pass multiple times or multiple bats may pass the detector. However, to address this issue, the same parameters for file partitioning were utilised on all detectors, and a single sound file was identified as a bat 'pass'. This allows a repeatable comparison of activity levels between static locations. It is not possible from this data (or any static (automated) detector data) to accurately assess the number of bats within an area, however an assessment of bat 'activity' can be made.

3.1.24 Static detectors could not be deployed at the site until the 18 June. There were two sets of static deployments, 14 detectors per deployment, within each rotation, two sets of deployments were within June (i.e. 28 static surveys) the final sets of static data for 'June' (i.e. 14 static surveys) was collected between 9 -14 July. Locations of deployments are presented in **Figure 1**. Dates of detector deployments analysed are presented in **Table 6**. The monitoring location 'Middle of Goose Hill' was an additional location requested by Stakeholders.

3.1.25 On four occasions (July at positions MS09, MS19 and MS22 and August at Aldhurst Farm), apparently functioning detectors in locations with high activity on other deployments recorded no bat activity, or only 'noise'. It was considered reasonable to assume that this was due to faulty detectors

(faulty or damp microphones, interference with equipment) or excessive loud 'noise' making noise sources (generators, crickets, farm machinery, rustling wind / leaves) covering up bat calls. Where it was reasonable to assume that the absence of activity from a deployment was not in line with the other findings for the deployment locations, this data was omitted from the analysis to prevent an artificially lower activity level being calculated.

3.1.26 During the August deployment at positions South of Mount Wood and MS06 the SD cards became corrupted, and no data was recoverable. However, these locations were redeployed as part of the second set of deployments, therefore this is not considered to be a limitation to the survey.

3.1.27 Despite these survey issues, the equipment functioned correctly in the vast majority of the surveys, with over 204,240minutes (3,404 hours) of data analysed and recorded from across the main development site.

3.1.28 In addition, in the analysis, all data was assessed using a 'passes per hour' manipulation/normalisation, in order to ensure that variations in deployment period were minimised within the comparative results.

3.1.29 It should be noted that some bat species are difficult to record on statics (i.e. brown long-eared) due to the 'quiet' nature of their echolocation calls. This was taken into consideration when analysing the results. Automatic identification is considered suitably accurate for the purposes of this survey, however, this type of software will provide false identifications in a low percentage of instances. As such, where species which are not present in Suffolk were identified, these were manually removed (less than 10 calls in total).

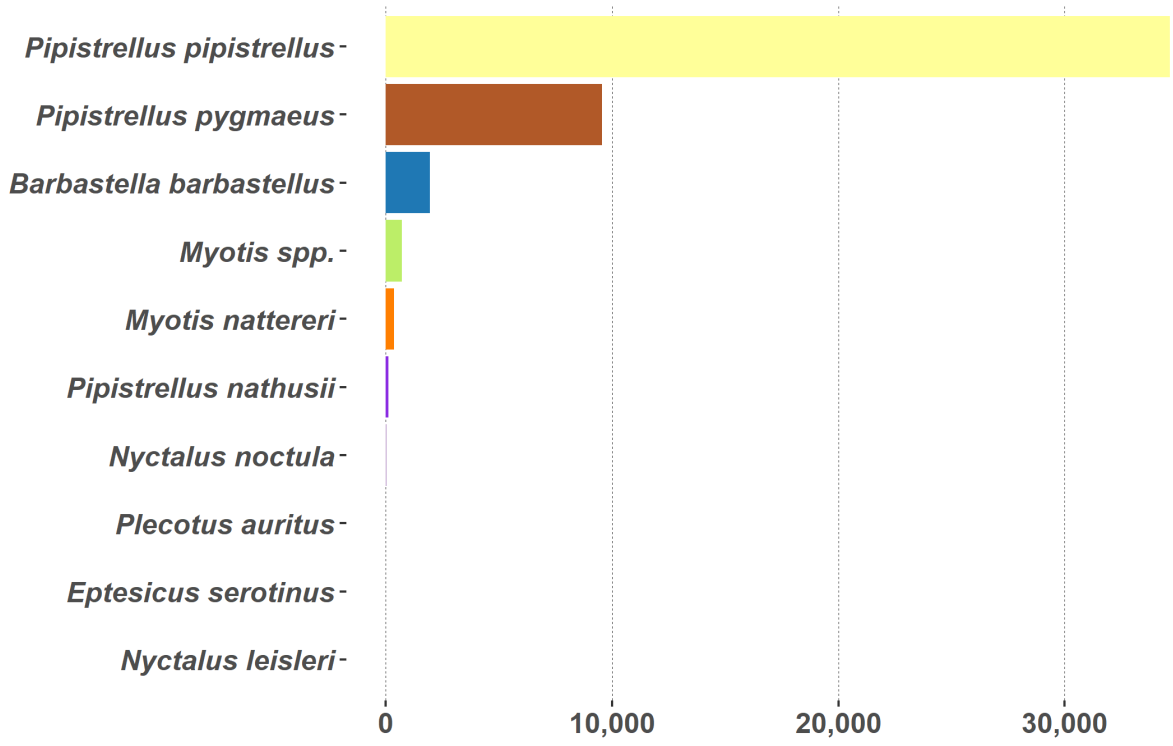
4 RESULTS

a) Seasonal variation of call frequency (i.e. activity)

4.1.1 During the survey period, a total of 47,481 'bat calls' were identified by SonoChiro, during 3,404 hours of data collection. The calls were identified to species group, and the call frequency from across the main development site was normalised into 'passes per hour'.

4.1.2 The distribution of these calls between the species identified is shown on **Plot 2** below.

Plot 2: Count of Species Observations



4.1.3 The majority of calls were recorded within June. **Table 8** below shows the level of call activity throughout the survey period.

Table 8: Number of Bat Passes per Month by Species

Species	June	July	August
Barbastella barbastellus	842	921	207
Eptesicus serotinus	3	6	1
Myotis spp.	282	299	149
Myotis nattereri	38	127	212
Nyctalus leisleri	1	0	0
Nyctalus noctula	38	6	9
Pipistrellus nathusii	99	29	5
Pipistrellus pipistrellus	16,419	13,170	5,048
Pipistrellus pygmaeus	4,579	3,332	1,649
Plecotus auritus	2	6	2
Total Nº of Bat Passes	**22,303**	**17,896**	**7,280**

b) Bat activity assessments

4.1.4 Activity levels across the main development site varied greatly. Once the data was normalised (to a passes per hour value), clear variations between the number of calls at each location became apparent. **Table 9** below outlines the 'Median calls per hour' across the main development site at each monitoring location, normalised for survey effort. Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having high activity. In these circumstances, the median is likely to be a more useful summary of the 'average' activity than is the mean.

Table 9: Median Bat Passes per Hour by Monitoring Location of each Species

Monitoring Location	Species									
	Barbastelle	Serotine	Natterer's	Myotis sp.	Leisler's	Noctule	Nathusius Pipistrelle	Common Pipistrelle	Soprano Pipistrelle	Brown long-eared
Aldhurst Farm	1.91		0.21	0.14		0.89		7.96	2.39	
Lovers Lane Entrance						0.14	0.21	2.28	0.61	
Middle Goose Hill	0.48			0.11		0.11		9.78	0.32	
MS02	0.50	0.13	0.13	0.53		0.13	0.13	1.08	5.00	0.12
MS03	0.60	0.13	0.13	0.13		0.13	0.39	4.81	0.38	0.13
MS05	0.41			0.13		0.14		3.73	2.07	
MS06	2.21	0.38	0.14	0.41	0.14	0.14	0.21	5.81	0.63	0.14
MS07	0.28		0.14	0.14		0.14	0.14	1.13	1.19	
MS09	0.83			0.14				9.61	0.97	
MS12	0.45		0.25	0.26		0.14	0.28	15.89	2.04	0.13
MS14	0.38		0.11	0.27				3.31	20.89	
MS15	0.19		0.38	0.58			0.14	35.96	2.76	
MS18	0.82		0.27	0.95				7.97	2.31	
MS19	0.32		0.27	0.30				2.71	2.69	
MS20	1.64		0.26	0.84			0.13	21.13	1.92	0.12
MS22	0.55		0.24	0.22			0.11	18.18	5.10	

Monitoring Location	Species									
	Barbastelle	Serotine	Natterer's	Myotis sp.	Leisler's	Noctule	Nathusius Pipistrelle	Common Pipistrelle	Soprano Pipistrelle	Brown long-eared
MS25	0.68		0.24	0.37		0.21		2.87	5.15	0.14
MS26	0.14							0.97	0.83	
MS27	0.27		0.12	0.13			0.12	25.77	9.31	
MS28	0.24			0.61			0.14	13.55	0.48	
MS29			1.48	0.37				3.12	0.24	
MS30	0.28		0.14	0.38				13.96	1.38	
MS31	0.20			0.11			0.14	0.61	0.48	
MS33	1.03			0.24		0.11		15.53	2.76	
MS34	0.38		0.14	0.14				3.07	0.63	
MS35	1.87		0.12	0.11				3.32	0.55	
MS36	0.12		0.21	0.11				0.85	0.21	
South of Great Mount Wood	1.79	0.21	0.25	0.19		0.14	0.13	7.21	0.83	0.13
The Grove	0.14		0.14	0.13			0.14	1.40	0.64	

4.1.5 Table 10 below shows the total number of bat passes at each monitoring location per month. The total bat passes per hour has been normalised for survey effort. This assessment involved reviewing the calculated activity levels and banding the results in to low, medium and high. This would give a relative activity level within the main development site, using only the data collected from within the main development site.

4.1.6 The bandings of activity are based upon the site data and are to aid analysis. They are bespoke for the site based on the results.

Table 10: Bat Passes per Hour by Monitoring Location

Location	Number of Bat Passes				
	June	July	August	Total	Total Bat passes per hour
Aldhurst Farm	749	91	FAULTY	840	11.1
Lovers Lane Entrance	1,356	133	9	1,498	12.5
MS02	699	211	244	1,154	9.6
MS03	315	258	7	580	4.8
MS05	355	62	0	417	3.5
MS06	415	456	29	900	7.5
MS07	329	55	93	477	4.0
MS09	762	FAULTY	10	772	9.5
MS12	500	1,076	938	2,514	21.0
MS14	2,005	666	223	2,894	24.1
MS15	991	2,228	3	3,222	26.9
MS18	473	1,236	315	2,024	16.7
MS19	246	FAULTY	716	962	11.9
MS20	1,117	1,361	992	3,470	28.9
MS22	1,341	FAULTY	825	2,166	26.7
MS25	348	836	464	1,648	13.7
MS26	1,502	76	8	1,586	13.2
MS27	1,996	3,577	393	5,966	49.7
MS28	1,016	872	260	2,148	17.9
MS29	0	321	262	583	4.9
MS30	943	703	95	1,741	14.5
MS31	300	13	11	324	2.7
MS33	1,088	1,532	481	3,101	25.8
MS34	1,342	236	48	1,626	13.6
MS35	326	932	92	1,350	11.25
MS36	1	20	119	140	1.2
South of Great Mount Wood	377	765	1	1,143	9.5
The Grove	1,411	179	46	1,636	13.6

Location	Number of Bat Passes				
	June	July	August	Total	Total Bat passes per hour
Middle of Goose Hill	----	----	598	598	13.4
Key					
Low Activity Levels		Medium Activity Levels		High Activity Levels	

4.1.7 Of the 29 monitoring locations, seven locations had 'low' levels (7.5 passes per hour or less) of activity. These locations are described in **Table 11** below. The bat activity levels at each of the monitoring locations are presented in **Figure 2**.

Table 11: Monitoring Locations where 'low' Activity was Recorded

Location	Total Bat Passes	Total Bat passes per hour
MS03	580	4.8
MS05	417	3.5
MS06	900	7.5
MS07	477	4.0
MS29	583	4.9
MS31	324	2.7
MS36	140	1.2

4.1.8 Of the 29 monitoring locations, 13 locations had 'medium' levels (between 7.5 and 15 passes per hour) of activity. These locations are described in **Table 12** below. The bat activity levels at each of the monitoring locations are presented in **Figure 2**.

Table 12: Areas Where 'Medium' Levels of Activity Were Recorded

Location	Total Bat Passes	Total Bat passes per hour
Aldhurst Farm	840	11.1
Lovers Lane Entrance	1,498	12.5
MS02	1,154	9.6
MS09	772	9.5
MS19	962	11.9
MS25	1,648	13.7
MS26	1,586	13.2
MS30	1,741	14.5
MS34	1,626	13.6
MS35	1,350	11.25
South of Great Mount Wood	1,143	9.5
The Grove	1,636	13.6

Location	Total Bat Passes	Total Bat passes per hour
Middle of Goose Hill	598	13.4

4.1.9 Of the 29 monitoring locations, nine locations had 'high' levels (greater than 15 passes per hour) of activity. These locations are described in **Table 13** below. The bat activity levels at each of the monitoring locations are presented in **Figure 2**.

Table 13: Areas Where 'High' Levels of Activity Were Recorded

Location	Total Bat Passes	Total Bat passes per hour
MS12	2,514	21.0
MS14	2,894	24.1
MS15	3,222	26.9
MS18	2,024	16.7
MS20	3,470	28.9
MS22	2,166	26.7
MS27	5,966	49.7
MS28	2,148	17.9
MS33	3,101	25.8

c) Assemblage of Species

i. Sitewide assemblage

4.1.10 The calls recorded were largely common or soprano pipistrelles, these bats formed 72.95% and 20.13% of the calls recorded respectively.

4.1.11 Overall, 1,153 Barbastelle calls were recorded during the survey. The numbers of calls from each species group are presented in **Table 14** below.

Table 14: Species and Number of Bat Passes

Species	Count (No.)	Precentage of total (%)
Common pipistrelle	34637	72.95
Soprano pipistrelle	9560	20.13
Barbastelle	1153	4.15
Myotis sp.	730	1.54
Natterer's	377	0.79
Nathusius pipistrelle	133	0.28
Noctule	53	0.11
Serotine	10	0.02

Species	Count (No.)	Precentage of total (%)
Brown long-eared	10	0.02
Leisler's	1	0.00

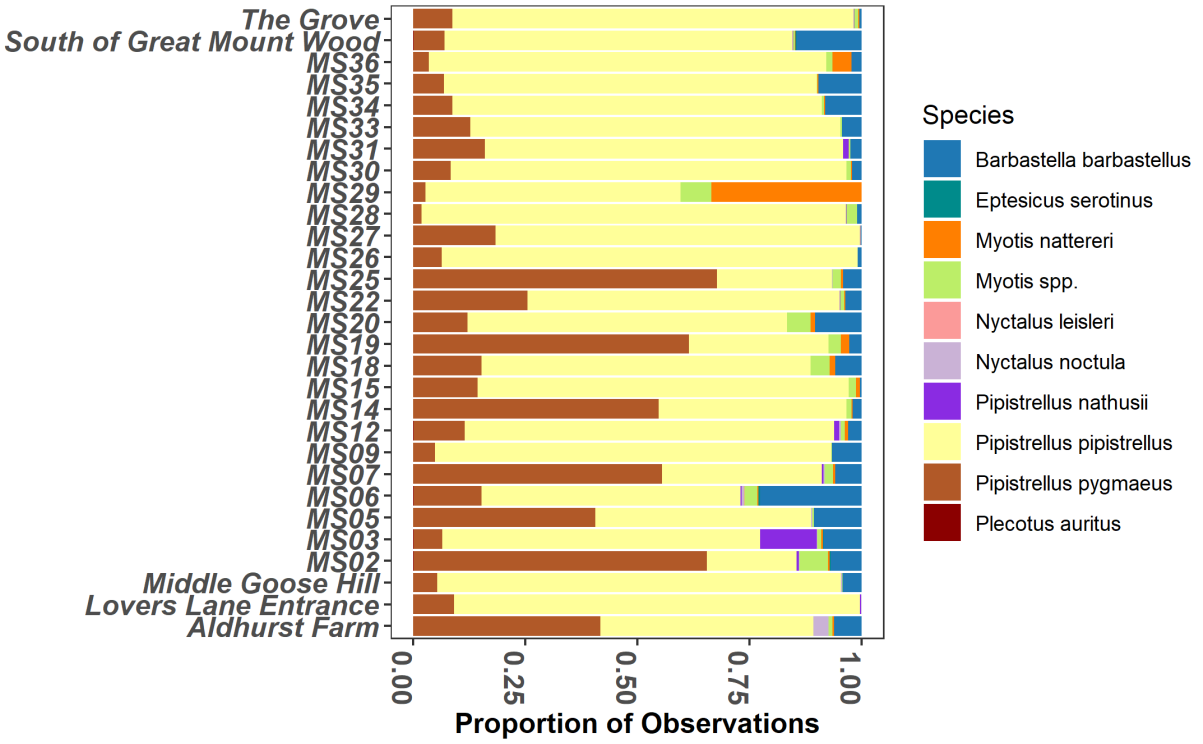
4.1.12 This assemblage assessment determined by the static surveys is aligned with that of the previous years results shown in the Sizewell C Project ES submitted in support of the DCO application and summarised in **Table 1** and **Table 2**.

ii. Assemblage at each detector location

4.1.13 Across the main development site, the assemblage of bats utilising each area varies with location. The activity level alone does not necessarily represent the value of the area (i.e. an area where a common pipistrelle repeatedly forages may not necessarily be more valuable than a location where a varied assemblage of bats forages / commutes).

4.1.14 **Plot 3** below shows the proportion of bat passes by monitoring location.

Plot 3: Proportion of bat passes recorded at each deployment location



4.1.15 To examine the diversity of the assemblage at each location, the proportion of bats which were not identified as 'common or soprano pipistrelles was examined.

4.1.16 **Table 9** shows the percentage of bat passes recorded within each of the two groups (common and soprano pipistrelles and 'other bats'). All data has been normalised for recording time into a 'passes per minute'. 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.

Table 9: Percentage of passes of 'common' and 'rarer' species of bats.

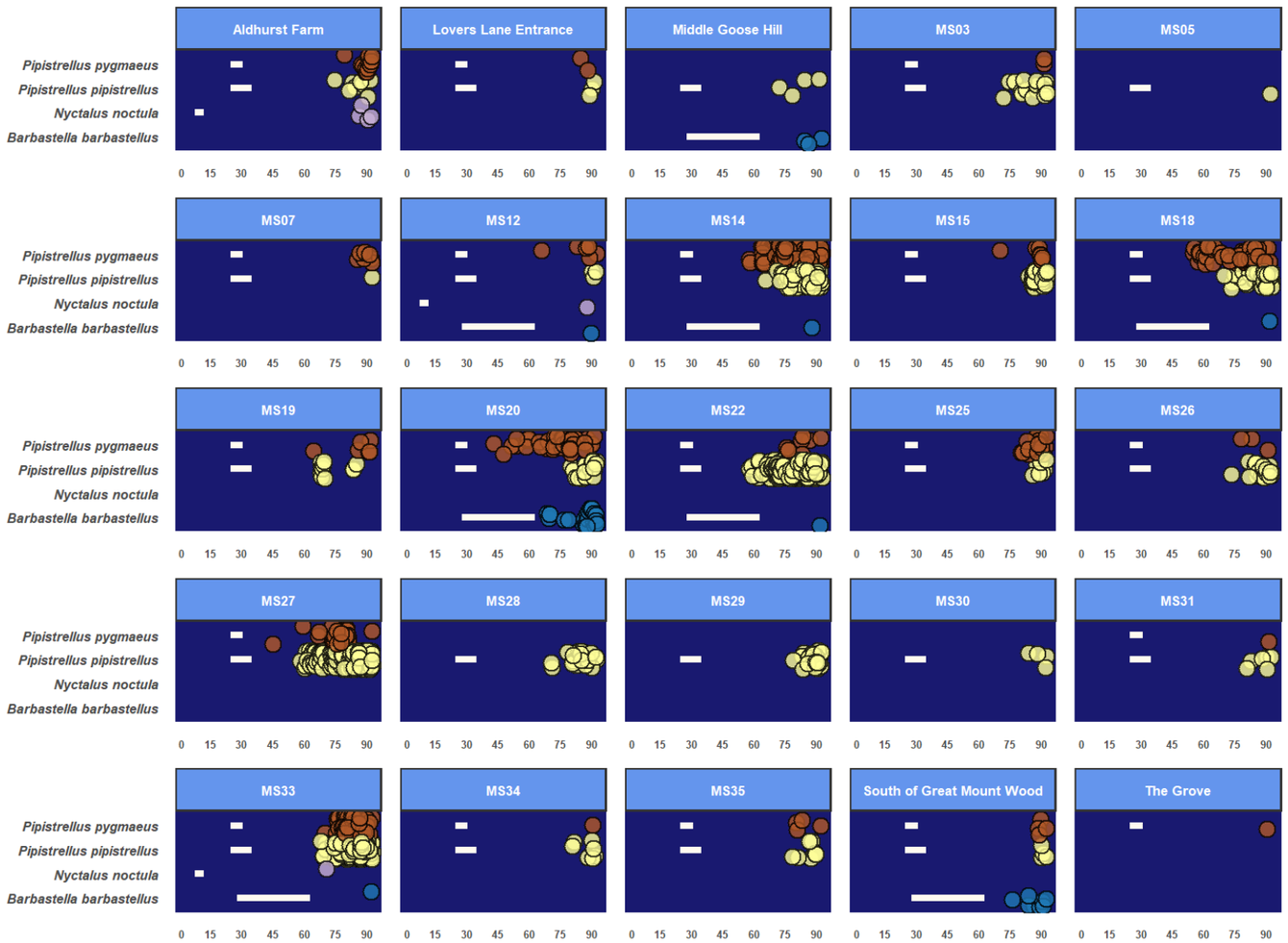
Position	Percentage of common bats (passes of common or soprano pipistrelle)*	Percentage of passes of 'rarer' bat species
Aldhurst Farm	89.3	10.7
Lovers Lane Entrance	99.7	0.3
MS02	85.4	14.6
MS03	77.2	22.8
MS05	89.0	11.0
MS06	72.9	27.1
MS07	91.2	8.8
MS09	93.3	6.7
MS12	93.9	6.1
MS14	96.6	3.4
MS15	97.2	2.8
MS18	88.7	11.3
MS19	92.7	7.3
MS20	83.4	16.6
MS22	95.2	4.8

Position	Percentage of common bats (passes of common or soprano pipistrelle)*	Percentage of passes of 'rarer' bat species
MS25	93.4	6.6
MS26	99.2	0.8
MS27	99.3	0.7
MS28	96.6	3.4
MS29	59.7	40.3
MS30	96.7	3.3
MS31	96.0	4.0
MS33	95.3	4.7
MS34	91.2	8.8
MS35	90.0	10.0
MS36	92.1	7.9
South of Great Mount Wood	84.6	15.4
The Grove	98.3	1.7
Middle Goose Hill	95.5	4.5

d) Areas where bat emergence times indicate nearby roosts

4.1.17 **Plot 4** below presents the bat observations, against the estimated emergence time, for species to exit their roosts; indicating the likelyhood a roost for that species is nearby. Any observation nearer or before sunset is likely to be a stronger indication that a roost is nearby. The roost emergence times for the bat species is based on the work of British Bat Calls: A Guide to Species Identification (Russ 2012). .

Plot 4: Roost and Observed Emergence by Location



First 90 minutes after sunset.
White bars are emergence times adapted from (Russ 2012)

5 DISCUSSION

a) Activity Levels

i. Areas with high levels of bat activity

5.1.1 The analysis of the results suggests that certain areas (and habitats) present on the main development site have higher levels of activity for bats. The most valuable areas appeared to be the following (shown on **Figure 2**):

- The North-east edge of Goose Hill woodland (MS12)
- The Bridleway adjacent to Upper Abbey Farm (MS14)
- The Northern edge of Kenton Hills woodland (MS15)
- The southern edge of Goose Hill woodland adjacent to the SSSI triangle (MS20)
- The Bridleway adjacent to Fiscal Policy woodland (MS22)
- The Western edge of the existing Nuclear facility (MS27)
- The Western edge of Reckham Pits Wood (MS33)

5.1.2 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.

5.1.3 Other areas with high levels of activity were the middle of Kenton Hills woodland (MS18) and the Southern edge of the EDF Energy Estate (MS28).

5.1.4 Therefore, the most important areas around the main development site for foraging bats are:

- Woodlands throughout the EDF Energy Estate, particularly Kenton Hills, around the periphery of the SSSI and Reckham pits; and
- Bridleway 19 from Lover's Lane to the north

ii. Areas with lower levels of bat activity

5.1.5 The lowest levels of activity were recorded in at monitoring locations:

- Lower Abbey Farm (MS03);
- The South-west corner of Ash Wood (MS05);
- The North-east corner of Ash Wood (MS06);
- The Southern edge of The Grove woodland (MS07);
- Alongside Sizewell Drain (MS29 and MS36); and
- To the north of the National Grid site (MS31).

iii. Areas with "rarer" bat activity

5.1.6 In addition to the areas where high levels of activity were recorded, it was important to determine which areas of the main development site are of importance due to the assemblage of bats they support (i.e. support a significant number of the rarer species of bats).

5.1.7 When the proportion of bat calls not attributed to common or soprano pipistrelles was assessed, nine monitoring locations had a notable higher proportion of rarer bats. These locations were:

- Aldhurst Farm – One of the proposed mitigation sites
- MS02 – Northern edge of The Grove woodland
- MS03 – In a small patch of woodland south of Lower Abbey Farm
- MS05 – South-west corner of Ash Wood
- MS06 – North-east corner of Ash Wood
- MS18 – Middle of Kenton Hills Woodland
- MS20 – Northern edge of SSSI
- MS29 – South-east edge of SSSI
- South of Great Mount Wood – Southern edge of Great Mount Wood

5.1.8 In these areas, calls by 'rarer' bats made up more than 10% of the overall calls. This suggests that these areas have importance for 'rarer' bats.

These areas were of particular value for Natterer's, Nathusius pipistrelle and Barbastelle bats.

5.1.9 The percentage of the overall number of bat calls that can be attributed to Barbastelle bats (4.15%) is notable and indicates that the EDF Energy estate is likely to be an important resource for this species.

iv. Areas where bat emergence times indicate nearby roosts

5.1.10 It is difficult to determine roosting activity from static detectors alone, however as explained above, the emergence times recorded during the survey season combined with habitat and feature assessment data can be utilised to infer the potential presence of nearby roosts.

5.1.11 None of the data indicated the presence of a roost in close proximity to the monitoring locations.

b) Summary

5.1.12 The most important areas around the main development site for foraging bats are the woodlands throughout the EDF Energy Estate and the Bridleway from Lover's Lane to the north. Nine of the monitoring locations had a notable higher proportion of rarer bats (Aldhurst Farm, MS02, MS03, MS05, MS06, MS18, MS20, MS29 and South of Great Mount Wood), these were located towards the northern extent of the EDF Energy estate on the periphery of Ash Wood, within Kenton Hills, on the periphery of the SSSI and south of Lower Abbey Farm.

5.1.13 Barbastelle were recorded at most of the monitoring locations which accords with the findings of previous surveys, which recorded Barbastelle across the EDF Energy estate. The site overall has a notable proportion of Barbastelle records with them making up 4.15% of the total number of bat passes.

5.1.14 The important areas identified by the 2020 static monitoring surveys (woodlands and bridleway) are also consistent with the previous findings. While the results did not indicate the presence of any roosts in close proximity to the monitoring locations, the species recorded indicated the continued presence of those species previously identified as present within the estate.

5.1.15 Based on the bat static survey results presented in this report, the assessment of impacts on bats presented at Section 14.13 in the Sizewell C Project ES [**APP-224**] (Ref. 11) is unchanged.

REFERENCES

1. EDF 2020. Sizewell C Development – Main Development Site: Volume 2, Chapter 14: Appendix 14A8 – Bats. [**APP-242**, **APP-243**, **APP-244**, **APP-245** and **APP-246**]

2. EDF 2020. Sizewell C Development – Main Development Site: Volume 2, Chapter 14: Appendix 14C1B – Bat Method Statement. [**App-252**]

3. EDF 2020. Sizewell C Development – Main Development Site: Volume 2, Chapter 14: Appendix 14C1A – Bat Mitigation Strategy. [**APP-252**]

4. Wildlife and Countryside Act, as amended. 1981. (Online) Available from http://www.legislation.gov.uk/ukpga/1981/69

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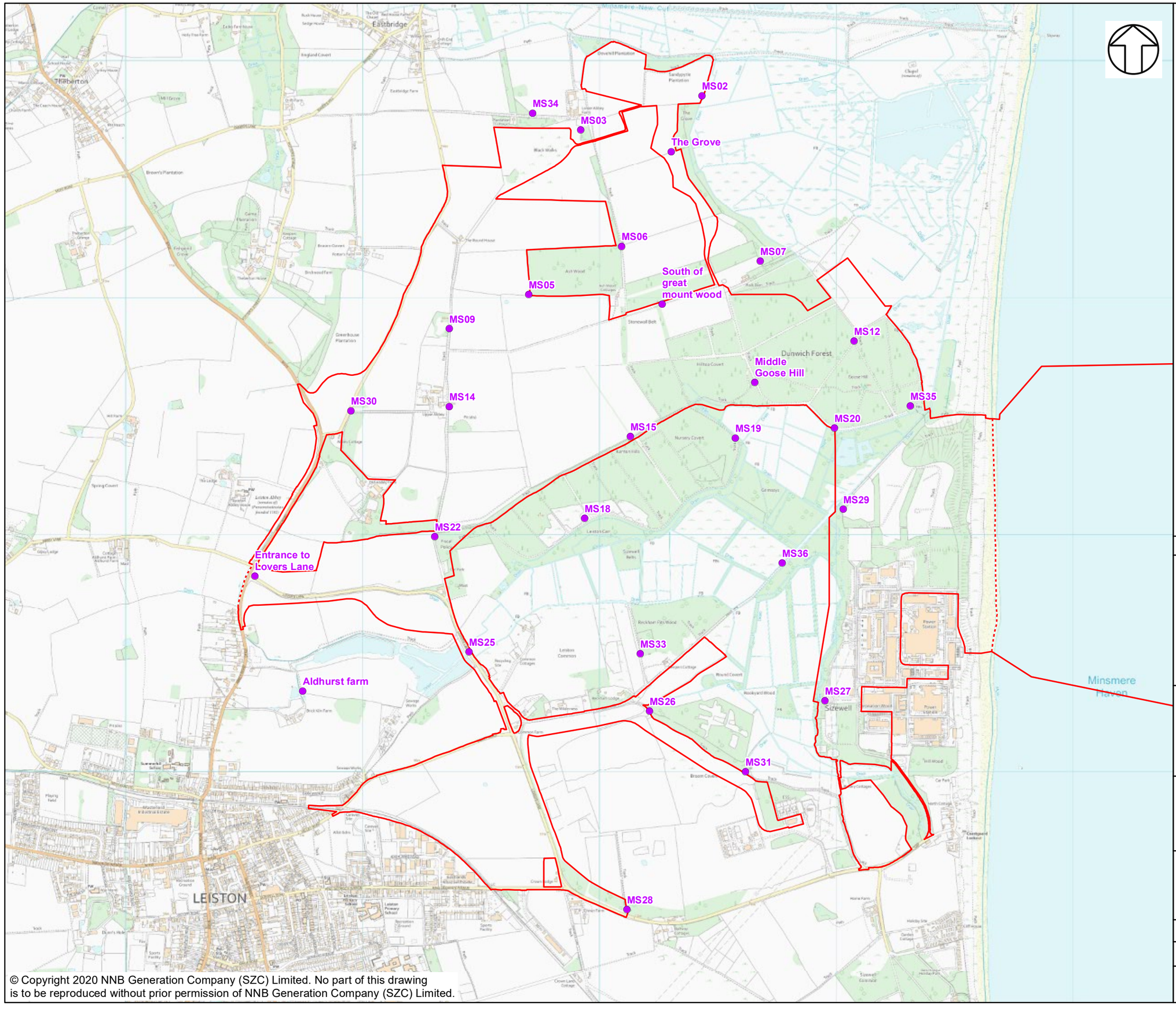
10. Wray S, Wells D, Long E, Mitchell-Jones T, December 2010. Valuing Bats in Ecological Impact Assessment, IEEM In-Practice p 23-25.

11. EDF 2020. Sizewell C Project – Main Development Site: Volume 2, Chapter 14: Terrestrial Ecology and Ornithology. [**APP-224**]



NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE
- STATIC MONITORING LOCATIONS

NOT PROTECTIVELY MARKED

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EDF CGN

DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT STATIC SURVEY

DRAWING TITLE:
STATIC MONITORING LOCATIONS

DRAWING NO:
FIGURE 1

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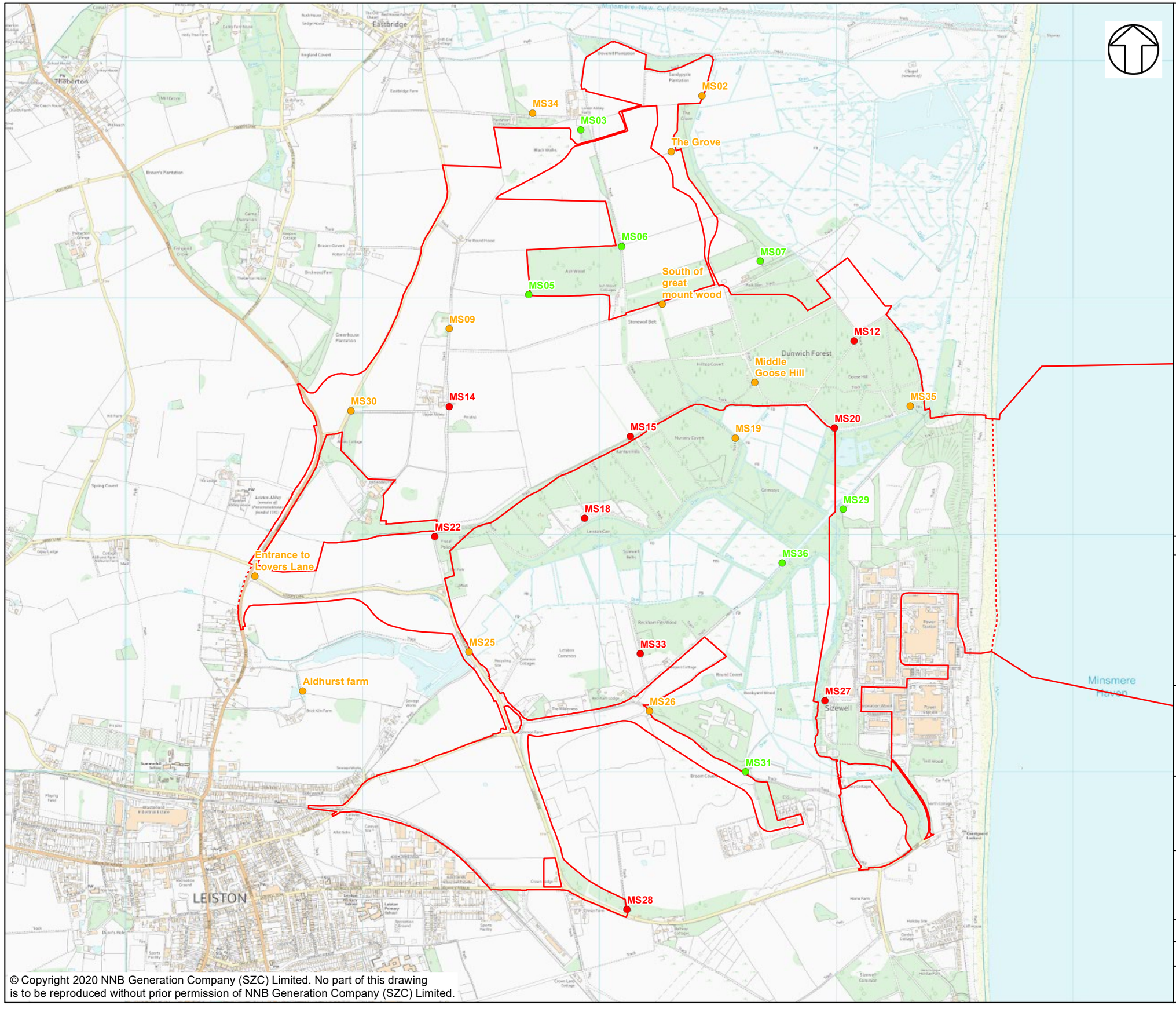

NOTES

KEY

MAIN DEVELOPMENT SITE

- SIZEWELL C MAIN DEVELOPMENT SITE BOUNDARY
- DEMARCATION LINE

BAT ACTIVITY LEVELS

- HIGH
- MODERATE
- LOW

NOT PROTECTIVELY MARKED

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DOCUMENT:
SIZEWELL C
MAIN DEVELOPMENT SITE
BAT STATIC SURVEY

DRAWING TITLE:
BAT ACTIVITY LEVELS AT EACH MONITORING LOCATION 2020

DRAWING NO:
FIGURE 2

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OCT 2020	Y.G.	1:15,000 @A3	01

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