

Kenfig Industrial Estate Wind Turbine
Ecological Assessment

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Issuing office

Merlin House | No 1 Langstone Business Park | Newport | NP18 2HJ
T: 01633 509000 | W: www.bsg-ecology.com | E: info@bsg-ecology.com

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	Name	Position	Date
Originated	James Garside	Senior Ecologist	19 April 2021
Reviewed	Owain Gabb	Director	21 April 2021
Approved for issue to client	Owain Gabb	Director	30 April 2021
Issued to client	James Garside	Senior Ecologist	30 April 2021

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1 Summary

- 1.1 Infinite Renewables Ltd plan to construct and operate a wind turbine on land at Kenfig Industrial Estate, in the County Borough of Neath Port Talbot. BSG Ecology was commissioned to undertake desk study and survey work (Phase 1 survey, bird VP survey and bat static detector survey) during 2020-2021, to inform an assessment of the likely ecological impacts of the proposed wind turbine.
- 1.2 The proposed turbine location is set within an area of hardstanding (a car park) of negligible biodiversity value. Desk study and survey have established that a small number of waterfowl and raptor species occasionally commute over the Site. A minimum of three bat species; common pipistrelle, soprano pipistrelle and noctule, which are known to be at risk of collision with turbines, were recorded during survey work. Potential for other protected and priority species to occur and be affected by construction and operation of the scheme was found to be minimal.
- 1.3 Due to the low value of the habitats within the site for bats, the scale of the development, and their recorded activity levels, it is concluded that effects on bats are likely to be very limited. Similarly, the infrequency of commuting waterfowl and raptor flights through the area suggests that collision risk for these species is likely to be very low. A flight corridor used by gulls apparently commuting to their roost site in winter passes over the northern part of the Kenfig Industrial Estate. Accepted avoidance rates of turbines by large gulls, combined with the distance of the flight corridor from the proposed turbine location (approximately 200 m) and the commuting nature of these gull flights, suggest that their collision risk is likely to be low. A breeding colony of herring and lesser black-backed gulls (of approximately 45 pairs in number) was recorded on the roof of the adjacent John Pye Auction House warehouse.
- 1.4 It is recommended that a Habitat Management Plan that sets out how biodiversity enhancement measures identified in this report will be delivered, and long-term objectives with regard to what they will seek to achieve, is made a condition of planning consent. This will ensure that the scheme meets the requirements of Welsh planning policy.

2 Introduction

Background to commission

- 2.1 Infinite Renewables Ltd plan to construct and operate a wind turbine on land at Kenfig Industrial Estate, in the County Borough of Neath Port Talbot (NPT).
- 2.2 The proposed wind turbine will be located at Ordnance Survey Grid Reference SS 79768 83500. The turbine will have a maximum height (to blade tip) of 100 m, and is likely to have a hub-height of 69 m and rotor diameter of 61 m. Access for construction will be via existing hardstanding and the wider Industrial Estate road network. The grid connection will be via a buried cable, which will be trenched and back-filled, to neighbouring buildings. Substantial areas of hardstanding within and adjacent to the Site can potentially be used for plant and material laydown.
- 2.3 The proposed turbine location is shown on **Figure 1**.

Site description

- 2.4 The proposed turbine location is set within a hardstanding car park plot (hereafter referred to as the 'Site').
- 2.5 The Site is located within the Kenfig Industrial Estate which consists predominantly of hardstanding and warehouse buildings, with grass verges and ornamental trees on broadly flat ground, at 10-12 m elevation above sea level. The Industrial Estate is surrounded by areas of scrub and bare ground, and is bordered by sections of the local rail network to the north and south and railway sidings to the west, and the M4 motorway to the east.
- 2.6 The wider landscape comprises a variety of habitats, including areas of high quality semi-natural habitat. Eglwys Nunydd reservoir, a large freshwater waterbody with adjacent pasture, scrub and woodland, is located beyond the railway to the north of the Industrial Estate. The land beyond the M4 motorway, to the east, consists of pasture fields under arable rotation and livestock grazing. The Kenfig Reserve is located beyond the railway to the south, and consists of an expanse of dunes, scrub and woodland, and includes the Kenfig Rivermouth and Kenfig Pool. Morfa sand, gravel and landfill site is located beyond the railway sidings, to the west of the Industrial Estate, beyond which is the Bristol Channel coast and Kenfig Sands. To the north-west of the Industrial Estate (between Eglwys Nunydd Reservoir and the Bristol Channel) is Margam Moors, which consists of agriculturally managed coastal levels.

Description of project

- 2.7 BSG Ecology was commissioned by Infinite Renewables Group Ltd to undertake desk study and survey work to inform an assessment of the likely ecological impacts of the proposed wind turbine.
- 2.8 The purpose of this report is to provide the ecological evidence necessary to inform a planning decision with regard to the proposed development.

3 Methods

Desk study

3.1 Desk study involved the collation of data from the following sources:

- The UK Government's MAGIC website¹ for information relating to the locations of statutory sites of nature conservation interest within 2 km of the development proposal.
- The Natural Resources Wales' website² for Natura 2000 Data Forms (providing details of the reasons for designation of Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites, and the citations for Sites of Special Scientific Interest (SSSIs).
- Biological records relevant to the site, and information with regard to non-statutory sites of nature conservation interest. Data was requested and received from South East Wales Biodiversity Records Centre³ for a search area extending to 2 km⁴ from the proposed turbine location.
- Further information on the context of the site, including locations of any ponds / wetlands within the vicinity, woodland cover and general land character was derived from online sources such as freely available Ordnance Survey mapping and Google Earth imagery.

Ecological approach

3.2 There is no industry standard guidance that provides direction in deriving a reasonable and proportionate level of survey work to inform planning applications for single wind turbines.

3.3 Detailed guidance in relation to bird and bat survey for large (multi-turbine) wind farms in the UK has generally been issued by SNH, with more basic advice provided by Natural England & Defra (2015). Technical advice with regard to some aspects of single turbine development has also been (historically) provided by Natural England. Natural Resources Wales and Welsh local planning authorities typically refer to guidance from the other statutory conservation agencies, and in particular that issued by SNH when commenting on planning-related matters.

3.4 A summary of relevant aspects of guidance is as follows:

- Guidance on bird survey at onshore wind farms (SNH, 2017) states, *"For many species, collision and/or displacement risk may only be a serious problem if the wind farm is large,"* and that, *Smaller developments and even single turbines may ... present a potential risk if placed in areas of high bird sensitivity, particularly on or near SPAs. Survey effort and assessment of the possible impacts of a proposed wind farm on birds should be in proportion to the scale of the wind farm and the bird interest in the area."*
- Guidance on bird survey from Natural England & Defra (2015) indicates that bird surveys are generally needed for proposed wind farms where these are: close to a site statutorily designated for its bird populations; on a migration route or local flight path; close to an area supporting concentrations of vulnerable birds; or, within 200 m of a landscape feature likely to influence flight behaviour.
- Guidance on bat survey and monitoring for onshore wind farms (SNH et al., 2019) states it *".. is not intended for use in relation to single wind turbines, micro installations (under 50kW) or offshore wind farms, although some aspects of the guidance may be relevant."*
- Natural England's Technical Information Note 51 (Natural England, 2014) states, *"To minimise risk to bat populations our advice is to maintain a 50 m buffer around any feature (trees, hedges) into which no part of the turbine intrudes. This means the edge of the rotor-swept area needs to be at least 50 m from the nearest part of the habitat feature. Therefore, 50 m should be the minimum stand-off distance from blade tip to the nearest feature."*

¹ <https://magic.defra.gov.uk> – Visited prior to commencement of work, and most recently on 19 April 2021.

² <https://naturalresources.wales/?lang=en> – Visited prior to commencement of work, and most recently on 20 April 2021.

³ This is held on a centralised database known as Aderyn.

⁴ The search area for protected sites and species was 2 km. The search area provides local ecological context and reflects core ranging distances for nesting raptors.

- TIN 051 goes on to indicate that site size, levels of exposure, inherent habitat quality and the presence of known roosts are key considerations in determining potential risks to bats and deriving an appropriate level of survey effort. No comment is provided in the Technical Information Note on survey effort.

- 3.5 In the absence of guidance that refers to survey effort for single turbines, it is therefore necessary to derive an appropriate level of survey based on the conservation sensitivity of the site being considered.
- 3.6 For this Site a scope of works involving desk study, an extended Phase 1 habitat survey, bird vantage point (VP) surveys and seasonal bat activity surveys (using static detectors at the proposed turbine location) was considered a reasonable and proportionate approach to characterising the baseline and assessing likely impacts.

Field survey

Phase 1 Habitat Survey

- 3.7 A Phase 1 habitat survey was completed by Kirsty Rogers ACIEEM on 05 May 2020.
- 3.8 The survey was completed with reference to industry standard guidance for Phase 1 habitat survey (JNCC, 2010) and involved identifying and mapping the habitats present within the survey area using standard codes and making notes on dominant or characteristic flora.
- 3.9 The survey was 'extended' to collect data on protected⁵ or otherwise notable⁶ species, and any habitats with the potential to support them.
- 3.10 The extent of the survey area is shown on **Figure 1**.

Bird VP Surveys

- 3.11 VP surveys were conducted during the 2020 breeding season (between April 2020 and August 2020 inclusive) and winter of 2020/2021 (between October 2020 and March 2021 inclusive). During each season, twelve three-hour watches were completed. The aim was to characterise bird flight activity over the proposed turbine location and adjacent areas and determine whether any regularly-used flight lines were present.
- 3.12 One VP was used during the respective survey seasons. The VP location was adjusted between the breeding season and winter surveys as a result of a change in access arrangements (see **Figures 2 and 3**), but this did not affect the visibility of the proposed turbine location.
- 3.13 During each watch, the surveyor scanned over an arc of 180 degrees using binoculars. The viewing arc was scanned constantly during each watch until a 'target species' was detected. The bird was then followed until it landed or was lost to view. The following information was recorded for each target species on a standardised form:
- Species
 - Time of observation
 - Duration of observation
 - Count

⁵ Species afforded protection under the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended).

⁶ Including species listed in response to Section 7 of the Environment (Wales) Act 2016 (and considered to be of principal importance to the conservation of biodiversity in Wales), and non-native invasive species identified on Schedule 9 (Part 2) of the Wildlife and Countryside Act 1981 (as amended).

- Estimated flight height (every 15 seconds)⁷
- Direction of flight
- Estimated distance and direction of bird from the observer
- Flight type / behaviour, where apparent (e.g. foraging, displaying, commuting etc.)

- 3.14 Flight height estimation is challenging; as such bird flight heights were recorded in broad height bands. These bands were based on typical parameters of turbines currently used at wind farm sites. Additional margins for error were built in to reflect the inexact nature of height estimation⁸. Features of known height (or for which height could be estimated accurately), such as warehouses, pylons and ornamental trees, were used when assessing flight height. The method of data collection is consistent with that required for collision risk modelling (using SNH's Band Model). SNH Guidance (2017) states that, "*In most circumstances ... target species will be limited to those species which are afforded a higher level of legislative protection.*" Target (or 'focal') species at Kenfig Wind Turbine were defined as all Schedule 1⁹ and Annex 1¹⁰ raptors / owls, migratory wildfowl (excluding Canada goose *Branta canadensis* and greylag goose *Anser anser*), and waders.
- 3.15 Gulls and passerines were not treated as target species. However notes were taken on flight activity of both, with a view to identifying any regularly used roosting, loafing and foraging areas, and associated flight lines. With regard to passerines, SNH (2017) guidance states, "*It is generally considered that passerine species are not significantly impacted by wind farms.*" This is likely to reflect the lack of any studies indicating population level effects resulting from wind farm mortality in passerine species.
- 3.16 Information on non-focal species was aggregated and summarised in five minute intervals on the reverse of the VP recording form.
- 3.17 A total of 36 hours of survey was completed from the VP during both the breeding season and winter periods.
- 3.18 Weather data were recorded at the start of each watch, with the conditions formally reassessed on at least an hourly basis thereafter (or at such point as it was apparent a change in conditions had occurred). Dates, times and weather conditions during VP surveys are contained in **Tables 1 and 2** in **Appendix 1**.

Bat Activity Surveys

- 3.19 The bat survey method was derived with reference to guidance documents for onshore wind projects produced by SNH *et al.* (2019). The guidance was co-authored by Natural Resources Wales (NRW), and is now the industry standard.
- 3.20 A static detector was deployed at the proposed turbine location (shown on **Figure 1**) in spring, summer and autumn 2020. Deployment dates can be found in **Table 1** in **Appendix 2**.
- 3.21 A Song Meter (SM4) bat detector with an external microphone was deployed. The SM4 detector was configured to record above the level of ambient noise, such as from wind or rain, using an adaptive trigger set to 6 decibels (dB). It was set to define a bat pass as a call note of >2 milliseconds (ms) separated from another by more than one second. An external microphone was connected via a cable to the logger, and attached to a pole or tree approximately 2.5 m above ground level.
- 3.22 The static detector was set to record for a minimum of 10 nights from half an hour before sunset to half an hour after sunrise, the period during which bats are usually active away from their roosts. The duration of recording per night varied throughout the survey period according to day/night length.

⁷ Height bands of 0-10 m, 10-20 m, 20-50 m, 50-80 m, 80-150 m, 150-200 m and 200+ m were used for recording flight height. The height range 20-150 m was considered to be collision risk height (which allowed a margin for error in addition to the blade sweep).

⁸ This is likely to result in an over estimation of mortality when the data are entered into SNH's Collision Risk Model.

⁹ Of the Wildlife and Countryside Act, 1981 (as amended).

¹⁰ Of Directive 2009/147/EC, often referred to as The Birds Directive.

- 3.23 Static detector survey was completed, as SNH *et al* guidance (2019) indicates these provide a far more useful data set than is obtained from walked transects.

Bat call identification

- 3.24 Bat call data was run through Wildlife Acoustics Kaleidoscope Pro auto-identification software, with each file then checked manually to confirm the species of bat in the recording. The number of bat passes was counted and relative (species) activity calculated.

Project Personnel

- 3.25 Kirsty Rogers, Senior Ecologist, ACIEEM, BSc, MRes, completed the extended Phase 1 survey. Kirsty has worked as a consultant ecologist since 2013, and is an experienced botanical surveyor. She also holds Welsh survey licences for bats and great crested newt.
- 3.26 Edward O'Connor, BSc, completed the breeding season ornithological survey work at the Site. Edward is a field ornithologist who has worked on various wind farms in South Wales, Powys and Ceredigion and has previously been employed in a wardening position by the Wildfowl and Wetlands Trust at their Penclacwydd (Llanelli) Reserve.
- 3.27 James Garside, Senior Ecologist, BSc, completed the winter VP survey work. James has considerable experience completing VP survey, having surveyed at wind farms throughout Wales, including various sites in Powys, and schemes in Pembrokeshire, Conwy, Neath Port Talbot, Bridgend, Blaenau Gwent, Carmarthenshire and Torfaen. He has also conducted a range of bird survey (including wetland bird survey) on behalf of NRW at their Newport Wetlands Reserve.
- 3.28 Joanne Conway, Ecologist, BSc, PG Cert, was responsible for data management and carried out flight line mapping. Joanne has worked on various wind farm sites across South Wales, typically co-ordinating programmes of bat survey and monitoring work and managing and interpreting data.
- 3.29 Charlotte Alsop, Ecologist, BSc, MRes, conducted the bat call analysis of the recorded data. Charlotte is proficient in bat call analysis and has considerable experience, having analysed large data sets for a wide range of wind farm sites.
- 3.30 Owain Gabb, Director, MSc, MCIEEM, CEnv acted as technical director for the work and technically reviewed this report. Owain has co-ordinated ornithological and terrestrial ecological work in relation to wind farms throughout the UK and Ireland, including numerous schemes in Wales.

Limitations to methods

- 3.31 There are not considered to be any limitations to the survey work.

4 Results and Evaluation

Desk study

Designated Sites

- 4.1 The site is not subject to statutory or non-statutory designation for its biodiversity interest. The locations of designated sites in relation to the proposed wind turbine are below.

Statutory Protected Sites

- 4.2 There are four statutory designated sites within 2 km of the Site; Cynffig / Kenfig Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI), Eglwys Nunydd Reservoir SSSI and Margam Moors SSSI.
- 4.3 Locations in relation to the proposed turbine, and reasons for notification are as follows:
- Kenfig SAC is located 450 m south-west of the Site boundary at its closest edge, and is designated for its dune, freshwater and salt meadow habitats and the flora they support (especially fen orchid *Liparis loeselii* and petalwort *Petalophyllum ralfsii*).
 - Kenfig SSSI covers the same area as Kenfig SAC (above), and as such is 450 m south-west of the Site at its closest edge. The SSSI was notified for the site's habitats and the flora, fungi and invertebrate communities they support. Birds and bats are not mentioned within the description.
 - Eglwys Nunydd Reservoir SSSI is located 520 m north of the Site at its closest edge, and consists of a large (91 ha) expanse of freshwater, notified for its wintering waterfowl and passage migrant (bird) communities.
 - Margam Moors SSSI is located 850 m north-west of the Site. The site is designated for its flora and the invertebrate community it supports.

Non-statutory Protected Sites

- 4.4 There are non-statutory designated sites of ecological interest located within 2 km of the Site. These include:
- NPT Watercourses Sites of Interest for Nature Conservation (SINC). All watercourses within NPT are designated SINC. The closest watercourse to the Site is located 180 m south-west and there is a network of freshwater watercourses within the 2 km search area,
 - Eglwys Nunydd SINC, located 280 m north¹¹,
 - North-Eastern Dunes (Kenfig) SINC, located 980 m south-east,
 - Kenfig Pools and Dunes Local Nature Reserve (LNR), located 450 m south-west.
- 4.5 These sites overlap the statutory designated sites (above) or support similar habitats that do not (by inference) meet the criteria for designation at the national level. However, it is reasonable to assume that they have been designated for their habitats and the flora and invertebrate communities they support.

Species Data

- 4.6 There are no records of protected or priority species for the Site, held within the Aderyn database.

Flora

- 4.7 The data search returned 3,236 botanical records, most of which were from the Kenfig Reserve and immediate surrounds. Of these, 58 records of 48 species are from the wider Industrial Estate (off-

¹¹ The boundary of the Eglwys Nunydd SINC takes in a portion of the reservoir shore, meaning that the distance between the Industrial Estate and its closest edge is shorter than that for the Eglwys Nunydd Reservoir SSSI.

Site), these include; charlock *Sinapsis arvensis*, yellow-wort *Blackstonia perfoliata*, Welsh poppy *Papaver cambricum* and sea mouse-ear *Gardenia remyi*.

Birds

- 4.8 The search returned 49 records of 41 bird species for the wider Industrial Estate (off-Site), from the period 2010-2015. These included records of species of conservation concern, many of which are relatively widespread and common, that long term population monitoring has shown to have significantly declined in abundance over the past 25 years (such as willow warbler *Phylloscopus trochilus* and bullfinch *Pyrrhula pyrrhula*). Records of scarce passage and vagrant species such as ring ouzel *Turdus torquatus* and purple heron *Ardea purpurea* were also returned. Schedule 1 species which may breed locally, for which records in the wider Industrial Estate were returned by the search, were; hobby *Falco subbuteo*, barn owl *Tyto alba* and Cetti's warbler *Cettia cetti*. Species treated as 'target species' during vantage point survey (see **Section 3.14**), for which records in the wider Industrial Estate were returned by the search, were; teal *Anas crecca*, great crested grebe *Podiceps cristatus*, cormorant *Phalacrocorax carbo*, grey heron *Ardea cinerea*, purple heron, hobby, merlin *Falco columbarius*, curlew *Numenius arquata*, lapwing *Vanellus vanellus*, oystercatcher *Haematopus ostralegus* and barn owl.
- 4.9 In total, the search returned 1,967 bird records, involving 202 species for the 2 km search area. The majority of the records (over 1000) are from the Kenfig Reserve, with most others from Eglwys Nunydd Reservoir and Margam Moors. These included records of an expected breeding bird community for the habitats, as well as a variety of scarce passage and vagrant species.
- 4.10 A record of a marsh harrier *Circus aeruginosus* nest located at Ordnance Survey Grid Reference SS 79172 84085 (approximately 800 m north-west of the Site boundary) during 2021 was provided by a local birdwatcher, and it is likely that a nest was present in the same approximate area during 2020. This record was not held by SEWBReC at the time of the data search.

Mammals

- 4.11 Four bat roost records were returned by the search:
- Two common pipistrelle *Pipistrellus pipistrellus* roosts, recorded in 2015, within expansion joints along the M4 (Kenfig Viaduct) to the south-east; a roost of up to two bats, approximately 600 m from the Site, and another of up to 11 bats, 900 m from the Site.
 - A possible common pipistrelle roost in farm buildings approximately 500 m east of the Site between 2008 and 2011 (inclusive).
 - A possible brown long-eared bat *Plecotus auritus* roost in farm buildings approximately 600 m north-east of the Site, in 2009.
- 4.12 In total, the search returned 41 bat records (including the four roost records described above), involving at least nine species, for the 2 km search area, involving records of noctule bat *Nyctalus noctula*, serotine bat *Eptesicus serotinus*, brown long-eared bat, common pipistrelle, soprano pipistrelle *Pipistrellus pygmaeus*, Nathusius' pipistrelle *Pipistrellus nathusii*, Natterer's bat *Myotis nattereri*, *Myotis* spp., Daubenton's bat *Myotis daubentonii*, lesser horseshoe bat *Rhinolophus hipposideros* and unknown bat spp.
- 4.13 Other protected and priority mammal records returned by the data search included:
- Twelve otter *Lutra lutra* records, all since 2000, the closest of which was located approximately 500 m south-west of the Site. Most records are from the Kenfig Reserve, and adjacent areas. There is also a roadkill record from the M4 motorway immediately adjacent to Eglwys Nunydd Reservoir (north of the Site).
 - Twenty badger records, all since 2000, the closest of which involved an active sett, 300 m south-west of the Site, in 2004.

- Other terrestrial mammal species considered to be vulnerable in Wales (Mathews and Harrower, 2020), for which records were returned by the search were hedgehog *Erinaceus europaeus* and harvest mouse *Micromys minutus*.

Other species

- 4.14 The search returned 22 records of great crested newt *Triturus cristatus*, all located within the Kenfig Reserve and adjacent railway sidings (between the Reserve and Industrial Estate), most of which have occurred since 2000. The closest record to the Site is located approximately 400 m to the west. Other amphibians for which records were returned were; smooth newt *Lissotriton vulgaris*, palmate newt *Lissotriton helveticus*, common toad *Bufo bufo* and common frog *Rana temporaria*, all of which appear to be locally abundant within the Kenfig Reserve.
- 4.15 Records were returned for all four commonly occurring reptile species; adder *Vipera berus*, grass snake *Natrix natrix*, slow-worm *Anguis fragilis* and common lizard *Zootoca vivipara*, mostly from the Kenfig Reserve and adjacent railway sidings.
- 4.16 Fish records returned by the search included records of brown trout *Salmo trutta*, European eel *Anguilla anguilla* and sea lamprey *Petromyzon marinus* in watercourses within 500 m of the Industrial Estate.
- 4.17 The search returned 1,125 invertebrate records, eight of which are from the wider Industrial Estate (off-Site). These concerned six moth species; lackey *Malacosoma neustria*, knot grass *Acrionicta rumicis*, rosy minor *Mesoligia literosa*, rosy rustic *Hydraecia micacea*, shoulder-striped wainscot *Leucania comma* and small square-spot *Diarsia rubi*. Invertebrate records for the wider search area included a variety of Section 7¹² *Lepidoptera* and carder-bees, scarce four-dot pin-palp beetle *Bembidion quadripustulatum* and hornet robberfly *Asilus crabroniformis*. Most invertebrate records returned by the search were from the coastal habitats west and south-west of the Site.
- 4.18 Non-native invasive species data returned by the search indicate that Japanese knotweed *Reynoutria japonica* and Himalayan balsam *Impatiens glandulifera* are present along the railway and sidings that border the Industrial Estate to the south and south-west. Other invasive plant species for which records were returned include *Rhododendron spp.* and *Crocasmia spp.*. Invasive vertebrates for which records were returned by the search include American mink *Neovison vison* and red-eared terrapin *Trachemys scripta*.

Field survey

Phase 1 Habitat Survey

- 4.19 The results of the Phase 1 habitat survey are shown on **Figure 1**. Target Notes and photographs are presented in **Section 9** of this report.

Bare ground

- 4.20 The Site is formed of a large carpark adjacent to the John Pye Auction House building (to the south-east) and is dominated by unvegetated hardstanding bordered by fencing.
- 4.21 Small gaps in the hardstanding (particularly along boundaries and where cracks have appeared) have been colonised with a mixture of ruderal and ephemeral / short perennial vegetation. These areas are generally dominated by herbs typical of disturbed ground and / or shallow soils including black mustard *Brassica nigra*, ribwort plantain *Plantago lanceolata*, Canadian fleabane *Conyza canadensis*, dandelion *Taraxacum officinale*, herb Robert *Geranium robertianum*, common cat's-ear *Hypochaeris radicata*, red valerian *Centranthus ruber*, butterfly bush *Buddleia davidii* and bramble *Rubus fruticosus*.

¹² Of the Environment (Wales) Act 2016.

- 4.22 For Open Mosaic Habitats on Previously Developed Land (OMH) to qualify as a Habitat of Principal Importance (HPI) under Section 7 of the Environment (Wales) Act 2016 they must meet the five criteria listed in **Table 1**.

Table 1: Criteria for Open Mosaic Habitats on Previously Developed Land HPI (adapted from JNCC, 2010).

Criterion	
1	The area of OMH is at least 0.25 ha in size.
2	Known history of disturbance or evidence that soil has been removed or severely modified by previous use(s) of the site. Extraneous materials/substrates such as industrial spoil may have been added.
3	Site contains some vegetation comprising early successional communities consisting mainly of stress tolerant species. Early successional communities are composed of a) annuals, or b) mosses/liverworts, or c) lichens, or d) ruderals, or e) inundation species or f) open grassland, or g) flower-rich grassland, or h) heathland.
4	The site contains un-vegetated, loose bare substrate and pools may be present.
5	The site shows spatial variation, forming a mosaic of one or more of the early successional communities (a-h) above (criterion 3) plus bare substrate within 0.25 ha.

- 4.23 Areas of ephemeral / short perennial vegetation on Site do not meet or support elements described in criterion 1, 4 & 5 due to the presence of built habitats and extensive hardstanding. On this basis the Site does not meet the definition of OMH.

Building

- 4.24 There is one building on Site, comprising a single storey metal portacabin in good condition (see **Figure 1 (TN 1)** and **Photograph 2**). This building was assessed as having negligible potential to support roosting bats.
- 4.25 A large warehouse (John Pye Auction House) is located immediately off-Site to the east, comprising corrugated metal cladding and a large flat roof (**Figure 1 (TN 2)** and **Photograph 6**).

Breeding Season VP surveys

Mallard *Anas platyrhynchos*

- 4.26 One mallard flight was recorded during the breeding season surveys, involving three birds which commuted at 20-50 m height, north-west over the Industrial Estate, on 30 April 2020.
- 4.27 This flight is shown on **Figure 2**.

Cormorant

- 4.28 Eight cormorant flights were recorded during the breeding season surveys. Six of the flights were recorded over two days, on 27-28 May 2020, with the other two recorded on 11 June 2020 and 07 July 2020. Each of the seven flights recorded during May and June concerned one bird commuting at 20-50 m height over the Industrial Estate on an approximate north-south axis (four north, three south). The flight recorded on 07 July 2020 involved two birds flying north-west over the Industrial Estate at 50-80 m height.
- 4.29 All breeding season cormorant flights are shown on **Figure 2**.

Grey heron

- 4.30 Four grey heron flights were recorded during April and May 2020 (30 April, 13, 19 and 27 May). All involved birds commuting north over the Industrial Estate; two were at 10-20 m height and two were at 20-50 m height.
- 4.31 All grey heron flights are shown on **Figure 2**.

Red kite *Milvus milvus*

- 4.32 One red kite flight was recorded during the breeding season surveys. The flight involved one bird commuting west over the Industrial Estate on 09 May 2020 at 20-50 m height throughout the 45 seconds for which it was observed.
- 4.33 This flight is shown on **Figure 2**.

Peregrine *Falco peregrinus*

- 4.34 One peregrine flight was recorded during the breeding season surveys, on 06 July 2020. The flight concerned an adult bird in commuting flight east over the Industrial Estate between 150 and 200 m height.
- 4.35 This flight is shown on **Figure 2**.

Lapwing

- 4.36 One lapwing flight was recorded during the breeding season surveys, on 30 April 2020, which concerned two birds commuting north-east over the Industrial Estate at 50-80 m height.
- 4.37 This flight is shown on **Figure 2**.

Non-focal species

- 4.38 Twenty-six non-focal species were recorded during the breeding season VP surveys:
- Herring gull *Larus argentatus* and lesser black-backed gull *Larus fuscus* were the most frequently recorded species, with both noted during all watches in the breeding season, and it was estimated that approximately three in four adult birds present were herring gull and approximately one in four were lesser black-backed gull. Birds of both species were recorded flying north-west over the Industrial Estate (to the north of the proposed turbine location) towards Eglwys Nunydd reservoir during the hour prior to sunset on 30 April 2020. During April and May 2020, evidence was recorded of birds nesting on rooftops within the Industrial Estate (including birds carrying nest material). The roof was accessed on 11 June 2020 by employees of John Pye Auctions, who counted 45 gull nests with eggs and / or chicks. The first recently fledged juvenile herring gull was noted in flight on 06 July 2020.
 - Three great black-backed gull *Larus marinus* flights were recorded during April and May 2020, and three black-headed gull *Chroicocephalus ridibundus* flights were recorded, one in April 2020 and two on 07 July 2020, involving one, five and seven birds respectively.
 - Two Canada goose flights were recorded during the breeding season surveys, three birds on 28 May 2020, and eighteen birds on 11 June 2020.
 - Two marsh harrier (male and female) were recorded circling together distantly to the west of the Industrial Estate before drifting south-east, and were briefly joined by a peregrine. These birds were recorded as non-focal due to the distance of the flights from the survey area and proposed turbine location.
 - A cuckoo *Cuculus canorus* was recorded flying over the Industrial Estate on 22 May 2020.
 - Sand martin *Riparia riparia* were recorded during most breeding season watches, with most flights involving birds commuting along a north-east, south-west axis over the Industrial Estate.

- Other passerine and near-passerine species recorded during the breeding season VP surveys were: wood pigeon *Columba palumbus*, collared dove *Streptopelia decaocto*, swift *Apus apus*, swallow *Hirundo rustica*, house martin *Delichon urbicum*, pied wagtail *Motacilla alba yarelli*, robin *Erithacus rubecula*, blackbird *Turdus merula*, song thrush *Turdus philomelos*, carrion crow *Corvus corone*, jackdaw *Corvus monedula*, magpie *Pica pica*, goldfinch *Carduelis carduelis*, greenfinch *Chloris chloris*, linnet *Linaria cannabina* and house sparrow *Passer domesticus*.

Winter VP surveys

Mallard

- 4.39 Two mallard flights were during the winter surveys. On 18 October 2020, three birds commuted south-east over the Industrial Estate at 20-50 m height. On 10 November 2020, one bird flew north at 20-50 m height over the Industrial Estate.
- 4.40 Both winter mallard flights are shown on **Figure 3**.

Cormorant

- 4.41 Two cormorant flights involving a total of three birds were recorded during the winter surveys. On 10 November 2020, two birds commuted south-east over the Industrial Estate at 10-20 m height for fifteen seconds, and on 12 January 2021, one bird commuted west over the southern portion of the Industrial Estate at 20-50 m height.
- 4.42 Both winter cormorant flights are shown on **Figure 3**.

Peregrine

- 4.43 One peregrine flight was recorded during the winter surveys, involving a 1st-winter / 2nd-calendar year bird which flew north over the Industrial Estate on 12 January 2021. The flight lasted for thirty seconds, the first fifteen seconds of which was at 20-50 m height, before the bird dropped to 10-20 m height for the remaining fifteen seconds.
- 4.44 This flight is shown on **Figure 3**.

Non-focal species

- 4.45 Twenty-eight non-focal species were recorded during the winter VP surveys:
- Herring gull and lesser black-backed gull were the most frequently recorded species, with both recorded during all watches in the winter. Watches timed to end at sunset found a well-used narrow flight corridor by these species, north-west over the northern edge of the Industrial Estate towards Eglwys Nunydd Reservoir (where they were presumed to be roosting). Use of this flight corridor peaked during the two hours prior to sunset, during watches in January / February 2021. Most birds using this flight corridor passed approximately 200 m to the north of the proposed turbine location.
 - Other gull records were: five great black-backed gull flights throughout the winter, one black-headed gull flight (of three birds, on 24 March 2021) and one Iceland gull *Larus glaucoideus* flight involving one bird following the flight corridor north-west over the northern edge of the Industrial Estate with herring gulls on 12 January 2021.
 - One Canada goose flight was recorded during the winter, which involved four birds on 12 January 2021, and one greylag goose flight was recorded, which involved four birds commuting south over the Industrial Estate on 03 February 2021.
 - On 18 October 2020, a harrier spp. was observed distantly to the west of the Industrial Estate (but poor views did not allow identification to species level). A sparrowhawk was recorded hunting over the Industrial Estate on the same date.
 - Passerine and near-passerine species recorded during the winter surveys were: wood pigeon, great-spotted woodpecker *Dendrocops major*, grey wagtail *Motacilla cinerea*, pied wagtail, wren

Troglodytes troglodytes, dunnoek *Prunella modularis*, robin, blackbird, song thrush, fieldfare *Turdus pilaris*, redwing *Turdus iliacus*, chiffchaff *Phylloscopus collybita*, blue tit *Cyanistes caeruleus*, carrion crow, jackdaw, magpie, starling *Sturnus vulgaris*, goldfinch, chaffinch *Fringilla coelebs* and bullfinch.

Bat Activity Surveys

- 4.46 A minimum of three bat species were recorded during the static detector surveys: common pipistrelle, soprano pipistrelle and noctule.
- 4.47 **Table 2** (below) shows the bat activity recorded during each season throughout the survey period, as well as total activity recorded (for each species and in total).

Table 2: Activity (P/h) per season and in total for each species / species grouping recorded during static surveys.

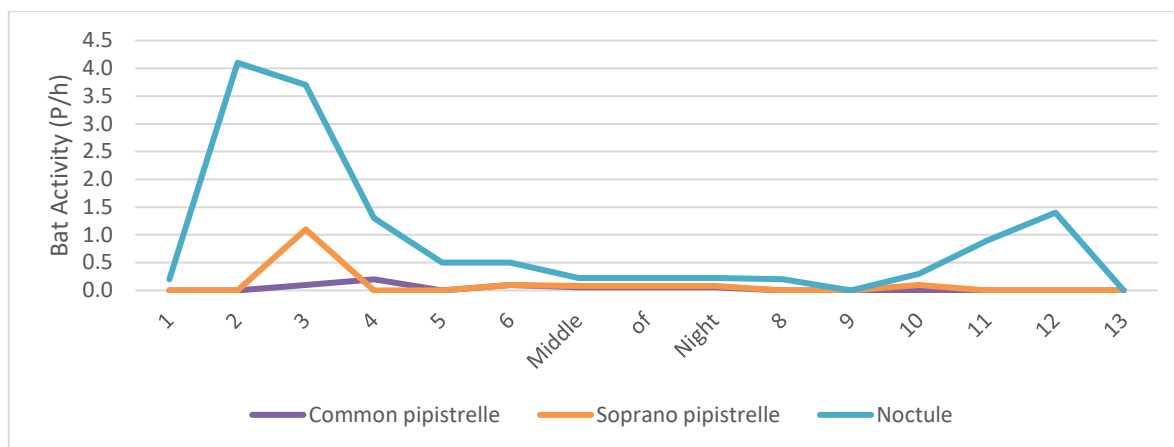
Note: due to overlapping call parameters, a proportion of passes could not be assigned to a single species. Where this is the case, they have been assigned to a combined category (e.g. common / soprano pipistrelle).

Species	Bat Passes per Hour (P/h) by Season			
	Spring	Summer	Autumn	Grand Total
Common / Nathusius' pipistrelle	0.02	0.00	0.00	0.01
Common pipistrelle	0.01	0.00	0.12	0.05
Common / Soprano pipistrelle	0.02	0.00	0.00	0.01
Soprano pipistrelle	0.02	0.11	0.14	0.09
Noctule	0.90	0.72	0.28	0.61
Grand Total	0.98	0.83	0.54	0.77

- 4.48 For the whole recording period, total bat activity at the proposed turbine location was recorded as 0.77 P/h (207 passes in total). The highest activity rate was recorded for noctule (0.61 P/h in total). Overall bat activity and noctule activity were highest during the spring deployment and were lowest during Autumn.
- 4.49 **Graph 1** (below) shows the activity of bats throughout the night. Overall, the highest levels of bat activity were recorded 40-60 minutes after sunset. No bat activity was recorded in the half hour before sunset or following sunrise.

Graph 1: Activity (P/h) of bat species throughout the night.

Note: activity that could not be identified to species level due to overlapping call parameters (e.g. common / soprano pipistrelle) is not shown.



- 4.50 Noctule activity peaked during the period 20-40 minutes after sunset, soprano pipistrelle activity peaked during the period 40-60 minutes after sunset and common pipistrelle activity peaked during the period 60-80 minutes after sunset. For noctule, a lower peak in activity was recorded 40-20 minutes before sunrise.
- 4.51 The relatively late peaks in activity (following sunset) for all three species do not indicate that there are any significant local roosts.
- 4.52 All three species recorded during the surveys are considered to be at high risk of collision with wind turbines (Scottish Natural Heritage, 2019) (see **Section 5**).

5 Potential Impacts and Recommendations

5.1 There are a number of ways in which the construction and operation of wind turbines can impact on ecological features. Those relevant¹³ to the proposed turbine at Kenfig Industrial Estate are:

- Habitat loss and / or modification through temporary land take for trenching and increased noise, vibration and pollution effects during directional drilling for the cable during the construction phase.
- Habitat loss for bats, birds and other species through permanent land take for the turbine base and access track, and temporary land take for soil storage, lay down of construction materials and for trenching associated with the cable route.
- Impacts on birds through localised construction phase disturbance, operational phase displacement and collision with the turbine blades.
- Impacts on bats through collision with the turbine blades.
- Impacts on other protected species through incidental killing and injury, disturbance and habitat loss.

Protected Sites

5.2 The habitats, flora and invertebrate communities of Kenfig SAC, SSSI and Margam Moors SSSI, for which they are designated, are considered to be sufficiently distant from the Site that they will not be directly (e.g., through removal or modification) or indirectly impacted (e.g., through noise or visual disturbance or pollution effects) as a result of the development of the Site. The findings of the VP survey suggest that there is no frequently used flight path of waterfowl (excluding gulls¹⁴), for which the Eglwys Nunydd Reservoir is designated, over the Site. Therefore, no direct or indirect impacts are anticipated on this site as a consequence of the proposed development.

5.3 It is not anticipated that the local SINC and LNR identified will be directly (e.g., through removal or modification) or indirectly impacted (e.g., through noise or visual disturbance or pollution effects) as a result of the development of the Site, due to the distance and lack of connectivity between the Site and their habitats.

Habitats

5.4 The habitat within the proposed turbine footprint consists entirely of hardstanding with limited vegetation in cracks. The grid connection route may result in additional temporary land take, likely affecting further areas of hardstanding. The temporary loss during construction, and the permanent reduction in the extent of this habitat post construction as a result of the turbine base will not have a significant ecological effect even at the Site level.

Bats

5.5 Habitat quality for bats around the turbine location is very low. Impacts of construction phase habitat loss are extremely unlikely to affect the local or favourable conservation status of any bat species.

5.6 The main impact to assess is therefore operational phase fatality through collision. A study undertaken by the University of Exeter on behalf of Defra (Mathews *et al.*, 2016), and Europe-wide wind farm fatality data collected by Dürr (2019), indicate that the UK bats which are most likely to be killed at wind farm sites are common and soprano pipistrelle, noctule¹⁵ and Nathusius' pipistrelle. As a result of these and other studies, SNH *et al* (2019) categorised noctule as being at high risk of collision and of high vulnerability to population level effects, and common and soprano pipistrelles

¹³ There is no indication that other impacts, such as changes in hydrology leading to wider impacts on habitats need to be considered with regard to Kenfig wind turbine. There is also limited likelihood of e.g. large-scale / long term noise and vibration impacts given the scale of the scheme.

¹⁴ Potential impacts on commuting gulls are discussed in **Section 5.18** of this report.

¹⁵ There is no indication from European-wide studies that collision fatality is an issue for brown long-eared bat, lesser horseshoe bat or those species of Myotis bats that occur in the UK.

as being of high risk of collision and medium vulnerability to population level effects through wind farm fatality.

- 5.7 Mathews *et al* (ibid) found bat casualty rates to be highly variable during their study, and did not find a clear correlation between activity and fatality levels (albeit this may simply reflect sample sizes / level of survey effort as the finding appears counter intuitive). At the European level, bat fatality has principally been recorded in late summer and autumn, possibly reflecting the number of young animals on the wing and more wide-ranging habitat use following the dispersal of maternity roosts.
- 5.8 In order to derive an “overall risk assessment” for large wind farms, SNH *et al.* (2019) guidance suggests that levels of activity and “site risk level” are considered in combination; this approach has been applied here. Determining the site risk level involves considering quality of foraging habitat in combination with the size of the scheme; the scheme is small scale and habitat quality within the Site and surrounding Industrial Estate is very low.
- 5.9 Limited guidance is provided on how to derive comparative activity levels by SNH *et al* (2019). To do this BSG Ecology reviewed 52 of our bat data sets¹⁶ that were collected and analysed in a consistent manner with that from the proposed turbine location at Kenfig Industrial Estate. This analysis allows bat activity to be ranked in the context of these other sites (in the absence of an alternative nationwide data set on activity levels¹⁷).

Table 3: Ranking of Activity Levels Based on Data from 52 Sites.

Species	Low	Low-moderate	Moderate	Moderate-high	High	Reference Range (hours)
Common pipistrelle	<0.82	0.82-2.82	2.82-8.44	8.44-13.98	>13.98	76,663
Soprano pipistrelle	<0.14	0.14-0.46	0.46-1.48	1.48-5.88	>5.88	76,663
Noctule	<0.06	0.06-0.13	0.13-0.23	0.23-0.65	>0.65	75,277

- 5.10 The total levels of activity recorded in common and soprano pipistrelle over the survey period (0.05 P/h and 0.09 P/h respectively) compares with median values of 4.1 B/h and 0.8 B/h from this data set, and indicates activity levels at the proposed turbine location are low for both species. For noctule the overall level of activity of 0.61 b/h at the proposed turbine location is moderate-high in terms of this data set, but it should be noted that recorded noctule activity was lower at the Site during the autumn recording period (which is the within the principal period in which bat fatalities have been recorded in Europe (see **Section 5.7**)).
- 5.11 Studies have shown that common and soprano pipistrelle favour foraging in close proximity to habitat features, and that activity has been shown to decline (in both foraging and commuting pipistrelles) with increased distance from treelines (Natural England, 2014). There are no tree lines suitable to function as linear habitat features for bats, within close proximity of the Site¹⁸.
- 5.12 The overall risk assessment for the Site based on bat activity levels and Site risk (habitat quality and relative activity) is low. For pipistrelle species it is likely that collision risk will be further mitigated through the location of the turbine, which is well away from any linear features likely to be preferentially used for foraging and commuting. For noctule the distance from linear habitat features is unlikely to significantly mitigate risk, but habitat quality is low and detected activity was not high (and was lowest during autumn), indicating overall risk is low (based on the SNH *et al* approach).

¹⁶ Forty-one of these sites were south of the Humber, and they were well spread, including locations in mid and South Wales, Cornwall, Kent and East Anglia.

Based on this activity rate falling into the lower fifth of activity rates (split by 20th percentile) from results from similar surveys carried out by BSG at 52 locations in England, Wales and Scotland where these species were recorded.

¹⁷ The Ecobat database set up for this purpose has suffered from both very limited take up and technical issues that have prevented analysis of the data it has been designed to capture.

¹⁸ Roadside ornamental trees approximately 50 m south-west of the Site are spaced up to 55 m apart and are subject to lightspill from street lighting, so are not considered to be a suitable linear feature for bats.

- 5.13 While fatality of noctule, common and soprano pipistrelle is possible, it follows that there is no indication that this will be regular or predictable or that the local or favourable conservation status of these species will be affected.

Birds

- 5.14 Construction phase impacts on birds are likely to be minimal:
- The hardstanding habitat and fences on Site are not suitable for nesting birds.
 - Breeding birds in off-Site ornamental trees and buildings are very unlikely to be impacted by the construction process, given their distance from the proposed turbine location, and considering existing levels of disturbance within the Industrial Estate, prior to construction.
- 5.15 Operational phase impacts on birds could result in displacement and collision of birds.
- It is considered unlikely that nesting gulls on the roof of the John Pye Auction House building (or any other building within the Kenfig Industrial Estate) will be significantly displaced by the presence of an operating wind turbine (post-construction).
 - There is potential for collision of birds with turbine blades to occur. Various published studies have concluded that collisions are rare events, often occurring in situations where there are large numbers of birds (such as on narrow-front migratory flyways), or where the behaviour of birds leads to high risk situations (such as where wind turbines are located on the shortest route between a breeding colony and a foraging area) (e.g. Langston & Pullan, 2003; Drewitt & Langston, 2006; Hötter et al., 2006).
 - VP survey at the proposed turbine location found that there are no frequently used flight paths of waterfowl or raptors over the Site, with a small number of target species recorded commuting over the Site on an occasional basis. Modelling of predicted collision has not been completed in relation to the turbine, as flight activity levels have been too low to make it statistically valid to do so¹⁹. VP survey found that there is a frequently used flight corridor used by gulls flying towards Eglwys Nunydd Reservoir (presumed to be their roost site) during the winter. The majority of birds using this flight corridor passed approximately 200 m to the north of the proposed turbine location.
- 5.16 It is considered that the risk of collision of target species is very low, given the infrequency of target species flights over the Site, coupled with accepted avoidance rates for these species (Urquhart, 2010), and the commuting nature of these flights (during which birds are more likely to detect and avoid moving blades).
- 5.17 SNH accept avoidance rates of 98 % can be applied when modelling collision risk for gulls (Urquhart, 2010). A study by the British Trust for Ornithology (BTO) suggests that this value is precautionary and presents data from seven terrestrial wind farm sites which demonstrate that actual avoidance by large gulls was 99.5 % (Furness, 2019). Given that gulls flying along the flight corridor were recorded in direct commuting flight, and that the flight corridor passed approximately 200 m to the north of the proposed turbine location it seems reasonable to assume this avoidance rate is the minimum that will apply in practice. It is not considered likely that a significant number of collisions will occur.

Other Protected and Priority Species

- 5.18 It is unlikely that there will be impacts on other protected and priority species arising from development.

Biodiversity Enhancement

- 5.19 Section 6 of the Environment (Wales) Act 2016 places a duty on public authorities to '*seek to maintain and enhance biodiversity*' so far as it is consistent with the proper exercise of their functions. In so doing, public authorities must also seek to '*promote the resilience of ecosystems*'. Given the very

¹⁹ SNH's Band (2007) model works by extrapolation and the outputs become fairly meaningless in situations where very low levels of flight activity are recorded.

low ecological value of the area of hardstanding which is to be lost through the development, small-scale enhancement measures are recommended.

- 5.20 Enhancement measures to benefit protected species and encourage their use of the Site will involve establishing a thin soil cap on the turbine base and seeding it with common bird's foot trefoil *Lotus corniculatus* (the food plant of the dingy skipper butterfly) and other pollinator-friendly species. The plot, once established, should be fenced off to prevent incursion by personnel and vehicles.
- 5.21 This enhancement measure (as outlined above) should be detailed in full within a Habitat Management Plan (HMP).

6 Conclusions

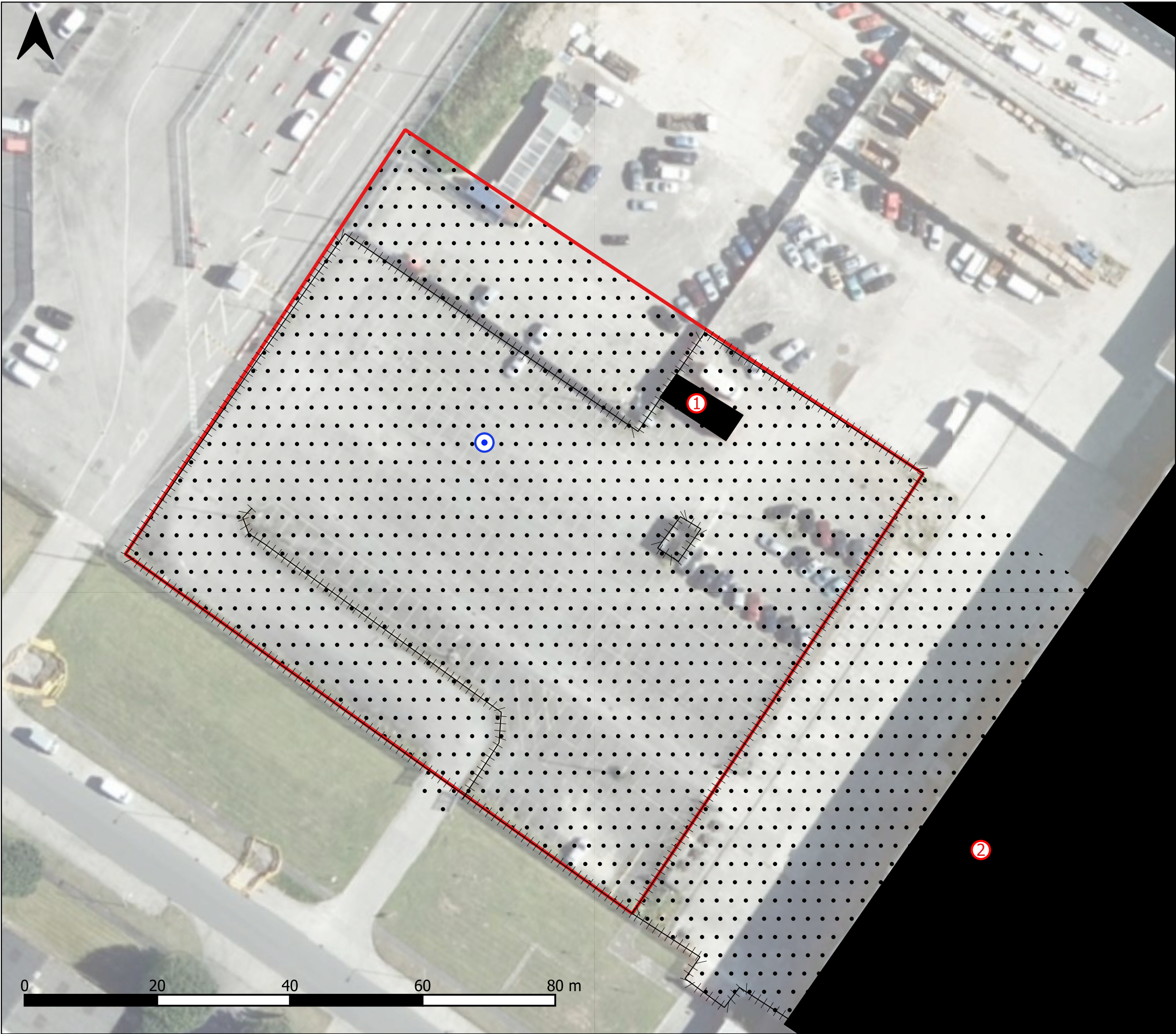
- 6.1 The proposed turbine and associated infrastructure proposed at Kenfig Industrial Estate are likely to result in minimal effects on biodiversity.
- 6.2 Measures to ensure biodiversity enhancement required under Welsh Government policy should be identified within a HMP. It is recommended that this is a condition of planning consent.

7 References

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8 Figures

(overleaf)



Legend

- Survey Area
- ⊙ Turbine location
- +++ Fence
- Buildings
- • Bare ground
- 1 Target note



OFFICE: Newport
T: 01633 509 000

JOB REF: P20-136

PROJECT TITLE
Kenfig Industrial Estate Wind Turbine

DRAWING TITLE
Figure 1: Phase 1 Habitat Survey Results

DATE: 30/04/2021	CHECKED: JGA	SCALE: 1:550
DRAWN: KR	APPROVED: JGA	VERSION: 1.0

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All dimensions are to be checked on site.
Area measurements for indicative purposes only.

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Sources: BSG Ecology survey data