Chapter 2: Site Description and Design Evolution

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2 Site Description and Design Evolution

2.1 Introduction

2.1.1 GB Wind Farm Limited (hereafter referred to as 'the Applicant') proposes to install and operate up to seven wind turbines, a battery energy storage system (BESS) and ancillary infrastructure (Giant's Burn Wind Farm, hereafter referred to as 'the Proposed Development') on land (hereafter referred to as 'the Site') approximately 1.3 km north-west of Dunoon as shown on Figure 1.1. This chapter outlines the process undertaken in selecting the Site as a potential location for a wind farm. It provides a description of the Site and surrounding area and discusses the design evolution process that was undertaken to arrive at the final design described in Chapter 3.

2.1.2 The principles of the Environmental Impact Assessment (EIA) process, that site selection and project design should be an iterative constraint-led process, have been followed in the preparation of the design of the Proposed Development. This has ensured that likely significant adverse impacts and effects, as a result of the Proposed Development, have been avoided or reduced as far as reasonably practicable throughout the design process.

2.1.3 This chapter draws on issues considered in more detail in the relevant technical Chapters 5 to 14 of the EIA Report. This chapter does not pre-empt the conclusions of the technical chapters but explains how potential environmental effects have informed the design of the Proposed Development.

2.1.4 The Proposed Development is described in Chapter 3 and is shown on Figure 3.1.

2.2 Site Selection and Consideration of Alternatives

2.2.1 National Planning Framework 4 (NPF4) was adopted by the Scottish Government on 13 February 2023 and sets out the overarching spatial strategy for Scotland to 2045. The foundations for the spatial strategy as a whole are the global climate emergency and the nature crisis. NPF4 supports a large and rapid increase in electricity generation from renewable sources to meet Scotland's net zero emissions targets. It identifies that onshore wind energy development proposals will be supported in principle except for where these are located in National Parks and National Scenic Areas.

2.2.2 NPF4 identifies that there are significant opportunities to capitalise on the natural assets of Scotland to reduce Scotland's greenhouse gas emissions through increased generation of renewable energy. The Proposed Development would make a valuable contribution to help Scotland meet its renewable energy and electricity production targets while also contributing to the global effort to cut greenhouse gas emissions and mitigate the impacts of climate change by reducing the rate of global warming.

2.2.3 Regulation 5 (2) (d) and Paragraph 2 of Schedule 4 of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations 2017) requires that an EIA report should provide: "*a description of the reasonable alternatives studied by the developer, which are relevant to the development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment*."

2.2.4 The Applicant's approach to site selection is outlined here in relation to alternative sites considered. The 'do nothing', i.e. not having a development, alternative is also explained in this chapter. The main alternatives considered for the Site include design, turbine specification, location, size, and scale. This chapter explores these options and explains how the final design of the Proposed Development has evolved.

Do Nothing Alternative

2.2.5 If the Proposed Development is not constructed, the land would continue to be used for commercial forestry and grazing. This option would have no beneficial impact with regards to the production of renewable energy, offsetting greenhouse gas emissions, or contribution to Scotland's renewable energy and net zero targets. One potential environmental benefit of the do nothing alternative is that the forest would continue to sequester carbon, thereby helping to mitigate climate change by absorbing carbon dioxide (CO_2) from the atmosphere. This benefit would persist, albeit within the context of ongoing forestry management practices, including periodic felling and harvesting. However, as set out in the Biodiversity Enhancement Strategy (BES) (Technical Appendix 6.5) and Peat Management Plan (Technical Appendix 8.1), biodiversity restoration and enhancement measures forming part of the Proposed Development are to include restoration of blanket bog, restoration of habitats via tree planting and forest-to-bog restoration (with associated benefits for wildlife),and increasing nesting and foraging opportunities are proposed. Given the potential environmental benefits associated with the Proposed Development, the do nothing alternative is not considered the most environmentally advantageous option. A consent application is therefore submitted to the Scottish Government's Energy Consents Unit (ECU), seeking to contribute to Scottish climate targets and enhance the

generation of low-carbon electricity whilst also contributing to biodiversity enhancement measures on the Site.

Site Selection

2.2.6 Statkraft UK Limited (Statkraft) undertakes initial feasibility studies of all sites identified as potentially suitable for onshore wind farm development. These take into consideration:

- the proximity of residential receptors;
- the wind resource;
- the presence and proximity of internationally, nationally and locally designated sites (for landscape, archaeology, ecology, ornithology, water, and geology);
- the potential for protected species and/or habitats (including deep peat);
- turbine delivery routes;
- the location of other wind farm developments in the area; and
- the local planning policy status for the area.

2.2.7 Statkraft only takes forward for development, 2 % of sites on which they do an initial feasibility assessment.

2.2.8 The Site of the Proposed Development is centred on BNG 213806, 678515 and located approximately 1.3 km north-west of Dunoon as shown on Figure 1.1, in the administrative jurisdiction of Argyll and Bute Council.

2.2.9 The initial feasibility assessment identified that the Site has:

- the presence of very good wind resource (determined by initial desk-based studies);
- the availability of the Site for wind energy development;
- proximity to a grid connection location;
- a route to site for the delivery of turbine components;
- no planning policies, which in principle, preclude wind energy development;
- no internationally or nationally designated sites for ecology, landscape or geology within the Site Boundary;
- compatibility with the existing commercial forestry use;
- a minimum distance of 700 m between the turbines and the closest residential properties; and
- an existing access track to the Site which would help minimise the length of new track required to access the areas of the Site where turbines are located.

Technology, Size and Scale

2.2.10 Onshore wind continues to be the lowest cost form of renewable energy. However, achieving the Scottish Government's ambitious 2045 Net Zero targets (see Planning Statement accompanying this application) presents a challenge, particularly within a context of limited financial support from the UK Government for onshore wind. The ability to maximise the potential yield from the Site through turbine technology at the point of procurement is critical to the financial feasibility of the Proposed Development, particularly in a period of increasing economic uncertainty. Flexibility in turbine choice also ensures that the energy output can be optimised within the defined height constraints. Without this ability to adapt and optimise the Proposed Development in such circumstances, the overall viability of the Proposed Development could be adversely affected.

2.2.11 The supply of smaller turbines across Europe is already reducing due to declining demand, as manufacturers increasingly shift their focus toward larger, higher-capacity machines. This trend reflects a transition in the global market, with development efforts now concentrated on enhancing turbine efficiency and output to maximise energy yield.

2.2.12 In the period leading up to consent and eventual construction of the Proposed Development, it is anticipated that the design and manufacture of commercial wind turbines will evolve further and offer a broader range of turbines than is currently available.

2.2.13 It is therefore evident that the consideration of larger turbines (with increased tip heights and rotor diameters) is essential to both the viability and constructability of the Proposed Development. To maximise energy yield from the Site, it was proposed that all wind turbines would have tip heights of up to 200 m were initially assessed as viable and feasible in terms of the logistical delivery of components to the Site.

2.2.14 However, in response to concerns raised during the consultation stage regarding the scale of the proposed turbines and potential impacts on the residential amenity of some nearby properties, the proposed height of two of the turbines was reduced to a maximum of up to 180 m to blade tip.

2.2.15 While the trend toward larger turbines is driven by economics and advancements in available technology, it remains important to consider the specific characteristics of the Site and its surroundings to determine the most appropriate turbine size.

2.2.16 A variety of factors relating to the Site and its surroundings were appraised to consider turbine sizes that could be appropriate. These considerations included:

- the proximity of nearby residential receptors, potential residential visual amenity, shadow flicker and noise issues;
- proximity to landscape designations;
- sensitivity to visible aviation lighting;
- the ability to get wind turbine components to the Site;
- the scale of the local topography and surrounding hills and landscapes;
- the landscape character type; and
- the sensitivity of environmental receptors to tall turbines.

2.2.17 Based on the assessment for site-specific factors and the objective of maximising energy yield, it was concluded that the Site could accommodate wind turbines of up to 200 m to tip height. Turbines over 200 m were considered more likely to have an increased impact on residential amenity and other landscape effects generally due to their scale in the landscape.

2.3 Site Location and Description

2.3.1 The Site is located approximately 1.3 km north-west of Dunoon and includes Bishop's Seat (504 m AOD) and Giant's Knowe, with the Proposed Development located on the north-eastern side of these features. The area is topographically complex and is characterised by several raised peaks including Tom Odhar (256 m AOD) to the east, and Kilbride Hill (396 m AOD) to the south. The area reaches a topographic height at Cruach nan Capull to the north-west, at an elevation of 611 m AOD.

2.3.2 The Proposed Development itself sits at an elevation of approximately 304 – 469 m AOD between Strone Saul and Eilligan. While there is commercial forestry surrounding the Site, it is most prominent along the eastern boundary.

2.3.3 The Site lies within the steep ridges and mountains Landscape Character Type (LCT). The Argyll and Bute Area of Panoramic Quality (APQ) encompasses an area to the west of the Site, 1.9 km from the nearest turbine. Additionally, the Spout Burn traverses the central portion of the Site, flowing in a north-western direction to join Glenkin Burn.

2.3.4 There are no landscape, ecological, geological, or archaeological designations within the Site Boundary. However, within 10 km of the Site, the following designations are present:

- Loch Lomond and the Trossachs National Park 1.8 km to the north;
- Loch Eck Wood Site of Special Scientific Interest (SSSI) (5.4 km to the north), Shielhill Glen SSSI (8.9 km south-east) and North End of Bute SSSI (9.8 km south-west);
- Holy Loch Nature Conservation Site (LNCS) 1.3 km north-east;
- Six Scheduled Monuments (SM) within 5 km of the Site – Dunloskin Wood, Platforms and Charcoal Production Area SM (0.1 km to the east), Ardnadam Settlement, Chapel and Enclosure SM (0.4 km to the east), Adam's Cave, Chambered Cairn, Ardnadam SM (0.8 km to the north-east), Ardhallow Battery and Defences SM (2.3 km to the south-east), Kilmun Collegiate Church, Tower and Burial Ground SM (2.6 km north-west), and Dunoon Castle SM (2.7 km to the south-east);
- A further sixteen SMs located within 10 km of the Site; and
- Fifteen Category A listed buildings are located within 10 km of the Site. Forty-nine Category B listed buildings and fifty-one Category C listed buildings are also located within 5 km of the Site.

2.3.5 The closest operational wind farms to the Site are Cruach Mhor, Inverclyde, and High Mathernock & Priestside, all are located between 10 and 20 km from the Proposed Development. Additionally, a wind farm known as Inverchaolain is proposed adjacent to the Site; however, at the time of submission of this EIA Report, it remains at the Scoping stage.

2.4 Design Concept and Approach

Constraints Led

2.4.1 Within the EIA process, the identification of constraints should be a continual activity throughout the design process. This takes cognisance of emerging findings from more detailed surveys, allowing for adjustments to the Proposed Development as necessary. By integrating the findings of technical and environmental studies into the design process, the Proposed Development can achieve a 'best fit' within its environmental context.

2.4.2 This approach has been adopted in respect of the Proposed Development. Where potentially significant effects have been identified, efforts have been made to avoid these by evolving the design of the Proposed Development. This is referred to within the EIA Report as mitigation embedded in the Proposed Development's layout and design, or simply 'embedded mitigation'. Information on embedded mitigation is explained further within each technical chapter of the EIA Report, as appropriate. Several design principles and environmental measures have also been incorporated into the Proposed Development as standard practice.

2.4.3 Embedded mitigation includes, but is not limited to:

- considering the size and scale of the Proposed Development appropriate to the location.
- use of existing tracks as much as is practicable and upgrading these to minimise groundworks.
- design of access tracks to minimise cut and fill, reducing landscape and visual effects as well as costs.
- sensitive siting of the proposed infrastructure incorporating appropriate buffer distances from environmental receptors (including nearby residential properties) to avoid or reduce effects.
- considering the appearance, finish and colour of wind turbines and the control buildings in accordance with the now NatureScot (NS) (formerly Scottish Natural Heritage (SNH)) guidance 'Siting and Designing Wind Farms in the Landscape', Version 3a (SNH, 2017).
- potential for up to 100 m micrositing of infrastructure during construction to ensure the best possible locations are chosen based on site investigations.

Landscape and Visual

2.4.4 Landscape and visual matters, including residential visual amenity, have been considered throughout the design of the project. Measures included within the design to prevent or reduce landscape and/or visual effects include:

- Moving turbines away from nearby homes located to the north-west, to reduce effects on residential visual amenity.
- Seeking to avoid, as far as practicable, turbine bases being seen in front of the skyline in views from the east, albeit this aim had to be balanced against the need to avoid moving turbines too far to the north-west and other environmental constraints – particularly areas of deep peat.
- A reduction in the number of turbines to facilitate the aims described above.
- A reduction in tip height of the two turbines closest to Dunoon, Sandbank and other visual receptors to the east of the Site to reduce and mitigate effects on those receptors and ensure a more even composition in views across the Firth of Clyde.
- Agreement of a reduced aviation lighting scheme with the Civil Aviation Authority (CAA) to minimise the number of lights required to 3 nacelle lights and no mid-tower lights.
- Standard mitigation so that aviation lights reduce to 200 candela (from 2000 candela) in good visibility conditions (more than 5 km).

Efficiency Modelling

2.4.5 Throughout the constraints-led design process, wind resource and energy yield analyses were undertaken to ensure that layout changes did not adversely affect the output of the Proposed Development.

Stakeholder Consultation

2.4.6 Statutory consultees were invited to input to the design process for the Proposed Development through consultation on the EIA Scoping Report submitted in February 2024.

2.4.7 Two public consultation events were undertaken in each of Dunoon, Kilmun, Innellan and Cove, in April 2024 and April 2025. The 2025 consultations included an additional event at Sandbank. These nine events in total allowed members of the local community to comment on the design proposals.

Feedback from the public consultation events was incorporated into the design evolution process where practicable and is presented in the Pre-Application Consultation (PAC) Report accompanying this application. Further details of the public consultation process can be found in Chapter 4.

2.4.8 In addition, meetings were held with South Cowal Community Council in May 2024 and Dunoon Community Council in September 2024. Discussions with communities will continue throughout the post-submission period, during construction and during decommissioning (refer to Chapter 4 and the PAC Report for further information).

2.5 Constraints and Opportunities Identification

2.5.1 The design of any wind farm is driven by the key objective of positioning turbines so that they capture the maximum energy possible within a suitable area while minimising the environmental effects.

2.5.2 The designations within the Site and surrounding area were identified as the first part of the constraints mapping process. These are shown on Figure 2.1. The known environmental and technical constraints within the Site were also identified through this early-stage constraints mapping (Figure 2.2). It is important to note that the identification of a constraint did not necessarily result in the exclusion of that area from the potential development envelope; rather it means that careful thought and attention was paid to the constraint and the design followed appropriately. The key constraints which were taken into account during the design process include:

- topography and ground conditions (including peat);
- environmental designations;
- identified landscape and visual constraints;
- proximity to residential receptors (with regards to visual amenity, shadow flicker and noise);
- presence of protected habitats and species;
- presence of watercourses, private water supplies and related infrastructure;
- presence of cultural heritage features;
- aviation and radar constraints;
- recreation resource;
- forestry; and
- fixed communications links.

2.5.3 The identification of constraints continued throughout the design evolution process as more detailed surveys refined the development envelope, as shown on Figure 2.3.

2.5.4 A description of how the various environmental and technical disciplines have contributed to the design through detailed assessment is described below. Information in respect of the survey work undertaken is provided in Chapters 5 – 14.

Topography and Slope Stability

2.5.5 The topography of the Site has meant that areas with gradients greater than 15% have been avoided for the siting of wind turbines.

2.5.6 Slope stability has been taken into consideration to understand whether infrastructure could be located within certain areas of the Site. Where slope stability was identified as an issue, these areas were deemed to be unsuitable for infrastructure and have therefore been avoided due to the potential for slope instability and peat slide risk.

Designated Landscapes and Visual Amenity

2.5.7 No international or nationally designated landscapes occur within the Site. The nearest nationally designated landscape is Loch Lomond and the Trossachs National Park (LLTNP), located approximately 1.8 km to the north-east of the Site on the north-east shore of Holy Loch and continuing to the north and north-east. The nearest locally designated landscape is the Bute and South Cowal Local Landscape Area (LLA), which covers an extensive area to the west of the Site.

2.5.8 Potential landscape and visual effects have been considered throughout the design evolution process. Several turbine and infrastructure layouts were considered during the design process, with the layout evolving to respond to landscape and visual constraints such as views from the A813, views from Dunoon, and views from local residential receptors. The potential for cumulative effects of the Proposed Development along with existing operational, under construction, consented and application stage wind farms in the study area have also been given landscape and visual consideration throughout the design evolution process.

2.5.9 The final layout has been optimised with regards to landscape and visual effects as far as practicable , using the identified viewpoints for the Landscape and Visual Impact Assessment (LVIA; see Chapter 5 for further information).

2.5.10 Where possible, proposed excavations for new sections of access tracks and other infrastructure have been minimised. The location of the substation compound and temporary construction compound have been given particular consideration in relation to reducing potential landscape and visual effects they were sited amongst the turbines back from the ridgeline away from residential properties and settlements.

Ecology

2.5.11 Ecology surveys were undertaken between April and October 2024 and in April 2025. Field surveys identified habitats and vegetation communities typically associated with upland landscape in west Scotland, including those associated with peatland, and considered to be of ecological value. Constraints mapping following field surveys included the identification of sensitive ecological features, including habitats present within the Site. Where relevant, buffers were placed around any sensitive features, and the design of the Site was amended accordingly.

2.5.12 Field surveys also identified that the Site had limited potential to support protected and notable species. No evidence of protected species was recorded which required constraint to development.

2.5.13 The design of the Proposed Development sought to minimise any effects on potential Groundwater Dependent Terrestrial Ecosystems (GWDTEs) through taking account of habitat (National Vegetation Classification, NVC) information, along with other site constraints, in layout iterations.

Ornithology

2.5.14 Ornithology surveys were undertaken across the Site between April 2021 and August 2024. The only identified species of Nature Conservation Importance that required detailed consideration was golden eagle. All golden eagle breeding sites recorded during baseline surveys have been buffered by more than 1.4 km f from any infrastructure associated with the Proposed Development. The final turbine layout has been designed to minimise potential effects on golden eagle by avoiding the creation of turbine strings and outliers, and by maintaining a turbine cluster.

Peat

2.5.15 According to NatureScot, the Site encompasses a variety of peatland classes. Class 1 is found on Strone Saul and Black Craig, Class 2 on Big Knap, Giant's Knowe and Bishops Seat. The remainder of the Site is Class 4 or 5, which are generally considered unlikely to be associated with peatland habitats. However, these areas may contain carbon-rich soils and areas of deep peat and priority peatland habitat.

2.5.16 As part of the baseline assessment, a comprehensive peat probing and condition assessment programme was completed between September 2023 and March 2025, the results of which are presented in full in the Peat Management Plan (PMP) in Technical Appendix 8.1 and the Peat Landslide and Hazard Risk Assessment (PLHRA) in Technical Appendix 8.2.

2.5.17 Detailed constraints advice was provided to the project team during the iterative layout design process for the turbines and associated infrastructure features. At various stages during the determination of the design, fieldwork was undertaken to provide feedback to the team. This approach identified site constraints to minimise potential adverse effects on peat where possible, by avoiding deeper areas of peat through initial peat depth and stability studies.

2.5.18 The design has sought to avoid areas of deeper peat (>1 m) where technically feasible. However, following an extensive programme of peat probing across the Site, it was evident that complete avoidance of deeper peat was not going to be possible given the peat depths identified. While the deepest areas of peat were avoided, not all areas of deep peat could be avoided. Following the mitigation hierarchy, mitigation in terms of peatland restoration will be applied. Further detail is provided in Chapter 8 and in the Outline Peat Management Plan (Appendix 8.1).

Hydrology and Hydrogeology

2.5.19 A 50 m buffer zone has been applied around the primary watercourses which traverse the Site. These buffers were used to ensure that turbines and infrastructure, other than tracks, were not located in close proximity to hydrological features in accordance with wind farm construction best practice guidelines (as noted in Chapter 8). This reduces the risk of run-off and water pollution into existing watercourses.

2.5.20 Five new watercourse crossings have been proposed as part of the Proposed Development and seven upgrades to existing watercourse crossings, subject to detailed design.

2.5.21 Data on private water supplies (PWS) was obtained from Argyll and Bute Council and supplemented with data from a PWS survey conducted on-site in May 2025. A PWS assessment is presented in Chapter 8. There are no PWS identified within the Site; however, there are PWS to properties south-

east and north-west of the Site outside of the 1.2 km Study Area from turbine locations. There is one PWS within the 100 m dewatering zone near the Site entrance on the B836. No effects to PWS are predicted.

Archaeology and Cultural Heritage

2.5.22 There are no SMs, listed buildings or Gardens and Designed Landscapes (GDLs) within the Site Boundary. Several non-designated heritage assets are identified within the Site Boundary including four non-designated heritage assets located within the alignment of the proposed access track.

2.5.23 The setting impacts to designated heritage assets outwith the Site Boundary has been given due consideration throughout the design evolution process, through review of visualisations taking cognisance of views from Scheduled Monuments located within 10 km of the Site, including selected designated heritage assets beyond 10 km, which have been included in the assessment at the request of Historic Environment Scotland (HES). The design taken forward for the Proposed Development minimises the placement of turbines along the lower slopes of Stone Saul to the north and east in order to reduce potential setting effects on three SMs located within 1 km of the Site which include Adam's Cave, chambered cairn (Asset 1), Ardnadam settlement, chapel and enclosure (Asset 2) and the Scheduled Dunloskin Wood, platforms and charcoal production area (Asset 3).

Noise

2.5.24 For the purposes of early constraints mapping, a buffer of 700 m was applied to residential properties in the vicinity of the Site. The distance of these buffers was further refined during the design process based on expert noise advice following noise monitoring measurements at three locations in proximity to the Site.

2.5.25 Noise modelling was undertaken for the proposed turbine layout at various stages of the design process, to predict the likely sound level which would result from the Proposed Development at nearby residential properties. The difference between measured background noise levels and predicted noise levels needs to be compliant with ETSU-R-97: 'The Assessment and Rating of Noise from Wind Farms' (Department for Trade and Industry (DTI), 1996) to avoid a significant adverse effect. ETSU-R-97 is endorsed by national energy policy as the appropriate guidance document for the assessment of noise from wind turbines. Applying design criteria in accordance with ETSU guidance, therefore, ensures that no exceedances of acceptable noise levels would occur for the Proposed Development.

2.5.26 During design evolution, noise considerations formed an important design consideration to the positioning of turbines to ensure that the maximum distances possible were employed between residential properties and the proposed turbines.

Shadow Flicker

2.5.27 Shadow flicker is considered to be a potential issue for residential properties located within a distance of ten times the rotor diameter of the proposed turbines. Potential shadow flicker effects were taken into consideration during the constraints mapping process. Shadow Flicker is considered further in Chapter 14.

Aviation

2.5.28 The potential aviation constraints on wind turbines at the Site were identified during the EIA process. The only aviation issues that need to be addressed are:

- potential effect on radar visibility at Glasgow Airport; and
- potential effect on Lowther Hill.

2.5.29 The Applicant is in dialogue with NATS En Route and Glasgow Airport regarding a defined and suitable mitigation strategy. The Proposed Development will be fitted with aviation safety lighting in accordance with the reduced lighting scheme outlined in Technical Appendix 13.1. The reduced scheme, whereby three out of the seven turbines (Turbine 1, Turbine 3 and Turbine 7) would be visibly lit, has been approved by the CAA and will ensure that lighting is minimised while meeting safety requirements.

Recreation

2.5.30 Consultation with Scotways identified a heritage path, right of way and Scottish hill track in the vicinity of the Proposed Development. These recreational receptors in addition to core paths and national cycle routes will be impacted by the construction of the Proposed Development. The recreational receptors are as follows:

- Core path C11(b) – Ardnadam heritage Trail Loop;
- Core Path C223(a) and 9c) – Dunans Loop to Invereck and Loch Lomond and the National Parks Boundary;
- Heritage path SA/HP416/1;

- Right of Way SA/SA37/1;
- Scottish Hill Track SA/HT94/2; and
- National Cycle Route 75 – Dunoon to Portavadie

2.5.31 An Outline Access Management Plan (OAMP) has been provided in Appendix 10.2. The aim of the OAMP is to provide safe and continuous use of core paths and recreational receptors which will be impacted by the Proposed Development. This will be achieved by minimising any anticipated impacts through appropriate mitigation and offsetting measures such as:

- Notification of timings when access to receptors will be limited;
- Communicating with residents, businesses and third-parties in close proximity of the Site by letter to advise of working hours; and
- Erection of signage, during the construction phase.

2.5.32 Further details are outlined in the OAMP. If the Proposed Development is consented the OAMP will be updated and submitted to Argyll and Bute Council for agreement and approval.

Forestry

2.5.33 Access to the Site will be via an area of commercial forestry which has been considered throughout the design evolution of the Proposed Development.

2.5.34 The use of existing tracks within the Site and containment of the Proposed Development to the northern side of the Site has reduced the area of tree felling. Approximately 32.94 ha of tree felling is proposed in order to accommodate the Proposed Development, however compensatory planting of approximately 13.57 ha is also planned, and the Applicant is seeking locations both within and outwith the Site.

2.5.35 The area of required felling and the requirement for compensatory planting are considered further in Chapter 12.

Telecommunications

2.5.36 Consultation with Ofcom and fixed link operators did not identify any fixed telecommunication links which run through the Site and could potentially be affected by the Proposed Development. More detail is provided in Chapter 14.

2.6 Design Evolution

2.6.1 Geographic Information Systems (GIS) constraints mapping was used to identify the areas within the Site which may be suitable for wind turbines and associated infrastructure. All known constraints gathered throughout the EIA process were used to inform the evolution of the location of the proposed turbines and associated infrastructure. During design optimisation, the locations of infrastructure and track design were refined in order to minimise the volume of earthworks and cut and fill required to construct the Proposed Development.

Turbine Layout Evolution

2.6.2 The design optimisation process was iterative, with each design involving a review of wireline visualisations from key landscape and visual receptors. The process also considered potential setting impacts on cultural heritage assets, potential noise effects on residential properties, potential impacts to peat, hydrology, ecology and ornithology, and consideration of the energy generation, seeking to maximise wind yield.

2.6.3 During the design process, turbine tip heights ranging from 180 m to 200 m were considered, including layouts that incorporated varied tip heights across the Site. Turbines with heights lower than 180m are not considered due to limitations in availability.

2.6.4 Four of the key design iterations for the Proposed Development are shown on Figure 2.3 and detailed in Table 2. 1.

Table 2.1 – Design Iterations

Layout	No. of Turbines	Description
A (Scoping Layout/Exhibition 1)	9	– Presented in the EIA Scoping Report, February 2024 and at public consultation events in April 2024. – Tip heights up to 200 m. – Layout A took into account initial desk-based observed constraints including ecologically important sites, sites of archaeological and/or cultural heritage importance, landscape designations, residential properties, watercourses, and slope. – Desk-based constraints were also augmented by the results of field-based survey work to input to Layout A. At the Scoping stage, two years worth of ornithological surveys had been completed and a 1.4 km buffer from golden eagle nesting locations was included as a hard constraint. This buffer meant that development would be limited to the eastern part of the scoping site boundary as shown in Layout A on Figure 2.3. The area within the 1.4 km buffer was not removed from the Site Boundary in order to retain the land for potential biodiversity enhancement measures.
B (Post Design Workshop)	8	– Layout B was the resulting layout following feedback through: o the EIA Scoping process; o public consultation events; and o the first design workshop. – Three different layout options were produced by Abseline (the landscape and visual consultant taking into consideration key landscape and visual concerns. Wirelines of the three layouts were considered from the viewpoints proposed in the Scoping Report. – The three layouts to be considered at a design workshop were a nine, an eight and a seven-turbine layout. Upon review of the wirelines from various viewpoints it was felt that nine turbines was too many for the Site, eight turbines was manageable and would increase the electricity generation capacity of the Site but seven turbines may be the most approriate. – The layout taken forward from the design workshop was the eight turbine layout (Layout B) with the caveat that the layout would be reviewed again once all environmental baseline survey results were available and that it may drop to seven turbines, which was felt to be most appropriate from a landscape and visual impact perspective. – At this stage, the Applicant had secured additional land to be used for the Proposed Development. The inclusion of the additional land did not open up much space for additional turbines due to various factors such as proximity to settlements, increasing the impact on landscape and visual receptors, ground conditions, and surveys undertaken to date. The additional land enabled an increase in the Site Boundary from what was included in the Scoping Report. – The introduction of a new area of land allowed the turbines to be moved south away from residential properties to the north-east and north-west of the Site whilst enabling the layout to stay at a number that was acceptable to the Applicant in terms of generating capacity. – Additional land also opened up a larger area for biodiversity enhancement opportunities. This land would be included in survey areas and peat probing was suggested as well to inform areas of potential peatland restoration. – Tip height reductions were also considered as an option to reduce the potential impact to residential amenity of nearby residential properties. – Bat detectors were on site and surveys ongoing **Key changes from Layout A are:** – reduction from nine to eight turbines; – two turbines moved into additional land available for development; – turbines moved away from Sandbank and nearest residential properties; and – turbine moves reduces visual dominance from key viewpoints
C (2nd Exhibition)	7	– Layout C was the design chill which was presented at the second round of public exhibitions (April 2025). – This is the layout that resulted following the completion of most environmental baseline surveys and several design workshops which considered the siting of both the turbines and the site infrastructure. – It was noted in the second design workshop that turbine 5 and turbine 3 in Layout B were particularly problematic from a buildability perspective due to challenging topography.

Layout	No. of Turbines	Description
		– The layout was examined in relation to wind yield and 3 x 3 rotor diameter ellipses were used to assess wake separation. – Because of environmental constraints (watercourse buffers and peat), technical constraints (topography and predicted cut and fill), and wind yield it was decided to remove a turbine in order for the remaining turbines to be sited in the most appropriate locations. A seven turbine scheme had also been considered the most appropriate from an LVIA perspective at the Layout B consideration stage. – Following a site visit to nearby residential properties, it was determined that the nearest turbine (turbine 6 in Layout C) would be reduced to a tip height of 180 m to minimise impact to residential and visual amenity. **Key changes from Layout B are:** – Reduction from eight to seven turbines; – Tip height of one turbine reduced to 180 m; – Micro-siting of turbines away from steep areas to flatter areas which reduces cut and fill ratios and reduces the footprint of earth impacted; and – Micro-siting of turbines outside of 50 m watercourse buffers.
D (Application Layout)	7	– Layout D is the final design which is being submitted as the Proposed Development. It is the result of the second round of public consultation events, additional peat probing, and updated engineering design. – Additional phase 2 peat probing and the hydrology walkover surveys provided additional evidence to suggest that the area in the north of the Site has deep peat and several bog pools in additional to the NVC bog habitats idenfitied in the ecology survey. – Whilst the turbine locations in Layout C were considered optimised in avoiding key constraints, the access tracks and some of the infrastructure were impacting on areas of deep peat and sensitive habtiat, as well as impinging on 50 m watercourse buffers. In order to improve the impact of the development, a new design was proposed with anadjusted turbine layout. This design was further informed by additional peat probing, national vegetation classification (NVC) and habitats surveys and a hydrology walkover survey. This final design (Layout D) reduces the impact to peat, avoids the most sensitive habitats and reduces the number of watercourse crossings. as well as retaining the other embedded mitigation that was introduced in the previous design stages such as reducing LVIA impacts. **Key changes from Layout C** – Turbine 3 shifted west to avoid siting track through bog pool; – Turbine 4 shifted north; – Turbine 5 shifted south-east; – Turbine 6 moved from west to east to keep tracks out of areas of deepest peat and most sensitive habitat; – Tracks changed to avoid areas of deepest peat and most sensitive habitat in northern part of the Site near turbine 7; – Addition of a second construction compound to accommodate the SSEN substation construction; and – Relocation of substation and construction compound to be further up into the Site.

Other Site Infrastructure

Site Access

2.6.5 Access to the Site would be afforded via a combination of existing and new forestry access tracks from the north, connecting to the public road B836, as shown in Figure 3.1.

Site Tracks

2.6.6 Several track layout options were considered as part of the site design process, with two key track layouts (1 and 2) shown on Figure 2.4. The key aim was to minimise the impact to deep peat, watercourses, and sensitive bog habitats.

2.6.7 In the final track layout (shown as Layout D in Figure 2.4), approximately 3.8 km of existing forestry access tracks have been incorporated to reach the area of the Site where turbines are located. Approximately, an additional 6.4 km of new access tracks are required to be constructed for the Proposed Development.

2.6.8 The new on-site access tracks and associated drainage have been carefully designed to avoid areas of deepest peat and potential peat slide risk, while also minimising cut and fill requirements. This

approach aims to reduce the amount of ground disturbance, amount of material required for construction, loss of sensitive habitats, and landscape and visual effects - particularly during construction. The potential track routes were probed extensively as part of the phase 2 peat probing exercise and re-routed as appropriate to avoid any deepest peat areas and areas of potential peat instability. Tracks were routed to minimise impact to the most valuable areas of habitats of conservation interest and were carefully considered on balance with potential effects on deep peat and watercourse buffers.

2.6.9 All access tracks have been designed with cognisance of the topography of the Site to ensure constructability and to permit the safe delivery of turbine components and associated parts.

Turbine Foundations and Hardstanding Areas

2.6.10 The turbine foundations, along with adjacent crane hardstanding and laydown areas, have been located and orientated appropriately to avoid the deepest areas of peat (informed through peat probing) where possible. Their placement also takes in accordance with contours to minimise the amount of cut and fill required. Peat stability has also been taken into account in the location of this infrastructure.

2.6.11 There are pockets of peat deeper than 5 m throughout the Site, and although every effort was made to avoid areas of deepest peat as per the mitigation hierarchy, it was not possible to avoid all deep peat. These areas would be subject to additional peat probing and site investigation prior to construction to ensure that minimal disturbance results, micro-siting the infrastructure appropriately.

Borrow Pit Search Areas

2.6.12 No borrow pit search areas are proposed as part of the Proposed Development.

Construction Compounds

2.6.13 Two construction compounds would be required for the duration of the construction phase. The construction compound locations are shown on Figure 3.1.

2.6.14 The main construction compound (50 m x 100 m) would be located adjacent to the substation compound at BNG 214540 679211 with a second temporary construction compound (50 m x 100 m) located on the other side of the access track at BNG 214483 679193. Part of the second construction compound will be retained for the operation phase of the Proposed Development and will house the BESS.

Substation

2.6.15 The Proposed Development would be connected to the electricity network via an on-site substation control building and located within the substation compound (approximately 40 m x 25 m) at BNG 214577 679150.

Siting of Substation and Construction Compounds

2.6.16 The locations are considered appropriate as they:

- are near the entrance to the area of the Site where the turbines are located, for practical purposes during construction;
- have appropriate topography (slope); and
- are located in an area of majority low risk peat hazard with a few locations that are potentially medium hazard risk.

2.7 Micro-siting

2.7.1 In order to be able to address any localised environmental sensitivities, unforeseen ground conditions or technical issues that are found during detailed intrusive site investigations and construction, it is proposed that the consent includes provision for a 100 m micro-siting allowance for the Proposed Development.

2.7.2 The technical assessments in Volume 2, Chapters 5 – 14 of the EIA Report, have considered the potential for horizontal micro-siting and it is considered that the Proposed Development could be micro-sited within 100 m without resulting in potential significant effects, except within watercourse buffers or where notable deep peat is identified. During construction, the need for any micro-siting would be undertaken under the supervision of the on-site Environmental/Ecological Clerk of Works (ECoW) (definition of this role is contained in the Outline Construction Environmental Management Plan (OCEMP) (Technical Appendix 3.1).

2.8 Conclusion

2.8.1 The design process has been iterative, responding to constraints identified throughout the EIA and public consultation, so that potential adverse impacts from the Proposed Development could be avoided or reduced. Potential beneficial effects through design have also been considered, and greater connectivity within the Site would be promoted through the creation of the access tracks. These will be available to be used by the public and will connect existing forestry and recreation tracks that exist within the wider area.

2.8.2 The final layout of the Proposed Development is described in detail in Chapter 3 and shown on Figure 3.1.

2.8.3 The assessment of the likely significant environmental effects of the final layout is addressed in Chapters 5 to 14 of the EIA Report.

2.9 References

Department of Trade and Industry (1996) *The Assessment and Rating of Noise from Wind Farms*.

National Records of Scotland (2021). *Mid-2020 Population Estimates of Settlements and Localities.* Available at: https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/settlements-and-localities/mid-2020. Accessed on 13 February 2025.

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Scottish Natural Heritage (2017). *Siting and Designing Windfarms in the Landscape Version 3a*. Available at: https://www.nature.scot/sites/default/files/2017-*11/Siting%20and%20designing%20windfarms%20in%20the%20landscape%20-%20version%203a.pdf.* Accessed on 13 February 2025.

Scottish Government (2017). *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017*. Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made. Accessed on 13 February 2025.