

NON-TECHNICAL SUMMARY

Kirkton Energy Park

Prepared for: Kirkton Wind Farm Limited

SLR Ref: 428.V11143.00001
Version No: 1
November 2022



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1.0 Introduction

This Non-Technical Summary (NTS) summarises the Environmental Impact Assessment (EIA) Report for the proposed Kirkton Energy Park development.

Kirkton Wind Farm Limited (the applicant), which is part of a joint venture between Wind 2 Limited (Wind2) and companies managed by Octopus Energy Generation, proposes to install and operate an energy park comprising eleven wind turbines with associated infrastructure (the proposed development) on land (the site) approximately 2.1km to the south of Melvich, Sutherland, centred on NGR NC 87999 59788. The area required for the proposed development is approximately 419.38ha (including two potential abnormal load turning areas) and is situated predominantly across two working farms, Kirkton Farm and Upper Bighouse. The location of the proposed development and application boundary are shown in **Figure 1** and **Figure 2**.

It is expected that each wind turbine would be rated at approximately 4.8MW giving a total installed capacity of approximately 52.8MW. The proposed development also includes 20MW of battery storage.

Based solely on the wind turbine element, the proposed development would produce an average of approximately 184,280 Mega Watt hours (MWh) of electricity annually (based on a site derived capacity factor of 39.8%). This equates to the power consumed by approximately 49,167 average UK households¹, which would be well above the current energy requirements of the 3,622 homes in North, West and Central Sutherland².

A shared ownership opportunity is being offered to the local communities in proximity to the proposed development, providing the opportunity for these communities to acquire up to a 10% share of the proposed development and receive profits generated throughout the operational lifetime.

The generating capacity of the proposed development would exceed 50MW and as such an application is being submitted for consent under Section 36 of the Electricity Act 1989, with the applicant also seeking a direction that deemed planning permission is granted.

Environmental effects of the proposed development have been considered as part of an iterative design process and included within the Environmental Impact Assessment (EIA). The results of the EIA are presented within the EIA Report and summarised in this NTS. The EIA Report informs readers of the nature of the proposed development, likely significant environmental effects and measures proposed to protect the environment, during site preparation, construction, and the operation of the proposed development.

The assessments reported in the EIA Report have been informed by work undertaken as part of the EIA process.

The EIA Report presents the findings of the EIA process by describing the proposed development, the current conditions at the site and the likely impacts which may result from the proposed development. Where appropriate, mitigation is proposed, and any residual impacts are reported.

¹ Calculated using the most recent statistics from the Department of Business, Energy and Industrial Strategy (BEIS) showing that annual UK average domestic household consumption in 2020 was 3,748kWh

² Statistics.Gov.Scot 2020

2.0 The Proposed Development

2.1 Design Evolution (EIA Report Chapter 2)

A number of parameters and considerations informed the site selection and design of the proposed development, which are described in full in the separate **Design and Access Statement** and summarised in **Chapter 2: Site Description and Design Evolution**. The initial input to the design process for the energy park was the bird and ecology data gathered during the extensive survey programme, to understand where turbines should be placed to minimise disturbance to protected species. Watercourse and peat information was incorporated into the design to further inform the position of turbines. In addition, key views of the site were identified and scrutinised to model the potential landscape and visual effects of the proposed development to enable the turbine array to be refined and positioned to reduce such effects where possible. Appropriate spacing of turbines was implemented to ensure they operate as efficiently as possible, and project economics were carefully considered alongside all of the other factors to bring together the design options.

Feedback from discussions with the Energy Consents Unit (ECU), The Highland Council (THC) and other consultees, through direct engagement and also via the formal Scoping process, was evaluated and fed into the evolution of the proposed layout.

Once turbine positions were selected, an access track layout and all other infrastructure necessary to build the energy park was added to the design, taking account in particular of ground conditions and the natural screening provided by the landform. The final design seeks to balance all of these individual considerations together.

2.2 Proposed Infrastructure (EIA Report Chapter 3)

The proposed development is described in detail in **Chapter 3: Description of Development** of the EIA Report. An outline Construction and Environmental Management Plan (CEMP) is contained in the EIA Report as **Technical Appendix 3.1**. The layout of the proposed development is contained in **Figure 3**. In summary the proposed development would comprise:

- 11 wind turbines including internal transformers, with blade tip heights of 149.9m;
- 11 turbine foundations (approximately 25m diameter) and associated crane hardstandings (approximately 35m x 35m and 1m in depth, with an area for additional crane pads that is 85m x 5m);
- approximately 2.03km of upgraded access tracks, and approximately 5.48km of new access tracks with a typical running width of 5m (wider at bends and junctions) and associated drainage. 446.95m of the new track is anticipated to be floating track where consistent peat depths of 1-1.5m or greater are identified along with shallow topography in the area (below 5%);
- approximately 7.5km underground cabling along access tracks to connect the turbine locations, and the onsite electrical substation; and
- one onsite substation which would accommodate 33KV switchgear to collect electricity produced onsite. The substation compound, which will incorporate up to 20MW of battery storage, would have a footprint of 75m x 100m and would include a control and metering building (approximately 14m x 23m and 7m high);

In addition to the above operational components of the proposed development, construction of the proposed development will also require:

- a temporary construction compound (125m x 50m);
- up to two borrow pit search areas (covering approximately 32,000m²);

- an abnormal load turning area (there are two options being considered which are 1.06ha and 1.60ha in size respectively;
- clearance of 87.75ha of conifer forest (net area of 70.75ha bearing trees); and
- clearance of 3.58ha of native woodland (which will be replaced onsite).

A substation compound location has been identified within the site, which would be utilised to facilitate connection to the national electricity grid network. The onsite substation would step up the voltage for transmission to the grid network. The grid connection option does not form part of this application and would be subject to a separate design and consent process undertaken by Scottish and Southern Energy Electricity Networks (SSEN). Although the precise route of cabling has not yet been determined, a potential grid connection route to the nearby Connagill Substation would likely follow a similar route to the existing Strathy North Wind Farm overhead line.

2.3 Habitat Management Plan

An outline Habitat Management Plan (HMP) is provided as **Technical Appendix 8.5** of the EIA Report. It is anticipated that the document would be developed, following the granting of planning permission, in discussion with THC, Scottish Environment Protection Agency (SEPA) and NatureScot (formerly SNH). The aim of the outline HMP is to establish the key objectives and principles by which parts of the site would be improved and managed for the benefit of biodiversity, which would then form the basis for the more detailed HMP. The outline HMP is intended to cover the improvement, management and monitoring of peatland habitats during the operational life of the energy park.

The main objective of the outline HMP is to enhance the habitats on site for described ecological receptors, particularly hen harrier and blanket bog habitats. This will be achieved through a programme of habitat management and enhancement with the aim of improving semi-natural habitats on site.

One of the main aims of the outline HMP is to increase the extent and diversity of blanket bog habitat in areas where suitable hydrological regimes can be created to support bog habitat. The ultimate aim of increasing blanket bog extent is to buffer the adjacent Caithness and Sutherland Peatlands Special Area of Conservation (SAC) land, and provide opportunities for the expansion of peatland floral species while returning former conifer forested areas to a more natural landscape.

The outline HMP puts forward the following outline prescriptions:

- 87.75ha of conifer forest on site will be felled and the entire area targeted for blanket bog restoration; and
- Within ditches which are hydrologically linked to the blanket bog restoration area, implement a system of ditch blocking.

Other important ecological features were identified by the EIA, including habitat for commuting and foraging otter (*Lutra lutra*) and bat species, spawning habitat for fish, running water, flush and spring, acid grassland, marshy grassland, broadleaved and coniferous woodland, greylag goose (*Anser anser*), pink-footed goose (*Anser brachyrhynchus*), merlin (*Falco columbarius*), golden plover (*Pluvialis apricaria*), curlew (*Numenius arquata*), snipe (*Gallinago gallinago*) and whimbrel (*Numenius phaeopus*).

However, it was established through the EIA process that none of these are likely to be significantly affected by the proposed development (subject to the implementation of “standard” good practice mitigation measures during the construction phase) and therefore these receptors are not considered priorities for management action in the outline HMP.

The broad principle aims of the outline HMP are as follows:

- to restore and manage approximately 87.75ha of peatland habitat within the afforested area in the north west corner of the site;
- to conserve, enhance and restore important habitats suitable for hen harrier; and
- to ensure the effect of the proposed development is measured.

The following specific objectives are proposed:

- forest removal of the mature conifer block in the north west corner of the site (approximately 87.75ha);
- increase water retention by implementing a system of ditch blocking for those areas which are hydrologically connected to the management area;
- monitor blanket bog restoration areas and undertake on-going management practices such as tree removal, sward cutting and hydrological management as required to reduce sward height and subsequent suitability for nesting raptors;
- habitat monitoring to assess suitability of management practices to aid hen harrier colonisation;
- undertake post-construction breeding bird surveys to monitor effect of the energy park;
- undertake post-construction breeding raptor surveys to monitor the effect of the energy park; and
- undertake post-construction habitat monitoring through a programme of fixed-point photography and quadrat monitoring to document blanket bog restoration in the north west corner of the site.

3.0 Benefits of the Development

3.1 Contribution Towards Government Targets

The proposed development would:

- make a meaningful contribution of at least 52.8MW (with a maximum output of 60MW from the combination of wind and battery) towards meeting the renewable energy generation targets set out by the Scottish Government, such as the goal for Scotland to have a fully decarbonised energy system by 2045;
- make a valuable contribution towards UK generation targets and the reduction in emissions of greenhouse gases, principally carbon dioxide, in becoming carbon neutral in 1.5 years as demonstrated by the carbon calculator; and
- make Scotland, and therefore the UK, less reliant on imported and price-volatile fossil fuels by generating the equivalent energy to supply the approximate domestic needs of 49,167 average UK households¹.

3.2 Community Shared Ownership

The proposed development is being brought forward with the opportunity for community shared ownership. The preferred model for shared ownership in the project is through revenue (profit) sharing. This would offer local communities the ability to invest in, and acquire up to a 10% share of the project. The local communities would see a return on investment through profits produced throughout the lifetime of the project. Discussions are in progress with the Farr North Community Trust and other representative community groups in Sutherland. A memorandum of understanding (MoU) is being developed to set out the proposed terms for the shared ownership opportunity. Interested community groups will be asked to sign the MoU as a precursor to a more detailed agreement with a grouping of interested communities. Local Energy Scotland has been providing independent advice and support to communities interested in the shared ownership opportunity. Further details of the consultation effort associated with and response from communities is provided in the **PAC Report** accompanying the application. Discussion relating to the shared ownership offering is also provided in the Planning Statement.

It is expected that shared ownership could act as a catalyst for wider investment in the area in community projects of strategic importance to the communities which make the investment. This is in addition to financial contribution for the local community which would be provided by the community benefit fund (Section 3.3).

3.3 Community Benefit Fund

The applicant would provide a Community Benefit Fund as part of the proposed development. The Community Benefit Fund is offered on the basis of a payment per MW of installed capacity at the Scottish Government recommended rate at the time of commissioning the proposed energy park. At present the recommended rate is £5,000 per MW. It is estimated that, depending on the type of investment selected, the community benefit fund alone would accrue benefits to the local economy of approximately £7.92 million over the 30 year life of the proposed development.

Community benefit funds could be directed to a range of activities including enhancing local built and natural environments, supporting local amenities and community activities, or boosting local economies.

3.4 Reduced Cost of Electricity

The proposed tip height of the turbines and location of the site maximises the energy yield from the proposed development, which will operate on a subsidy free basis and contribute to the reduction of the cost of electricity to the consumer.

The applicant has committed to offer a 'near neighbour electricity contribution scheme' for residents living nearby the proposed development, as part of the community benefit package.

The applicant is looking at two potential options for a 'near neighbour electricity contribution scheme':

- Option 1: Electricity Bill Contribution Scheme; and
- Option 2: Home Energy Efficiency Grant.

Option 1 could see residents living within proximity of one of the proposed wind turbines receive up to a £400 contribution to their annual home electricity bill. If this option is selected the qualifying property would receive this payment annually in arrears based on actual energy bills. New build properties and approved plots would also be eligible.

Option 2 could see residents of properties within proximity of one of the proposed turbines capitalise the electricity bill contribution, converting this to a single lump sum of £4,500 to fund or part fund measures to improve the energy efficiency and decarbonisation of their home. The cost of these measures would be reimbursed up to a maximum value of £4,500 upon presentation of receipts, covering all eligible works submitted in a single claim.

In addition to the 'near neighbour electricity contribution scheme', the Kirkton Energy Park is proposed to become part of the Octopus Fan Club initiative, whereby households in proximity to the Kirkton Energy Park will have the option to opt in to either the near neighbour scheme or The Octopus Energy Fan Club programme, whereby they would receive a discount of up to 50% on the unit price of the electricity they use while the Kirkton Energy Park turbines are generating. The precise area around Kirkton which will be encompassed by the Fan Club will be the subject of consultation with the local communities.

3.5 Other Economic Benefits

It is estimated that the construction of the proposed development will directly support an estimated 16 person-years of net additional temporary employment locally and 94 person-years within Scotland during the 18 month construction period. The local economy would be expected to be boosted by approximately £1.1 million of net Gross Value Added (GVA) and the Scottish economy by approximately £5.5 million GVA during the construction of the proposed development. The operational phase of the proposed development will directly support approximately 3 full time equivalent jobs locally and indirectly support approximately 9 full time equivalent jobs locally.

4.0 Environmental Impact

4.1 Landscape and Visual Amenities (EIA Report Chapter 7)

EIA Report **Chapter 7: Landscape and Visual**, assesses the landscape and visual effects of the proposed Kirkton Energy Park. The Landscape and Visual Impact Assessment (LVIA) was undertaken by experienced Landscape Architects from SLR Consulting Ltd following the Guidelines for Landscape and Visual Impact Assessment (GLVIA) produced by the Landscape Institute and Institute of Environmental Management and Assessment (2013). Following GLVIA, landscape effects and visual effects were assessed separately.

Landscape effects relate to the potential changes to the physical aspects of an area, the landscape character, and how that landscape is experienced. Visual effects chiefly concern the potential for changes to the views experienced by people ('known as visual receptors').

The LVIA focused upon likely significant effects in addition to the baseline conditions (including existing operational wind farms). An additional cumulative assessment focused on the effects of the proposed development in addition to the baseline conditions (as above) in conjunction with future (i.e. consented and proposed) wind developments within the 40km Landscape and Visual Impact Assessment (LVIA) study area.

Mitigation of the predicted landscape and visual effects of the proposed development was an integral part of the design development process. This included assessment of different wind turbine layouts and sizes. Based on this assessment, the following key design mitigation measures were embedded:

- Reduce the extent of the proposed development which is visible and consider the appearance of the turbines from the Special Landscape Areas along the northern coastline, particularly Farr Bay, Strathlyon and Portskerra SLA;
- Reduce the potential effects on the Wild Land Area (WLA) 39 as far as possible through consideration of the design/layout of the turbines and ancillary infrastructure, including avoiding the need for visible aviation lighting;
- Ensure an organised and well balanced layout from views along the A836 (heading west), transitioning from Caithness into Sutherland;
- Reduce the potential effects on views from within Strath Halladale, particularly for residential receptors and people travelling along the A897, by creating an organised and well balanced layout; and
- Minimise the extent of the proposed development visible from the more populated areas of Melvich and Portskerra.

4.1.1 Predicted Landscape Effects

The main part of the Kirkton Energy Park site is located in the Sweeping Moorland and Flows to the south of Melvich, close to the north coast of Scotland. It is comprised of blanket bog, areas of heath, grassland, commercial forestry and broad-leaved woodland. The A836 (also forming part of the North Coast 500 route) lies to the north of the site and the A897 within Strath Halladale lies to the east.

The Sweeping Moorland and Flows landscape within which Kirkton Energy Park would be located, occurs extensively across Caithness and east Sutherland. This forms a backdrop to the smaller scale and diverse coastal landscapes that lie to the north. The site also lies on the elevated landform to the west of Strath Halladale and overlooks this smaller scale, more intimate landscape. The elevation of the site varies between 20m AOD at the access point south of Kirkton Farm, to approximately 160m AOD on the north west edge of the site. The elevation of the proposed wind turbines ranges from approximately 90m AOD to 120m AOD.

Within the wider area to the south east, south and south west, the landscape predominately comprises the extensive Sweeping Moorland and Flows. Large areas of commercial forestry are located throughout the

moorland, which contrasts in colour and texture with the moorland. The moorland is also interrupted by lower lying straths that cut into the fringes of the moorland. A number of prominent summits rise above the Sweeping Moorland and Flows, particularly to the south and west, including Morven (706m AOD); Ben Griam Beg (580m AOD); Ben Griam Mòr (590m AOD); Ben Loyal (765m AOD); and Ben Hope (927m AOD). The coastline to the north and north west comprises a combination of high cliffs, prominent headlands, such as Strathy Point and Dunnet Head, and sheltered bays. Set behind the coastal edge are more settled, smaller scale landscapes comprising coastal crofts and small settlements. To the east, the landscape transitions to farmed lowland plain associated with north east Caithness.

Nine Landscape Character Areas (LCAs) have been identified and assessed for potential landscape effects due to the proposed development:

- Sweeping Moorland and Flows;
- Rounded Hills – Caithness and Sutherland;
- Rocky Hills and Moorland;
- Lone Mountains;
- Sandy Beaches and Dunes;
- High Cliffs and Sheltered Bays;
- Strath – Caithness and Sutherland;
- Farmed Lowland Plain; and
- Coastal Crofts and Small Farms.

The LVIA identifies that the proposed development would be visible from all nine of the LCTs (detailed above) included in the assessment to a greater or lesser degree. The level of effect on the character areas differs primarily due to: the level of intervening landform screening; their variable sensitivity to wind farm development; and the existing influence of operational wind farms. Significant adverse effects, as a result of the proposed development, are predicted for LCTs 'Sweeping Moorland and Flows', 'Strath – Caithness and Sutherland', and 'Coastal Crofts and Small Farms'. Effects on the other six LCTs are assessed as Not Significant.

Overall, identified significant landscape effects are contained within an approximate 10km radius of the site and are localised in nature.

4.1.2 Predicted Visual Effects

As identified by the ZTVs, visibility of the proposed development would primarily be limited by the undulating landform within the study area. The proposed development would be visible within the northern part of Strath Halladale, however, it would be largely screened from locations to the east and west by surrounding hills and upland areas. This has the effect of limiting potential visual effects from much of Sutherland and Caithness, and largely focuses the area of potential significant effects to Strath Halladale.

Of the 19 viewpoints assessed in **Technical Appendix 7.3: Viewpoint Assessment** of the EIA Report, Major/moderate and significant adverse effects are identified at six viewpoints: Viewpoint 1 (A897, Strath Halladale, Achiemore); Viewpoint 2 (A897, Strath Halladale, Golval); Viewpoint 4 (A836, at the Junction to Bighouse); Viewpoint 5 (Bighouse); Viewpoint 8 (Beinn Ratha); and Viewpoint 9 (Totegan, near Strathy Point) all within 10km of the proposed development. Moderate, Moderate/minor, minor or negligible and Not Significant effects are assessed at the other 13 viewpoints.

During the design process it was deemed unavoidable that the northern part of Strath Halladale would have sight of the majority of the proposed development, therefore the design and layout of the proposed development

sought to reduce the effects on this part of the Strath through moving turbines as far west (away from the Strath) as possible and positioning turbines in a north – south row which mirrored the Strath itself and avoided perceptions of turbines overlap or stacking.

It is not considered that the wind turbines of the proposed development would be visually prominent from the majority of views from settlements, key locations or access routes. Neither would the proposed development create a perception of encirclement by wind energy development on any settlements. The majority of the viewpoints where significant effects are predicted are restricted to the northern part of Strath Halladale.

4.1.3 Predicted Effects on Designated Landscapes

The proposed development is not sited within a designated landscape. The following landscape designations were identified within the 40km Landscape and Visual Impact (LVIA) study area:

- Farr Bay, Strathy and Portskerra SLA;
- Bens Giam and Loch nan Clar SLA;
- Dunnet Head SLA;
- The Flow Country and Berreidale Coast SLA;
- Ben Kilbreck and Loch Choire SLA;
- Eriboll East and Whiten Head SLA;
- Kyle of Tongue National Scenic Area (NSA);
- Tongue House Garden and Designed Landscape (GDL); and
- Castle of Mey (Barrowgill Castle) (GDL).

Due to there being no, or limited visibility of the proposed development, the two GDLs identified above are not considered in detail within the **Chapter 7: Landscape and Visual** of the EIA Report. Kyle of Tongue NSA has also not been assessed in detail (with agreement of NatureScot) within **Chapter 7: Landscape and Visual** due to a combination of the intervening distance, limited visibility of the proposed development and the presence of other wind farms in the intervening landscape.

The LVIA assessment acknowledges that the Farr Bay, Strathy and Portskerra SLA would see a Medium magnitude of change and localised Major – moderate and Significant adverse effects on the parts of the SLA closest to Melvich. However, the effects on the other five SLAs detailed above are considered to be Not Significant.

4.1.4 Cumulative Effects

The LVIA considers the potential cumulative effects with other wind farms as part of the assessment judgements that are made. This includes existing and consented wind farms, which form part of the baseline landscape and visual context, together with proposed wind farms that are at planning application stage. Reference is also made to proposed developments that are at EIA scoping stage in the LVIA where these are considered relevant.

4.1.5 Predicted Effects on Residential Visual Amenity

A residential Visual Amenity Assessment (RVAA) has been carried out on all properties falling within 2km of the proposed wind turbines. Nineteen residential properties were identified as having potential views of the proposed development within the 2km RVAA Study Area. There is no visibility of existing, consented and proposed wind farms (submitted in a planning application) within the study area, therefore cumulative effects have not been considered in the RVAA.

No properties lie within 1km of the proposed turbines, which contributes to reducing the potential for overbearing or overwhelming effects occurring. However, there are properties within 2km with clear views to

the proposed development. Major effects are predicted for 16 properties at between approximately 1.2km and 2.4km. At these properties, it is considered that although the proposed turbines visible would be prominent features, factors such as distance and the layout of the proposed development, together with open views from the properties that would be retained, in directions other than towards the proposed development, would avoid the potential for the RVAA threshold being reached³.

4.1.6 Predicted Effects on Wild Land

A Wild Land Area Assessment (WLAA) has been carried out for Wild Land Area (WLA) 39 East Halladale Flows. This WLA is located to the east of the proposed development, with the nearest turbine of the proposed development located at a distance of approximately 2km from the WLA.

It is predicted that Kirkton Energy Park would have Major – moderate and significant effects on western parts of the East Halladale Flow WLA, with this relating to the attributes associated with the horizontal emphasis of the landscape with few foci and the potential for extensive visibility of tall features. These significant effects would occur on the western side of the WLA within distances of up to between 8km and 10km. While Strathy North, Strathy South and Strathy Wood Wind Farms would be seen behind or to the south of Kirkton Energy Park in places, the proposed development would be noticeably closer than the other wind farm developments to the west.

An integral part of the proposed development is the removal of the commercial forestry in the northern part of the site, with this area being restored to peatland. Commercial forestry is a notable detracting element in views from the WLA and its removal would be a positive change that could continue beyond the operational life of the wind farm.

The effects of Kirkton Energy Park on the northern and eastern parts of the East Halladale Flow WLA are assessed as not significant.

The proposed development would largely be seen, from WLA 39 East Halladale Flows, in the context of the operational and consented wind farms of Strathy North, Strathy Wood and Strathy South (albeit in closer proximity). The proposed development would therefore not introduce wind turbines into views from the WLA where wind turbines would not already have been visible. Further to this, views north to the coast and the sea would be unobstructed by the proposed development. Overall, Kirkton Energy Park would not fundamentally alter the key attributes and qualities and the East Halladale Flows, when considered in relation to the overall WLA and its baseline context.

4.2 Ecology (EIA Report Chapter 8)

The potential effects of the proposed development on habitats and non-avian species during construction and operation have been assessed.

A minimum radius of 5km was applied for records of protected or otherwise notable species (extended to 10km for bats) and non-statutory designated sites for nature conservation (extended to 10km for statutory designated sites).

4.2.1 Baseline Surveys

Baseline surveys were undertaken in September to October 2020 and May to November 2021. Surveys undertaken included bat surveys, surveys for a range of terrestrial mammal species, vegetation surveys and fish habitat assessment surveys. All surveys were undertaken in accordance with relevant good practice guidelines.

³ Landscape Institute Technical Guidance Note 2/19 defines the RVAA threshold as: 'the effect of the development on Residential Visual Amenity of such nature and / or magnitude that it potentially affects 'living conditions' or Residential Amenity'.

There are six statutory designated sites within a 5km radius of the application boundary. Two of these designations – Caithness and Sutherland Peatlands Special Area of Conservation, and the West Halladale Site of Special Scientific Interest – extend slightly within the application boundary, however this is to facilitate habitat improvements and no infrastructure is proposed within these designations.

The site is predominantly characterised by Blanket Bog and Wet Dwarf Shrub Heath habitats. The site also supports smaller areas of Acid / Neutral Flush / Spring, Continuous Bracken, Acid Dry Dwarf Shrub Heath, Improved Grassland, Marshy Grassland, Planted Broad-leaved Woodland, Planted Coniferous Woodland, Semi-improved Acid Grassland, Semi-Improved Neutral Grassland and Semi-Natural Broad-leaved Woodland.

Several habitats within 250m of proposed infrastructure were identified as being potentially groundwater dependent but a detailed assessment, presented in **Chapter 10: Hydrology, Hydrogeology, Geology and Soils**, confirmed that these habitats are sustained by rainfall rather than groundwater.

The Allt na h-Eaglaise offers high quality fish habitat from the confluence with the River Halladale to lower-mid section within the main proposed energy park site. Upstream of this point the habitat is still considered to be good, however the steeper gradient is likely to limit the usable habitat. The upper section of the southern tributary is considered to offer low quality habitat due to the steep overgrown channel which is likely to be ephemeral in the upper reaches. The Allt nan Gall upper and lower sections are considered to offer high quality fish habitat, while the steeper faster flowing mid-section provided good habitat. Allt an Tigh-Choinneimh offered high quality fish habitat up to the gorge section. Above this point habitat is considered to be low quality, although usable habitat is still present.

The Kirkton Energy Park site is characterised by an area of upland, exposed habitat which offers sub-optimal habitat for bats in terms of foraging and commuting. With respect to roosting, the site offers no significant potential due to a lack of structures and mature deciduous woodland habitat.

The site contains dry and wet habitats, varied vegetation structure, open areas and ecotones, and is considered generally suitable for a variety of reptile and amphibian species. There is a solitary historical record of common lizard (*Zootoca vivipara*) within 5km of the site over the past 15 years.

Otter spraints and feeding signs in the form of predated fish were identified at points along the lower reaches of the Allt na h-Eaglaise watercourse, outwith the site boundary. No resting places were discovered within the study area. Although no direct evidence of otter was found within the site and only in the survey buffer, it is possible that otters could forage along the length of all tributaries which connect the site to the Halladale River.

No evidence of pine marten (*Martes martes*) was found during the field survey.

Although suitable Water Vole habitat was present on site (especially along the Allt na h-Eaglaise and Allt nan Gall watercourses and supporting tributaries), no evidence was recorded during the survey.

The site offered sub-optimal foraging habitat for badger (*Meles meles*) (mainly heath / marsh) and no evidence of this species was found.

For deer species, shelter on site is limited to a limited to an area of coniferous plantation area of coniferous plantation in the north of the site and very small stands of coniferous plantation in the south. There are areas of recent broadleaf plantation, however, these are immature and deer are excluded by fencing. The existing coniferous plantation in the north west will be felled and earmarked for peatland restoration as part of the HMP. The restored area will be able to support deer however opportunities for shelter will be limited. The 2021 foot count data for Bighouse Estate, provided by NatureScot, showed 141 stags, 123 hinds and 50 calves across the 7,200 ha to the west of the A897, and 38 stags, 119 hinds and 64 calves across the 7,188 ha to the east of the A897 – this indicates a density on the west of 4.7 per km², and 3.1 per km² on the east.

4.2.2 Predicted Effects

The proposed development is not predicted to have any significant effects on any of the six statutory designated sites within a 5km radius of the application boundary.

The proposed development has been designed to avoid flush habitats, watercourses and areas of deepest peat as far as possible. However, some loss of bog habitats is unavoidable and the proposals would result in the direct loss of up to 3.16ha of regionally important Blanket Bog, up to 4.62ha of locally important Wet Dwarf Shrub Heath habitats, and up to 0.44ha of locally important Mire habitats. The loss would be compensated for through measures to restore and manage peatland habitat within an area of approximately 87.75ha of conifer plantation and rides, through tree felling, ditch blocking and ground smoothing, which would be delivered via a Habitat Management Plan (HMP). The proposed development is not predicted to have any significant effects on Blanket Bog and Wet Dwarf Shrub Heath habitats.

It is clear from the survey that the majority of the watercourses within the site offer good to high quality fish habitat. During construction design it will be important to ensure that suitable water crossings are put in place which follow current best practice and don't impede fish passage. It will also be important to ensure that Pollution Prevention Guidelines (PPGs) and the replacement Guidance for Pollution Prevention (GPPs) are followed and measures undertaken to minimise pollution of the aquatic environment. In order to ensure that the aquatic environment is safeguarded, it is recommended that a water quality monitoring plan is put in place encompassing electrofishing, macro-invertebrate sampling and chemical monitoring of the main three watercourses prior to, during and post-construction, and that this is agreed with the Northern District Salmon Fisheries Board.

Bat Activity levels across the site were very low with a total of 91 bat passes across all detectors over three deployment occasions, in line with expectations. Common pipistrelle are considered to be a species of medium risk from wind turbine mortality. However, based upon these results, it is concluded that the frequency of use of the site and specifically the turbine envelope is low, such that the risk of killing and injury of bats from the wind turbines is very low. This risk is further reduced due to the open nature of the site and lack of features such as mature deciduous woodland.

To ensure compliance with the Wildlife and Countryside Act 1981, mitigation will be required to reduce the chances of inadvertently killing or injuring individual reptiles during construction works. Given the large spatial scale of the works, fencing and translocation are not considered appropriate. Proposed mitigation therefore involves habitat management and identification of potential refugia and hibernacula if present.

With regards otter, pre-construction surveys providing up to date information on constraints and ECoW supervision would ensure that construction takes place in an appropriate manner, and direct impacts as a result of destruction of otter resting places or disturbance of otter using resting places is considered unlikely. Construction work will primarily take place during daylight hours and as such, direct disturbance of foraging otters, should they venture on to site, is also considered to be unlikely. Direct impacts and associated effects are therefore considered to be non-significant. There is potential for indirect impacts on otters to result from pollution from construction activities. With the mitigation measures detailed above including the requirement for EnvCoW / ECoW and the requirement for pollution control during construction (to be taken forward within the proposed development CEMP), effects will be non-significant.

No evidence of pine marten, water vole or badger was recorded, and therefore no significant effects upon these species are likely. A pre-construction update survey would be undertaken for these species to check for subsequent colonisation of the site and mitigation measures would be developed, if required, if protected mammal species are found to have colonised the site.

The development of Kirkton Energy Park would result in the permanent loss of approximately 15.29ha of heath / moorland grazing resources for deer. This direct loss of habitat is considered to be negligible and represents 3.64% of the area of the development boundary and an even smaller percentage in terms of grazing habitat

available in the wider area, outwith the planning boundary. There are no proposals for new deer fencing and therefore movement of deer will not be further restricted by the proposed development. However, given the proximity of the designated sites there could be legitimate concerns in relation to increased browsing and trampling not to mention potential welfare issues should the carrying capacity be exceeded. NatureScot provide a general guide of < 3 – 5 deer per km² as a sustainable level for blanket bog and woodland. Therefore, current densities are considered to be within this level.

No significant effects are predicted for any other protected or notable animal species, and no potential significant cumulative effects were identified.

4.3 Ornithology (EIA Report Chapter 9)

The bird interests of the site have been assessed using current NatureScot and Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines. Consultation through direct engagement as well as via the formal Scoping process was undertaken with NatureScot.

4.3.1 Baseline Studies

Baseline studies and surveys took the following into account:

- sites designated for their bird interest (i.e. Caithness and Sutherland Peatlands Special Protection Area (SPA)); and
- bird species considered to be important and potentially affected by the project, such as species of European conservation importance (as listed on Annex I of the Birds Directive) and species considered to be of principal importance for biodiversity in Scotland.

The following field studies were undertaken:

- vantage point (VP) surveys - undertaken between September 2019 and February 2020, March 2020 to August 2020, September 2020 to February 2021 and March 2021 to August 2021 including flight data recorded for target species;
- diver surveys - undertaken between May and August in both 2020 and 2021;
- moorland Breeding Bird surveys - undertaken between April and July in both 2020 and 2021; and
- breeding Raptor surveys - undertaken between March and July in both 2020 and 2021.

4.3.2 Evaluation

Nine designated sites with avian qualifying features were identified within 10km of the proposed development site.

Following the field surveys, impacts on the following bird species were assessed:

- Greylag Goose;
- Pink-Footed Goose;
- Curlew;
- Lapwing (*Vanellus vanellus*);
- Golden Eagle (*Aquila chrysaetos*);
- Whooper Swan (*Cygnus cygnus*);
- Golden Plover;

- Dunlin (*Calidris alpina*);
- Hen Harrier (*Circus cyaneus*);
- Merlin;
- Greenshank (*Tringa nebularia*); and
- Peregrine (*Falco peregrinus*).

4.3.3 Common Scoter

Common scoter (*Melanitta nigra*) are a qualifying feature of the Caithness and Sutherland Peatlands SPA. Following pre application discussions with RSPB and NatureScot, an assessment of the proposed development on Common scoter has been carried out (**Technical Appendix 9.3: Common Scoter Assessment** of the EIA Report).

The Common scoter Assessment concluded that there would be no impacts on Common scoter as a result of the proposed development, as there would be no interaction of Common scoter with the proposed development. This lack of interaction is primarily due to the distance between identified nest sites and the proposed development, and also the anticipated flight routes/paths for Common scoter travelling north-south.

4.3.4 Predicted Effects

The residual effects, taking into account construction and operation, were then assessed to establish if they would have significant effects on the ornithological receptors and a cumulative assessment was carried out to identify any regional level impacts which could become significant as a result of the proposed development.

No significant residual effects were identified and it is therefore concluded that the proposed development could proceed without having an adverse effect on the ornithological receptors on and around the proposed development.

No significant cumulative negative effects on important bird species are predicted.

4.4 Hydrology, Hydrogeology, Geology and Soils (EIA Report Chapter 10)

The proposed development has been assessed in relation to the potential effects on hydrology and hydrogeology (i.e. the water environment), geology (including peat), and soils during construction, operation, and decommissioning.

The primary access to the site is from the north from a minor unnamed public road (referred to as the Kirkton Farm road throughout the EIA Chapters) which is connected to the A836. Five new watercourse crossings will be required for the proposed tracks to the proposed turbines within the application boundary. Six existing watercourse crossings will also be used.

Information on the study area was compiled using baseline information from a desk study which was then verified by an extensive programme of field work prior to completion of the assessment. The assessment was undertaken considering the sensitivity of identified receptors and also considering mitigation measures incorporated as part of the site design (embedded mitigation).

A programme of peat probing has been completed and this has been used to inform the site design. The proposed turbines have been located in areas of shallow peat, avoiding siting any turbines on peat depth greater than 1m. A hazard impact assessment concluded that, subject to the employment of appropriate mitigation measures, the presence of peat and potential peat slide instability are not development constraints

The site is drained by two main catchments: Allt na h-Eaglaise and Halladale River. The Allt na h-Eaglaise drains the northern extent of the site whilst the Halladale River drains the full extent of the site. Both watercourses have been classified by the Scottish Environment Protection Agency (SEPA) with an overall status of 'Good'.

There is one private water supply source located within 5km and downstream of the site, at Kirkton Farm. The source is a surface water abstraction and it is for domestic use. Additionally, there are two Controlled Activity Regulation authorisations within 1km; at Kirkton Cottage and on the Halladale River.

It has been confirmed that the metamorphic bedrock beneath the site is a low productivity aquifer, with small amounts of groundwater in the near surface weathered zone and secondary fractures.

An assessment of potential Groundwater Dependent Terrestrial Ecosystems (GWDTEs) has been completed. It has been shown that the areas mapped as potential high and moderate GWDTEs are not sustained by groundwater but rather are sustained by incident rainfall and surface water runoff.

Mitigation measures have been identified, either through the site design or in accordance with good practice guidance. Examples include maintaining a 50m buffer to watercourses where possible, no direct discharge of water into watercourses and the specification of Sustainable Drainage Systems (SuDS) to limit the rate of runoff from the site and to allow the quality of water to be managed at source prior to any discharge being made.

The site design and embedded mitigation have been shown to eliminate any significant residual effects on the water environment, geology, and soils. In addition, it has been shown that there would be no cumulative effect on the water environment, geology, and soils.

A programme of water monitoring would be required prior to any construction activity and during construction of the proposed development. Data collected would be compared to baseline water quality to confirm the efficacy of the mitigation measures during construction. The scope of the monitoring programme would be agreed with THC, in partnership with SEPA, Flow Country Rivers Trust and The Northern District Salmon Fishery Board.

An assessment of the potential effects of the proposed development on the water environment, geology, and soils has identified no significant impacts in terms of the EIA Regulations.

4.5 Cultural Heritage and Archaeology (EIA Report Chapter 11)

An EIA was conducted on the results of direct and indirect impacts of the proposed development on Cultural Heritage assets. This assessment has been undertaken in accordance with national legislation, national and local government policies and guidance documents of the Chartered Institute of Archaeologists (CIfA). To complete the assessment, Historic Environment Scotland (HES) and the Highland Council Historic Environment Team (THCHET) were consulted regarding heritage assets within their respective remits.

4.5.1 Study Areas

A baseline study was conducted, with a study area comprising the site and a 1km buffer from the turbine locations. A baseline condition for the study area was compiled, which comprised a synthesis of all known heritage assets within this area to create a predictive model for unknown buried archaeological remains within the site. Two field surveys were undertaken to support this predictive model. Any heritage assets identified during these surveys that were not previously recorded within the Historic Environment Record have been assigned an SLR number and are identified within the Site Gazetteer (**Technical Appendix 11.1** of the EIA Report). Assets of regional and national importance within the study area were assessed for indirect impacts as a result of the proposed development.

A 10km study area from the proposed turbines was established to assess indirect effects on the setting of designated heritage assets of national importance. The EIA Report includes a consideration of the operation effects upon the eight designated heritage assets agreed upon by HES and THCHET.

4.5.2 Predicted Effects

The assessment concluded that the probability of unknown prehistoric heritage assets within the site is moderate to high, based on the high level of prehistoric activity within the region and the presence of features of an unknown date within the site. However, the potential presence of well-preserved features of a prehistoric date is considered minimal. The potential for unknown heritage assets of a Roman date is very low (if not nil), due to the site being significantly further north than any other Roman site within Scotland. The potential for unknown early-medieval and medieval heritage assets within the site is considered to be low, due to the lack of known heritage assets dating to these periods within the site and the 1km buffer. The potential for unknown post-medieval agricultural heritage assets within the site is considered to be moderate to high, due to the existence of assets of this date within the boundary, however, the potential for well-preserved remains is lower. The potential for unknown post-medieval occupation activity within the site is considered to be low, as the focal point for this activity is located outwith the site boundary. Multiple undated features within the site have been considered with regard to potential dating phases where appropriate.

Mitigation in relation to the majority of heritage assets within the site (MHG9697, SLR36 & SLR37) has been embedded into the design of the proposed infrastructure, to reduce the risk of direct impacts wherever possible. However, where design has been unable to be adjusted due to ranging factors, direct impacts upon four assets have been predicted to occurred and mitigation proposed. These assets are MHG18160 (an abandoned township), SLR24 (a mound of unknown date), and two hut circles (SLR34 and SLR35). This impact would most likely result from infrastructure installation (e.g., access tracks). Proposed mitigation comprises the preservation of the assets within the digital record through a pre-commencement condition and/or a watching brief according to the requirements of THCHET. Any harm caused to buried remains could be balanced by the net gain in knowledge (heritage capital) resulting from investigation and reporting. No significant residual direct effects are anticipated from the construction of the proposed development.

Eight designated heritage assets within 10km of the turbine locations were identified and assessed for operational effects as a result of the proposed development. These assets consist of Halladale Bridge (SM3304), Leathad Carnaich (SM1876), Millburn Barrows, Strath Halladale (SM13622), Bighouse, Garden Pavillion and Walled Garden (LB7160), Bighouse and associated buildings (LB7159), The Borg (SM1839), Smigel Bridge (LB12915), and Smigel Mill (LB7141).

The assessment concluded that there would be no impact on the significance of the following assets: Smigel Bridge, Smigel Mill, Millburn Barrows, and Bighouse, the Garden Pavillion, the Walled Gardens and the associated buildings. The magnitude of impact on Halladale Bridge, Leathad Carnaich, and The Borg was assessed to be minor adverse, which is not considered to be significant in EIA terms.

Potential cumulative effects were considered with regard to wind farm developments, with the assessment concluding that the proposed development would not form any significant effects in EIA terms and would therefore not contribute to any significant cumulative effects.

Post-operational effects were considered, and no significant effects were predicted, assuming the decommissioning process would not cause any additional ground disturbance and the land within the site would return to its pre-development state.

The EIA report concluded that there are no effects on cultural heritage assets from the proposed development that would be significant in EIA terms.

4.6 Site Access, Traffic and Transport (EIA Report Chapter 12)

Chapter 12: Site Access, Traffic and Transport of the EIA Report considers the environmental impacts that are potentially significant where the Kirkton Energy Park (the proposed development) is likely to result in increased traffic flows. The assessment focuses on the construction phase of the proposed development as the worst-case

scenario for traffic generation. Potentially significant traffic related environmental effects may result from two forms of potential impact:

- the transport configurations made for the movement of wind turbine components (including blade, tower sections and nacelle), transported as abnormal loads. Abnormal indivisible loads (AILs) are those which exceed the length, weight or height criteria defined in 'Abnormal Load Movements – A brief guide to Notification and Authorisation requirements' (Transport Scotland, June 2007); and
- the import of general construction materials transported via 'conventional' heavy goods vehicles (HGVs) and low loaders.

4.6.1 Baseline

The study area for the focus of this assessment includes the local road network that would be utilised by the traffic associated with the proposed development. This area includes:

- site access junction with the A836;
- A836 east of the site access to junction with the A9; and
- A9 to Scrabster Port.

Baseline traffic flows were undertaken by 'Nationwide Data Collection' (NDC) who installed an automatic traffic count (ATC) within the study area along the A836 near to the existing site access junction. The table below summarises this data with directional and two-way flows set out.

Table 4-1: Average Weekday Traffic Flows – 12 Hour Flows

Period	Eastbound			Westbound			Two-Way		
	Total	HGV	%HGV	Total	HGV	%HGV	Total	HGV	%HGV
12-hour	538	4	1%	698	5	1%	1,236	9	1%

The capacity performance of the A836 has been calculated from Design Manual for Roads and Bridges, Volume 5, Section 1 TA 46/97, and compared against the existing 24-hour baseline traffic flows. The spare capacity has then been calculated and presented in the table below.

Table 4-2: Existing Capacity of A836

Baseline Flow (24-hr)	Capacity	Spare Capacity	Spare Capacity %
1,359	18,329	16,970	93%

The A836 has been calculated to have a theoretical spare capacity of approximately 93%.

4.6.2 Road Safety

A total of 14 accidents were recorded throughout the study area. A total of 25 casualties resulted from the 14 accidents and of these there was one fatality recorded, three serious injury accidents and 21 slight injury accidents.

4.6.3 Cumulative

The following cumulative sites have been identified and reviewed:

- Bettyhill Wind Farm Phase 2 (scoping);
- Limekilns (36 Variation) Wind Farm (approved);
- Limekiln Wind Farm Extension (approved);
- Strathy South Wind Farm (approved);
- Strathy Wood (approved); and
- Armadale Wind Farm (in planning).

The review has confirmed that the cumulative impact of the Kirkton Energy Park combined with other permitted development will not result in any significant cumulative impacts.

4.6.4 Trips

An indicative 18 month construction programme has been prepared and is set out in a construction timeline in **Chapter 3: Description of Development** of the EIA Report. The following table provides the calculated trip generation across the indicative construction period.

Table 4-3: Daily Two-Way HGV Trip Generation by Construction Month

Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site establishment and restoration					7	7	7							-	-	-	-	-
Access tracks & haul roads	10	10	10	10	10	-	-	-	-	-	-							
Substation works										11	11	11	11	11	11	11	11	11
Cable laying											1	1	1	1	1	1	1	1
Cement											1	1	1	1	1	1	1	1
Turbine foundations												3	3	3	3	3	3	3
TOTAL	10	10	10	10	17	7	7	-	-	11	13	16	16	16	16	16	16	16

Table 4-3 above, confirms that month 5 and months 12 to 18 would see the highest number of HGV two-way movements over a consistent period, with an average of 17 and 16 per day as the maximum. Through the working day this would result in less than 2 two-way HGV movements per hour.

To ensure a robust assessment, it has been assumed that three abnormal load transport vehicles would deliver components on a day during the 'worst case' month, with an additional two HGV deliveries included for the crane and drilling rigs.

Light vehicles of which consist of smaller vehicles such as cars and vans, which would typically be associated with the workforce, have also been calculated to provide total two-way vehicle movements predicted to arise from the proposed development. It is envisaged that a maximum of 30 personnel would be required on the site at any one time. Based on the conservative assumption that 20% of workers would car share, this would equate to 24 vehicle trips per day (48 two-way movements per day).

Table 4-4 below provides the calculated daily and hourly two-way movements during the ‘worst-case’ month of the construction phases (month 5).

Table 4-4: Trip Generation (two-way)

	HGV/ AIL	Lights	Total
Daily	22	48	70
Average Hour	2	4	6

4.6.5 Trip Distribution

All construction vehicles (except abnormal loads) would enter the site from the east, having travelled along the A836. It is anticipated that all HGVs and deliveries will travel from further afield via the A9 to the A836, with no construction traffic travelling from the west. In addition, it is assumed that the A897, which extends south from the A836 at Melvich to the A9 at Helmsdale, is not suitable for HGVs and so this route is not included.

Abnormal load deliveries will continue westbound along the A836 past the Kirkton Farm road access road where they will utilise one of the two blade transfer/ tower turning locations before turning back onto the A836 and travelling eastbound to turn right onto Kirkton Farm road for access to the site, thereby making the turn at the junction between the A836 and the Kirkton Farm road from a shallow angle.

Light vehicle trip generation would see a maximum of 48 two-way trips each day during the worst-case months. It has been assumed that the majority of light vehicles will travel to the site via the A9 and the A836, however a small number may travel along the A897 to the A836 and may also travel west along the A836. As such, it is assumed that 90% of light vehicles will travel along the A836 to the A9, with 5% heading west from the site along the A836 and 5% heading east before heading south onto the A897.

4.6.6 Assessment

The increase in traffic flows along the A836 has been calculated for the maximum trip generation occurring during the worst-case month and for the average trip generation likely to occur during the rest of the construction phase. **Table 4-5** shows the predicted daily total and HGV traffic increases for these two different occurrences. The baseline flows are those observed on an average weekday over a 12-hour period between 07:00 and 19:00.

Table 4-5: Predicted Daily Increase in Traffic along the A836 – 12 Hour Flows

Road Link	Trip Case	Baseline		Development		Baseline + Development		Increase %	
		Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
A836 East of Site	Maximum day	1,235	9	70	22	1,318	44	6%	244%
	Average day			65	17	1,300	26	5%	189%

The results above show that all percentage increases in total traffic volumes are below the IEMA thresholds (i.e. an increase of 30%); however the increase in HGV traffic along the A836 are in exceedance of the IEMA thresholds. The largest increase would be where the total traffic flows increase by 6% (244% HGV increase) for a worst-case day. The average day during the construction period would see only a 5% increase to total traffic flows, but a significant 189% increase to HGVs.

In summary, while total traffic levels are within the IEMA thresholds of a 30% increase to traffic flows along the A836 east of the site access point, HGV trip generation is significantly increased for both the worst-case scenario and the average day. While the increase in HGVs is significant above the base level of HGVs, it can be confirmed that the impact to the theoretical capacity of the road is negligible with capacity remaining at 92% even during the maximum day.

The effects associated with the proposed development, prior to the implementation of mitigation measures, are summarised in **Table 4-6** below.

Table 4-6: Summary of Predicted Effects (Pre-Mitigation)

Type	Duration	Sensitivity	Magnitude	Significance
Noise & vibration	Temporary	High	Negligible	Not significant
Driver severance & delay	Temporary	Low	Negligible	Not significant
Community severance & delay	Temporary	Negligible	Negligible	Not significant
Vulnerable road users	Temporary	High	Moderate	Significant
Road safety	Temporary	High	Negligible	Not significant
Hazardous and dangerous loads	Temporary	High	Moderate	Significant
Dust & dirt	Temporary	Medium	Moderate	Significant

Following the assessment of traffic impacts, the significance of potential effects that could occur during construction both before and after proposed mitigation measures are presented in **Table 4-7** below.

Table 4-7: Summary of Predicted Effects (Pre and Post-Mitigation)

Potential Impact	Pre-Mitigation		Proposed Mitigation / Enhancement	Residual Effects	
	Magnitude	Significance		Magnitude	Significance
Noise & vibration	Negligible	Not significant	Traffic Management Plan for the movement of abnormal loads.	Negligible	Not significant
Driver severance & delay	Minor	Not significant	Framework Construction Traffic Management Plan (CTMP) provided.	Minor	Not significant
Community severance & delay	Low	Not significant	Trial Run for abnormal loads prior to commencement of construction.	Low	Not significant
Vulnerable road users	Moderate	Significant	Provision of information to local residents and users of amenities, to involve the community in the safe operation of the Traffic Management Plan and to alleviate stress and anxiety.	Minor	Not significant
Road safety	Minor	Not significant		Minor	Not significant
Hazardous & dangerous loads	Moderate	Significant	Good construction practices including wheel wash and careful loading.	Minor	Not significant
Dust & dirt	Moderate	Significant		Minor	Not significant

4.6.7 Statement of Significance

Taking account of all the potential effects that are likely to arise and the assessment having tested the worst-case scenario expected, it is considered that the proposed development would not lead to a significant adverse effect due to traffic impacts.

The assessment concludes that the impacts during the construction phase will not be significant; the review of the worst-case scenario, the temporary nature of the construction phase and the application of mitigation measures will further reduce any impacts in traffic and transportation terms.

4.7 Noise (EIA Report Chapter 13)

The construction, operation and decommissioning of wind energy schemes can have an impact on nearby noise-sensitive receptors. However, disruption due to construction is a localised phenomenon and is temporary and intermittent in nature. Predictions have shown that there will be minimal impact during this phase of the development.

Onshore wind turbine developments generally occur in rural locations where background noise levels can be low and therefore wind turbines can be audible. Noise limits are set in accordance with the guidance document ETSU-R-97 to protect the amenity of residents living close to wind turbines.

The ETSU guidance establishes noise limits in relation to existing background noise levels. ETSU-R-97 guidance allows for a higher noise limit at properties which are financially involved with a proposed development.

Predictions for a candidate wind turbine have been undertaken in accordance with the calculation methodology in ISO9613-2. The methodology is considered to provide realistic predictions of wind turbine noise based on suitable input parameters as outlined in the Institute of Acoustics Good Practice Guide.

Noise measurement devices were deployed at the nearest residential properties to measure the background noise levels. This data was then utilised to inform the assessment of the predicted effects from the proposed development.

The noise assessment provided in **Chapter 13: Noise** of the EIA Report concludes that wind turbine noise immission levels from the proposed development would not exceed the ETSU-R-97 noise limit at any receptor, for any given wind speed and would therefore be not significant.

For the proposed development, the effect of construction and decommissioning noise, including construction traffic, is predicted to be not significant and no specific mitigation measures are considered necessary. Further to this the effect of operational noise is also predicted to be not significant and no specific mitigation measures are considered necessary. The cumulative noise from the other consented or proposed wind turbines in proximity to the proposed development would not cause an increase to the operational or construction noise levels predicted through the assessment, and therefore would not lead to significant effects. The operational and construction noise from the proposed development would not add cumulatively to noise from other wind developments.

4.8 Socio-Economics and Land Use (EIA Report Chapter 14)

The assessment of socio-economics and land use sets out the likely socio-economic effects, including recreation and land use effects, associated with the proposed development.

The assessment has been broken down into two phases: construction (approximately 18 months) and operational periods.

For the purposes of assessing socio-economic issues (employment and economy), a Wider Study Area (WSA) has been set primarily at the area of the Highland Council administrative area but referencing Scotland as a whole where relevant. For the purpose of assessing effects on recreational and land use receptors, the study area is

more local (Local Area of Influence or LAI), extending approximately 5km from the site, encompassing communities from Melvich in the north and extending down Strath Halladale to Trantlebeg.

The expenditure during the pre-development, construction and commissioning phase of the proposed development is estimated to be approximately £56.62 million, from which businesses within the local area and Scotland as a whole would benefit.

Expenditure on goods and services together with spending by employees have been assessed in terms of their effects on the local and national labour markets:

- during the 18 month construction phase, the proposed development is expected to support, in net terms, around 16 person-years of employment benefiting local residents. This represents an overall contribution to employment in the WSA of around 0.01%, which would be negligible (but beneficial). Nationally (for Scotland as a whole) the proposed development would be expected to support approximately 94 person-years of employment; and
- during the operational phase the proposed development is expected to require 3 new full-time employees (engineers and technicians) locally and further posts would be created elsewhere in Scotland. Additional benefits would accrue to the local supply chain as a result of services supplied to the operation of the wind farm, creating an estimated 9 indirect jobs, giving a total of 12 new jobs throughout the operation of the proposed development. The effect on employment during the operational phase is considered to be negligible (but beneficial).

The local economy in the WSA would be expected to be boosted by a total of £1.1 million of net GVA during the construction period. The Scottish economy would benefit by some £6.7 million net GVA.

Information from other comparable projects indicates that a wide range of supply chain businesses could expect to benefit from the investment in the local and Scottish economy, including waste management, aggregates supply, forestry services, equipment hiring, fencing, and catering. The applicant would employ good practice measures with regard to maximising local procurement, including the implementation of a Local Contractor Policy, where additional weight is given in the tendering process to primary contractors that show a clear commitment to increasing local content in their supply chains.

In terms of the tourism and visitor economy, a number of published studies have been reviewed which indicate that the presence of the proposed development would not have a deterrent effect on people visiting the area once the wind farm is operational. However, accommodation in the local area is generally sparse, and consequently the use of holiday accommodation by construction workers may lead to displacement of tourism visitors during the 18-month construction period. This could have a temporary adverse effect on the local tourism economy. Mitigation measures in the form of an Accommodation Strategy are proposed to provide alternative accommodation combined with the limited number of construction workers would reduce the socio-economic effects at the level of the WSA to minor (beneficial) and negligible.

With regard to recreation and tourism assets, no significant effects are expected during construction of the proposed development subject to appropriate good practice management of construction traffic effects along the access roads to the site and within the site through the implementation of a Construction Traffic Management Plan (CTMP). Beneficial effects (also not significant) may be experienced by some businesses, such as accommodation businesses and shops, that supply goods and services to construction workers.

No significant adverse effects have been identified during the operational phase. Whilst potential for adverse visual effects has been identified for certain viewpoints along the A836, which is a tourist route, actual visibility would be dependent on the intervening topography and vegetation, and whether people are looking towards the proposed development; in practice, visitors are more likely to be looking towards the coast than inland. In practice, therefore, people moving through the area whether on foot, bicycle, horseback or car, would experience intermittent views of the proposed development which would not form a major part of their

experience, resulting in a minor level of effect on this high - medium sensitivity receptor, which is considered to be not significant.

The applicant is committed to offering a package of community benefits to local communities that would include a near neighbour electricity contribution scheme, access route enhancement and a community benefit fund which would enable the community to invest in their local area.

The proposed opportunity for the local community to invest in the energy park, and hence share the profits resulting from its operation, supports the Scottish Government's ambition to deliver lasting economic and social benefits to communities from renewable energy development in Scotland. It is expected that any proposed income streams would provide a long term, flexible revenue which could be used to support community projects within the local area.

Overall, the proposed development is expected to have a positive economic effect that is not significant in EIA terms, and no significant adverse effect on land use, tourism and recreation. Benefits arising through spending by construction workers and operational staff, as well as through community benefits packages (including potential for investment) would support local businesses and communities.

4.9 Other Issues (EIA Report Chapter 15)

4.9.1 Shadow Flicker

Shadow flicker may occur under certain combinations of geographical position and time of day, when the sun passes behind the rotors of a wind turbine and casts a shadow over neighbouring properties. As the blades rotate, the shadow flicks on and off, an effect known as shadow flicker. The effect can only occur inside buildings, where the flicker appears through a window opening.

Six properties sit within the shadow flicker zone of influence and were assessed for shadow flicker effects. The shadow flicker zone of influence is 11 rotor diameters (plus 25m micro-siting), which equates to 1,488m. The properties within the shadow flicker zone of influence:

- Kirkton Cottage;
- Kirkton Farm House;
- Ar Dachaidh;
- 27 Upper Bighouse;
- 25 Upper Bighouse; and
- Smigel.

All properties listed above are financially involved (owned by landowners participating in the wind farm development) with the proposed development with the exception of Kirkton Cottage and Smigel.

In line with relevant guidance, the shadow flicker assessment has adopted a criterion of 30 hours of shadow flicker in one year as a significance threshold⁴. Where less than 30 hours of shadow flicker is predicted to occur in one year at a particular property, this is considered to be a minor effect (not significant).

The shadow flicker assessment set out in **Chapter 15: Other Issues** of the EIA Report, shows that no properties are predicted to experience over 30 hours of shadow flicker in a year, with a maximum of 14.6 hours predicted at any one property (Ar Dachaidh). Predicted shadow flicker effects are therefore considered to be not significant.

⁴ Guidance from Northern Ireland in Best Practice Guidance to PPS18: Renewable Energy (Department for the Environment, 2009)

4.9.2 Climate and Carbon Balance

Onshore wind farms by their very nature tackle the issue of climate change. It is estimated that the proposed development would displace approximately 2.49 million tonnes of carbon dioxide (CO₂) in its lifetime when compared to the amount of CO₂ fossil fuels would have produced to generate the same amount of electricity.

The proposed development would produce an average of approximately 184,280 Mega Watt hours (MWh) of electricity annually (based on a site derived capacity factor of 39.8%). This equates to the power consumed by approximately 49,167 average UK households⁵, which would be well above the energy requirements of the 3,622 homes in North, West and Central Sutherland⁶. This equates to an annual reduction in CO₂ emissions of approximately 82,839 tonnes, when compared to the amount of CO₂ emitted by fossil fuels to produce the same amount of electricity.

In terms of carbon footprint, the 'Carbon Calculator' is the Scottish Government's tool provided to support the process of determining the carbon impact of wind farm developments in Scotland, which in turn establishes any effect on climate.

The calculations of total carbon dioxide emission savings and payback time for the proposed development indicates the overall payback period of a wind farm with 11 turbines with an average (expected) installed capacity of 4.8MW each would be approximately 1.5 years, when compared to the fossil fuel mix of electricity generation.

The proposed development is expected to take around 18 months (1.5 years) to repay the carbon exchange to the atmosphere (the CO₂ debt) through construction of a wind farm; the site would in effect be in a net gain situation following this time period and can then claim to contribute to national objectives (for the remaining 28.5 years of operation).

4.9.3 Aviation

An assessment has been carried out to understand the potential impact of the proposed development on aviation related infrastructure.

The assessment looked at radar Line of Site (LoS) for radars that may potentially be affected by the proposed development (technical impacts only). Four radar were considered as part of the assessment:

- Lossiemouth PSR;
- Saxa Vord ADR;
- Alanshill PSR; and
- Wick Airfield.

The proposed development was deemed to be not visible to the above extant radar (diffraction effects have not been included in the LoS assessment). The proposed development is not assessed as having any significant effects with regards to aviation radar.

The proposed development site is within Low Flying Area 14, where military aircraft are permitted to fly down to 250 feet above ground level and obstacles. However, the proposed wind turbines would be fitted with infrared lighting in order to mitigate against physical obstruction to low flying aircraft operating in the area. The proposed development is not assessed as having any significant effects on low flying military aircraft.

⁵ Calculated using the most recent statistics from the Department of Business, Energy and Industrial Strategy (BEIS) showing that annual UK average domestic household consumption in 2020 was 3,748kWh

⁶ Statistics.Gov.Scot 2020

4.9.4 Telecommunications

Early constraints mapping identified the presence of three fixed links running north – south through the site. These links are operated by Telefonica, MBNL and Vodafone.

No turbine forming part of the proposed development is within 166.5m of the MBNL, Vodafone or Telefonica fixed links that run through the site (this separation distance has been determined through direct engagement with the link operators). Therefore, the proposed development is not assessed as having any significant effects with regards to telecommunications.

4.9.5 Risk of Accident or Disaster

The vulnerability of the proposed development to major accidents and natural disasters, such as flooding, sea level rise, or earthquakes, is considered to be low due to its geographical location and the fact that its purpose is to ameliorate some of these issues.

Despite the risk of major accidents and natural disasters being considered as low, the vegetation and openness of the site does present a potential, albeit remote, fire risk. The Outline CEMP (EIA Report **Technical Appendix 3.1**) contains measures for reducing the risk of fires occurring during the construction of the proposed development and these are considered to be appropriate to the level of potential risk.

The nature of the proposals and remoteness of the site means there would be negligible risks of accidents and disasters to population and human health; biodiversity; land, soil, water, air and climate; and material assets, cultural heritage and the landscape.

With regard to risks of accidents during the construction phase, the construction works for the proposed development would be undertaken in accordance with primary health and safety legislation, including the Health and Safety at Work Act 1974 and the Construction (Design and Management) (CDM) Regulations 2015 which would include a requirement to produce emergency procedures in a Construction Phase (Health & Safety) Plan in accordance with the Regulations.

5.0 Summary of Significant Effects

The following Table (**Table 5-1**) summarises the significant effects predicted as a result of the proposed development.

Table 5-1: Summary of Significant Effects

Topic	Mitigation	Residual Significant Effects
Landscape and Visual	Design	<p>Significant Landscape Effects at:</p> <ul style="list-style-type: none"> • Sweeping Moorland and Flows landscape character type; • Strath – Caithness and Sutherland landscape character type; and • Coastal Crofts and Small Farms landscape character type. <p>Overall, identified significant landscape effects are contained within an approximate 10km radius.</p> <p>Significant Visual Effects at:</p> <ul style="list-style-type: none"> • Viewpoint 1 (A897- Strath Halladale, Achiemore); • Viewpoint 2 (A837-Goval, Strath Halladale); • Viewpoint 4 (A836 - junction to Bighouse); • Viewpoint 5 (Bighouse); • Viewpoint 8 (Beinn Ratha); and • Viewpoint 9 (Totegan, near Strathy Point). <p>Significant effects have generally been identified within the northern part of Strath Halladale.</p>
Ecology	Design, Pre-Construction Surveys, Construction Environmental Management Plan, Habitat Management Plan	None
Ornithology	Design, Pre-Construction Surveys, Construction Environmental Management Plan, Habitat Management Plan	None
Hydrology, Hydrogeology, Geology and Soils	Other than the good practice measures that the developer would implement as standard, no specific mitigation is required.	None
Cultural Heritage and Archaeology	Design and preservation of the assets within the digital record through a pre-commencement condition and/or a watching brief	None

Topic	Mitigation	Residual Significant Effects
	according to the requirements of HCHET	
Site Access, Traffic and Transport	<p>Traffic Management Plan for the movement of abnormal loads.</p> <p>Framework Construction Traffic Management Plan (CTMP) provided.</p> <p>Trial Run for abnormal loads prior to commencement of construction.</p> <p>Provision of information to local residents and users of amenities, to involve the community in the safe operation of the Traffic Management Plan and to alleviate stress and anxiety.</p> <p>Good construction practices including wheel wash and careful loading.</p>	None
Noise	Design, Construction Environmental Management Plan	None
Socio-economics and Land Use	Design	None
Other Issues	Design	Displace approximately 2.49 million tonnes of carbon dioxide (CO ₂) over lifetime when compared to the amount of CO ₂ fossil fuels would have produced to generate the same amount of electricity.

6.0 Next Steps and Further Information

The ECU will consider the Section 36 application and the findings of the EIA. Before making a decision on the application, the ECU will consult a number of consultees including THC, NatureScot and SEPA, and will consider all representations received from other parties including members of the public.

A copy of the NTS will be made available for download from the applicant website at: www.kirktonwindfarm.co.uk.

Hard copies of this NTS are available free of charge from:

SLR Consulting Limited
Office 4.04,
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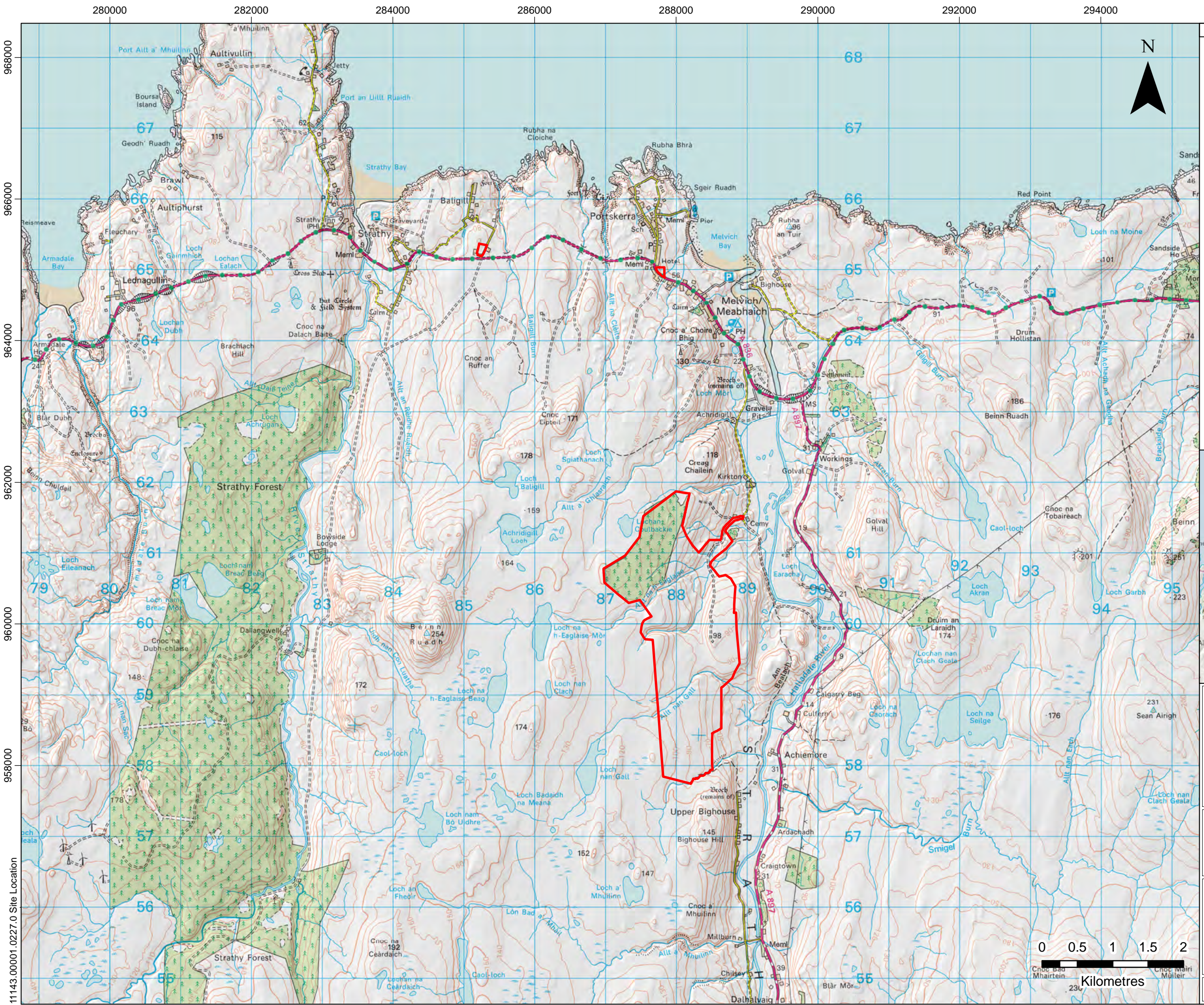
Tel: 07718 482283

Paper copies of the EIA Report may be purchased by arrangement from the above address for £1,200 per copy, or £15 per USB memory stick copy. The price of the paper copy reflects the cost of producing all of the Landscape and Visual photographs at the recommended size. As such, a USB memory stick version is recommended.

Hard copies of the EIA Report can be viewed at the following locations during their opening hours:

- The Highland Council Wick Office, Caithness House, Market Square, Wick, KW1 4AB; and
- Thurso Library, Davidson's Lane, Thurso, KW14 7AF.

FIGURES



LEGEND

Application Boundary

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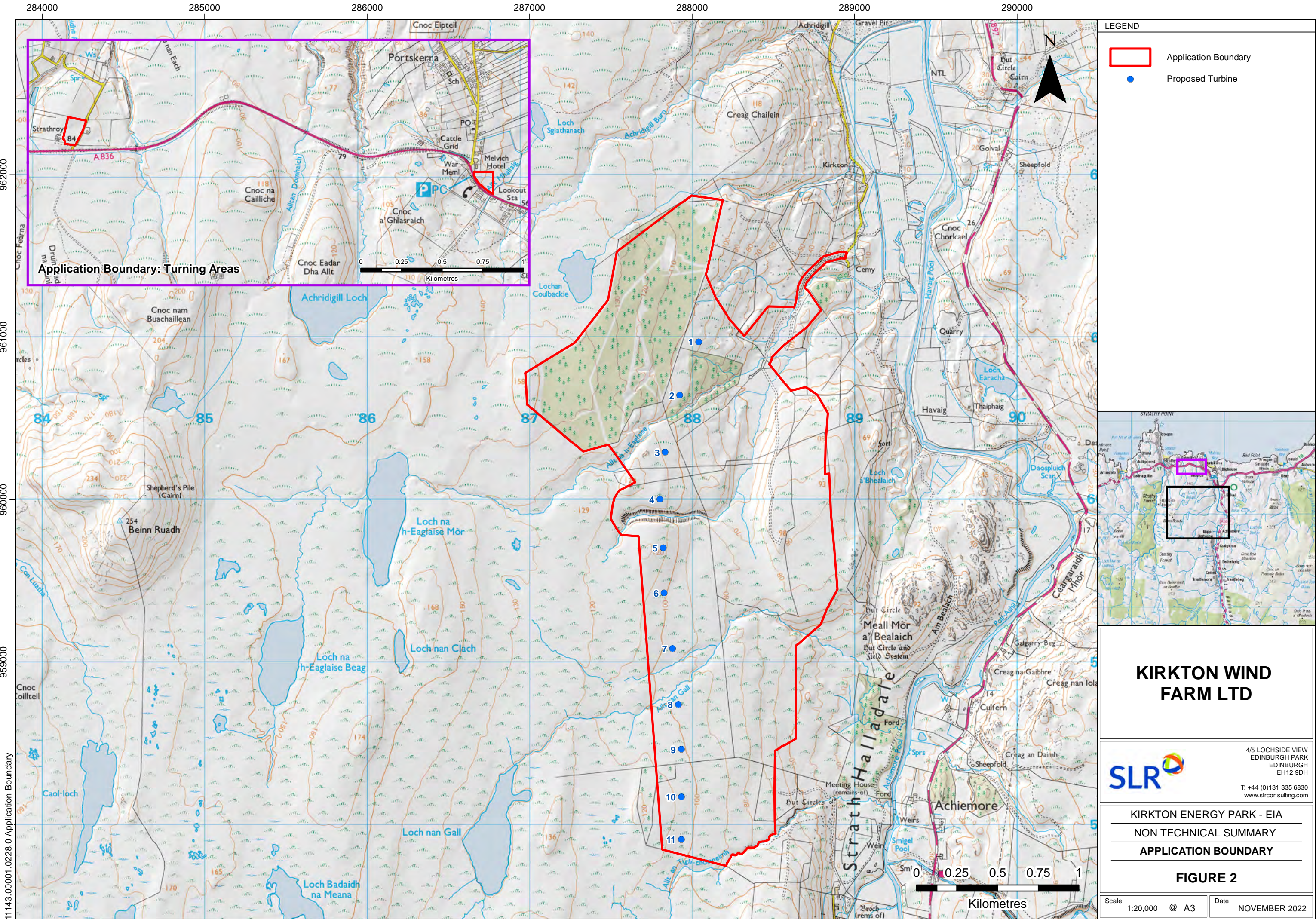
NON TECHNICAL SUMMARY

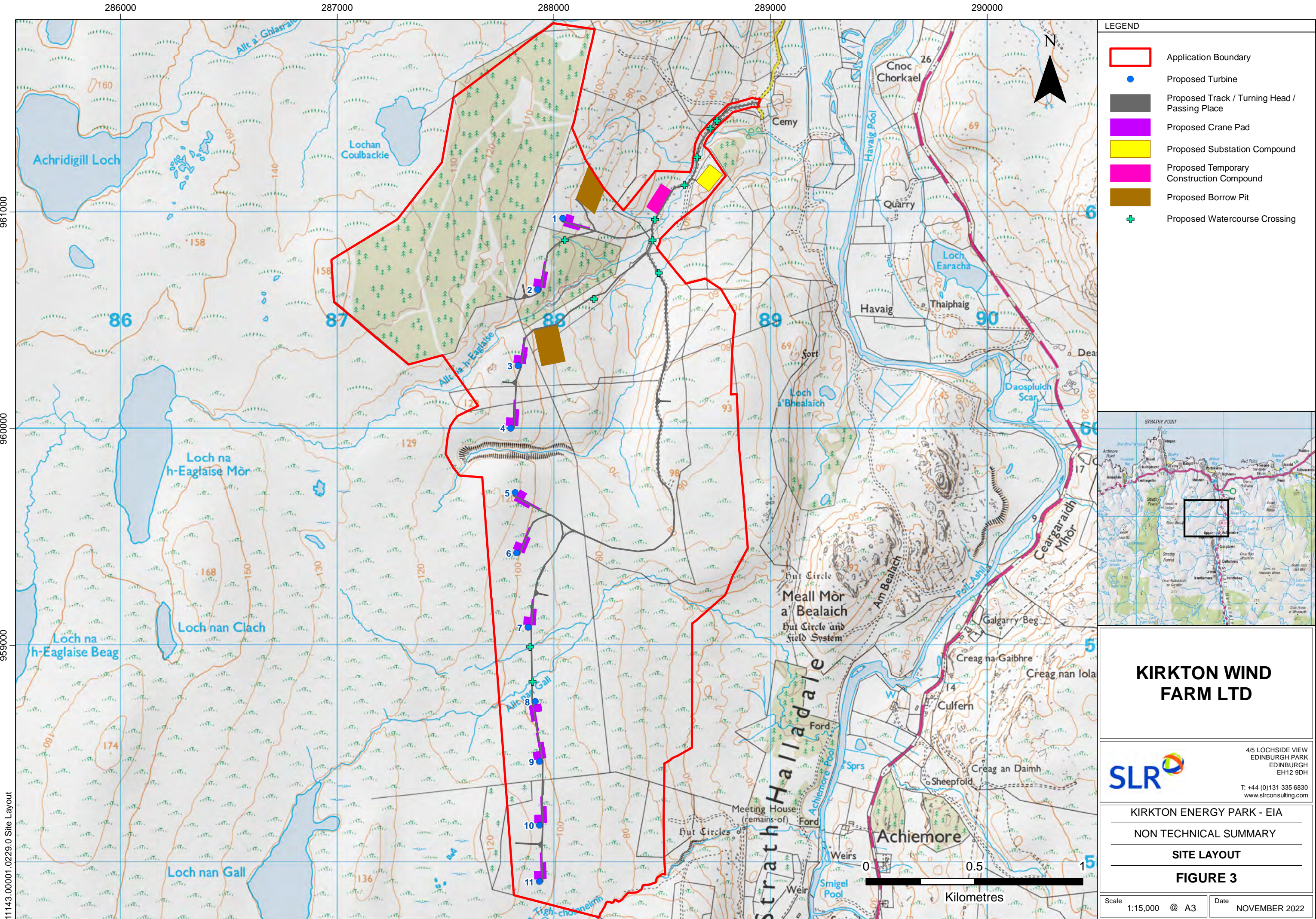
SITE LOCATION

FIGURE 1

Scale
1:50,000 @ A3

Date
NOVEMBER 2022





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