

ACHANY EXTENSION WIND FARM DESIGN AND ACCESS STATEMENT

July 2021



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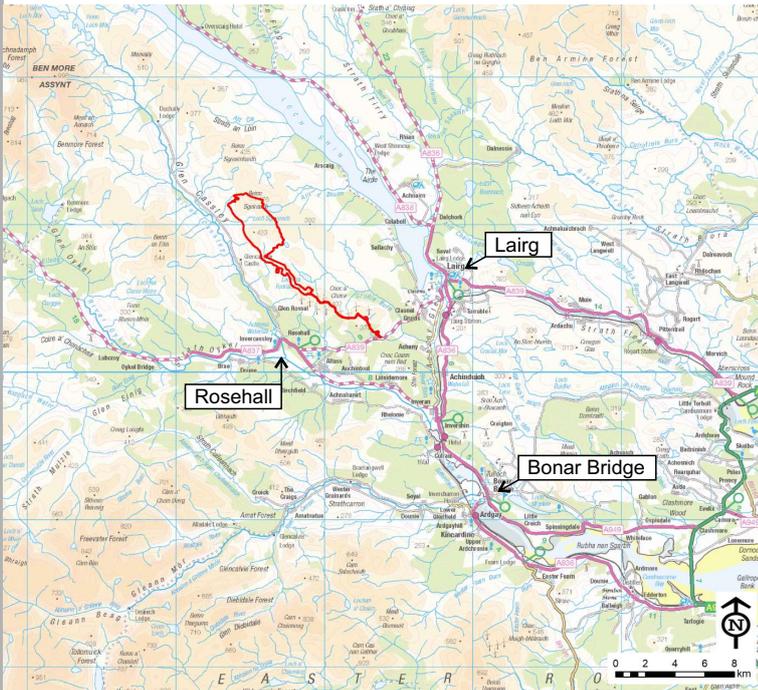


INTRODUCTION

The Proposed Development

SSE Generation Ltd (SSEG), “the Applicant”, is proposing to construct an extension to the operational onshore Achany Wind Farm to generate renewable electricity from wind power. The proposed wind farm, called 'Achany Extension Wind Farm' would be located on land to the north-west of the operational Achany Wind Farm

The Proposed Development is being promoted by the Applicant in support of the Scottish Government's targets for reduction in greenhouse gas emissions to net-zero by 2045 and energy generation via renewable sources to an equivalent of 50% by 2030.



The location of the proposed wind farm is approximately 4.5 kilometres (km) directly north of the village of Rosehall and 11km to the west-north-west of Lairg.

Site Location Plan

The Proposed Development would consist of 20 turbines with a maximum tip height of 149.9m, an onsite substation, welfare building and store, a potential extension to the existing operations building at Achany Wind Farm to accommodate additional staff, a permanent Light Detection and Ranging (LiDAR) station to monitor meteorological data and associated access tracks and hardstanding areas.

Temporary elements required to construct the Proposed Development would include two site compound areas (one close to the main access on the A839 and one on the main wind farm site), up to 5 borrow pits (including reworking of a borrow pit used previously for Achany Wind Farm) and a concrete batching plant.

The Design and Access Statement

This Design and Access Statement details the evolution of the design for the Proposed Development, and in particular the key considerations which were taken on board in developing the preferred turbine layout. It also provides a presentation of the preferred turbine layout and the proposed design and finishes of individual components.

The Design and Access Statement is laid out in the following sections:

1. Site Context;
2. Design Development;
3. Materials and Finishes; and
4. Access Considerations.

SECTION 1. SITE CONTEXT

Landscape Context

The location of the Proposed Development comprises an upland plateau area which lies between Glen Cassley and Loch Shin approximately 10.7km to the west-north-west of Lairg, in central Sutherland. The existing wind turbines of the Achany and Rosehall Wind Farms lie to the south-east with the closest turbines being separated by just under 2km.

The Proposed Development site lies at a transitional point in the landscape. To the north-west and west, the land rises into a complex landscape of rugged mountains, moorland and lochs, penetrated by few straths and glens and with limited habitation and access. To the east and south-east, the landscape comprises a range of lower lying, rounded hills and plateaux where rural habitation and small villages are more common throughout straths, glens and coastal lands. An extensive pattern of commercial forest plantation characterises the straths which wrap around the Proposed Development site to the south and east. Wind turbines are an established feature within parts of this central and eastern area, mostly focussed around the lower lying ridges and plateaux that flank the main inhabited glens, inland from the immediate coastal ridges.



The landscape to the south and east of the Proposed Development site is characterised by lower, rolling hills, extensive areas of forest plantation and rural settlement within the straths and glens. Wind turbines are a frequent feature of the rounded hills surrounding the straths and glens.

Achany and Rosehall Wind Farms, seen across the Kyle of Sutherland



The landscape beyond the Proposed Development to the north and west is more remote, characterised by rugged mountains, moorland and lochs. This image shows the setting to the north from Meall an Aonaich which lies around 11.5km to the north-west of the Proposed Development.

Looking North from Meall an Aonaich

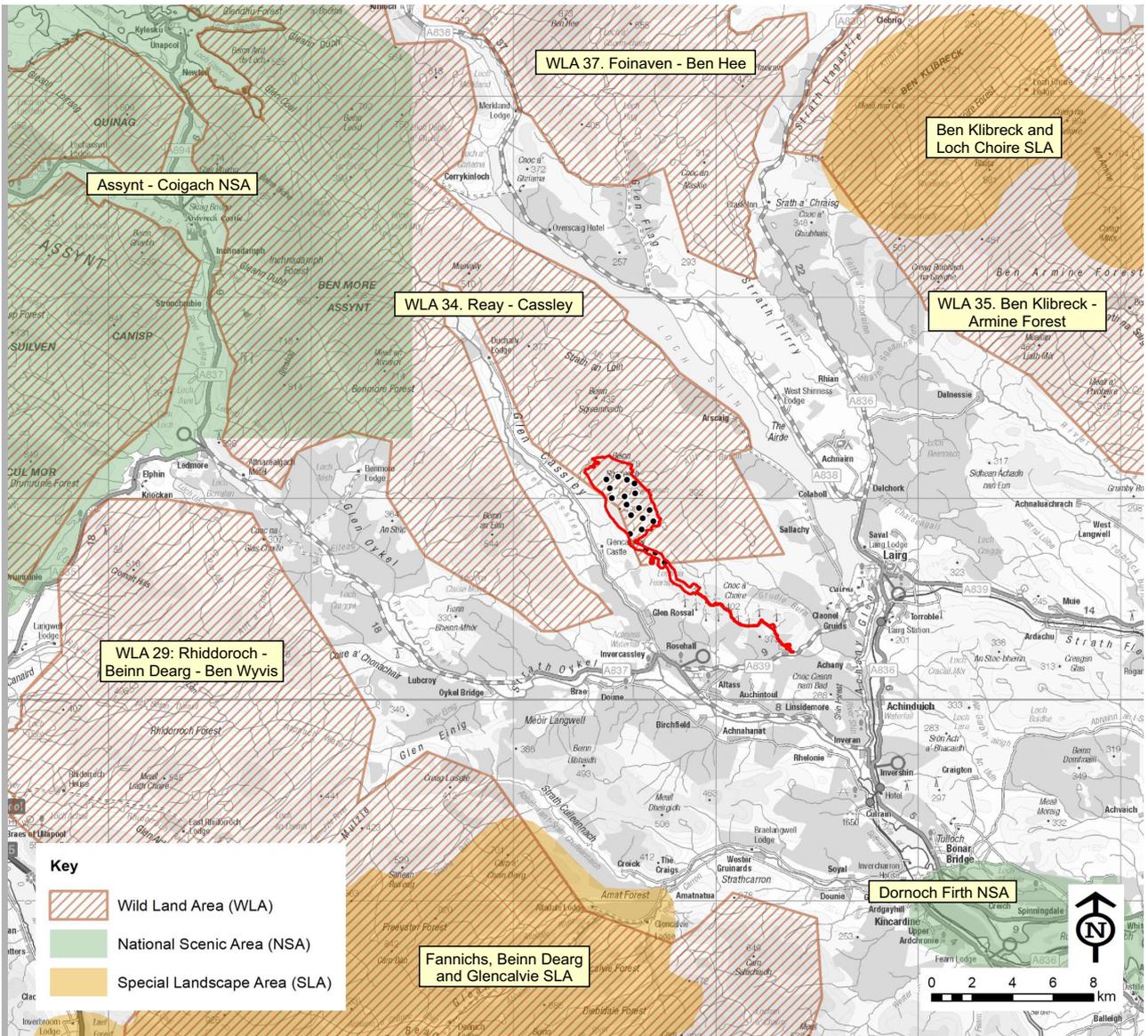


Looking north across the plateau where the Proposed Development would be located



Looking south-east from the Proposed Development site towards the operational Achany Wind Farm

Designated and Protected Landscapes



The Proposed Development site is located approximately 10km to the east and south-east of the Assynt – Coigach National Scenic Area (NSA), with the closest turbine lying approximately 10km from the boundary. NSA is a national, statutory designation and comprises areas that have been designated as having outstanding scenic value in a national context.

The Proposed Development site is located within the southern tip of the Reay – Cassley Wild Land Area (WLA 34), one of 40 areas identified by NatureScot as comprising an extensive area where lack of built structures and contemporary land use, and a sense of perceived naturalness, remoteness and challenging terrain contribute to a wild character. The WLA covers an area of over 560km² between Inchnadamph and Loch Shin, and stretches over 45km to the north-west.

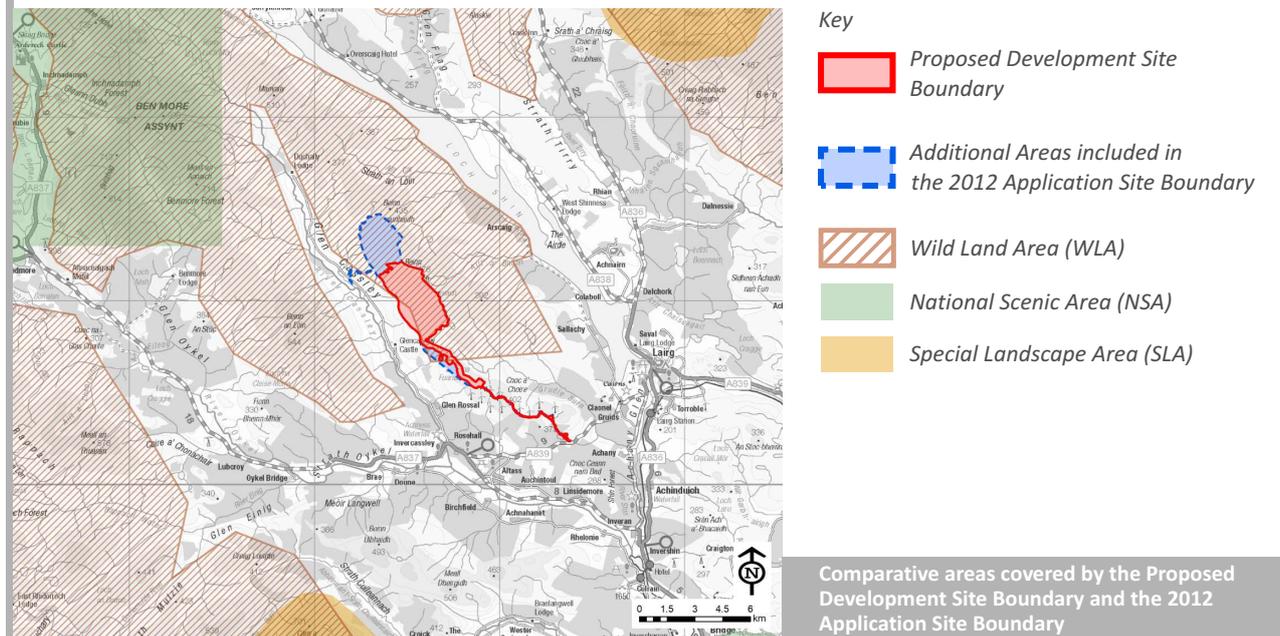
Other NSAs, WLAs and Special Landscape Areas (SLAs) identified by THC, cover parts of the surrounding landscape, all at greater than 10km from the Proposed Development.

SECTION 2. DESIGN DEVELOPMENT

Former Development Proposal

An application to construct and operate a 26 turbine wind farm and associated works on Glencassley Estate was submitted to the Scottish Governments Energy Consents Unit (ECU) in 2012. THC North Planning Applications Committee recommended to raise no objection to this application in 2013, however, it was refused by Scottish Ministers in 2015, in respect of impacts on the Assynt Coigach NSA and on wild land.

In the context of the Climate Emergency and increased renewable energy generation targets, the Applicant decided to review and optimise the 2012 Glencassley Wind Farm design as the Site offers excellent potential for a wind farm development due to its wind resource and proximity to the existing operational wind farm giving potential to minimise new infrastructure requirements. However, the concerns raised in relation to the previous development proposal have been taken into consideration in the evolution of the layout design for the Proposed Development.



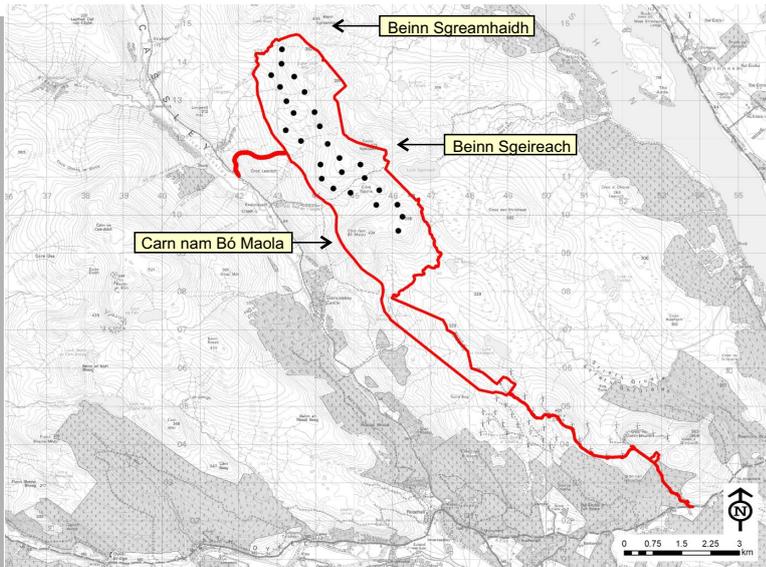
Design Process

In terms of aesthetic appeal and minimising potential effect on the wider area, the key elements of the Proposed Development would be the wind turbines and permanent access tracks. Other elements such as the substation and LiDAR position would affect a more localised area. In arriving at the preferred design option, consideration has been given to a range of factors including technical constraints, environmental constraints, economic factors, sustainability and health and safety.

The design process for the Proposed Development has involved the following key stages:

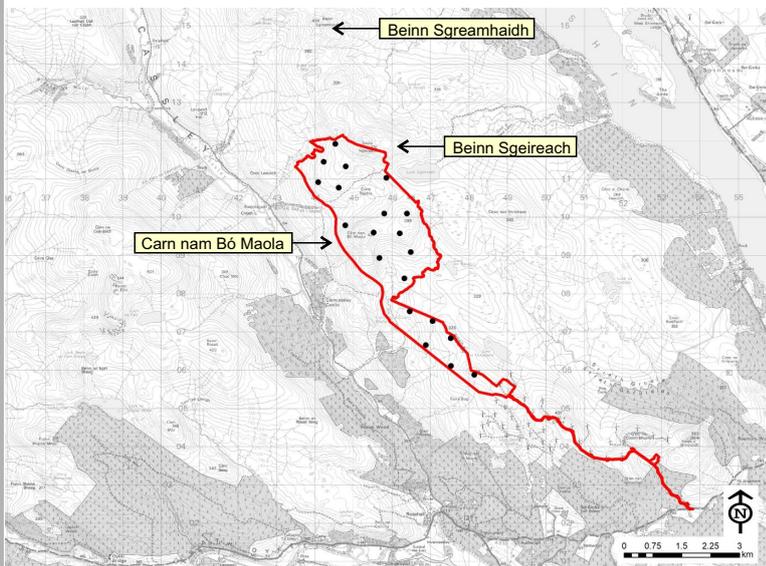
- Stage 1. Initial site layout: A preliminary technical layout, was developed based on initial constraints identified, available turbine options and wind analysis;
- Stage 2. Landscape and visual review: A landscape and visual review of the preliminary layout was undertaken with the aim of identifying a layout within the defined site boundary which minimised potential landscape and visual effects;
- Stage 3. Layout optimisation: Based on the parameters of the landscape and visual review, and other identified preliminary constraints, a layout optimised to take advantage of available wind resource was developed; and
- Stage 4. Design evolution and refinement: Following the acquisition of detailed environmental survey work and peat probing, a number of adjustments to the final layout were made to minimise environmental effects whilst ensuring a workable engineering solution.

Design Iterations



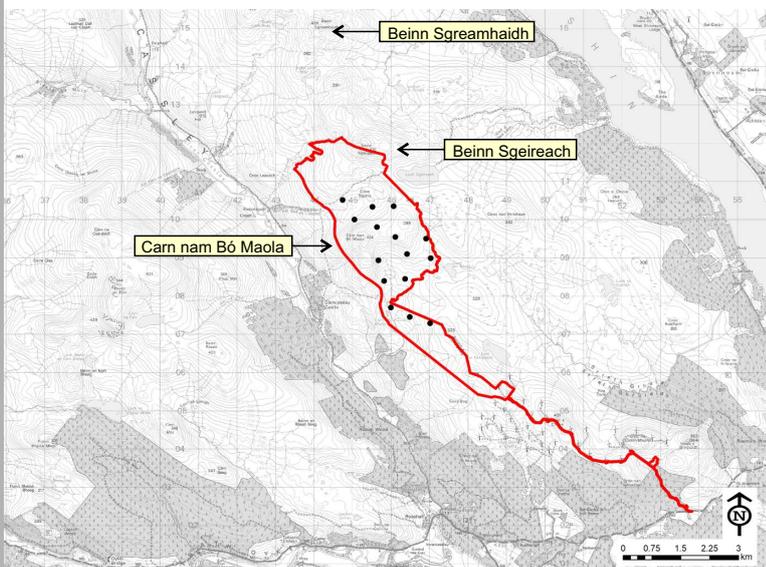
The 2012 Application layout comprised 26 turbines at 126.5m to tip, set on the western edge of the plateau between Glen Cassley and Loch Shin, to the west of Beinn Sgeireach, stretching 5.6km from the southernmost turbines on Carn nam Bó Maola to the northernmost turbine west of Beinn Sgreamhaidh. The northernmost turbines were approximately 8km to the east of the NSA boundary.

2012 Application Layout



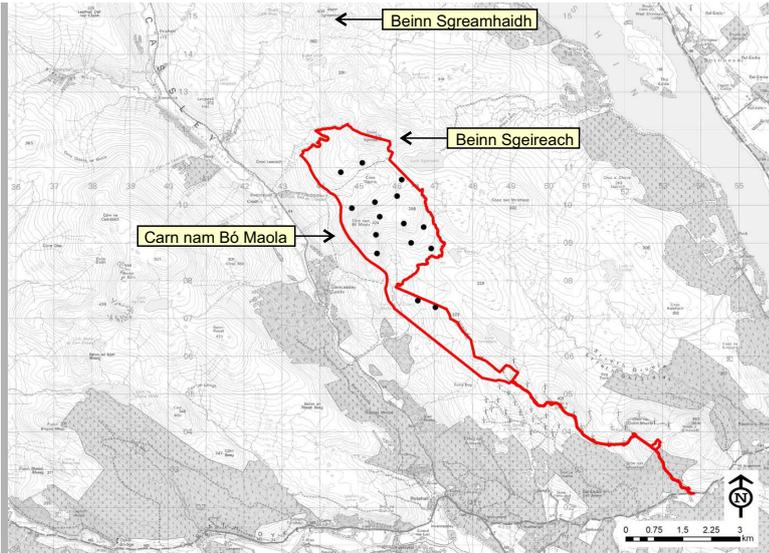
An initial decision was made to confine the site boundary for the Proposed Development further to the south and closer to the existing Achany Wind Farm. The preliminary layout considered turbines up to 200m to tip, all set to the south and west of Beinn Sgeireach.

Preliminary Layout



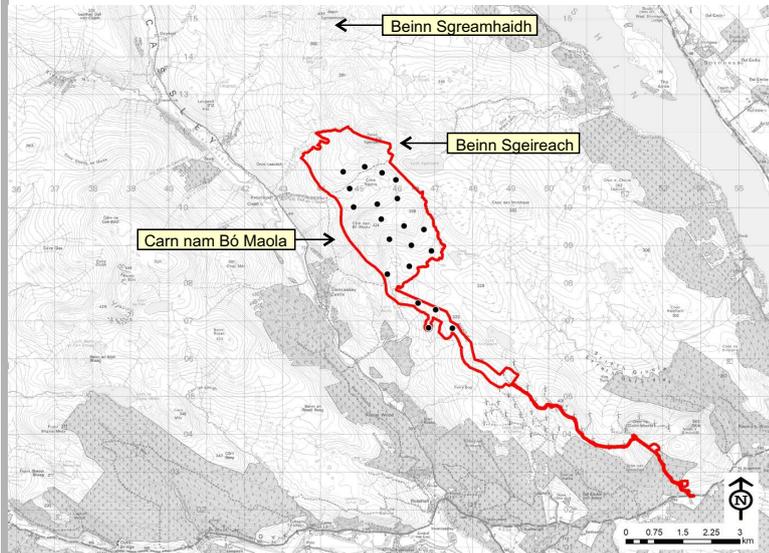
An exercise was undertaken by landscape consultants to identify a potential optimal layout from a landscape and visual perspective, with the aim of reducing potential effects on the WLA and NSA. The conclusion of this exercise was to confine proposed turbine locations to the south of Beinn na Sgeireach. It was also recommended that turbines should be 149.9m to tip to minimise landscape and visual effects and to avoid the requirement for visible turbine lighting.

Landscape and Visual Optimised Layout



The landscape optimised layout was further reviewed and developed from a wind resource and technical basis and taking into account other preliminary constraints. The optimised layout was based on a layout of 15 turbines at 149.9m to tip with the option of additional turbines.

Optimised Layout



Through a series of workshops, a number of adjustments were made to the layout based on more detailed environmental and technical survey work and peat probing. The Site Boundary was also refined for the final layout.

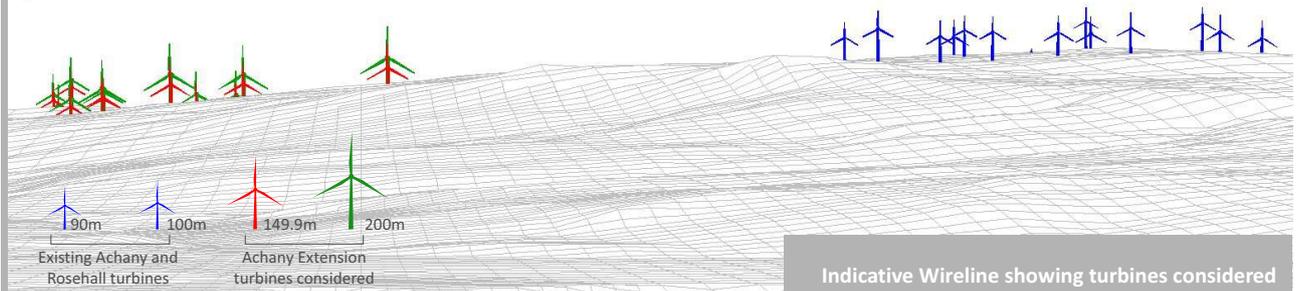
The final layout presented with the application comprises 20 turbines and is considered to be the optimum layout, achieving the maximum output whilst minimising the potential for environmental effects.

Final Layout

Selection of Proposed Turbine

During the initial phases of the design, turbines were considered up to 200m to tip. However, a turbine of 149.9m to tip was selected. The advantages of this tip height were considered as follows:

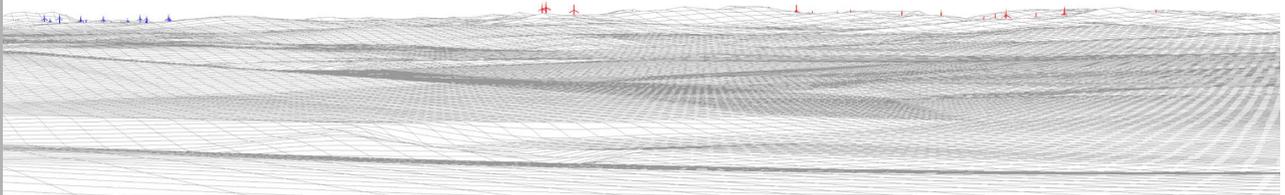
- The turbines would potentially be visible from fewer areas and would appear as a smaller feature when visible;
- The turbines would appear further from the NSA, core parts of the WLA and residential areas ;
- The turbines would appear more in proportion to the existing turbines of the neighbouring Achany and Rosehall Wind Farms;
- The turbine components of the 149.9m turbines would be less challenging to transport;
- The 149.9m turbines would not require visible aviation lighting.



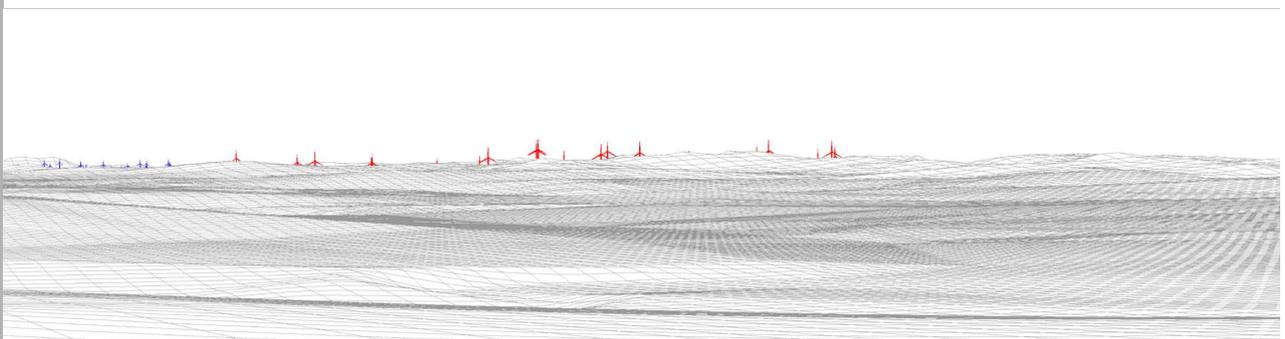
Illustrative Comparison of Layouts



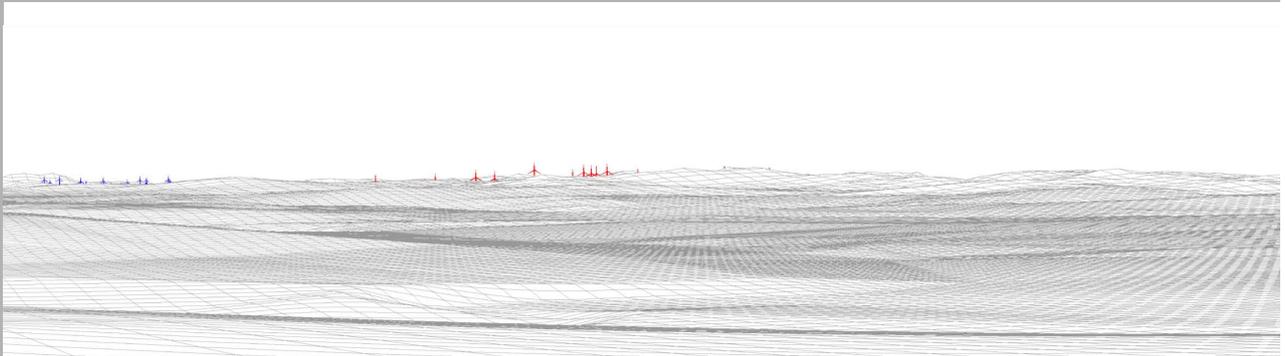
VP1: A836 above the Crask Inn



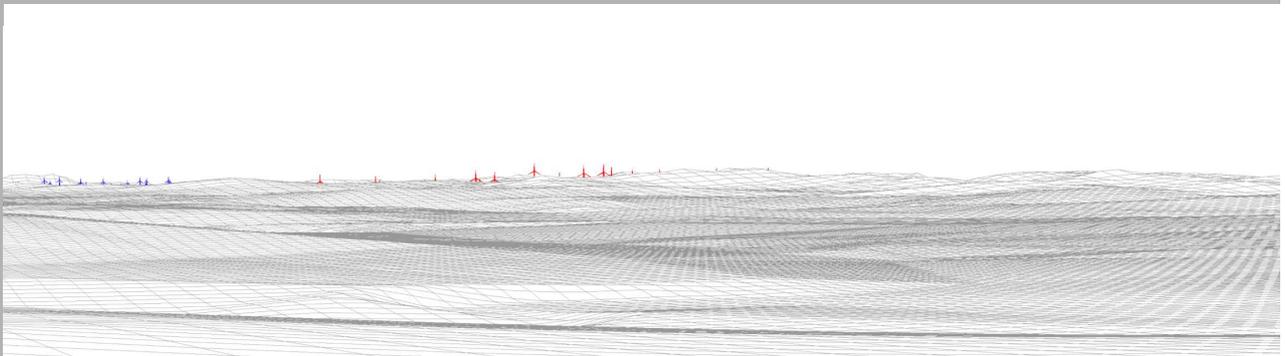
VP1: A836 above the Crask Inn - 2012 Application Layout (126.5m to tip)



VP1: A836 above the Crask Inn - Preliminary Layout (200m to tip)



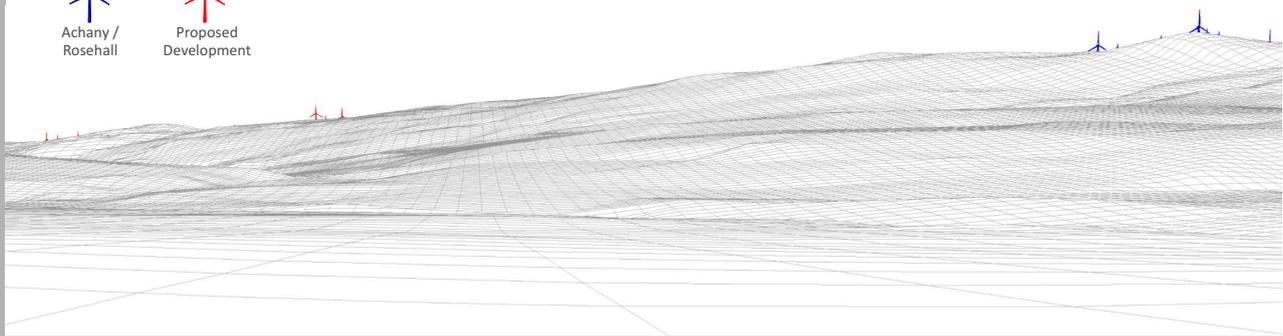
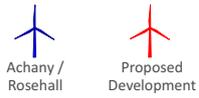
VP1: A836 above the Crask Inn - Optimised Layout (149.9m to tip)



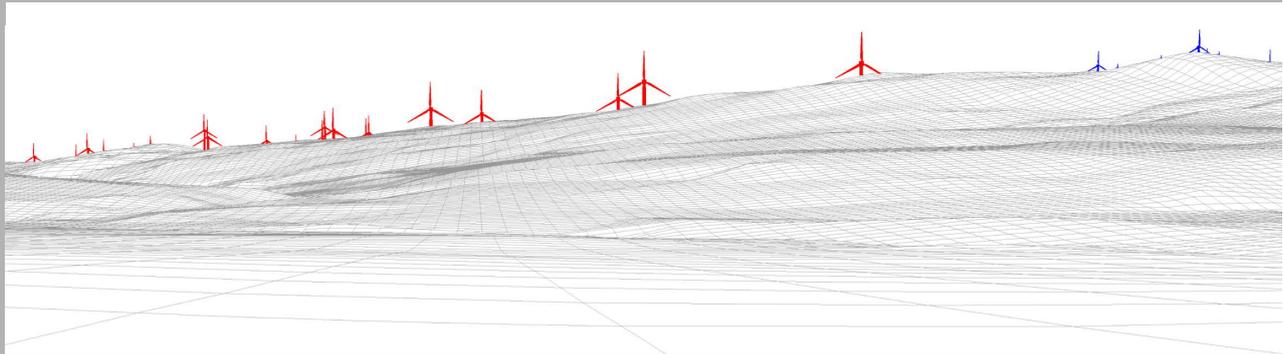
VP1: A836 above the Crask Inn - Final Layout (149.9m to tip)

The aim of design development for Crask, was to minimise the spread of turbines into the more remote and mountainous landscapes to the west, by maintaining a connection to the existing wind turbines in the southerly view, and to limit as far as possible the appearance of turbines above the higher parts of the skyline.

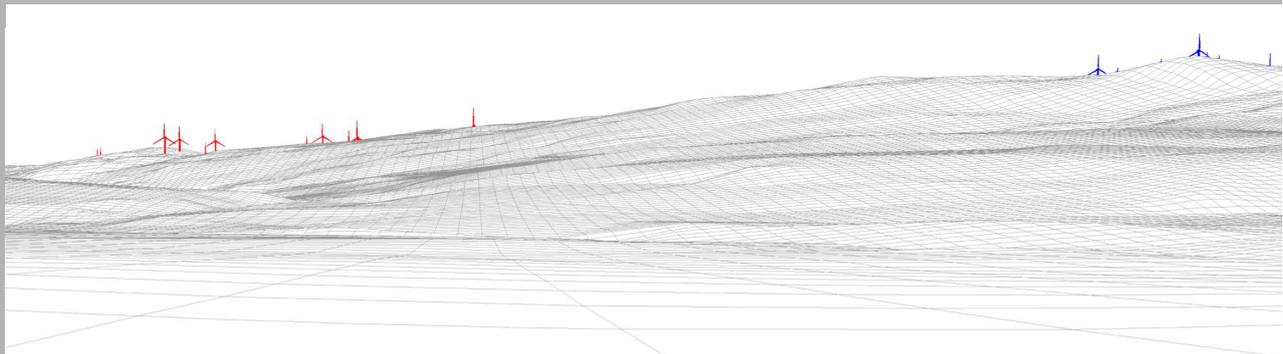
VP6: Rosehall



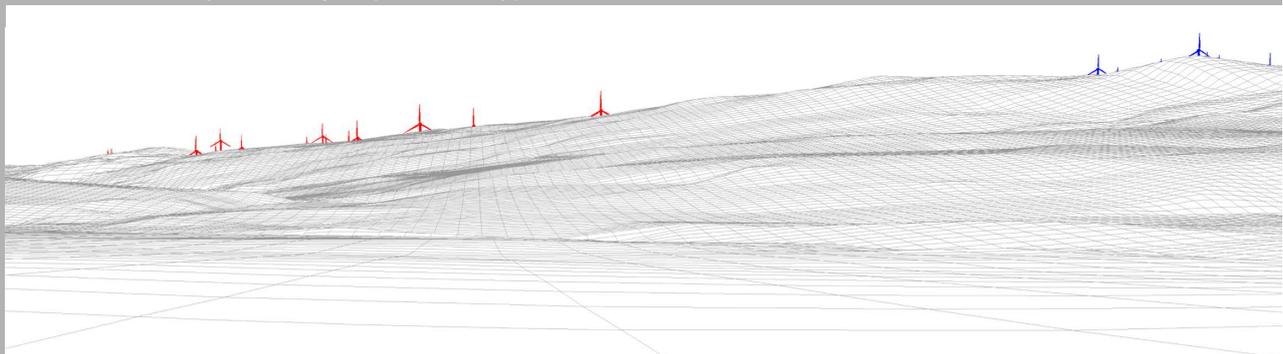
VP6: Rosehall - 2012 Application Layout (126.5m to tip)



VP6: Rosehall - Preliminary Layout (200m to tip)

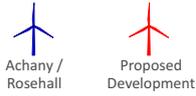


VP6: Rosehall - Optimised Layout (149.9m to tip)

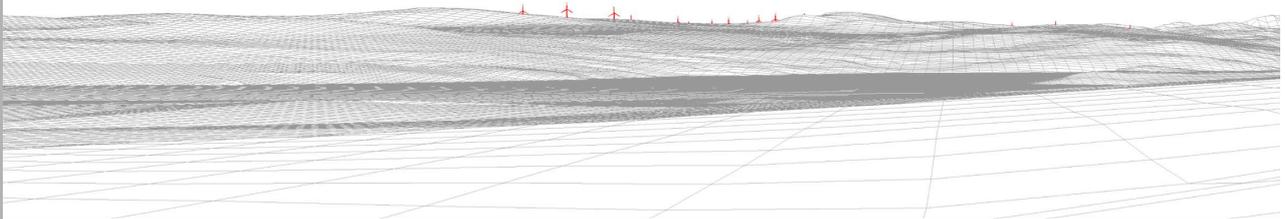


VP6: Rosehall - Final Layout (149.9m to tip)

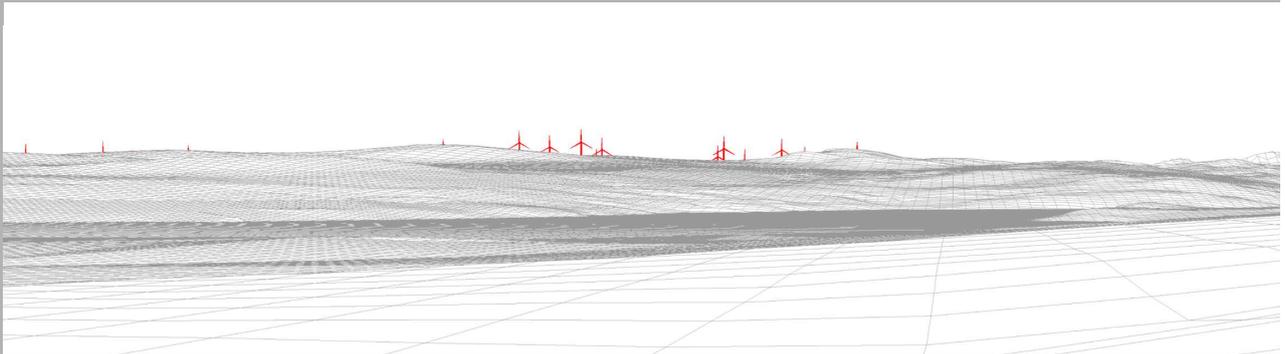
The movement of the Proposed Development south away from the NSA inevitably results in it moving closer to Rosehall. Here, the design sought to minimise the scale of turbines above the skyline and to maintain a separation between the Proposed Development and existing turbines. 149.9m turbines appear at a similar scale to existing turbines in the view.



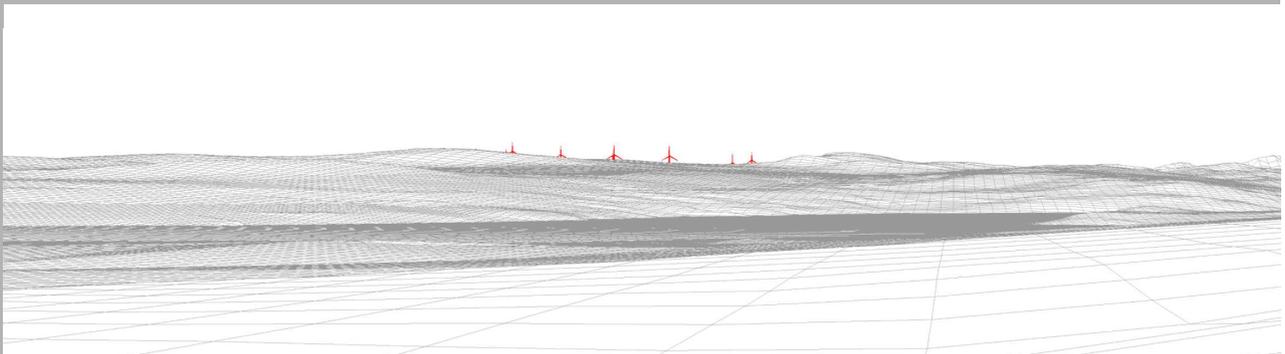
VP9: Achnairn caravan and camping site entrance



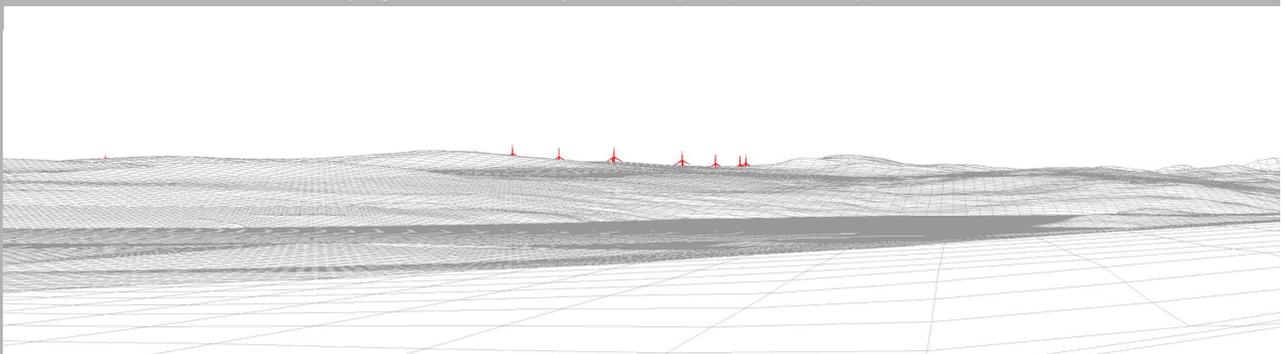
VP9: Achnairn caravan and camping site entrance - 2012 Application Layout (126.5m to tip)



VP9: Achnairn caravan and camping site entrance - Preliminary Layout (200m to tip)

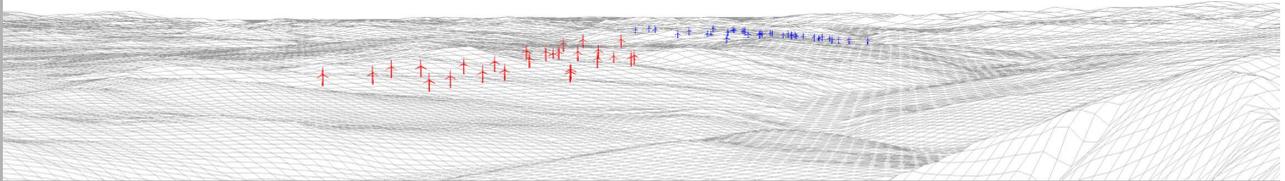


VP9: Achnairn caravan and camping site entrance - Optimised Layout (149.9m to tip)

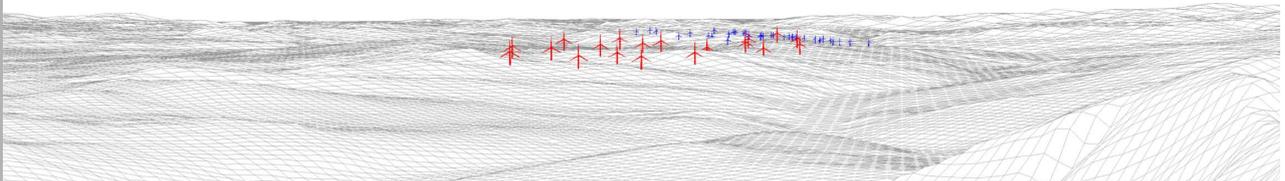


VP9: Achnairn caravan and camping site entrance - Final Layout (149.9m to tip)

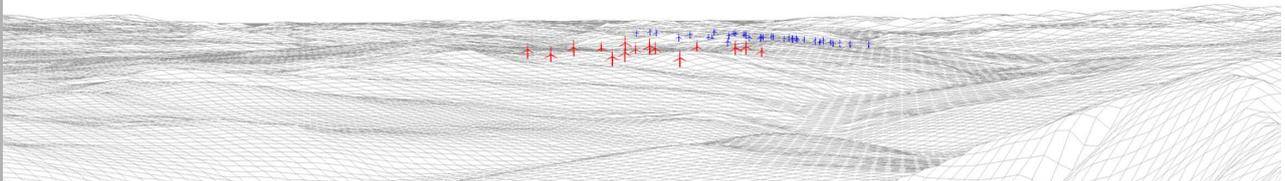
In views from the north-east side of Loch Shin, the aim of the design was to minimise the spread of turbines to the west, to create a concise grouping, and to limit the vertical scale of the turbines, keeping them in proportion to the scale of the ridge that encloses the loch to the south-west. As far as possible, the aim was to keep the turbines, and particularly hubs, below the level of the enclosing landform. The 149.9m turbines appear more in proportion to the landform than the 200m turbines, whilst the 2012 layout shows a greater spread of turbines to the west.



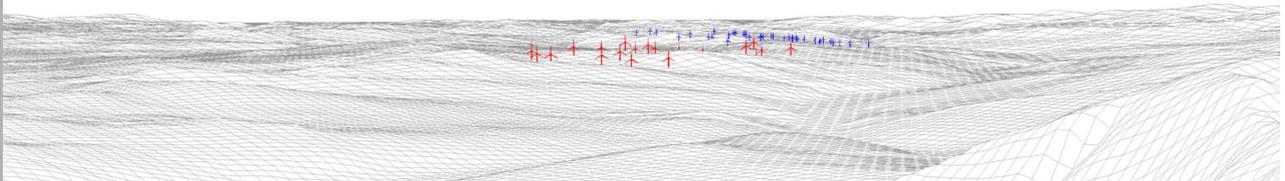
VP10: Ben More Assynt - 2012 Application Layout (126.5m to tip)



VP10: Ben More Assynt - Preliminary Layout (200m to tip)



VP10: Ben More Assynt - Optimised Layout (149.9m to tip)



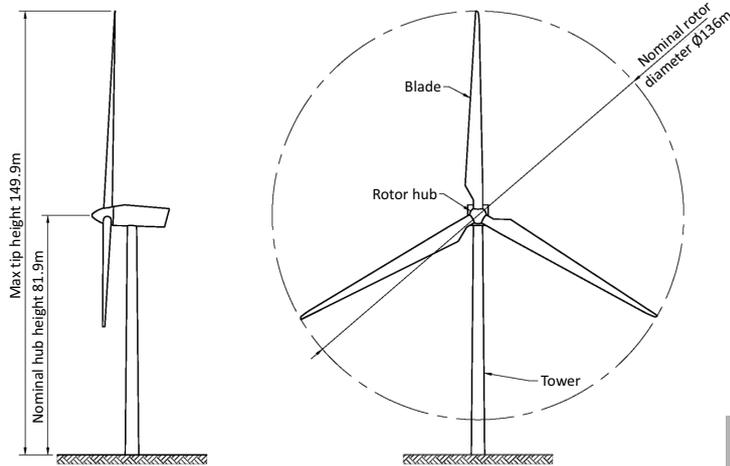
VP10: Ben More Assynt - Final Layout (149.9m to tip)

In this view from the NSA, the aim of design development was to push turbines further away from the NSA and create a concise grouping which appears more closely in relation to the existing Achany and Rosehall Wind Farms. It was noted that from this location, the 200m turbines, although further away than those of the 2012 application appeared larger in the view. The 149.9m turbines appear more proportionate to the 2012 turbines, but more concise and distant in the view.

SECTION 3. MATERIALS AND FINISHES

Wind Turbines

The 20 wind turbines would be three-bladed horizontal axis turbines, up to 149.9m to tip with a blade diameter of up to 136m. The turbines would be automatically controlled to ensure that they face directly into the wind at all times and therefore the orientation of the wind farm would alter with change in the wind direction



The turbine towers would be of tapering tubular rolled steel plate construction. The blades would be made from fibre-reinforced epoxy. The finish of the turbines is proposed to be a semi-matt pale grey colour. The transformers would be located internally to each turbine, thus avoiding the need for an adjacent structure.

The final choice of turbine would be dependent on economics and available technology at the time of construction.

Nominal Turbine Dimensions

Tracks and hardstandings

The location of the Proposed Development allows access to be made via existing access tracks through Achany Wind Farm. Localised widening of the existing tracks may be required to facilitate the delivery of the wind turbine components. Approximately 17.3km of new tracks would be required to reach individual turbines. New tracks would have a minimum 4.5m wide running surface with localised widening on corners and passing places to access the turbines from the existing access tracks, during both construction and operation. The access tracks would be designed to incorporate passing places that would be suitable for construction plant.

When designing new track alignments, care has been taken to minimise water crossings and avoid sensitive areas such as deep peat.

Depending on local ground conditions, two different track construction methods would be used:

- Floating tracks: Where the track construction is laid onto a geotextile membrane avoiding the need for excavation. This method allows continued flow of sub-surface water and avoids the unnecessary generation of peat for re-use. Floating tracks would be used where the peat depth is greater than 1m and where ground conditions such as gradient and peat stability allow.
- Cut tracks: Where the topsoil and peat are stripped back to expose a suitable bearing stratum on which to construct the track. Depending on topography cut slopes or embankments are required. Culverts are required to ensure the uninterrupted flow of water below the track. Cut tracks would typically be used on ground where the peat layer is less than 1m and where ground conditions are not suitable for a floating track design.



Floating track construction - Glendoe Hydroelectric scheme



Cut track - Stronelairg Wind Farm

Areas of hardstanding would be required at each turbine location to allow the placement of cranes for construction and maintenance, and at the substation and welfare building sites.

The careful removal of the vegetated peat layer prior to construction would be fundamental to ensuring that the edges of the new cut tracks and hardstanding areas would re-establish and marry in with the adjacent vegetation. Cutting and embankment slopes would be carefully graded to tie in to the surrounding landscape at a gradient suitable for the replacement of vegetated peat to minimise the visual appearance of the disturbed footprint. Where suitable quantities of vegetated peat were available, this would also be used on the shoulders of floating tracks to help soften the transition with the adjacent undisturbed moorland. Peat would not be spread on any undisturbed ground.

It is anticipated that tracks and hardstanding areas would be surfaced with crushed stone, sourced from on-site borrow pits. This stone is anticipated to have a similar colour and tone to existing exposed rock in the surrounding landscape.

Borrow Pits

Up to five borrow pits are envisaged as part of the Proposed Development. This would include the re-working of previously worked borrow pit for the Achany Wind Farm. The location of the proposed borrow pits has been largely technically driven due to the suitability of available rock closer to the surface and requirement for the production of rock throughout the site, but have been micro-sited to try to reduce their potential visual effect. It is anticipated that borrow pits towards the northern end of the site would be smaller or may not even be required if sufficient rock were generated by borrow pits closer to the site entrance.

Borrow pits used for construction of the Proposed Development would be reinstated with a suitable restoration profile to minimise longer term visual effects. It is envisaged that borrow pit reinstatement would involve re-profiling to minimise the appearance of cut faces and to provide a more natural appearing land form, and the replacement of the vegetated peat layer to re-establish the native ground flora as far as possible. The retention of some cut faces on steeper slopes may be considered, where these reflect existing bedrock within the landscape setting. On slacker slopes, reinstatement may include the creation of pools, reflective of existing peat pools within the landscape.



Example of a borrow pit at Achany Wind Farm reinstated to include a small lochan, pictured approximately 1 year after reinstatement.

Borrow Pit Reinstatement, after 1 year

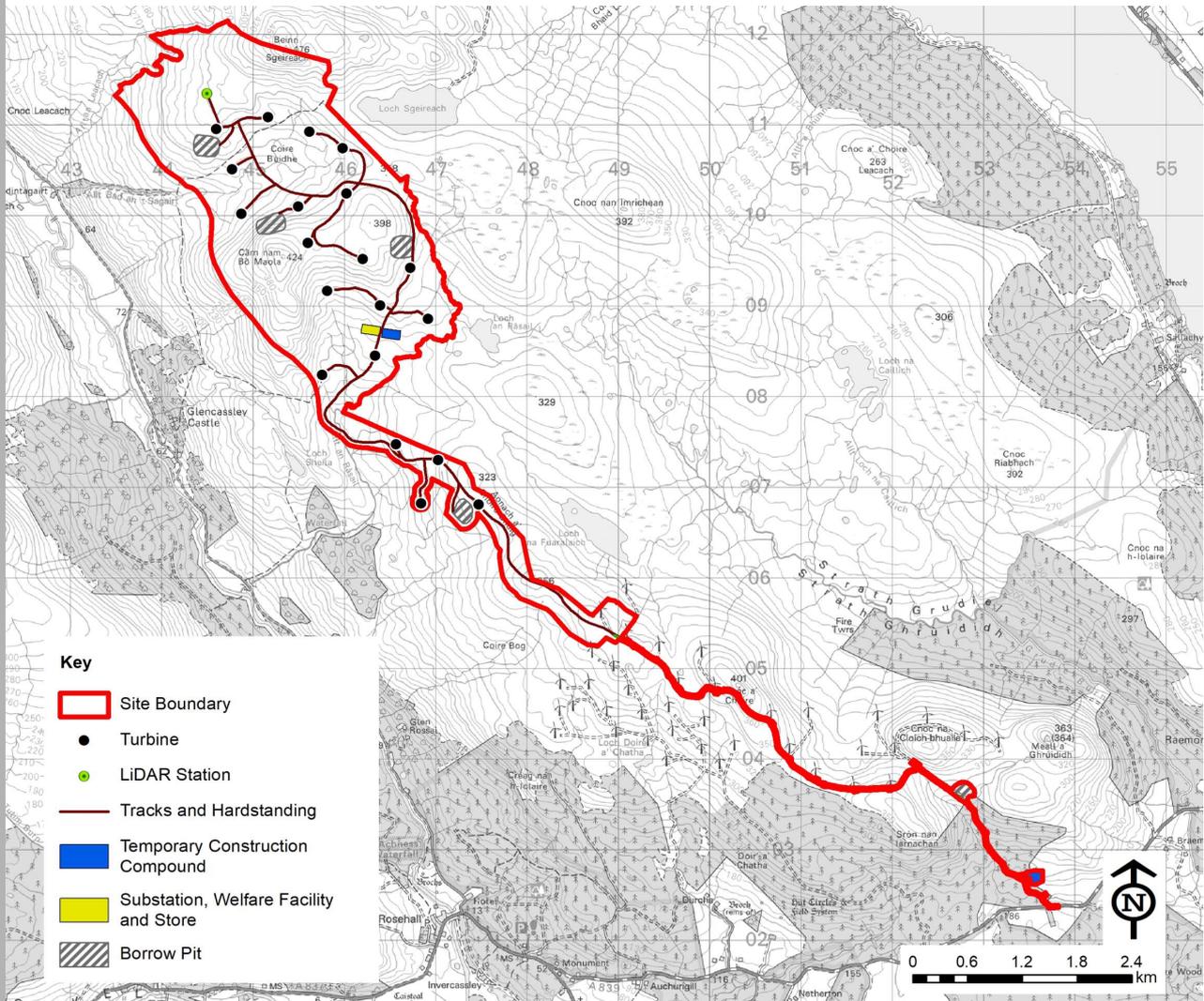


Example of a borrow pit at Achany Wind Farm pictured after approximately 10 years following reinstatement.

Borrow Pit Reinstatement, after 10 years

Other Structures

Other structures required for the Proposed Development comprise the substation and welfare buildings and LiDAR station which would be set in fenced compounds.



The substation would be accommodated on a levelled platform located towards the south of the Proposed Development. The site selected is considered to be a suitable location for this facility:

- The location towards the southern part of the site is easily accessible and provides good opportunity for buried cable connections to all wind turbines;
- The area avoids deep peat, is over 50m from any watercourses and of a relatively even gradient, reducing requirements for cut and fill and the generation of excess peat;
- The area provides sufficient space to accommodate all the required facilities; and
- The area is set in a fairly low position, screened by landform from the majority of the surrounding landscape and thereby reducing wider landscape and visual effects.

Due to the altitude, it is likely that most substation equipment would be accommodated within buildings. Up to three buildings are envisaged on the substation platform accommodating substation equipment and operations and welfare facilities. The clustering of required buildings in one location would help to localise the visual effects associated with these structures and avoid a scattering of smaller scale infrastructure, which can increase the perceived scale of the wind turbines. Accommodation of these facilities at a single site would also contain activities during the operational phase, avoiding unnecessary transportation around the wider wind farm site. There may be opportunity to accommodate some operations activities in an extension to the existing Achany Wind Farm Operations Building which would reduce the scale of the operations and welfare building required on the site.

Buildings would be constructed with a profiled steel cladding. Colour studies have been carried out to determine the most favourable colour choice for the buildings.

Various greens and browns were considered during the process. Whilst greens appear to reflect the natural colours in the landscape at some times of year, during the autumn and winter months a green building has a higher chance of strongly contrasting with its surroundings. A dark brown is considered more consistently reflective of colour changes throughout the changing seasons in this area.

Van Dyke brown is therefore suggested as most appropriate because it matches well with a number of the existing colours seen in the landscape and is also likely to suit brighter conditions, when light contrast is higher and shadows are stronger. A softer brown, such as Coffee / Bison, would not react so well in these conditions.



In summer, subtle shades of green and brown are more prominent within the landscape. Shadows and bare peat form patches of darker brown. Bare rock is less prominent within the context of lighter colours and longer vegetation growth but forms occasional patches of pale grey.

Whilst the greens within the grassy areas of moorland may more readily be represented by Dark Lustral / Tundra, the darker tones of Van Dyke brown also complement the areas of shadow.

Proposed Development site, August 2020



In autumn / winter, dark and reddish browns are the more prominent colours of the moorland. The bare rock stands out as a contrasting paler grey within the darker colours of the moorland.

A building in green would be more out of place in this landscape. Whilst the reddish tones of the moorland are similar to Coffee / Bison, the darker brown of Van Dyke brown is present in the areas of shadow and peat and compliments all the colours of the landscape.

Proposed Development Site, October 2020



VAN DYKE BROWN / IRONSTONE



DARK LAURAL / TUNDRA / SHERWOOD



COFFEE / BISON



SPRUCE GREEN / THYME / CHIVE



NATURAL STONE



Buildings would be constructed with a profiled steel cladding and would be likely to appear similar to those for the Stronelairg substation. It is proposed that cladding would be coloured Van Dyke brown, the same colour used for the Stronelairg buildings.

The Stronelairg substation building: in wider context and detail

Where possible, the detailed design would seek to 'design out' fencing which can lead to an additional human scale element, emphasising the scale of substation buildings and wind turbines and forming a more cluttered appearance. However, fencing would be required around LiDAR stations and some substation components. Where practicable, a post and wire construction would be used in favour of steel palisade. However, for safety and security reasons the use of 2.5m steel palisade fencing would be required in some locations. Where possible, consideration would be given to colouring the fencing a similar dark brown shade to the substation buildings to minimise its visual appearance.



The dark brown colour of the fencing, the same as the building, helps to provide continuity and reduces the effect that fencing can have of increasing the perceived development footprint.

Melgarve substation

SECTION 4. ACCESS CONSIDERATIONS

Access Tracks

The location of the Proposed Development on adjoining land to Achany Wind Farm enables some of the existing access infrastructure to be used. Access for the construction and operation of the site would be from the A839 via the existing entrance to Achany Wind Farm. New tracks would be constructed to access individual turbines as detailed in Section 3.

The access tracks would provide access to all turbine positions and to the substation and LiDAR stations. During construction of the Proposed Development, there would be some restrictions to public access to parts of the site for health and safety reasons. However, during operation, the tracks would be accessible to members of the public for non-motorised recreation in line with the Draft Outdoor Access Management Plan (Technical Appendix 14.2 of the EIA Report).

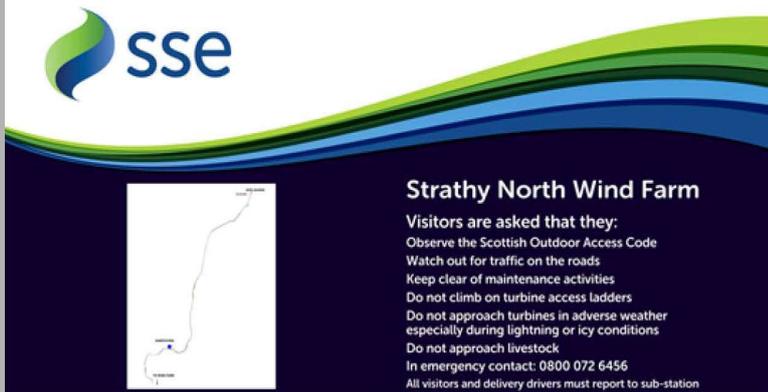


Access to the site from the A839 would be via existing access tracks through Achany Wind Farm. These tracks are typically built to a high standard, capable of accommodating construction vehicles and large wind turbine deliveries

Existing Entrance to Achany Wind Farm

Signage would be put in place for the lifetime of the wind farm to highlight to the public the potential safety issues of accessing the site during adverse weather (e.g. ice throw and lightning etc.) and ongoing Estate activities (shooting etc.). Signs are present at the Site entrance for the operational Achany Wind Farm but would be updated as required to reflect the addition of the Proposed Development.

The access tracks for the Proposed Development would be suitable for use by emergency vehicles.



Example of the type of signage which would be installed to inform the public during the operational lifetime of the Proposed Development.

Example of access signage

Pedestrian Access to Buildings

For health and safety reasons, access to the on-site buildings would be restricted to persons who are specifically authorised to enter these facilities. In accordance with the Electricity Safety, Quality and Continuity Regulations 2002, the substation buildings and facilities would be contained within either secured buildings or security fenced compounds.

There would not be any restriction of access to other parts of the site unless maintenance works required a temporary secure area for health and safety reasons.

Ramped accesses to the substation buildings would be provided to assist with the safe installation of, and future maintenance of the equipment. The welfare and control building would be provided with suitable disabled access and parking facilities in line with building regulations.