Technical Appendix 5.3: Residential Visual Amenity Assessment

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Contents

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Introduction

This Residential Visual Amenity Assessment (RVAA) describes the change in view likely to be experienced by residents within 3 km of the Proposed Development. The RVAA should be read in conjunction with **Chapter 5: Landscape and Visual Amenity**.

The RVAA has been undertaken in accordance with the principles contained within the Landscape Institute's Guidelines for Landscape and Visual Impact Assessment 3rd Edition (GLVIA3) and Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19 (LI TGN 2/19). The approach is also informed by numerous decisions made following public inquiries into wind energy proposals in Scotland and elsewhere in the UK.

GLVIA3 notes the need for a 'residential amenity assessment' to consider the effects of development on private properties (GLVIA3, Page 107, Para. 6.17). This is noted to include an assessment of visual effects, although is separate from LVIA.

LI TGN 2/19 explains that *"the purpose of RVAA is to provide an informed, well-reasoned answer to the question: 'is the effect of the development on Residential Visual Amenity of such nature and / or magnitude that it potentially affects 'living conditions' or 'Residential Amenity'?'"* (LI TGN 2/19, Page 5, Para. 2.1).

The RVAA does not consider other components of residential amenity, such as noise or shadow flicker, which are considered in the appropriate chapters of the EIA Report.

Findings of significant effects on views or visual amenity from a property do not automatically imply the need for further assessment. However, for properties likely to experience a high magnitude of visual change and which are in proximity to a development, undertaking an RVAA may be appropriate.

The methodology for the RVAA is set out below along with the scope of the assessment. The findings of the assessment are presented in tabular format and the assessment concludes with a summary of the findings. The following figures have been prepared to accompany this assessment:

- Figure A5.3.1 – Residential Property Locations
- Figure A5.3.2 - Residential Property Locations and Blade Tip (200 m) Zone of Theoretical Visibility
- Figure A5.3.3 - Residential Property Locations and Hub Height (119 m)[1] Zone of Theoretical Visibility
- Figure A5.3.4 - Residential Property Locations and Aviation Lighting ZTV
- Figure A5.3.5 - Residential Property Locations and Aviation Lighting Intensity ZTV

Methodology

The methodology is summarised as follows:

- identification of properties to be considered (defining the study area and scope);
- collation of baseline information from maps and aerial photographs and preparation of wireframe visualisations, to inform field survey;
- field survey to collate information in relation to baseline views and visual amenity from each property;
- assessment of the magnitude of change in visual amenity likely to be experienced at the property; and
- for properties experiencing a high magnitude of change, a judgement of whether the predicted change in views and visual amenity reaches the 'Residential Visual Amenity Threshold' described in LI TGN 2/19; that is, whether it would adversely affect residential amenity or 'living conditions'.

The following section sets out the methodology and the factors considered in more detail.

Study Area

The assessment includes detailed consideration of the changes in views and visual amenity from all properties within approximately 3 km of the proposed turbines (refer to **Figure A5.3.1**). This includes a bothy at Cairnhead, which is not in residential use but has been included for completeness. Although there is the potential for significant visual effects to occur beyond 3 km, such effects are not considered likely to affect 'living conditions'.

[1] The hub height used is a candidate turbine used for assessment purposes. The actual hub height of the scheme, if consented, may differ.

This opinion has been informed by experience, observations made on-site and an understanding of the Proposed Development.

Properties were identified using Ordnance Survey (OS) AddressBase Plus data and verified in the field. Properties, including their curtilage and access drives, with no theoretical visibility (as indicated by the ZTV in **Figure A5.3.2**) were not considered in the RVAA.

Desktop Studies

For the purposes of this RVAA, the visual amenity experienced at a property is made up of a combination of the type, nature, extent and quality of views that may be available from the property and its domestic curtilage (e.g. gardens and access drives).

OS maps, aerial imagery and Google Streetview were used for desktop research to assist with recording information such as the location of the residential elements of each property, the orientation of the property, and the extent of its curtilage.

In considering baseline visual amenity, the following has been examined:

- the nature and extent of the available existing views (including main/primary views) from the property and its garden, including the proximity and relationship of the property to surrounding landform, landcover and visual foci; and
- views experienced when approaching or departing from the property via its driveway and/or access roads, if applicable.

Field Surveys

Field surveys were undertaken from publicly accessible locations in the summer to winter months of 2024/25, to determine the following baseline information:

- the orientation and likely views from each property (including primary aspects and presence of windows);
- layout and orientation of the gardens and property curtilage;
- access location, and likely views from private or shared driveways or access tracks;
- the nature of existing views from the properties and their gardens, including the proximity and relationship of the properties to surrounding landform, landcover and visual foci and the scenic quality of views; and
- potential screening provided by local variations in topography, the built environment and vegetation/tree cover within the surrounding landscape.

Field work was undertaken between summer and winter of 2024/25. This enabled the 'maximum case' scenario to be assessed, on the basis that any available screening offered by deciduous vegetation was at a minimum during winter months.

Preparation of Accompanying Visualisations

On this basis of guidance included in LI TGN 2/19, indicative wireline visualisations based on a bare ground Digital Terrain Model (DTM) were generated from all individual properties and property groups (within 3 km) using Resoft Windfarm software. Wirelines were centred on the Proposed Development and illustrate a 53.5˚ included angle of view and 2 m viewing height from each location. From certain locations, more than one 53.5˚ included angle of view wireline is required, to show the full extent of the Proposed Development. The wirelines are not necessarily representative of the primary outlook of the property and do not show features such as buildings and trees that may provide screening or filtering of views. It should therefore be noted that these indicative wireline visualisations represent a 'maximum visibility scenario' which may potentially be experienced from the property or its curtilage, and this should be borne in mind when using the images.

The illustrative wireline visualisations show the proposed turbines only, with turbines numbered for ease of reference. No other components of the wind farm have the potential to affect 'living conditions'. These are therefore not included in any of the accompanying visualisations. The primary outlook of residential properties is discussed in the tables for each property/ property group in the assessment section which follows.

Due to proximity and increased scope for cumulative interactions in views from properties within the RVAA Study Area the consented Sanquhar 2 (44 turbines at 200 m to tip) and the application stage Lorg (10 turbines at 200 m to tip) and Euchanhead (21 turbines at 230 m to tip) wind farms are included in the wireline visualisations, where visible within the 53.5 degree view(s). Where there are cumulative interactions between the Proposed Development and these schemes, this is highlighted. The wireline visualisations from representative viewpoints are appended to the end of this report (see **Figures A5.3.6 to 14**).

Assessment of Potential Change to Views and Visual Amenity

Sensitivity of Residential Receptors

GLVIA3 advocates an approach which considers the overall sensitivity of visual receptors (people) in terms of *"both their susceptibility to change in views and visual amenity and also the value attached to particular views" (GLVIA3, Page 113, Para. 6.31), whilst stating that visual receptors most susceptible to change are likely to include "residents at home"* (GLVIA3, Page 113, Para. 6.33).

Taking account of the purposes of this RVAA, and taking a precautionary approach, all people at their place of private residence are considered to be of high sensitivity to changes in their views and visual amenity. Recreational users of the non residential bothy are judged to be of medium susceptibility. As a consequence, no individual assessment of sensitivity is outlined in the assessment which follows.

Magnitude of Change to Views and Visual Amenity

The likely changes in views and visual amenity as a result of the Proposed Development are considered with reference to the individual wireframes from each property (see **Figures A5.3.6 to 14**). A judgement on the magnitude of visual change which will be experienced is made, and the change in views summarised, with reference, as appropriate, to the following factors which are set out in GLVIA3 (Page 115, Para. 6.39-6.40):

- *"Scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view occupied by the Proposed Development;*
- *degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line, height, colour and texture;*
- *angle of view in relation to the main activity of the receptor;*
- *distance of the viewpoint from the Proposed Development; and*
- *extent of the area over which the changes would be visible."*

The following additional factors are specific to the type of development proposed:

- type and nature of the available view (e.g., panoramic, framed);
- relative size and proximity of turbines;
- number, extent and composition of turbines visible (and presence of screening);
- position of turbines in views from the property e.g., whether in the primary outlook from the property;
- proportion of the skyline occupied by the turbines;
- direction (including the aspect) of the view affected; and
- density and spacing of turbines and their overall composition in the view.

For each property or group of properties, the evaluation consists of:

- a description of the property and of its location and context;
- a description of the likely existing available views and visual amenity from the property and its domestic curtilage, including gardens and private or shared access drives; and
- a description of the likely effect on views and visual amenity resulting from the Proposed Development, as well as other existing and proposed schemes included in the study area and likely to influence the decision-making process.

The detailed information for each property or group of properties concludes with a judgement with respect to the visual component of residential amenity or 'living conditions' and whether the 'Residential Visual Amenity Threshold' is breached. It is intended that this judgement may assist the decision maker in coming to the wider planning judgement on overall residential amenity, when considered within the context of other components (e.g. noise and shadow flicker).

Informed by the preparatory desk work and supported by maps and wireframes, an assessment was undertaken, during field surveys, of the magnitude of the likely change in visual amenity that may result from the introduction of the Proposed Development into the local landscape and the view(s) from each property or property group.

Magnitude of visual change is expressed on a relative scale, as set out in **Table 1** below, which highlights the differences between the types of change experienced in views from residential properties examined as part of this RVAA. The existing and proposed view from each property is described, and the likely relative magnitude of change (high, medium, low, barely perceptible) arising from the Proposed Development is determined. The nature of existing and predicted views (open, enclosed, panoramic, focused, framed etc.) affects the relative magnitude

of change and is taken on board in reaching that judgement. The RVAA looks at the range of views likely to be available from the house and its curtilage and considers potential effects on all of these.

Table 1: Magnitude of Change in Views and Visual Amenity

Magnitude of Change in Visual Amenity	Description
High	The Proposed Development will be a key/defining element in the view
Medium	The Proposed Development will be clearly discernible but will not be a key/defining element of the view
Low	The Proposed Development will be visible and will form a minor element of the view
Barely Perceptible	The Proposed Development may go unnoticed as a minor element of the view or is not visible

The RVAA concludes, for properties predicted to experience a **high** magnitude of change, with a judgement as to the potential effect on 'living conditions', or residential visual amenity. This corresponds to the 'Residential Visual Amenity Threshold' as described in LI TGN 2/19.

For properties experiencing a magnitude of change of medium or smaller, it is considered that there is no potential for 'living conditions' to be affected, and this final stage is therefore not undertaken.

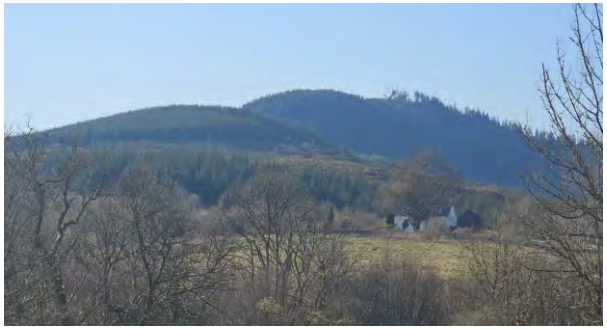
Properties Considered in the Assessment

Eight residential buildings (and one non-residential bothy used for recreational purposes) were identified within approximately 3 km of the Proposed Development using mapping and address data, and ZTV analysis confirmed theoretical visibility from all of them. **Table 2** below lists all the properties assessed as part of this study. Where appropriate, properties were grouped where they have similar geographic locations and were deemed likely to experience similar views. For each property or property group, **Table 2** contains a reference number, the property name (as informed by OS AddressBase Plus data) and details of location. Computer modelling was used to provide details of distance, viewing direction and potential visibility of the Proposed Development. This potential visibility is illustrated in the illustrative wirelines appended at the end of this report.

Following site survey and analysis of illustrative wirelines, notes were prepared for each of the properties and the potential magnitude of change which will be experienced at these. Where the magnitude of change is judged to be less then 'high', commentary on these findings is provided in **Table.2** below, and these receptors are not carried forward into the detailed Residential Visual Amenity Assessment.

Table 2 - Properties Considered in Assessment

Ref.	Name	Distance to Nearest Turbine		Magnitude of Change and Commentary	
		Easting	Northing		
01	Shinnelhead	272947	599148	1.7 km	**Refer to wireline A5.3.6** The property is accessed via a long shared forest track (and Core Path) from the east, where track side vegetation provides a high degree of filtering/screening. Primary views from the property are oriented to the north. Mature trees and vegetation around the property provide filtering/screening, including in views to the south-west towards the site. The rising landform to the south of the property will provide a further level of screening, with the tips of five and hub of one turbine (T1) visible, at a distance of approximately 1.7 km, and seen on higher ground in views to the south-west of the property curtilage. However, and given the screening provided by the landform and the nature of views from the property itself, effects are unlikely to breach the residential visual amenity threshold. **Not considered further.** Effects on recreational users of the Core Path network, to the west of and near the property, are considered in the LVIA (refer to **Viewpoint 4**). A medium scale of change is predicted from this location.  *Highlights screening to south of property.*
02	High Appin	274676	597255	2.1 km	**Refer to wireline A5.3.7** **High – consider further**
03	Appin Lodge	275295	597399	2.7 km	**Refer to wireline A5.3.8** Appin Lodge has more open and primary views focused to the south-east, looking down the Shinnel Water valley.

Ref.	Name	Distance to Nearest Turbine		Magnitude of Change and Commentary	
		Easting	Northing		
					The wireline suggests visibility of five turbines, four turbine hubs and one with turbine blades only, in views to the north-west at a distance of approximately 2.7 km. Vegetation, including coniferous forest to the rear (west) of the property are likely to provide a level of filtering/screening. Given the viewing distance, nature of primary views and potential screening provided by vegetation to the west in secondary views from the property, effects are unlikely to breach the residential visual amenity threshold. **Not considered further.**  *View looking up the Shinnel Water valley towards Appin Lodge and highlights screening to rear (west of the property).*
04	High Auchenbrack	275714	597095	3 km	**Refer to wireline A5.3.9** High Auchenbrack has open and primary views focused to the south-east, looking down the Shinnel Water valley. Some partially screened views are available from the rear of the property, looking north-west towards the site. However, given the viewing distance (just over 3 km), and secondary nature of partially screened views, effects are unlikely to breach the residential visual amenity threshold. **Not considered further.**

Ref.	Name	Distance to Nearest Turbine		Magnitude of Change and Commentary	
		Easting	Northing		
					 *Highlights open nature of primary views from south-eastern façade, and partial screening to rear.*
05	Blairoch	270728	596549	1.2km	**Refer to wirelines A5.3.10a and A5.3.10b** The property is accessed via a long shared minor road/ forest track to the south-east. Key, and more open, views from property are orientated to the south, looking over the Dalwhat Water valley. The Proposed Development is located to the north-east. The steeply rising landform to the north and east combined with vegetation cover (including mature trees around the property, and forest cover on the hillside to the north and east) will largely screen views towards the Proposed Development, from the property. Effects are unlikely to breach the residential visual amenity threshold. **Not considered further.**  *View looking north-west towards southern frontage – highlighting screening from forestry to north and east of property.*

Ref.	Name	Distance to Nearest Turbine		Magnitude of Change and Commentary	
		Easting	Northing		
06	Benbuie	271076	596130	1.4km	**Refer to wireline A5.3.11** The property is accessed via a long shared minor road/ forest track to the south-east. The property sits in a slight depression, to the south of the minor road through the Dalwhat Water valley. Key, and more open, views from property orientated to the south, looking over the Dalwhat Water valley. The Proposed Development is located to the north-east. The wireline suggests visibility of up to seven turbine blades and three turbine hubs, at a distance of approximately 1.4 km. Vegetation cover, including mature trees around the property, and forest cover on the hillside to the north-east, will provide notable screening, in views towards the Proposed Development. Given the secondary/ well screened nature of views and the viewing distance, effects are unlikely to breach the residential visual amenity threshold. **Not considered further.**  *View looking north-west towards southern frontage – highlights open nature of primary views to the south and partial screening from vegetation around and forestry on rising ground to north.*
07	Glenjaan	271662	594228	2.4km	**Refer to wireline A5.3.12** Key, and more open, views from property orientated to the south-east, looking over the Dalwhat Water valley. The Proposed Development is located to the north-east at a distance of approximately 2.4 km. Surrounding tree cover (mature deciduous trees near the property) will somewhat limit secondary views towards the Proposed Development, from the property. The nearest turbines (T8 and T9) will also largely be screened by intervening landform. In this context are unlikely to breach the residential visual amenity threshold. **Not considered further.**

Ref.	Name	Distance to Nearest Turbine		Magnitude of Change and Commentary	
		Easting	Northing		
					 *View looking south-west over the Dalwhat Water*
08	Corriedow	272101	593810	2.7 km	**Refer to wireline A5.3.13** Potential for some gable end views from the northern façade of the property, and on approach to it. Given the viewing distance (2.7 km); screening provided by the landcover to the closest turbines (T7 to T9) and nature of views, effects are unlikely to breach the residential visual amenity threshold. **Not considered further.**  *Highlights limited nature of gable end view towards the Proposed Development.*
09	Cairnhead Bothy	270153	597191	1.1km	**Refer to wireline A5.3.14** Effects on recreational users visiting the Cairnhead Striding Arch (immediately west of the bothy) are considered in **Chapter 5: Landscape and Visual Amenity** (refer to **Viewpoint 3**). A low magnitude

Ref.	Name	Distance to Nearest Turbine		Magnitude of Change and Commentary	
		Easting	Northing		
					of change is predicted from this location due to the combination of screening provided by the rising landform and forestry, to the north of this location. **Not considered further**.

Assessment of Effects on Residential Visual Amenity

This section sets out the detailed assessment of effects on views and visual amenity for the property taken forward for detailed assessment as per **Table 2**. The tables below present the detailed assessments. The assessment should be read in conjunction with the accompanying illustrative wirelines (refer to **Figures A5.3.6 to A5.3.7**).

Table 3 - High Appin

Property Name (and aerial photography)	High Appin **Refer to Figure A5.3.7**	
Grid Reference	274676, 597255	
Direction to the Proposed Development	West	
Distance from the Property to the Nearest Turbine, and Turbine Number	2.1 km	T9

Description of Property, Location and Context

- 1.5 storey period house
- Accessed via a private track, to the north-east, which inks to the minor road along the Shinnel Water valley.
- Outbuildings to the south-west of the property, around yard and rear garden area.
- Small garden to the south-east.

View of rear façade and rear garden area, on north-western façade of property.

View from primary frontage, looking south-east down the Shinnel Water valley. Garden vegetation will partially filter/screen views in this direction from the property itself.

View from yard area to rear (west) looking towards ridge above Appin Burn valley.

View from western edge of property curtilage, looking towards ridge above Appin Burn valley.

Description of Existing Views and Visual Amenity

High Appin is oriented with primary views to the south-east, looking down the Shinnel Water valley. Views from the rear (north-west) of the property are reasonably open, looking up the Appin Burn valley towards enclosing hills in closer proximity (Cormunnoch Hill, Mullwhanny and Blackcraig Hill). Similar open views will be available on the approach to the property.

Description of Likely Effects on Views and Visual Amenity as a Result of the Proposed Development

The Proposed Development will be visible from the rear (north-west) of the property and from the garden and yard area to the rear. Turbines will be seen above closer proximity enclosing horizons to the north-west. The Proposed Development will also be visible in more direct views, when accessing the property.
During the hours of darkness, aviation lights on four of the proposed turbines will also be visible. Due to the lower lying nature of the property these lights will be seen at 9 to 4 candela level (when dimmed to 10% in clear weather conditions) as highlighted on **Figure A5.3.5.**
Primary views from the property, to the south-east and looking down the Shinnel Water valley, will not be altered by wind farm development to the west.

Cumulative Context

In an alternative theoretical and future cumulative baseline, which includes consented and proposed wind farms, certain turbines in the application stage Lorg and Euchanhead Wind Farms will be visible behind horizons to the north-west. The Proposed Development will be seen in the context of these schemes, extending the horizontal field of view occupied by turbines and bringing turbines closer to the property.
RVAA Findings
The magnitude of change from this property will be high. Turbines will be visible on the approach to the property in direct views to the west. Primary views from the property are orientated to the south-east and will not be altered by the Proposed Development. However, open secondary views will be available from the rear (north-western) façade of the property and rear garden areas, with all nine turbines seen at a distance of approximately 2.1 km. Should they be constructed, the Proposed Development will be seen in front of turbines in Lorg and Euchanhead Wind Farms. **Due to the viewing distance (approximately 2.1 km); secondary nature of views from the property itself towards the Proposed Development; and unaltered nature of primary views (to the south-east) the Proposed Development will not appear overwhelming or oppressive and will not breach the residential visual amenity threshold.** **In terms of cumulative effects, in a theoretical future cumulative baseline, which includes proposed schemes, the Proposed Development will be seen in front of these wind farms, in secondary views from the property. This is not judged to breach the residential visual amenity threshold.**

Conclusion

Residents at High Appin will experience a high magnitude of change in the view from parts of their property and/or from their gardens, curtilage and access track. When combined with the high sensitivity of the residential receptor, there is the potential for these residential receptors to experience a significant visual effect (which will extend into the hours of darkness, due to associated aviation safety lighting). However, residents at High Appin are not judged to be subject to effects on residential visual amenity which will breach the residential visual amenity threshold.

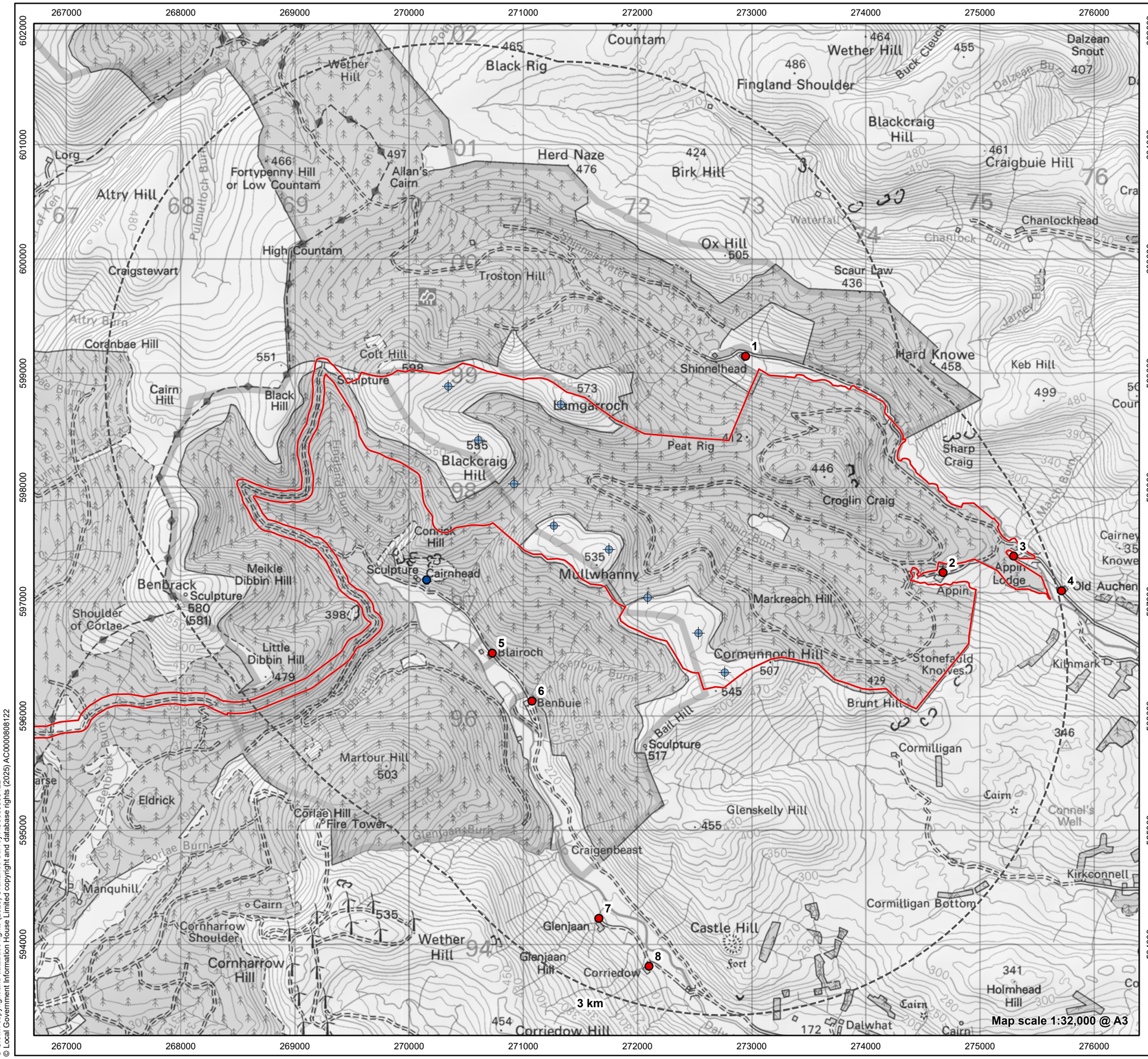
No other properties, within 3 km of the Proposed Development, will be subject to effects which will breach the residential visual amenity threshold.

The operation of the Proposed Development will not render any properties as undesirable places to live.

References

The Landscape Institute (2013) Guidelines for Landscape and Visual Impact Assessment 3rd Edition

The Landscape institute (2019) Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19 (LI TGN 2/19)



Statkraft

N

- Site Boundary
- Turbine
- 3 km from Outermost Turbines
- Non Residential Property – Cairnhead Bothy
- Residential Property
  - 1: Shinnelhead
  - 2: High Appin
  - 3: Appin Lodge
  - 4: High Auchenbrack
  - 5: Blairoch
  - 6: Benbuie
  - 7: Glenjaan
  - 8: Corriedow

0 1 2 Km

Source: LUC, Pell Frischmann, OS

Produced By: HD
Checked By: NE
Version: 00

Date: 08/05/2025
Ref: 11634_EIA_LVIA

Figure A5.3.1
Residential Property Locations

Map scale 1:32,000 @ A3

Appin Wind Farm
EIA Report

Statkraft

N

- Site Boundary
- Turbine
- 3 km from Outermost Turbines
- Non Residential Property – Cairnhead Bothy
- Residential Property
  - 1: Shinnelhead
  - 2: High Appin
  - 3: Appin Lodge
  - 4: High Auchenbrack
  - 5: Blairoch
  - 6: Benbuie
  - 7: Glenjaan
  - 8: Corriedow

Zone of Theoretical Visiblity (Tip Height 200 m)

- 1 - 3 Turbine Blade Tips Visible
- 4 - 6 Turbine Blade Tips Visible
- 7 - 9 Turbine Blade Tips Visible

Note:
The ZTV is calculated to turbine tip height (200 m) from a viewing height of 2 m above ground level. The terrain model assumes bare ground and is derived from OS Terrain 5 height data. Earth curvature and atmospheric refraction have been taken into account. The ZTV was calculated using ArcGIS Pro 3.4.0 software.

0 1 2 Km

Source: LUC, Pell Frischmann, OS

Produced By: HD
Checked By: NE
Version: 00

Date: 08/05/2025
Ref: 11634_EIA_LVIA

Figure A5.3.2
Residential Property Locations and Blade Tip Height (200 m) Zone of Theoretical Visibility (ZTV)

Appin Wind Farm
EIA Report

Map scale 1:32,000 @ A3

Statkraft

N

- Site Boundary
- Turbine
- 3 km from Outermost Turbines
- Non Residential Property – Cairnhead Bothy
- Residential Property
  - 1: Shinnelhead
  - 2: High Appin
  - 3: Appin Lodge
  - 4: High Auchenbrack
  - 5: Blairoch
  - 6: Benbuie
  - 7: Glenjaan
  - 8: Corriedow

Zone of Theoretical Visibility (Hub Height 119 m)

- 1 - 3 Turbine Hubs Visible
- 4 - 6 Turbine Hubs Visible
- 7 - 9 Turbine Hubs Visible

Note:
The ZTV is calculated to turbine hub height (119 m) from a viewing height of 2 m above ground level. The terrain model assumes bare ground and is derived from OS Terrain 5 height data. Earth curvature and atmospheric refraction have been taken into account. The ZTV was calculated using ArcGIS Pro 3.4.0 software.

0 1 2 Km

Source: LUC, Pell Frischmann, OS

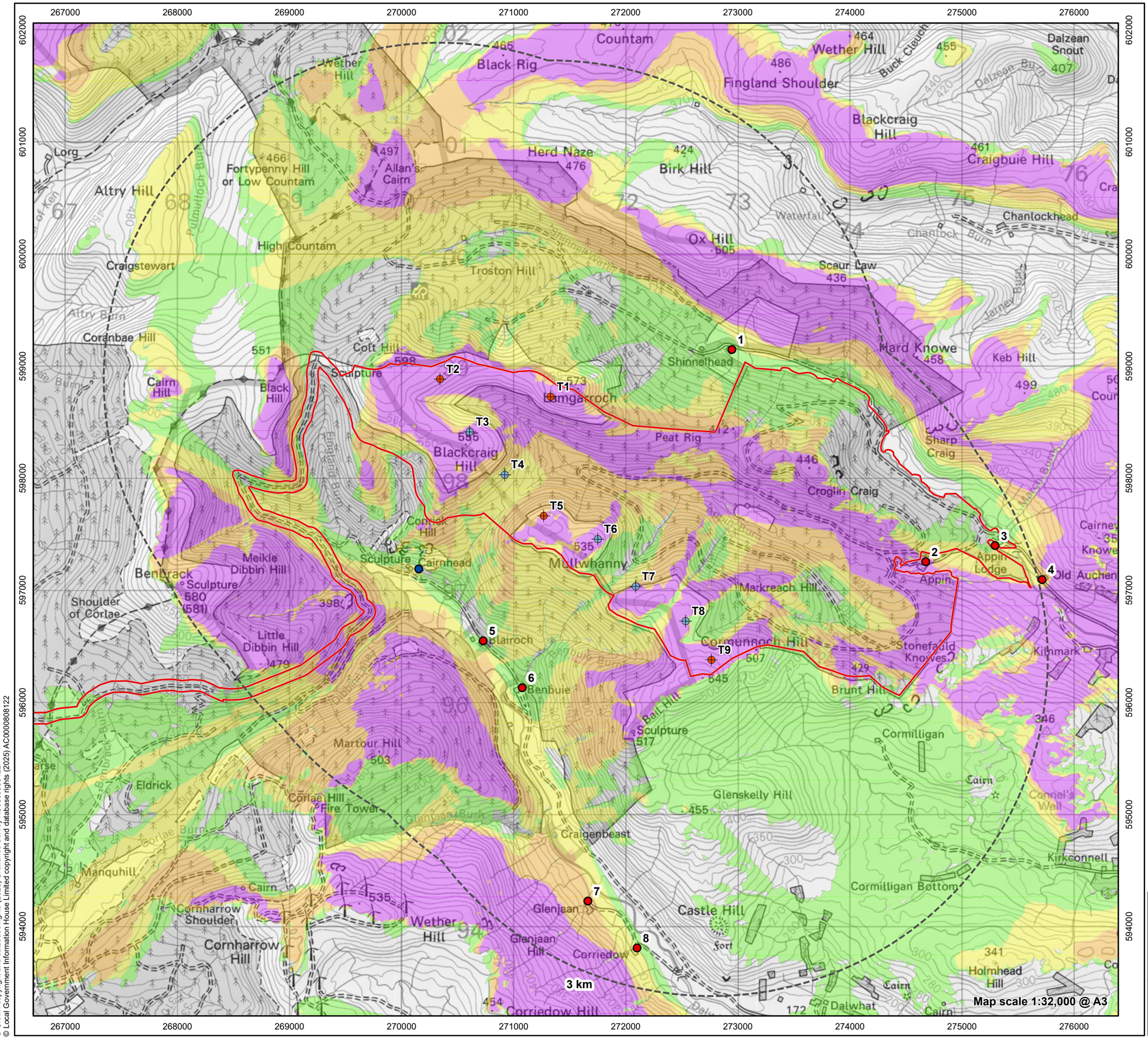
Produced By: HD
Checked By: NE
Version: 00

Date: 08/05/2025
Ref: 11634_EIA_LVIA

Figure A5.3.3
Residential Property Locations and Hub Height (119 m) Zone of Theoretical Visibility (ZTV)

Appin Wind Farm
EIA Report

Map scale 1:32,000 @ A3



Statkraft

N

- Site Boundary
- Turbine with Nacelle Lighting
- Turbine without Nacelle Lighting
- 3 km from Outermost Turbines
- Non Residential Property – Cairnhead Bothy
- Residential Property
  - 1: Shinnelhead
  - 2: High Appin
  - 3: Appin Lodge
  - 4: High Auchenbrack
  - 5: Blairoch
  - 6: Benbuie
  - 7: Glenjaan
  - 8: Corriedow

Zone of Theoretical Visibility (Nacelle Lighting)

- 1 Nacelle Light Visible
- 2 Nacelle Lights Visible
- 3 Nacelle Lights Visible
- 4 Nacelle Lights Visible

Note:
The ZTV is calculated to turbine hub height (119 m) from a viewing height of 2 m above ground level. Lit turbines will be 1,2,5, and 9. The terrain model assumes bare ground and is derived from OS Terrain 5 height data. Earth curvature and atmospheric refraction have been taken into account. The ZTV was calculated using ArcGIS Pro 3.4.0 software.

0 1 2 Km

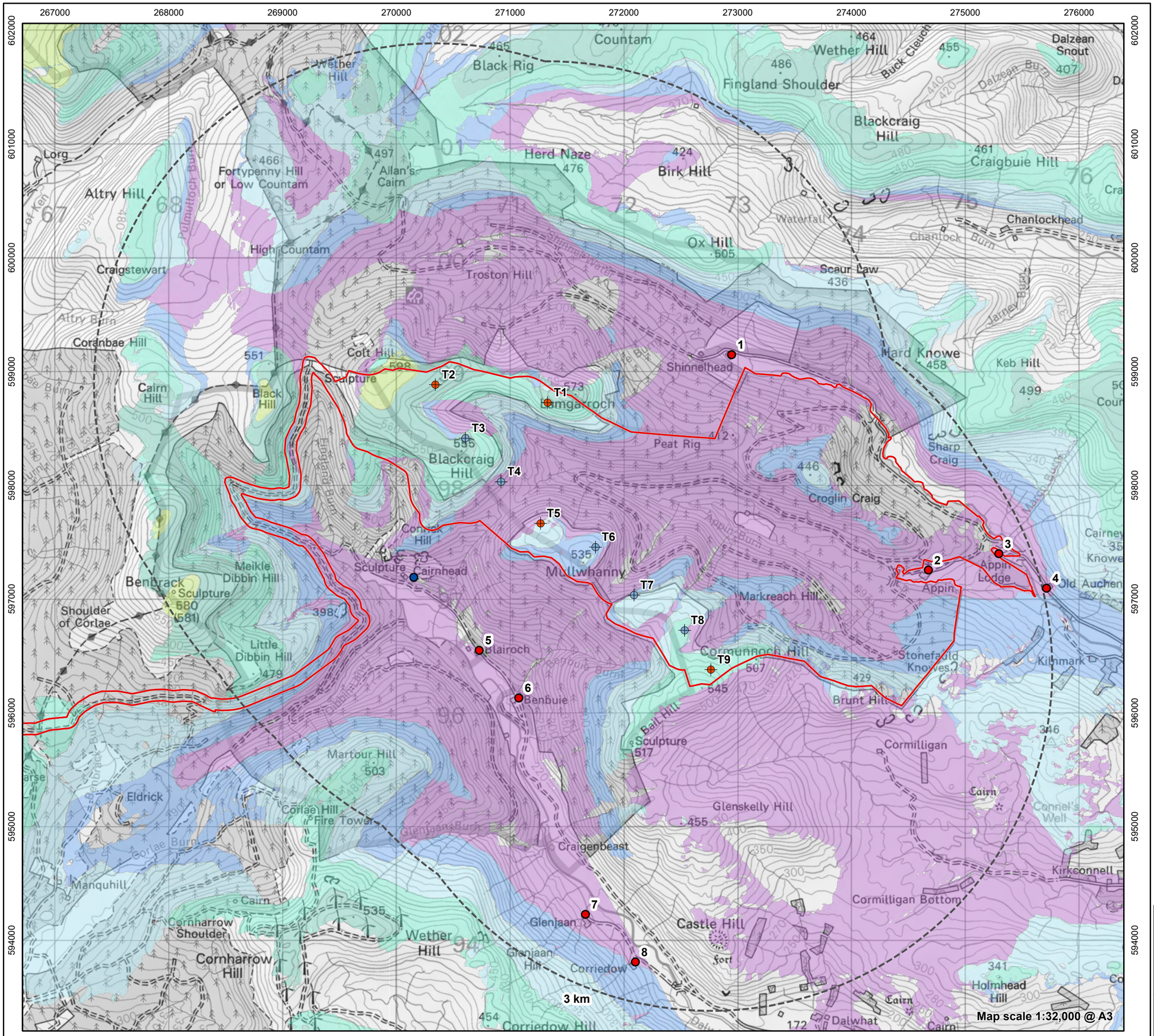
Source: LUC, Pell Frischmann, OS

Produced By: HD
Checked By: NE
Version: 00

Date: 09/05/2025
Ref: 11634_EIA_LVIA

Figure A5.3.4
Residential Property Locations and Aviation Lighting Zone of Theoretical Visibility (ZTV) - Nacelle Lighting

Appin Wind Farm
EIA Report



Statkraft

N

- Site Boundary
- Turbine with Nacelle Lighting
- Turbine without Nacelle Lighting
- 3 km from Outermost Turbines
- Non Residential Property – Cairnhead Bothy
- Residential Property
  - 1: Shinnelhead
  - 2: High Appin
  - 3: Appin Lodge
  - 4: High Auchenbrack
  - 5: Blairoch
  - 6: Benbuie
  - 7: Glenjaan
  - 8: Corriedow

Vertical Angle of Lighting from Nacelle	Maximum and Minimum Luminous Intensity (Candela/cd.)	10% of Maximum and Minimum Luminous Intensity (Candela/cd.)
Above 5°	147 to 34	15 to 3
4° to 5°	247 to 134	25 to 13
3° to 4°	481 to 237	48 to 24
2° to 3°	1160 to 481	116 to 48
1° to 2°	2119 to 1170	212 to 117
0° to 1°	2206 to 1968	221 to 197
-1° to 0°	2036 to 987	204 to 99
-2° to -1°	996 to 383	100 to 38
-3° to -2°	394 to 197	39 to 20
-4° to -3°	199 to 131	20 to 13
-5° to -4°	131 to 92	13 to 9
Below -5°	94 to 38	9 to 4

Note:
Maximum and Minimum luminous intensity based on: Contamex Europe Ltd. (CEL) - CEL-WT-MIC Medium-intensity Red 2000cd. Light - LED Aircraft Warning Light Technical Specification.
The ZTV is calculated to turbine hub height (119 m) from a viewing height of 2 m above ground level. Lit turbines will be 1,2,5, and 9. The terrain model assumes bare ground and is derived from OS Terrain 5 height data. Earth curvature and atmospheric refraction have been taken into account. The ZTV was calculated using ArcGIS Pro 3.4.0 software.

0 1 2 Km

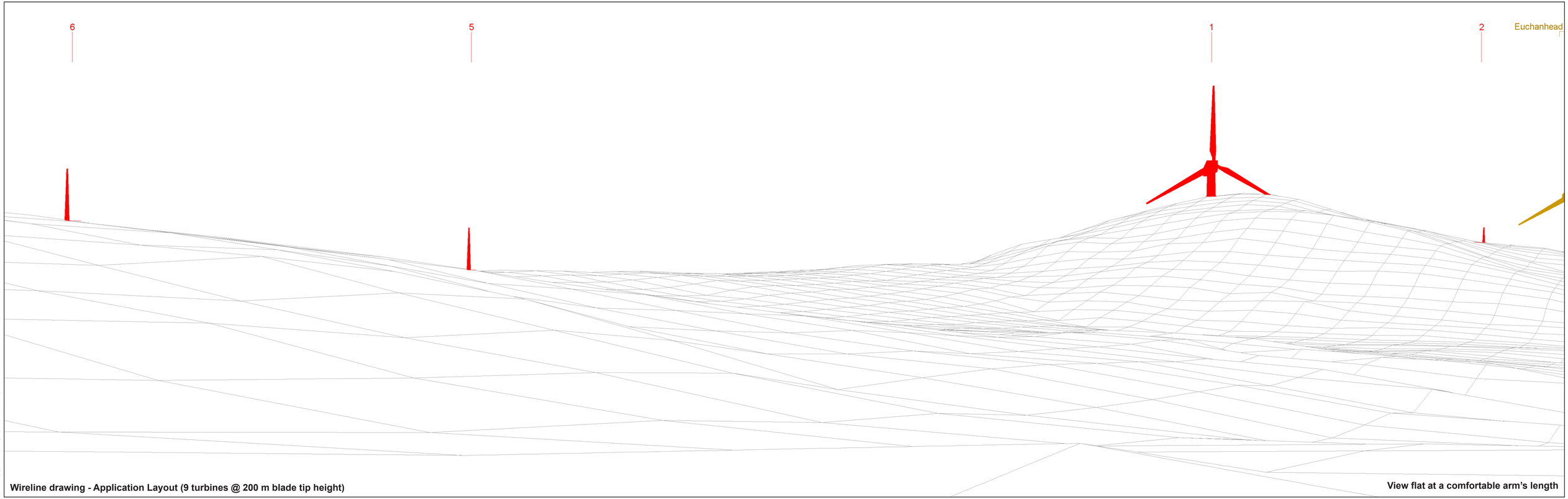
Source: LUC, Pell Frischmann, OS

Produced By: HD
Checked By: NE
Version: 00

Date: 08/05/2025
Ref: 11634_EIA_LVIA

Figure A5.3.5
Residential Property Locations and Visible Aviation Light Intensity Zone of Theoretical Visibility (ZTV)

Appin Wind Farm
EIA Report



Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height)

View flat at a comfortable arm's length

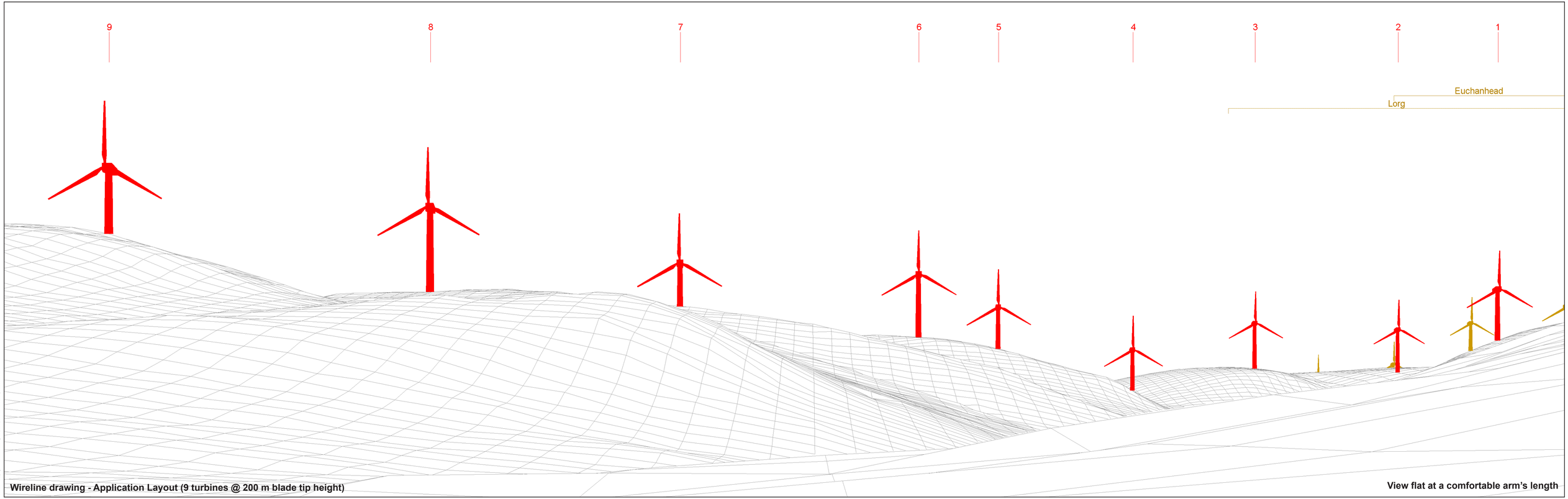
LUC

OS reference:	272947E 599148N	Horizontal field of view:	53.5° (planar projection)
AOD:	277 m	Principal distance:	812.5 mm
Direction of view:	240°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.7 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status): Proposed scheme; Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.6
Property 1: Shinnelhead



Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height)

View flat at a comfortable arm's length

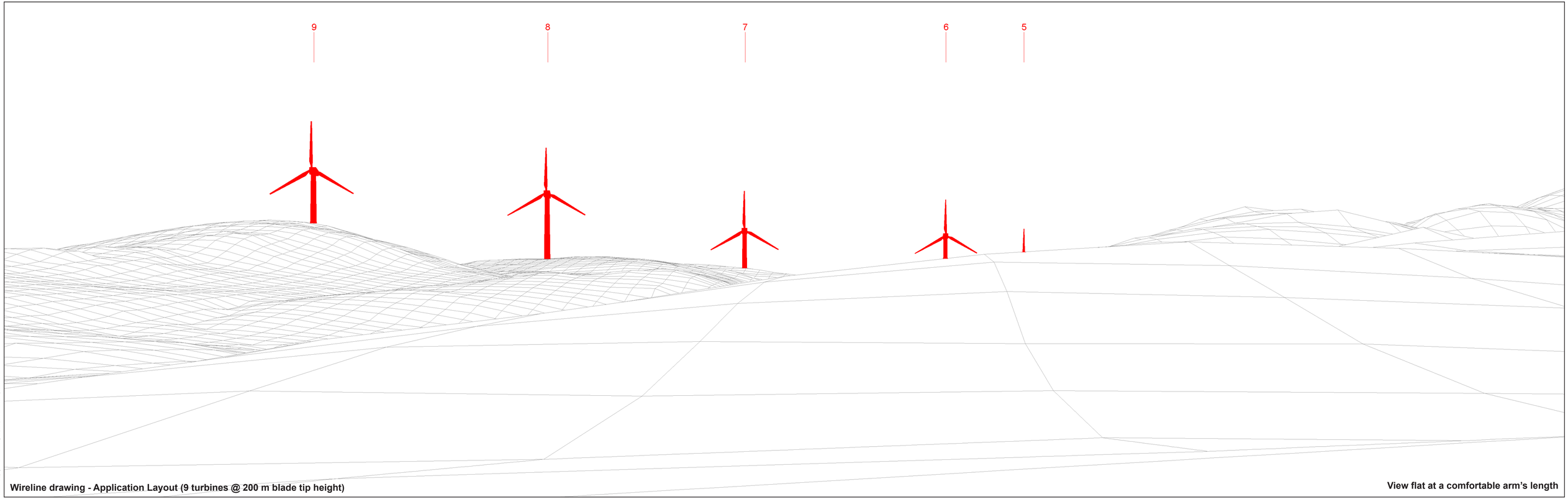
LUC

OS reference:	274676E 597255N	Horizontal field of view:	53.5° (planar projection)
AOD:	254 m	Principal distance:	812.5 mm
Direction of view:	269°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	2.1 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status): Proposed scheme; Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.7
Property 2: High Appin



Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height)

View flat at a comfortable arm's length

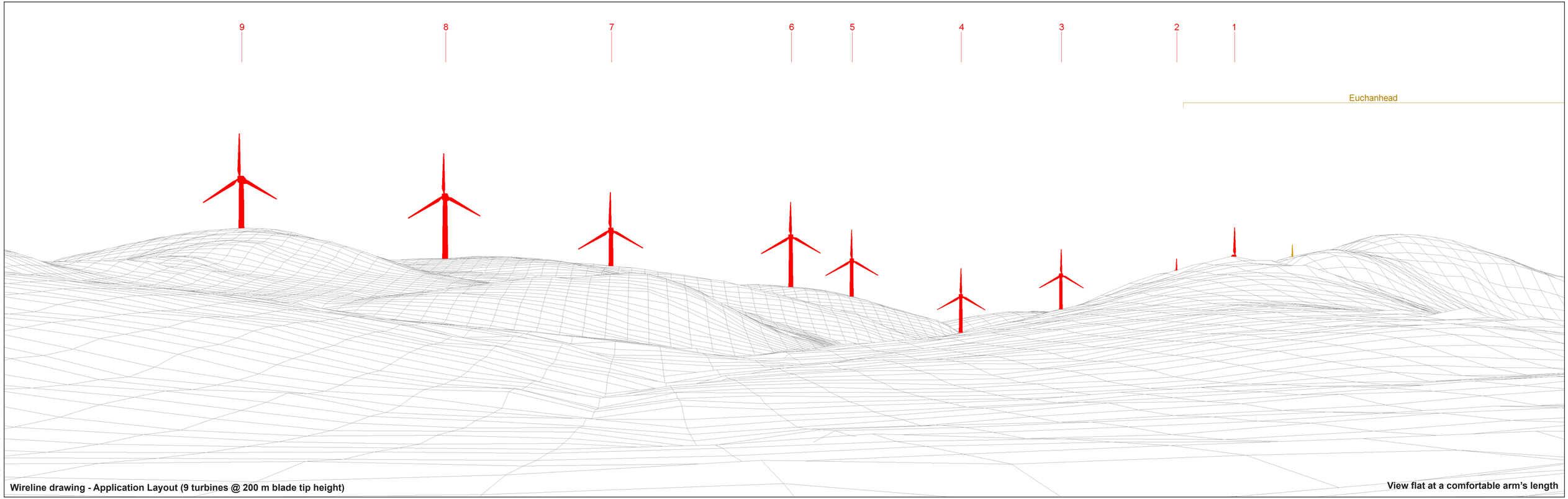
LUC

OS reference:	275295E 597399N	Horizontal field of view:	53.5° (planar projection)
AOD:	219 m	Principal distance:	812.5 mm
Direction of view:	265°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	2.7 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status):
- Proposed scheme
- Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.8
Property 3: Appin Lodge



Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height)

View flat at a comfortable arm's length

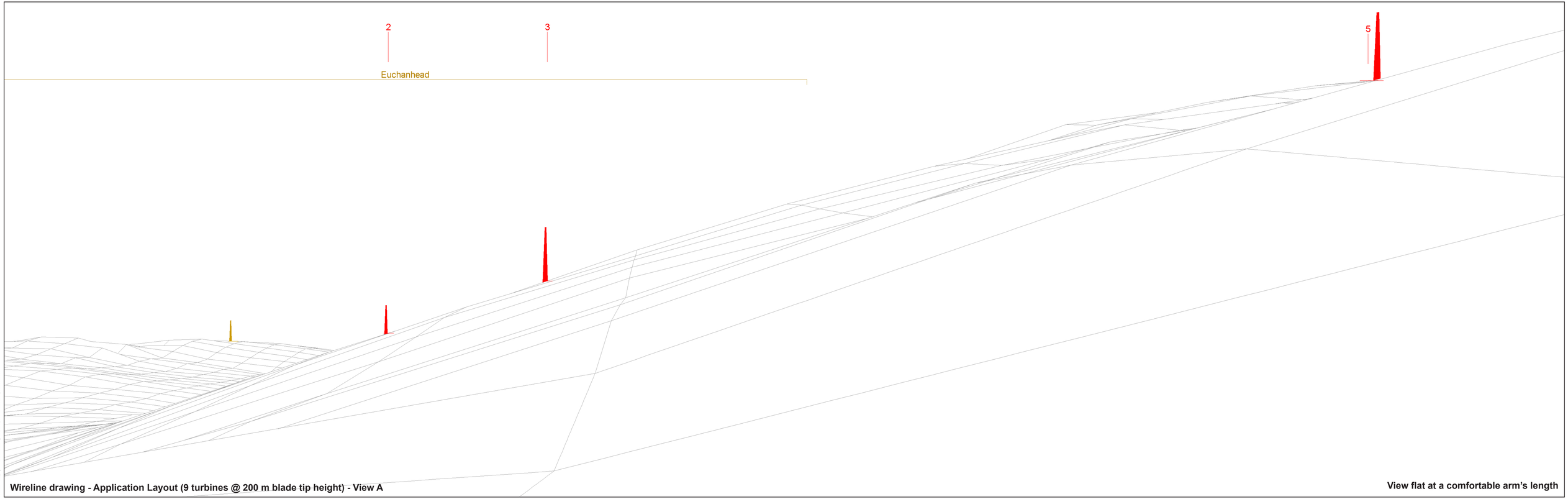
LUC

OS reference:	275714E 597095N	Horizontal field of view:	53.5° (planar projection)
AOD:	201 m	Principal distance:	812.5 mm
Direction of view:	275°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	3.0 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status):
- Proposed scheme
- Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.9
Property 4: High Auchenbrack



Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height) - View A

View flat at a comfortable arm's length

LUC

OS reference:	270728E 596549N	Horizontal field of view:	53.5° (planar projection)
AOD:	239 m	Principal distance:	812.5 mm
Direction of view:	5°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.2 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status): Proposed scheme; Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.10a
Property 5: Blairoch

Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height) - View B

View flat at a comfortable arm's length

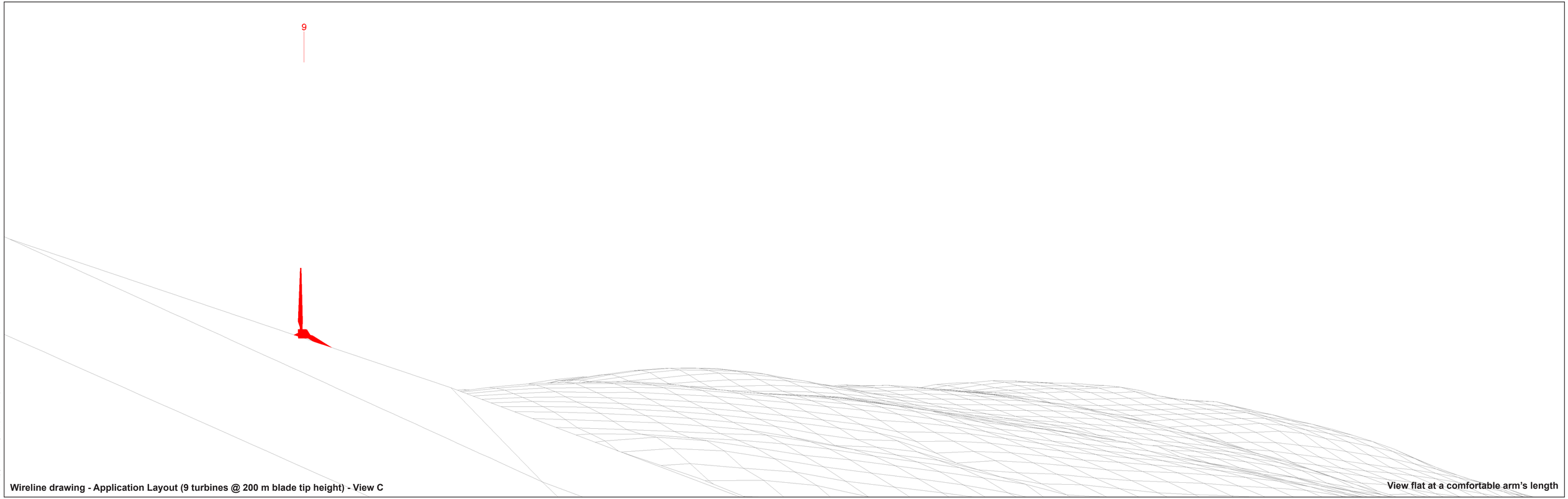
LUC

OS reference:	270728E 596549N	Horizontal field of view:	53.5° (planar projection)
AOD:	239 m	Principal distance:	812.5 mm
Direction of view:	58.5°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.2 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status):
- Proposed scheme
- Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.10b
Property 5: Blairoch



Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height) - View C

View flat at a comfortable arm's length

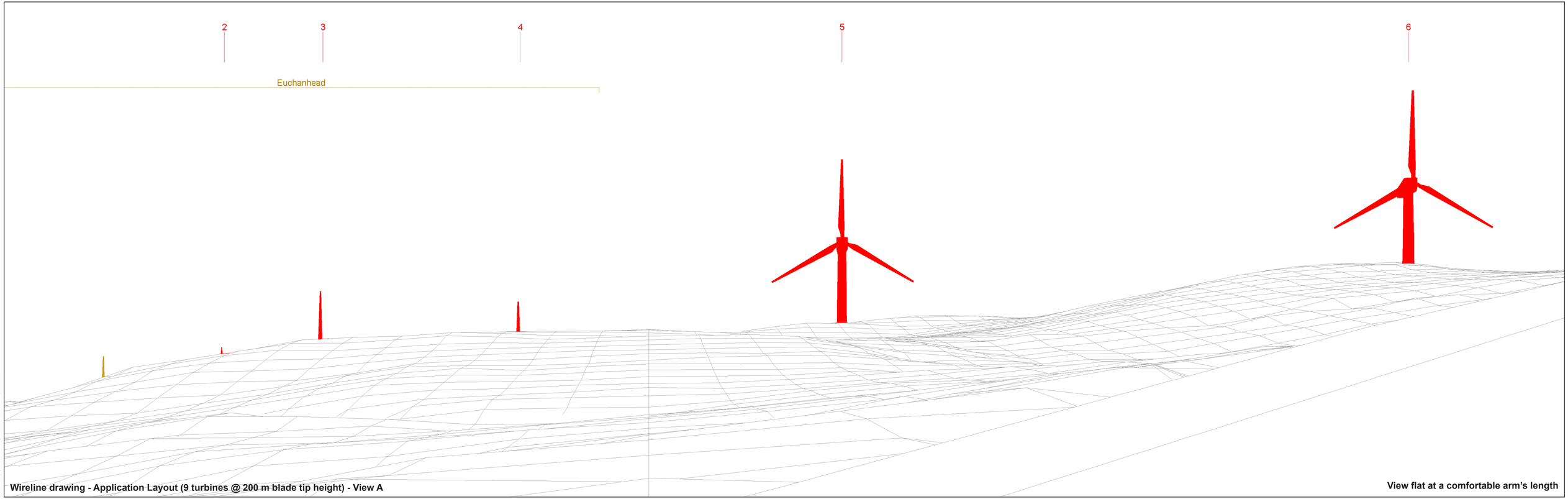
LUC

OS reference:	270728E 596549N	Horizontal field of view:	53.5° (planar projection)
AOD:	239 m	Principal distance:	812.5 mm
Direction of view:	112°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.2 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status):
- Proposed scheme
- Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.10c
Property 5: Blairoch



Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height) - View A

View flat at a comfortable arm's length

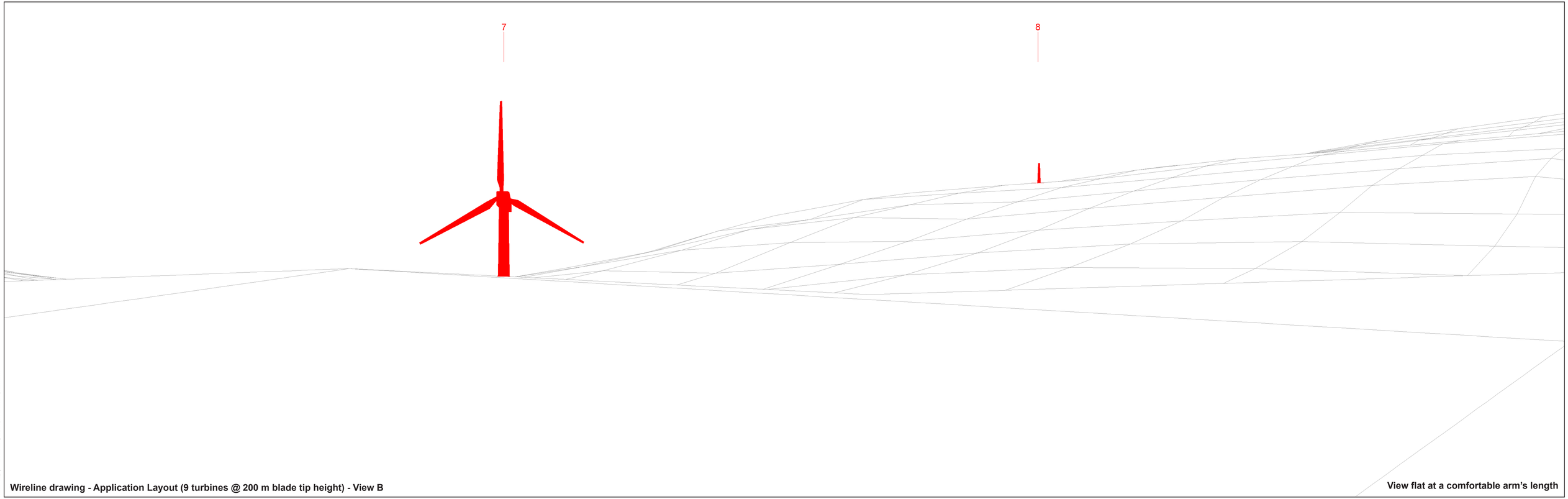
LUC

OS reference:	271076E 596130N	Horizontal field of view:	53.5° (planar projection)
AOD:	224 m	Principal distance:	812.5 mm
Direction of view:	5°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.4 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status):
- Proposed scheme
- Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.11a
Property 6: Benbuie



Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height) - View B

View flat at a comfortable arm's length

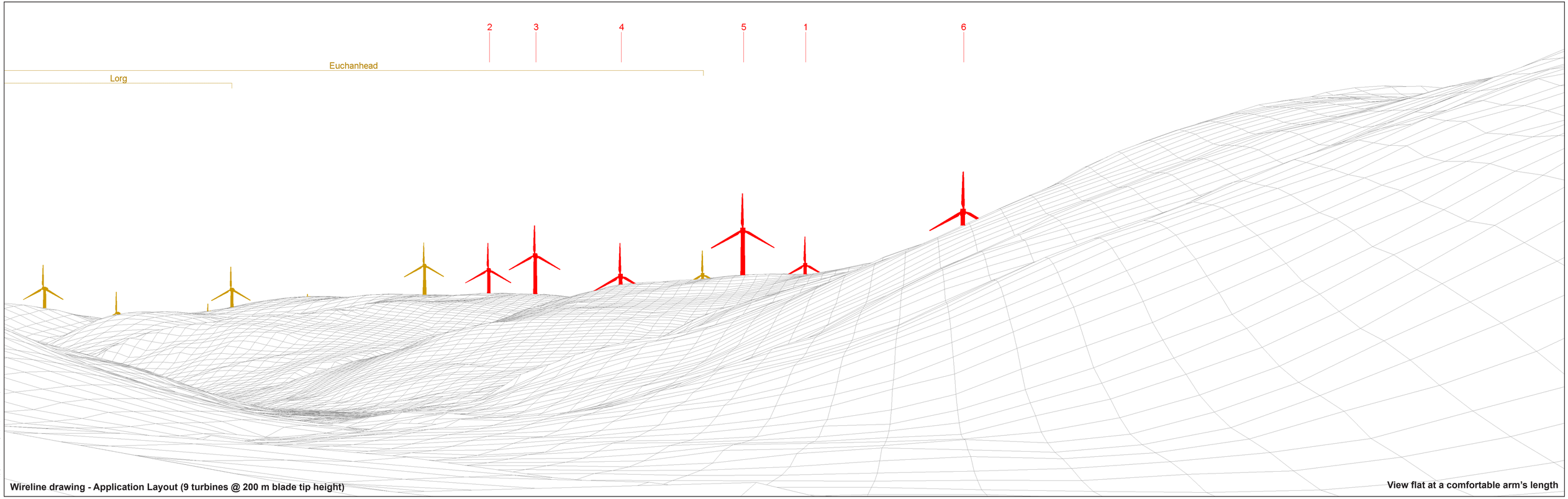
LUC

OS reference:	271076E 596130N	Horizontal field of view:	53.5° (planar projection)
AOD:	224 m	Principal distance:	812.5 mm
Direction of view:	58.5°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.4 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status): Proposed scheme; Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.11b
Property 6: Benbuie



Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height)

View flat at a comfortable arm's length

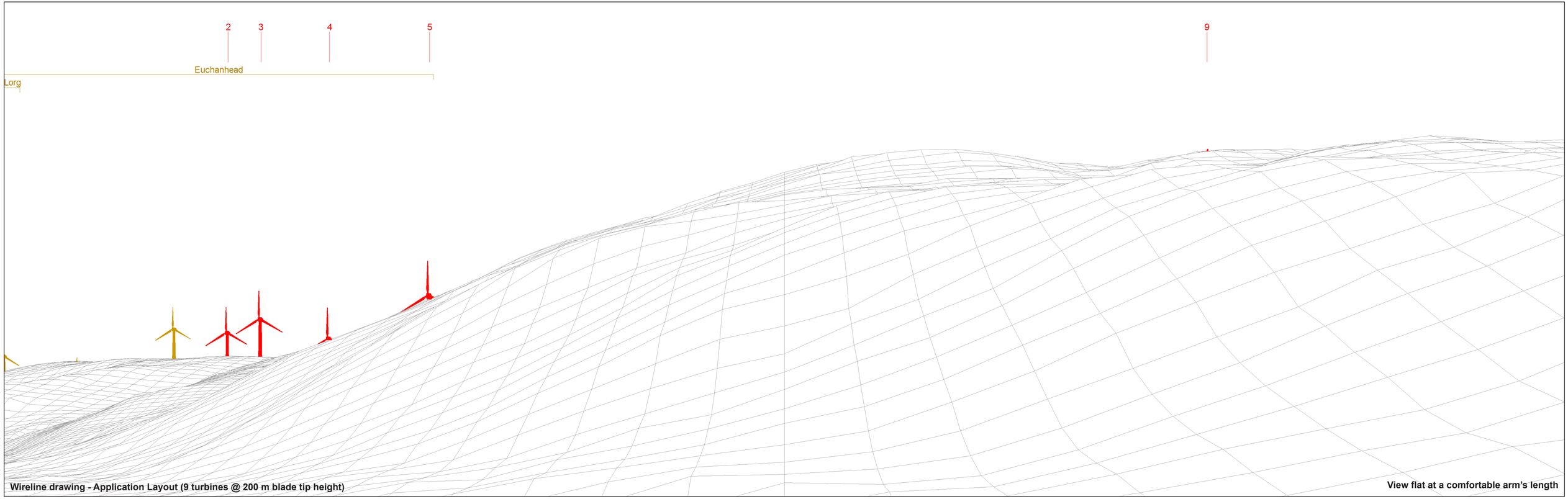
LUC

OS reference:	271662E 594228N	Horizontal field of view:	53.5° (planar projection)
AOD:	208 m	Principal distance:	812.5 mm
Direction of view:	355°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	2.4 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status):
- Proposed scheme
- Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.12
Property 7: Glenjaan



Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height)

View flat at a comfortable arm's length

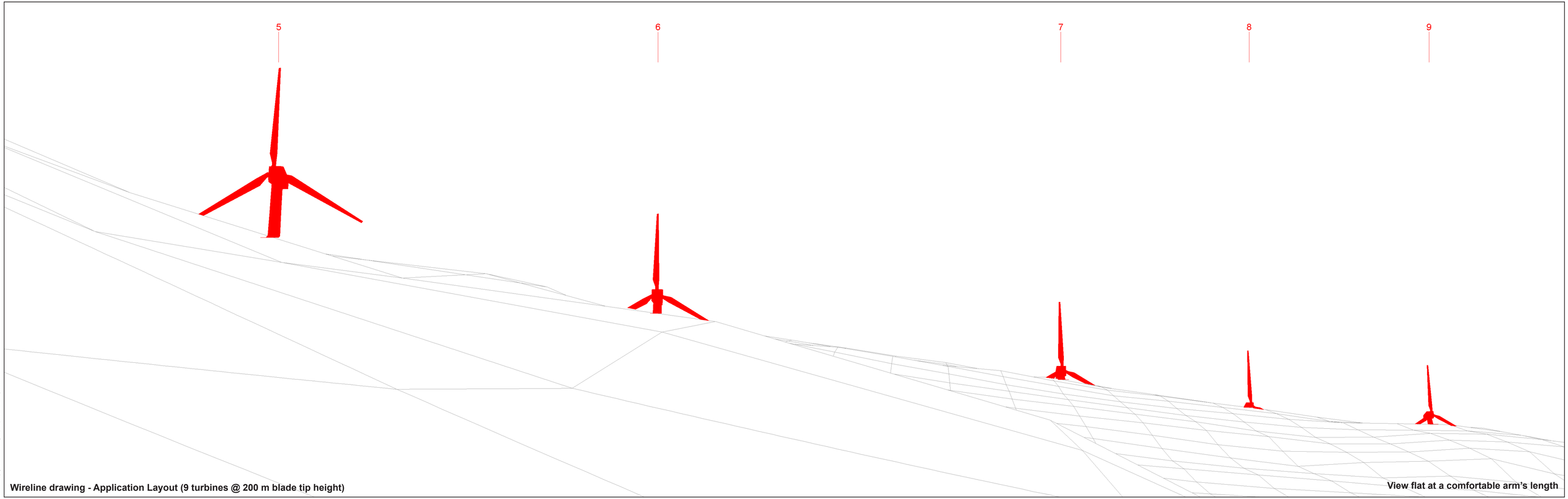
LUC

OS reference:	272101E 593810N	Horizontal field of view:	53.5° (planar projection)
AOD:	200 m	Principal distance:	812.5 mm
Direction of view:	360°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	2.7 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status):
- Proposed scheme
- Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.13
Property 8: Corriedow



Wireline drawing - Application Layout (9 turbines @ 200 m blade tip height)

View flat at a comfortable arm's length

LUC

OS reference:	270153E 597191N	Horizontal field of view:	53.5° (planar projection)
AOD:	290 m	Principal distance:	812.5 mm
Direction of view:	85°	Paper size:	841 x 297 mm (half A1)
Nearest turbine:	1.1 km	Correct printed image size:	820 x 260 mm

Wind Farm Developments key (by status):
- Proposed scheme
- Application

Notes:
1) Pitch angle set to between 4 and 12 degrees to include full vertical extent of turbines

Appin Wind Farm
Figure A5.3.14
Property 9: Cairnhead Bothy