TECHNICAL APPENDIX 8.9: Landscape and Visual Assessment of Aviation Lighting

Technical Appendix 8.9: Landscape and Visual Assessment of Aviation Lighting

1. Introduction

1.1.1 ASH design + assessment Ltd (ASH) has undertaken an assessment of the landscape and visual effects of the aviation lighting proposals for the Proposed Varied Development. This assessment is supported by a series of Zone of Theoretical Visibility (ZTV) Figures illustrating the theoretical extent of visible aviation lighting (see **Volume 3, TA Figures A8.9-1 to 8.9-5**). Daytime visualisations have been prepared from all viewpoints included in the assessment of the Proposed Varied Development. Each of the accompanying wirelines indicate which turbines would be lit. Photomontages have been prepared from four[1] of the main LVIA viewpoints to illustrate the effects of the proposed lighting strategy (see **Figures V3a-2.5, V3a-3.5, V3a-4.5 and V3a-14.5**).

1.2 Description of Proposed Lighting

1.2.1 This assessment is based on the lighting scheme proposed in **Chapter 15: Aviation and Radar, Technical Appendix 15.1: Aviation Lighting Assessment,** and on the requirements of the CAA Policy Statement: *Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level*[2] (the CAA policy statement).

1.2.2 In line with the approved CAA lighting scheme and policy statement, the assessment is therefore based on the following assumptions:

- Each of the 5 cardinal turbines (T2, T5, T6, T9 and T17) would have a 2,000 candela (cd) red light fitted to the top of the nacelle (assumed to be at 132 m), visible in all directions;
- A second 2,000 candela light would be fitted to the nacelles of each of the 5 cardinal turbines (T2, T5, T6, T9 and T17) to act as a back-up to be used in the event of failure of the main light;
- Infrared lights would be installed on the nacelles of turbines T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T15, T16, and T17)
- Visibility sensors will be employed to dim medium-intensity lights from 2,000cd to 200cd when visibility is 5km (or greater), in line with CAA policy and NatureScot's preference.
- All lights would be steady (i.e. not flashing). However, depending on wind direction, moving turbine blades seen in front of lights may give an impression of flashing lights from some locations.

[1] Photomontages have been prepared from VP2 and VP5 using photography taken at night in line with NatureScot's Guidance. Photomontages from VP3 and VP21 have been prepared using manipulated daytime photography due to health and safety risks associated with undertaking hilltop photography at night.

[2] The Air Navigation Order 2016, S.I. 2016 No.765, Article 222.

2. Proposed Mitigation

2.1.1 Due to the height of Proposed Varied Development (230m to tip), aviation lighting would be required in line with the Air Navigation Order[2]. Discussions between the Applicant and the CAA on a reduced aviation lighting scheme are ongoing. As such the lighting scheme outlined in **Technical Appendix 15.1 Aviation Lighting Scheme** has been used as the basis for this assessment.

2.2 Cardinal Lighting Strategy

2.2.1 In order to limit the potential aviation lights visible from receptors, the proposed lighting scheme consists of a 2,000 candela steady red light on the nacelles of only 5 of the 15 turbines (T2, T5, T6, T9 and T17) together with infra-red lighting, not visible to the unaided human eye on the nacelles of all turbines.

2.3 Reduced Lighting Intensity at Different Vertical Angles

2.3.1 Light 'spill' caused by aviation lighting would be minimised, by adjusting the narrow vertical beam spreads of 3° (-1° to +2°) using shields or optical adjustments. This ensures visibility to pilots at or above nacelle level while significantly reducing downward spill. This would maintain compliance with the CAA and ICAO's omnidirectional horizontal visibility requirements without excessive illumination[3, 4].

Table 1: Example Potential Reductions in Light Intensity at Different Vertical Angles[5]

Vertical Angle	Turbine Lighting Intensity 2000cd light	Turbine Lighting Intensity 200cd light
0 degrees to 3 degrees	2200/2500cd	220/250cd
0 degrees to -1 degrees	2200 to 980cd	220 to 98cd
-1 degrees to -2 degrees	980 to 420cd	98 to 42cd
-2 degrees to -3 degrees	420 to 220cd	42 to 22cd
-3 degrees to -4 degrees	220 to 170cd	22 to 17cd
Below -4 degrees	Below 170cd	Below 17cd

[3] ICAO Annex 14 Chapter 6 Visual Aids for Denoting Obstacles
[4] CAA Policy Statement – Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level
[5] NatureScot (2024). Guidance on Aviation Lighting Impact Assessment. Available at: Guidance on Aviation Lighting Impact Assessment | NatureScot. Accessed August 2025.

2.3.2 The implication of this is that lighting intensity will vary depending on the angle of receptors relative to the aviation lighting. This can represent a considerable reduction in the perceived brightness of the aviation lighting from receptors at lower levels. **Figure A8.9-2: Visible Aviation Lighting Theoretical Intensity ZTV** illustrates the ZTV for the proposed aviation lighting strategy taking account of the angles at which the lights would be seen.

2.3.3 The design of the lights can also be used to minimise the lighting spill onto the turbine nacelles, towers and blades.

2.4 Reduced Intensity Based on Meteorological Visibility

2.4.1 The visible lights on the on the five cardinal turbines will be dimmed to 10% of their nominal intensity when the measured meteorological visibility exceeds 5km. These conditions are estimated to prevail in the north of Scotland for more than 90% of the time.[6] When meteorological visibility is less than 5km, the perceived brightness of the full intensity lights (2,000cd) would be reduced by the conditions requiring their use. This means that receptors located over 5km from the Proposed Varied Development are unlikely to experience the aviation lighting at full intensity.

3. Approach and Methodology

3.1.1 The cardinal aviation lighting assessment has been prepared with reference to Guidelines for Landscape and Visual Assessment (Third Edition) (GLVIA3)[7] and taking account of the guidelines provided by NatureScot[8,9].

3.1.2 GLVIA3 places a strong emphasis on the importance of professional judgement in identifying and defining the significance of landscape and visual effects. As part of this assessment, professional judgement has been used in combination with structured methods and criteria to evaluate value, sensitivity, and magnitude and significance of effect. The assessment has been undertaken by Landscape Professionals at ASH design + assessment.

3.1.3 Methods promoted by GLVIA3 require an appreciation of the existing environment and the ability of its key components to accept the change proposed. An understanding of the potential effects which could occur and how these could affect the key components and the potential to mitigate adverse effects. The NatureScot Guidance emphasises the importance of appreciating the different sensitivities landscape and visual receptors have at night and the potential effects that aviation lighting specifically might have. There are four key stages to the assessment which are presented in the following sub-sections.

[6] See for example Dr Stuart Lumsden, Technical Report on the Propagation of Light from the Proposed Aviation Warning Lights at the Clash Gour Wind Farm Development, CD 14.7, DPEA reference WIN-300-4, 31 July 2020, paragraph 6.5.7

[7] Landscape Institute (LI) / Institute of Environmental Management and Assessment (IEMA), (2013), *Guidelines for Landscape and Visual Impact Assessment, Third Edition. Routledge.*

[8] Scottish Natural Heritage, (2017), Visual Representation of Wind Farms (Version 2.2).

[9] NatureScot (2024). Guidance on Aviation Lighting Impact Assessment. Available at: Guidance on Aviation Lighting Impact Assessment | NatureScot. Accessed August 2025.

3.2 Establishing the Baseline

3.2.1 A 25 km Study Area was selected, being the area within which it is considered that significant effects from the cardinal aviation lighting could potentially be experienced. This area is consistent with the Detailed Study Area for the main LVIA of the Proposed Varied Development

3.2.2 The baseline has been determined through a combination of desk study and site survey, taking account of the appearance and intensity of existing visible lights. Desk appraisal has involved review of the ZTV and wirelines. Site survey of low-level visual receptors was undertaken at twilight and in the subsequent hours of darkness in August 2025.

3.3 Appreciation of the Proposed Varied Development

3.3.1 An appreciation of the proposals has been developed through building an understanding of the proposed cardinal aviation lighting requirements and the surveyors experience of existing wind turbine sites with aviation lights of a similar intensity during the hours of darkness.

3.4 Analysis of Receptors and Residual Effects

3.4.1 Establishing the baseline is followed by the systematic identification of likely effects on the receptors. This is a two-fold process, giving consideration to how effects could arise from a cardinal aviation lighting strategy for the Proposed Varied Development, and how these changes could be accommodated in the existing baseline.

Landscape and Visual Sensitivity

3.4.2 Sensitivity concerns the nature of the baseline landscape or visual receptor, and the ability to accommodate development of the type proposed without compromising the key characteristics and / or composition.

3.4.3 There are two aspects which contribute to the evaluation of landscape and visual sensitivity: value and susceptibility to change. The consideration of these two separate aspects in the differing assessments for landscape and visual amenity are outlined below.

3.4.4 Landscape sensitivity is reflective of the nature of the landscape and its ability to accommodate development of the type proposed without compromising its key characteristics and components. This involves the consideration of the baseline value of the landscape and its susceptibility to change. When considering value and susceptibility in the context of aviation lighting, the degree to which the character of the area is currently characterised by artificial lighting or a lack of it, is particularly important. It should be noted that some characteristics that contribute to the daytime value of a landscape may not be as relevant at night and vice versa.

3.4.5 Visual sensitivity considers the nature and viewing expectation from the receptor and takes into account the perceived value of the existing view and the susceptibility of the visual receptor to change. The importance of the aspect of the view which would be changed contributes to the sensitivity evaluation. The sensitivity evaluation considers the value of views during low light conditions when aviation lights could be on, as well as during full darkness.

3.4.6 The value and susceptibility of receptors can differ at night. Features that are valued during the day may not be visible at night while other features such as the starry night sky may best be appreciated during the hours of darkness. Likewise, individuals seeking

out activities that require darkness (i.e. stargazing) will have a higher level of susceptibility than others whose activities take place irrespective of the light levels (i.e. outdoor sporting clubs that gather under flood lights in the evening or commuters focused on the road).

3.4.7 Criteria for the evaluation of sensitivity to change are presented below in **Table 2**. These levels represent points on a continuum and, where required, interim ratings such as Low-Medium have been used to indicate the anticipated level.

Table 2: Landscape and Visual Sensitivity Criteria

Sensitivity Rating	Landscape Sensitivity	Visual Sensitivity
High	A landscape which is specifically recognised and valued and for its dark skies and has a notable susceptibility to new sources of light.	• Visual receptors occupying buildings, recreational routes or promoted locations where an appreciation of dark skies is a particularly noted and valued aspect of the view and there are no other lights or distracting features.
Medium	A landscape which is valued for some dark sky conditions but is influenced by some existing peripheral or localised sources of light.	• Visual receptors occupying buildings, recreational routes or other locations where an appreciation of dark skies is obtained and/or there are localised or peripheral sources of lighting within the baseline; or • Visual receptors occupying buildings, travelling on public roads or other transport routes, or at other locations where dark skies are present, but the activity of the receptor is less focussed on an appreciation of the dark sky conditions.
Low	A landscape which is less noted for dark sky conditions and/or is affected by existing baseline lighting leading to a limited susceptibility to new sources of light.	• Visual receptors occupying buildings, routes and other locations where existing lighting is prominent and/or distracting in the baseline leading to a less notable focus on the dark sky conditions; or • Visual receptors occupying buildings, travelling on public roads or other transport routes or at other locations where dark skies are affected by localised or peripheral sources of lighting within the baseline but the activity of the receptor is less focussed on an appreciation of the dark sky conditions.

Magnitude of Change on Landscape and Visual Receptors

3.4.8 Magnitude of change concerns the extent to which the existing landscape character or view would be altered by the Proposed Development. Elements specific to the evaluation of magnitude of change for the differing assessments of landscape and visual amenity are detailed below:

- Landscape

- The degree to which features or characteristics may be removed, altered or added within the landscape;
- The geographical extent of proposed changes;
- Whether changes would be direct or indirect; and
- The potential duration and reversibility of proposed changes (taking into consideration proposed mitigation measures where relevant).

- Visual Amenity
  - The scale or extent of proposed changes within the view;
  - The location of proposed changes within the view, relevant to other existing features;
  - The extent to which this may alter the composition or focus of the view; and
  - The duration and reversibility of proposed changes (taking into consideration proposed mitigation measures where relevant).

3.4.9 Criteria for the evaluation of magnitude of change are presented below in **Table 3**. These levels represent points on a continuum and, where required, interim ratings such as Low-Medium have been used to indicate the anticipated level.

Table 3: Landscape and Visual Magnitude of Change Criteria

Magnitude Rating	Landscape	Visual
High	A notable change in landscape characteristics over an extensive area ranging to a very intensive change over a more limited area.	Where the Proposed Varied Development would result in a very noticeable change in the existing view.
Medium	A perceptible change in landscape characteristics over an extensive area ranging to a notable change in a localised area.	Where the Proposed Varied Development would result in a noticeable change in the existing view.
Low	A virtually imperceptible change in landscape characteristics over an extensive area or a perceptible change in a localised area.	Where the Proposed Varied Development would result in a perceptible change in the existing view.
Negligible	No discernible change in any landscape characteristics or components.	Where the Proposed Varied Development would result in a barely perceptible change in the existing view.

3.5 Assessment of Significant Effects

3.5.1 The purpose of this assessment in the context of the Proposed Varied Development is to identify predicted significant effects on the landscape and visual amenity arising from the proposed cardinal aviation lighting strategy. For the purposes of the assessment effects identified as being **Moderate** or above may be regarded as significant in term of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the 2017 EIA Regulations)[10].

3.5.2 The significance of effect for landscape and visual elements is considered as follows:

- The assessment takes into account identified effects upon existing landscape receptors resulting from the introduction of cardinal aviation lights on the Proposed Varied Development and assesses the extent to which these would be lost or modified, in the context of their importance in determining the existing baseline character.
- The assessment takes into account likely changes resulting from the introduction of cardinal aviation lights on the Proposed Varied Development to the visual composition, including the extent to which new features would distract or existing elements in the view or disrupt the scale, structure or focus of the existing view.[11]

3.5.3 Criteria used for the assessment of effects are presented below in **Table 4**. These levels represent points on a continuum and, where required, interim ratings such as Low-Medium have been used to indicate the anticipated level

Table 4: Landscape and Visual Significance of Effect Criteria

Effects Significance	Landscape Effects	Visual Effects
Major Adverse (significant)	The Proposed Varied Development would comprise a clearly noticeable and detracting new light source within a landscape of particular value, leading to substantial deterioration of dark sky characteristics.	The Proposed Varied Development would create a prominent and very detracting source of light within an existing highly valued view of a dark sky.
Moderate Adverse (significant)	The Proposed Varied Development would form a noticeable new source of light within a landscape of generally dark skies, or a more detracting source of light within a landscape where some existing lights are present, leading to an	The Proposed Varied Development would introduce a fairly prominent and somewhat distracting new light source within an important part of a view that is somewhat appreciated for its darkness, or would be more

[10] Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: http://www.legislation.gov.uk/ssi/2017/101/contents/made (Accessed February 2020).

[11] The prominence of the cardinal aviation lights in the view will vary according to the prevailing weather conditions. The assessment has been carried out, as is best practice, by assuming the 'worst case' scenario. This is assumed to be in clear conditions in full darkness, unless the value of the view or effect would be greater in different lighting conditions. However, it is recognised that predicted effects could be reduced in some conditions (i.e. in the case of low cloud or haze).

Effects Significance	Landscape Effects	Visual Effects
	appreciable reduction in the dark sky characteristics of the landscape	prominent within a less important part of generally dark view.
Minor Adverse (Not Significant)	The Proposed Varied Development would form a perceptible new source of light within the landscape but would not lead to a noticeable deterioration of dark sky characteristics.	The Proposed Varied Development would form a perceptible new light source but would not distract from the dark qualities of the view, or would be a more prominent feature within a setting where existing light sources are already present within view.
Negligible (Not Significant)	The Proposed Varied Development would add an additional source of light to the landscape but would be well accommodated within the setting of baseline lighting.	The Proposed Varied Development would form a barely perceptible feature within the existing view and would not reduce the appreciation of dark skies within the view.

3.6 Limitations of the Assessment

3.6.1 The use and limitations of ZTV diagrams are explained in **Technical Appendix 8.1: Technical Methodologies for Visual Representation**. The appearance and brightness of the cardinal aviation lights has been estimated by the assessors, based on experience of similar intensity aviation lighting visited and observed during the hours of darkness.

4. Assessment of Effects

4.1 Existing Lighting Baseline

4.1.1 The site survey indicated that artificial light within the 25km Study Area was concentrated within the Great Glen and side glens where settlements are located. The settlements of Fort Augustus, Invermoriston, Drumnadrochit, Dores and Foyers are the most notable contributors of artificial light, and there are also scattered lights at individual properties and farms. Generally the western side of the glen, which is more settled, also has higher levels of artificial light than the eastern side of the glen which is less developed in comparison. Street lights are found along some sections of the major transport routes, including the A87 through Glen Moriston, and the A82 to the west of Loch Ness for sections which pass through settlements. Car headlights and break lights as well as reflections of these on other road markers result in randomised bright illuminations in the landscape.

4.2 Potential Effects

4.2.1 Potential effects relate to the appearance of the proposed 2,000 candela nacelle lights on the five cardinal turbines. The effect of lighting on the viewer could be influenced by both the number and the intensity of the lights potentially visible and the extent to which

baseline lighting is present. The following issues have been considered in the assessment of predicted effects:

- Aviation lights are typically focussed on a horizontal plane with intensity of light reducing below a specified viewing angle. Therefore, a lesser effect may be experienced by a viewer situated at increased angles below the horizontal (see **Figure A8.9-2: Visible Aviation Lighting Theoretical Intensity ZTV**). However, potential intensity at different viewing angles differs between lighting manufacturers.
- Perceived intensity of the aviation lights would diminish with distance. However, in some instances, combinations of greater numbers of aviation lights seen from further away could counter this effect to some extent.
- The CAA Policy Statement allows for the lights to be reduced to 10% of their nominal value during periods where the measured meteorological visibility exceeds 5km (i.e. 200 candela). This means that the cardinal aviation lights will emit a maximum intensity of 200 candela approximately 90% of the time; and when the higher light intensity lights are triggered by poor visibility, the lights will appear less bright to observers due to the atmospheric conditions.
- Nacelle aviation lights could lead to illumination of turbine blades as they pass through the horizontal plane of the beam and therefore in some situations the viewer would be able to perceive the movement of the turbines during the hours of darkness; and
- In certain wind directions and viewing angles, moving turbine blades in front of the aviation light would cause a flashing effect. Where a number of different turbines were aligned, this effect could be increased to a flickering impression.

4.3 Zone of Theoretical Visibility

4.3.1 A hub height ZTV (149 m above existing ground level), was generated to illustrate areas where views of the cardinal aviation lights would theoretically be obtained (**Figure A8.9-1a: Visible Aviation Lighting Hub Height ZTV A3**. Detailed technical information on the methods for production of ZTVs is included in the **Technical Appendix 8.1: Technical Methodologies for Visual Representation**.

Intensity of Visible Aviation Lighting

4.3.2 **Figure A8.9-2: Visible Aviation Lighting Theoretical Intensity ZTV** illustrates the theoretical intensity ZTV for the cardinal aviation lighting scheme. It shows that the greatest levels of theoretical intensity would generally be experienced on elevated hill tops and slopes ranging from approximately 15 to 30 km from the Site. Closer areas with greater levels of theoretical intensity include:

- Glas-bheinn Mhòr and Meall Fuar-mhonaidh (approximately 4-5km to the east/north-east)
- Meall a'Chràthaich (approximately 2km to the west)
- Càrn nan Earb, Càrn Mhic an Toisich and An Suidhe (approximately 7-9km to the south-west)
- Carn a'Chaochain (approximately 15km to the south-west)
- Càrn Gorm and Càrn a' Mhuilt (approximately 14-15km to the north-west)

- Summits west of Glen Brein, including Carn Thòmais and Carn Vungie (approximately 12-14km to the south-east)
- Summits of Beul a' Chasain and Meall nan Aighean Mòr (approximately 13-15km to the south-east)

4.3.3 As the majority of the areas which would theoretically experience greater levels of lighting intensity are over 5km from the Proposed Varied Development, they would only experience the lighting at reduced intensities. While perceptible, at distances of over 10km the aviation lights would generally appear as distant points within the wider view. It should be noted that as these are also elevated areas it is likely that the aviation lights would be seen in the context of aviation lighting on cumulative developments (if constructed), such as Tomchrasky and Bunloinn Wind Farms (both consented), Loch Liath Wind Farm (application), Millennium East Wind Farm and Culachy Wind Farm (both application), as well as other wind farms further to the north and east.

4.3.4 Many of the potential visual receptors at lower elevations are not shown to have theoretical visibility of the aviation lighting due to screening by intervening topography. Where theoretical visibility is shown, the aviation lights would likely be experienced at lower intensities due to the viewing angle. However, they would introduce new sources of artificial lighting in the upland landscape.

4.4 Visible Aviation Lighting Effects on Landscape Character Types and Designated and Protected Areas

4.4.1 The landscape character types and designated and protected areas within the Study Area are illustrated on **Figure A8.9-3: Visible Aviation Lighting Landscape Character Types with Theoretical Intensity ZTV** and **Figure A8.9-4: Visible Aviation Lighting Designated and Protected Landscapes with Theoretical Intensity ZTV**. The landscape receptors most likely to experience significant effects as a result of the introduction of aviation lighting are those directly affected by the development's location within them and those in close proximity where the aviation lighting would represent a notable change to the surrounding landscape.

4.4.2 The following landscape receptors within the Study Area were identified as having the potential to experience effects as a result of the cardinal aviation lighting:

- LCT 222: Rocky Moorland Plateau – Inverness;
- LCT 224: Farmed and Wooded Foothills;
- LCT 225: Broad Steep-Sided Glen;
- Glen Affric National Scenic Area (NSA);
- WLA 24: Central Highlands; and
- Loch Ness and Duntelchaig Special Landscape Area (SLA);

4.4.3 While the upland landscapes are overwhelmingly characterised by their lack of artificial light, the more settled parts of these landscapes, located primarily within LCT 225, feature areas with higher levels of artificial light. These are focused around the settlements of Fort Augustus, Invermoriston, Drumnadrochit, Dores and Foyers and scattered farmsteads and properties along the roads that pass through these landscapes at lower elevations. Passing vehicle headlights would also add to the baseline of artificial lights. Lights from more settled landscapes would be visible in the distance from more elevated areas.

4.4.4 Theoretical visibility from other landscape receptors within the Study Area is either very limited and / or located at a distance at which significant effects on landscape character and designated and protected landscapes would be unlikely and as such these are scoped out.

Effects Likely to be Significant

4.4.5 Significant effects were identified for localised parts of one landscape character type and one designation. The cardinal aviation lighting on the Proposed Varied Development, would directly affect a localised part of the landscape character area within which it is located.

Landscape Character Types

LCT 222: Rocky Moorland Plateau – Inverness

4.4.6 The character of this LCT during hours of darkness is not specifically discussed within the NatureScot landscape character assessment. However, this is a sparsely inhabited upland landscape, where settlement is generally limited to the outskirts of this LCT. Therefore there are few sources of artificial light, beyond scattered properties and passing vehicles at the edge of or right outside this LCT, usually at lower elevations, which may be visible from some areas within this LCT. However existing wind farms, including the Operational Development, are located within this LCT, and therefore the turbines of the Proposed Varied Development would not represent a new feature within the daytime context of the LCT. Baseline artificial lighting would be limited to the lit operational Corrimony turbines and occasional lights from vehicles passing through the wider area and settlements at lower elevations which would be visible from within the ZTV. The lack of artificial light contributes to the perception of remoteness on the open plateau, and may affect the key characteristics of *"Sense of remoteness due to sparse habitation, little evidence of active land use or obvious human artefacts and rugged, patchy texture"* and the *"Strong contrast in landcover and settlement between the plateau and adjoining straths and glens"*. This LCT is considered to have a Medium sensitivity to the proposed turbine lights.

4.4.7 The aviation lights would directly affect this LCT, adding artificial lights on the plateau, which would be perceived within the immediate context of the Site and its surroundings, and from elevated areas within this sub-area of the LCT as well as from facing slopes within the northern sub-area. These changes would represent a perceptible change within the wider landscape ranging to a notable change within a localised area within the southern sub-area, within approximately 5km of the Site. This includes Meall Fuar-mhonaidh to the east of the site, which would experience the lighting at a higher intensity. This is reflective of a localised Medium magnitude of change reducing to Low overall. It was assessed that this would result in **Minor-Moderate** (not significant) overall effects, with areas of localised **Moderate** (significant) effect relating to the potential for the aviation lights to influence the sense of remoteness within this LCT and the contrast between the plateau and the adjoining more settled straths and glens.

Designated and Protected Areas

Loch Ness and Duntelchaig SLA

4.4.8 The Loch Ness and Duntelchaig SLA is characterised by the strongly linear landform of the Great Glen fault, which contains the large waterbody of Loch Ness. To the east, the

landscape consists of a mosaic of undulating moorland, tracts of woodland and smaller lochs, including Loch Duntelchaig, creating a contrast to the scale and simplicity of the Great Glen. Settlements are found near intersections with side valleys at the mouths of rivers or burns which cut into the steep slopes, the largest of these being Fort Augustus, Invermoriston and Drumnadrochit. Further details on the special qualities of the SLA are included in **Technical Appendix 8.4: Assessment of Designated and Protected Landscapes**. The characteristics of the SLA during the hours of darkness are not specifically discussed in the citation. However, aspects of the "Dramatic Great Glen" special quality, including the "Distinctive views of grand proportions…" and the "The striking profile of the glen…" may be sensitive to the introduction of artificial light.

4.4.9 Levels of artificial light are relatively low within the Great Glen, particularly on the eastern, less settled side of the glen, but there are concentrations of artificial light around settlements, including Fort Augustus, Invermoriston, Drumnadrochit and Foyers, associated with individual properties, streetlights and headlights of passing vehicles on transport routes including the A82, and the B852. On the shore of Loch Ness, Urquhart Castle is also lit. The surrounding uplands which provide the backdrop to the glen, as well as the moorland plateau around Loch Duntelchaig, would be more sensitive to the introduction of artificial light.

4.4.10 Theoretical visibility of the aviation lights would be concentrated along open slopes to the east of the Great Glen. Here, higher numbers of lit turbines would be experienced to the south. Up to 5 lit turbines would be visible from more elevated locations to the south of Whitebridge, while smaller numbers of lit turbines would be visible further north near Dores and from hill tops and open, facing slopes around Loch Duntelchaig (usually ranging between 1 and 3, with all 5 lit turbines visible from some hill tops) experienced at a greater distance. There would be some visibility from the western side of the glen around Meall Fuar-mhonaidh on the plateau edge. Other sources of artificial lighting can already be seen within the SLA and as such the aviation lighting would not introduce a wholly new feature into the surrounding landscape context.

4.4.11 The introduction of aviation lighting on the skyline to the west would appear noticeable from areas around Meall Fuar-mhonaidh. However, this is not predicted to affect the role of Meall Fuar-mhonaidh as a landmark when experienced from elsewhere within the SLA or the appreciation of the Great Glen when seen from its summit as the lights turbines would be experienced in the westerly context. Experiencing lit turbines from and around the summit of Meall Fuar-mhonaidh in close proximity, would have the potential to reduce the night time connection to the wider, western landscape of the Balmacaan and Affric mountain interior described in the citation, and the remote qualities of the hill-top.

4.4.12 Given the above it was assessed that the aviation lighting on the Proposed Varied Development would result in a localised **Moderate** (significant) effect around the western ridge and the summit of Meall Fuar-mhonaidh, with a **Minor** (not significant) effect for the SLA as a whole. Nevertheless, Meall Fuar-mhonaidh would remain an integral part of the SLA and it's setting in relation to the Great Glen would not be affected.

Effects Likely to be Not Significant

Landscape Character Types

LCT 224: Farmed and Wooded Foothills

4.4.13 This LCT is found to the east of the Great Glen. It comprises a ridge of low hills with a complex landform of rocky ridges interrupted by short glens, which sometimes feature lochs and rivers. The panoramic views of the open, exposed upper slopes and summits contrast with the sheltered and enclosed lower, slopes with conifer forests and woodlands. The key characteristics of the LCT listed in the character assessment do not describe the landscape during hours of darkness. However, settlement is relatively sparse within the LCT within the study area, consisting of small farms, crofts and farming settlements, located along transport routes. As such levels of artificial light are relatively low. The high degree of forestry and woodland cover also limits the visibility of lights particularly from more low-lying areas. This landscape is considered to have a Low-Medium sensitivity to the type of development proposed.

4.4.14 The aviation lights would be experienced particularly from open, exposed slopes within the southern part of this LCT, including Beinn a' Bhacaidh, Murligan Hill and north-facing slopes of Suidhe (see VP5, **Figure V3a-4.5: VP21 Toll Creagach - Visible Aviation Lighting Photomontage**) where 4-5 lit turbines would be visible (although lower numbers of lit turbines would be seen from the actual summit of Suidhe), generally experienced at medium levels of intensity. As they would be experienced in the wider upland landscape to the west of the Great Glen, where lights are not currently a dominant feature of the landscape, this may distract from open, exposed upper slopes and summits. From the northern part of this LCT, lower numbers of lit turbines would generally be visible, at a greater distance.

4.4.15 It was assessed that this would result in **Minor** (not significant) overall effects, with a localised **Minor-Moderate** (not significant) effect from elevated areas within the southern part of this LCT.

LCT 225: Broad Steep-Sided Glen

4.4.16 This LCT comprises the area of the Great Glen immediately surrounding Loch Ness, and is characterised by a clearly defined, V-shaped glen encompassing the long, linear Loch Ness and the farmed alluvial plains at either end of the loch. Settlement is concentrated near intersections with side valleys, with further properties sometimes scattered along the loch-edge, or perched on the high valley slopes where terrain permits. The western side of the glen is generally more settled. Levels of artificial light are relatively low, particularly on the eastern, less settled side of the glen, but there are concentrations of artificial light around settlements, including Fort Augustus, Invermoriston, Drumnadrochit and Foyers, associated with individual properties, streetlights and headlights of passing vehicles on transport routes including the A82, and the B852. On the shore of Loch Ness, Urquhart Castle is also lit. As a result, this LCT is considered to have a Low-Medium sensitivity to the proposed aviation lights.

4.4.17 The lit turbines would be theoretically visible around Invermoriston as well as the eastern shore of Loch Ness across from Invermoriston, however, this would be limited by tree cover. Generally 1-2 lit turbines would be visible and experienced at lower levels of intensity, although 3-5 lit turbines may be visible from some open upper slopes. The

aviation lights would also be experienced from some open areas above Urquhart Bay and to the south of Dores, from where 1-4 lit turbines may be visible. The aviation lights would be experienced within the surrounding upland context beyond the containment of the Great Glen. As most of the baseline lighting within this LCT is located at lower level, this would introduce lighting into a new part of this landscape, which may have the potential to slightly reduce *the "contrast between the smaller scale landscapes of settled, lower slopes and the large scale moorland and forested backdrop"*, and disrupt the *"visual focus directed along the linear route of the glen or across the water to the opposite shore and up to the skyline"*, although it would appear external to the LCT.

4.4.18 The introduction of the aviation lighting to the west in a different LCT would therefore result in a perceptible change within a localised part of this LCT and a Low magnitude of change. It was assessed that the aviation lighting could result in a localised **Minor** (not significant) effect within areas around the north end of Loch Ness, with the overall effect being **Negligible** (not significant).

Designated and Protected Areas

Glen Affric NSA

4.4.19 The Proposed Varied Development is located approximately 12 km to the east of this NSA. The NSA was scoped out of the main LVIA assessment as significant daytime effects were deemed to be unlikely. The special qualities for the NSA do not include reference to dark skies nor do they describe the landscape during hours of darkness. The special quality considered to be the most sensitive to the introduction of aviation lighting is *"A journey into wildness"* which references the *"general absence of buildings and other obvious man-made features, other than occasional, single-storey cottages"* which *"lends a sense of remoteness to the whole length of the glen"*. There are relatively few sources of artificial light, which contribute to this sense of remoteness and the *"feeling of leaving civilisation and moving into a harsh environment where nature and natural forces dominate"* described under this special quality. However it is noted that the lit turbines of Corrimony Wind Farm can be seen in the midground to the east, and the lights of Inverness are visible in the distance to the north-east.

4.4.20 Operational wind farms are present in the wider landscape to the east and therefore the turbines of the Proposed Varied Development would not represent a new feature within the daytime context of the LCT. The aviation lights of the Proposed Varied Development would indirectly affect slopes and summits, particularly on the ridgeline along the northern boundary of the NSA, from where the lit turbines would be seen to the east, in a similar part of the view as the aviation lights of Corrimony Wind Farm, slightly further in the distance, with the number of lit turbines visible and lighting intensity increasing at higher elevations. When moving further west, the aviation lights would appear less bright with the increasing distance. The aviation lights would be experienced in the context of views outwards from the NSA. As a result, this LCT is considered to have a Medium sensitivity to the proposed cardinal aviation lights.

4.4.21 The introduction of the aviation lighting to the east would result in a perceptible, but relatively distant change within a localised part of the NSA on its northern edge. This would represent a Low magnitude of change. While they may be locally intrusive in a few locations, given the context of existing aviation lights in this part of the view, the introduction of aviation lighting would be very unlikely to lead to any discernible reduction to the scenic quality of the NSA at night or to change the intrinsic landscape

characteristics or special qualities. It was therefore assessed that while the aviation lighting could result in a slight, localised alteration to the sense of remoteness and a localised **Minor** (not significant) effect there would be a **Negligible** (not significant) effect overall.

WLA 24: Central Highlands

4.4.22 This WLA is located approximately 11km to the northwest of the Site and is comprised of a mix of large mountains, peatland and glens that run west – east, including: Killian, Strath Croe, Strathconon, Orrin, Glen Strathfarrar, Glen Cannich and Glen Affric. The WLA was scoped out of the main LVIA assessment as significant daytime effects were deemed to be unlikely in the context of other operational developments which already affect the sense of wildness. However, WLA 24 is included in the assessment of potential effects of visible aviation lighting given the sensitivity of Key Qualities associated with sanctuary, solitude and remoteness to changes in the artificial lighting baseline at night.

4.4.23 The Key Qualities of the WLA do not include reference to dark skies nor do they describe the landscape during hours of darkness. However, the WLA may be perceived as more extensive at night due to the lack of artificial lighting within the surrounding context. The WLA's key qualities, most closely related to sanctuary, solitude and remoteness which will be intensified by the dark include:

- WLQ1: An extensive and awe-inspiring range of large scale, high and rugged mountains; and
- WLQ2: An extensive, remote mountain interior with strong qualities of sanctuary and solitude.

4.4.24 The exterior parts of the WLA near its eastern boundary already experience some degree of artificial light during the hours of darkness. These take the form of scattered farmsteads within adjacent glens, passing headlights along the A831 and minor roads to the east, as well as the distant lights of Inverness to the north-east, experienced from some hill tops. The aviation lights of Corrimony can be seen in the midground to the east. However, the WLA's sense of isolation and remoteness are undoubtedly enhanced by the largely dark nature of the surrounding landscape at night. While the WLA itself would be highly sensitive to the introduction of artificial lighting within its boundaries, the cardinal aviation lighting on the Proposed Varied Development would be located over 10 km to the east.

4.4.25 Theoretical visibility of the aviation lights is focused on summits and east-facing slopes near the eastern edge of the WLA. The theoretical intensity ZTV (**Figure A8.9-4: Visible Aviation Lighting Designated and Protected Landscapes with Theoretical Intensity ZTV**) indicates that, the highest levels intensity would be experienced at higher elevations beyond 15km, however the intensity would be somewhat reduced due to the distance.

4.4.26 As other sources of artificial lighting, particularly the aviation lights of Corrimony Wind Farm, can already be seen within the easterly landscape context outside of the WLA, the aviation lighting would not introduce a wholly new feature into the surrounding landscape context. However, given the overall lack of artificial light within the WLA, it is considered to have a Medium-High sensitivity to aviation lighting.

4.4.27 While the aviation lights would increase the presence of human development within the wider landscape to the east, they would be seen outside of the WLA in a context where lighting is already a feature in the landscape. Uninterrupted dark skies would still be

experienced in other directions particularly to the west within the interior of the WLA. The changes would be perceptible but relatively distant, occurring in a localised parts of the WLA resulting in a Low magnitude of change.

4.4.28 While the aviation lights would be experienced in some of the *"open and exposed panoramic views over an awe-inspiring and extensive range of mountains*" described as part of WLQ1*,* they would be unlikely to reduce the *"prevailing absence of human artefacts and contemporary land use across the WLA interior"* experienced in these views, as they would be experienced outside of the WLA in views where other lights are already present. The sense of remoteness within the mountain interior which also contributes to WLQ2 would not be affected, largely due to the limited theoretical visibility within these parts of the WLA and distance at which the aviation lights would be experienced. No significant effects are anticipated for any of the WLQs. It was assessed that the effect on the WLA would be **Minor** (not significant).

Summary of Visible Aviation Lighting Effects on LCTs and Landscape Designations / Protected Areas

4.4.29 Anticipated effects on designated and protected landscapes and LCTs are summarised in Table 5 below. For the purposes of this assessment, effects with a **Moderate** rating or greater are considered to be significant.

Table 5: Summary of Visible Aviation Lighting Effects on LCTs and Landscape Designations / Protected Areas

	Not Significant				Significant		
	Negligible	Negligible - Minor	Minor	Minor - Moderate	Moderate	Moderate - Major	Major
LCT 222: Rocky Moorland Plateau – Inverness;				x	L		
LCT 224: Farmed and Wooded Foothills			x	L			
LCT 225: Broad Steep-Sided Glen	x		L				
Glen Affric NSA	x		L				
WLA 24: Central Highlands			x				
Loch Ness and Duntelchaig SLA			x		L		

L – denotes that the effect would be localised to only part of the landscape resource.

4.5 Visible Aviation Lighting Effects on Visual Receptors

Viewpoints

4.5.1 All of the 15 viewpoints included in the LVIA fall within the study area for the aviation lighting assessment. These VPs are considered to be representative of the range of views likely to be obtained during low light or dark conditions. Wirelines indicating turbines which would be lit are provided for all VPs included within the LVIA (**Figures V3a-1.3a - V3a-15.3a**). In consultation with NatureScot four of these viewpoints were selected as

the locations for visualisations of the aviation lighting.[1] These are marked with an asterisk below.

- VP1 - Track to Loch Liath
- VP2 - Old Bridge, Invermoriston*
- VP3 - Meall Fuar-mhonaidh*
- VP5 – Suidhe Viewpoint, B862*
- VP6 - Summit by Suidhe Viewpoint, B862
- VP7 – B862 south of Foyers
- VP8 – Lochside picnic layby on B852
- VP10 - Great Glen Way near Carn a' Bhodaich
- VP12 – Creag Dhubh
- VP14 – Meall Dubh
- VP15 – Poll-gormack Hill
- VP17 - B862 south of Dores
- VP20 - Path north of Affric Lodge
- VP21 – Toll Creagach*
- VP26 - A87 Bun Loyne

Settlements and Residential Receptors

4.5.2 Settlement within the study area is focused around Fort Augustus, Invermoriston, Drumnadrochit, Dores and Foyers and scattered properties situated on the sides of the Great Glen and within the side glens, mainly along transport routes. As indicated on **Figure A8.9-5: Visible Aviation Lighting Visual Receptors with Theoretical Intensity ZTV**, theoretical visibility of aviation lighting would be limited from Fort Augusts, Foyers and Drumnadrochit. While there is some theoretical visibility from Invermoriston, this would be limited to a large degree by vegetation. There is no theoretical visibility from Dores itself, but there is some visibility from properties to the south of Dores. Artificial lighting is already present in each of these communities in the form of streetlights, domestic lights and other lights such as at the local hotels. While these are not brightly lit landscapes it is unlikely that the introduction of the proposed aviation lighting would be perceptibly detracting even on the outskirts given the existing baseline lighting and screening by trees and buildings.

4.5.3 The following residential receptors within the study area were identified as having the potential to experience effects as a result of the aviation lighting (see **Figure A8.9-5: Visible Aviation Lighting Visual Receptors with Theoretical Intensity ZTV**).

- R7 - Properties south of Dores
- R9 - Easter and Wester Aberchalder and Migovie
- R12 - Garthbeg, Corriegarth Lodge and nearby properties
- R13 - A range of properties on or in the vicinity of the B862 minor public road in the area near Whitebridge
- R14 - Knockie Estate Cottages, and properties in the vicinity including Knockie Lodge Hotel

Routes

4.5.4 Based on the theoretical lighting intensity ZTV, the following route receptors within the Study Area were identified as having the potential to experience effects as a result of the aviation lighting (see **Figure A8.9-5: Visible Aviation Lighting Visual Receptors with Theoretical Intensity ZTV**):

- B862
- Core Path IN12.04 - Kindrummond to Dirr Wood
- Core Path IN25.02 - Garthbeg to Errogie, south side of Loch Mhor
- Great Glen Way

Effects Likely to be Significant

4.5.5 The majority of the representative VPs, residential groupings, and routes were selected for inclusion within the aviation lighting assessment, have been identified as likely to experience similar effects to those identified for the main LVIA (**Chapter 8: Landscape and Visual**). Receptors identified as likely to experience significant visual effects as a result of the aviation lighting discussed below.

Viewpoints

VP1 - Track to Loch Liath

4.5.6 This viewpoint is illustrative of open, close-proximity views, from a track on the edge of the Operational Development site. During the day, views are over moorland and young trees with the Operational Development turbines visible in close proximity on top of a ridge to the north-east, with associated tracks and substation visible too. Deer fences and a small lochan can be seen in the foreground. Views south and west are contained by landform and forestry, so main views are directed north-east towards the Operational Development and Proposed Varied Development. Much of this detail is lost during the hours of darkness as baseline artificial lighting is limited, consisting mainly of lights associated with the substation and occasional traffic accessing the Operational Development site. This viewpoint is considered to have a Low-Medium sensitivity.

4.5.7 The wireline (see **Figure V3a-1.3a: VP1 Track to Loch Liath - Proposed Varied Development Wireline**) shows that 4 of the aviation lights would be visible to the north-east from this viewpoint where they would be seen above the skyline in close proximity, where they would form a new and relatively noticeable feature in nighttime views. Due to the proximity to the Proposed Varied Development and the low levels of baseline artificial light, it is considered that this would result in a Medium magnitude of change. This would result in a **Moderate** (significant) effect.

VP3 - Meall Fuar-mhonaidh

4.5.8 This VP is illustrative of elevated views from a popular local hill summit on the north-western side of Loch Ness, situated within Loch Ness and Duntelchaig SLA. During daytime there are elevated, panoramic views over craggy upland moorland with occasional lochans and mountains in the distance to the south, south-west and south-east. Views across the Great Glen to the east, over Loch Ness, low-lying farmland and forested slopes. The Operational Development is visible in close proximity to the south-west. As the sun sets, views are more likely to be focused to the west as other features fade. Some baseline artificial lighting is present, consisting of distant lights from scattered

properties and roads, mainly focused to the east and north-east towards the Great Glen, with the immediate surroundings near this viewpoint being relatively dark (see **Figure V3a-3.5: VP3 Meall Fuar-mhonaidh - Visible Aviation Lighting Photomontage**). Anyone accessing this VP during hours of darkness would be likely to carry their own light source. This viewpoint is considered to have a Medium sensitivity.

4.5.9 The ZTV shows that aviation lighting on all 5 of the lit turbines would be visible from the viewpoint in close proximity, in a part of the landscape where other lights are not currently visible. They would introduce lights to an otherwise dark part of the view, resulting in a Medium magnitude of change. This is considered to lead to a **Moderate** (significant) effect to the viewpoint.

VP5 – Suidhe Viewpoint, B862

4.5.10 This is an elevated viewpoint with an information board by the B862, illustrative of views from the roadside and situated on General Wade's Military Road, within the Loch Ness and Duntelchaig SLA. It has elevated, panoramic views but with main views focused towards north and north-east over Loch Ness. At night views are generally over a dark landscape, but with some limited artificial light present in the form of car headlights along the B862, as well as distant lights from properties to the north within Stratherrick (**see Figure V3a-4.5: VP5 Suidhe Viewpoint, B862 - Visible Aviation Lighting Photomontage**). Views will likely be focused to the west across the Great Glen as light fades. This viewpoint is considered to have a Medium sensitivity.

4.5.11 The ZTV shows that the aviation lights on all 5 lit turbines would be visible from this viewpoint, seen above the ridgeline across the Great Glen in an otherwise dark part of the view. The lights would appear noticeable from this viewpoint, resulting in a Medium magnitude of change. This is considered to lead to a **Moderate** (significant) effect.

VP7 – B862 south of Foyers

4.5.12 This viewpoint is illustrative of views from section of the B862. It has open views over moorland and farmland across nearby areas of woodland and hills to the east. Turbine tips of Corriegarth and Dunmaglass Wind Farms would be perceptible to the north-east and east and the Operational Development turbines to the north-east on the skyline during the daytime. However as the light fades much of these features are lost, and Night-time views are generally of a dark landscape. Baseline lighting would be limited to a couple of lights from nearby properties, and intermittent lights from passing vehicles along the B862 and those accessing properties. While travellers are unlikely to stop at this VP at night, it is representative of open, passing, side view for travellers views from this stretch of road. This viewpoint was considered to have a Low-Medium sensitivity.

4.5.13 The ZTV shows that all 5 of the lit hubs would be visible from this viewpoint, seen above the skyline to the north-west in the otherwise dark landscape at a distance of approximately 10km. This would result in a localised Medium magnitude of change for this viewpoint with open views north-west, leading to a **Moderate** (significant) effect.

<u>Settlements and Residential Receptors</u>

R12 - Garthbeg, Corriegarth Lodge and nearby properties

4.5.14 This grouping is representative of views obtained from properties setback from the B862 road, near the southern end of Loch Mhor. These properties have mixed orientations with some main views north-west across Loch Mhor; and some to the south-east and north-

east. The turbines of the Operational Development are visible on the skyline to the north-west, while turbines of Corriegarth Wind Farm are seen to the south-east in daytime views. Baseline artificial lighting is largely limited to the properties themselves, with potential views of lights from other scattered properties and the B862 from westernmost properties, potentially filtered by trees. The details of the view would fade during the hours of darkness leaving a generally dark landscape apart from baseline artificial lighting around properties. This residential grouping was considered to have a Medium sensitivity.

4.5.15 The ZTV shows that 4-5 of the aviation lights would be visible from this receptor grouping, seen in main/oblique or side views on the skyline. As this would result in a change to a part of the view with limited baseline artificial lighting, it would result in a Medium magnitude of change. The turbine lights would form a new and noticeable feature on the north-western skyline resulting in a **Moderate** (significant) effect to the residential grouping.

R13 - A range of properties on or in the vicinity of the B862 minor public road in the area near Whitebridge

4.5.16 This grouping is representative of views obtained from a range of properties on or in the vicinity of the B862 minor public road in the area near Whitebridge, including properties between Gorthleck to the north through Whitebridge and down to Knockie Estate. It includes mixed orientations and elevations with some main views west and north-west across Loch Ness and some to the south-east and north-east, with some views enclosed or filtered by trees. Baseline lighting would be limited to the properties themselves, and lights from passing vehicles along the B862 and other local access roads. This residential grouping was considered to have a Medium sensitivity.

4.5.17 The ZTV shows that up to 5 of the aviation lights would be visible from parts of this receptor grouping, while other parts would see fewer lights. These would be seen above the skyline to the north-west in a part of the view where currently no artificial lighting is visible. This would result in a localised Medium magnitude of change for properties with open views north-west. However for other properties where lower numbers of turbines would be visible or where views would be screened by trees or landform, the magnitude of change would range from Negligible through Low to Low-Medium. This would result in effects ranging from **Negligible** (not significant) through **Minor** (not significant), **Minor-Moderate** (not significant) to **locally Moderate** (significant).

<u>Routes</u>

Great Glen Way

4.5.18 This is a long-distance recreational route from Fort William to Inverness with high level and low level options. It has varied views of the Great Glen during daytime, including some elevated open views from the high level route sections over glens and distant hills with occasional areas of forestry. Other sections are sometimes enclosed by woodland. The Operational Development is visible to the west from some sections. The level of baseline artificial lighting varies throughout this route. Some sections of this route pass through more settled areas, such as around Fort Augustus, Invermoriston and Drumnadrochit, where streetlights, passing vehicles and lighting at adjacent properties would set a baseline of artificial lighting. From other sections of the route, such as to the north of Invermoriston, baseline lighting would limited to occasional, more distant lights

from scattered properties, in an otherwise relatively dark landscape. Near VP10, lights from nearby properties and more distant settlements to the west/north-west are visible. Individuals walking along this route during the hours of darkness would be likely to carry their own light source. While sensitivity would vary, the overall sensitivity for this route is considered to be Medium.

4.5.19 The ZTV shows visibility of the aviation lights near Invermoriston; north-east of Drumnadrochit near the A82 and Tychalt; and on a track and minor road C1060, including around VP 10. While the lights would generally be screened by nearby trees within Invermoriston itself, where views would be more inward looking, the aviation lights would be seen in close proximity to the north-west from part of the high level route to the north of Invermoriston, where a small number would be seen above the skyline. Near the Allt Saigh watercourse up to four aviation lights would be visible, appearing noticeable on the western skyline. Generally they would be experienced at a lower intensity from this section of the route, but would appear in an otherwise relatively dark landscape. Near VP10, up to 5 of the aviation lights would be seen above the more distant skyline (over 20km away) to the south-west. While they would introduce lights into a part of the view where relatively few lights are currently visible, they would appear distant and would not be experienced within a completely dark landscape. This would result in a locally Medium magnitude of change near Allt Saigh, and a Low magnitude of change in other areas where the turbines would be visible, being Negligible elsewhere where aviation lights would not be visible. The resultant effect would be locally **Moderate** (significant) near Allt Saigh and **Minor** (not significant) in other areas where the turbine lights would be seen, and **Negligible** (not significant) elsewhere along this route.

Effects Likely to be Not Significant

Viewpoints

4.5.20 VP2 - Old Bridge, Invermoriston

4.5.21 This VP is representative of close-proximity views from Invermoriston, with main daytime views towards the west framed by trees along the river bank looking towards hills with forestry in mid-ground and craggy moorland on higher ground. Much of this detail is lost during the hours of darkness, with views becoming more inward looking. The main sources of lighting are nearby properties and streetlights along the A82, and intermittent lights from passing vehicles. These are often filtered by surrounding trees and situated mainly at lower levels within the view. This viewpoint is considered to have a Low sensitivity.

4.5.22 The wireline (see **Figure V3a-2.3a: VP2 Old Bridge, Invermoriston - Proposed Varied Development Wireline** and **V3a-2.5: VP2 Old Bridge, Invermoriston - Visible Aviation Lighting Photomontage**) shows that 1 aviation lights would be visible to the north-west of this viewpoint. While there is existing artificial lighting at lower levels, the Proposed Varied Development would introduce a singular light to an otherwise dark part of the view, resulting in a Low magnitude of change. This is considered to lead to a **Minor** (not significant) effect.

VP6 - Summit by Suidhe Viewpoint, B862

4.5.23 This viewpoint is illustrative of views from an elevated viewpoint at a popular summit along the South Loch Ness Trail, near the Suidhe Viewpoint on the B862. It has open, elevated, panoramic views over the landscape with views over lochs and broad forested

valleys during daytime. At night-time views are generally across a dark landscape and focused to the west across the Great Glen as light fades. The main sources of artificial light are intermittent headlights of vehicles passing along the B862, with more distant lights from settlement to the north and from vehicles along the A82. This viewpoint is considered to have a Medium sensitivity given the lack of artificial lighting.

4.5.24 The wireline (see **Figure V3a-5.3a: VP6 Summit by Suidhe Viewpoint, B862 - Proposed Varied Development Wireline**) shows that 2 of the aviation lights would be visible from this viewpoint. They would be seen in the distance above the ridgeline across the Great Glen to the north-west in a part of the view where no other lights are currently visible. This would result in a Low-Medium magnitude of change, leading to a **Minor-Moderate** (not significant) effect.

VP8 – Lochside picnic layby on B852

4.5.25 This viewpoint is illustrative of worst-case low-level views from a picnic spot and parking area on the B852 on the eastern shore of Loch Ness, within Loch Ness and Duntelchaig SLA, and has shoreline views across Loch Ness during the day, with tips of the Operational Development turbines visible in a dip on the skyline. Intermittent lights from passing cars may be visible along the B852, and lights from settlements and from passing cars along the A82 can be seen across Loch Ness, situated mainly at lower level, including lights from Urquhart Castle. This viewpoint is considered to have a Medium sensitivity.

4.5.26 The wireline (see **Figure V3a-7.3a: VP8 Lochside Picnic Layby on B852 - Proposed Varied Development Wireline**) shows that 1 of the aviation lights would be visible from this viewpoint to the south-west, seen above the skyline in a part of the landscape where other lights are currently not visible. However, it would be seen in a context where some existing baseline lighting is already present at lower levels. It is considered that this would result in a Low magnitude of change, leading to a **Minor** (not significant) effect.

VP10 - Great Glen Way near Carn a' Bhodaich

4.5.27 This viewpoint is illustrative of views from a section of the Great Glen Way on the C1060 minor road, to the north of Carn a'Bhodaich. It has elevated open views west-north-west over moorland and fields towards forested hills and mountains with wind farm clusters visible in the distance. Views to the south-west extend to distant upland with turbines of the Operational Development on the skyline. The details of these views would fade as the darkness sets in. Residential properties and infrequent vehicle headlights provide baseline artificial lighting, with a concentration of lighting from distant settlements to the north/north-west, although generally views are relatively dark. The sensitivity of this viewpoint is considered to be Medium.

4.5.28 The wireline (see **Figure V3a-8.3a: VP10 Great Glen Way near Carn a'Bhodaich - Proposed Varied Development Wireline**) indicates that 4 of the aviation lights would be visible from this viewpoint above the skyline to the south-west. The Proposed Varied Development would introduce new lighting to this part of the view. Given the combination of existing baseline artificial lighting and distance, this is considered to result in a Low magnitude of change, and a **Minor** (not significant) effect for this VP.

VP12 – Creag Dhubh

4.5.29 This viewpoint is illustrative of elevated view from a hilltop within the Central Highlands WLA, with views north across Glen Affric NSA. Daytime views east extend across large areas of moorland and woodland towards uplands, featuring several wind farms at

varying distances. The aviation lights of Corrimony Wind Farm would be visible against the hillside to the east in the midground, but this is otherwise a generally dark landscape, considered to be of Medium sensitivity.

4.5.30 The wireline (see **Figure V3a-9.3a: VP12 Creag Dhubh - Proposed Varied Development Wireline**) indicates that 3 of the aviation lights would be visible on the skyline to the east from this viewpoint. They would be seen in a similar part of the view but slightly to the south of the Corrimony aviation lights. While they would increase the presence of artificial lighting in this part of the view, they would be seen in a context where lighting of a similar type would already be present, resulting in a Low-Medium magnitude of change, leading to a **Minor-Moderate** (not significant) effect.

VP14 – Meall Dubh

4.5.31 This viewpoint is illustrative of elevated views from a Corbett path, near Millennium Wind Farm. It features expansive elevated views to the north-east extending across moorland and woodland during the day and the Operational Development is visible on the hillside to the north-east. The main sources of baseline artificial lighting include scattered properties at lower elevations within Glen Moriston and passing cars along the A887. Some distant lights would potentially also be visible to the east within the Great Glen. This viewpoint is considered to have a Low-Medium sensitivity.

4.5.32 The wireline (see **Figure V3a-10.3a: VP14 Meall Dubh - Proposed Varied Development Wireline**) indicates that all 5 aviation lights would be visible from this viewpoint to the north-east. The turbine lighting would be seen on the skyline in a context where some artificial light would be visible in the valley below, although it would introduce lights to a part of the view where no lights are currently present. Due to the distance at which the lighting would be experienced and the baseline artificial lighting, it is anticipated that this would result in a Low magnitude of change, and a **Minor** (not significant) effect.

VP15 – Poll-gormack Hill

4.5.33 This viewpoint is illustrative of elevated mid-range views from a summit within the Braeroy-Glenshirra-Creag Meagadh WLA. It has elevated panoramic views across upland moorland to the east, north-east and across the forested slopes of the Great Glen to the west. A number of wind farms feature in daytime views, including Millennium and Beinneun and Extension Wind Farms which are prominent to the north-west, and the Operational Development and Corrimony Wind Farm which form a grouping to the north. This is a relatively dark landscape with little baseline artificial lighting. This viewpoint is considered to have a Medium sensitivity.

4.5.34 The ZTV indicates that 5 lit hubs will be visible from this viewpoint on the skyline to the north. While they would introduce artificial lighting into this part of the view, they would be seen at a distance. It is considered that this would result in a Low-Medium magnitude of change to a viewpoint which is considered to be of Low sensitivity, resulting in a Minor-Moderate (not significant) effect.

VP17 - B862 south of Dores

4.5.35 This VP is illustrative of elevated views across Loch Ness from a B-road and nearby properties, situated within Loch Ness and Duntelchaig SLA. It has open, elevated views of Loch Ness during the day, with tips of the Operational Development turbines visible in a dip on the skyline. Intermittent lights from passing cars along the B862 as well as nearby properties are the main sources of artificial light. Lights from settlements and from

passing cars along the A82 can be seen across Loch Ness, situated mainly at lower level. This viewpoint is considered to have a Medium sensitivity.

4.5.36 The wireline (see **Figure V3a-12.3a: VP17 B862 south of Dores - Proposed Varied Development Wireline**) shows that 3 aviation lights would be visible from this viewpoint. Although would be seen in a context where some artificial light is already present at lower levels, they would be seen above the skyline in a part of the landscape where no other lights are currently visible. The lights may be obscured or filtered by vegetation from some properties in the vicinity. Given, to the distance at which they would be experienced, it is anticipated that this would result in a Low magnitude of change leading to a **Minor** (not significant) effect for this VP.

VP20 - Path north of Affric Lodge

4.5.37 This VP is illustrative of an elevated point on a path north of Affric Lodge, on the slopes of Am Meallan, within the Central Highlands WLA and Glen Affric NSA. It offers elevated views down towards Loch Affric and Loch Beinn a' Mheadhoin and across moorland and forested slopes, while views north are contained by landform. Wind turbines, including the Operational Development and Corrimony, are visible in views to the east during the day. At night this is a relatively dark landscape, but the aviation lights of Corrimony Wind Farm are visible against the hillside in views to the east.

4.5.38 The wireline (see Figure **V3a-13.3a: VP20 Path north of Affric Lodge - Proposed Varied Development Wireline**) shows that 3 of the aviation lights would be visible from this viewpoint. However, they would be seen at over 20km away from this Medium sensitivity viewpoint. While they may be perceptible, at this distance they would represent a Low magnitude of change. The introduction of the aviation lights would represent a small, distant and not detracting change to only one part of the much larger dark landscape within which the aviation lights of Corrimony Wind Farm would be seen in a similar part of the view. Therefore, it was assessed that they would have a **Minor** (not significant) effect.

VP21 – Toll Creagach

4.5.39 This VP is illustrative of elevated views from a Munro on the edge of the Glen Affric NSA and Strathconon, Monar and Mullardoch SLA, within the Central Highlands WLA. During the day if offers panoramic views across mountain tops to the north and along valleys to the River Cannich to the north-east, and towards Loch Mullardoch. Views south-east extend across large areas of forestry and towards uplands, featuring several wind farms at varying distances. However, as the sun sets the main view is likely to be focused to the west as other features fade. This is a relatively dark landscape, although the aviation lights of Corrimony Wind Farm can be seen in the midground to the east/south-east, and the distant lights of Inverness can be seen to the north-east, while views west are more characterised by a lack of baseline artificial lighting (see **Figure V3a-14.5: VP21 Toll Creagach - Visible Aviation Lighting Photomontage**).

4.5.40 All 5 of the aviation lights would be visible from this VP in the midground to the south-east, in a similar part of the view to the aviation lights of Corrimony. While they would increase the presence of artificial lighting in this part of the view, they would be seen at a distance, in a context where lighting of a similar type would already be experienced. It is considered that this would result in a Low-Medium magnitude of change to a viewpoint

which is considered to be of Low-Medium sensitivity, resulting in a **Minor-Moderate** (not significant) effect.

VP26 - A87 Bun Loyne

4.5.41 This VP is illustrative of elevated views from a layby and short section of the A87 road. During the day. it has elevated main views to the north-east over a wooded glen with an overhead line on the distant skyline and local overhead line in the foreground, with some tips of the Operational Development perceptible on skyline. Beinneun and Beinneun Extension Wind Farm are prominent in the foreground in views to south, although they are partly screened by roadside vegetation. Passing vehicles provide some intermittent baseline artificial light. Aviation lighting on 3 of the lit turbines would be visible on the skyline in main views, introducing artificial light into an otherwise relatively dark landscape. However, it would represent a relatively small, distant and not detracting change to only one part of the much larger dark surroundings seen in the context of passing vehicle headlights. This would result in a Low-Medium magnitude of change to this viewpoint which is considered to be of Low sensitivity, leading to a **Minor** (not significant) effect.

Settlements and Residential Receptors

R7 - Properties south of Dores

4.5.42 This grouping is representative of views obtained from properties in an elevated location on/near the B862 south of Dores, on the eastern slopes of Loch Ness, including Balnafoich, Kindrummond and Drummond. These properties have open, elevated views of Loch Ness during the day, with tips of the Operational Development turbines visible in a dip on the skyline. Passing cars along the B862 as well as other properties are the main sources of artificial light at night. Lights from settlements and from passing cars along the A82 can be seen across Loch Ness, situated mainly at lower levels. This residential grouping is considered to have a Medium sensitivity.

4.5.43 The ZTV shows that aviation lights on 2-3 of the lit turbines would be visible from these properties. Although they would be seen in a context where some artificial light is already present at lower levels, they would be seen above the skyline in a part of the landscape where other lights are not currently visible. The lights may be obscured or filtered by vegetation from some properties within this grouping. Given the distance at which they would be experienced, it is anticipated that the introduction of the aviation lights would result in a Low magnitude of change. It was judged that this would lead to a **Minor** (not significant) effect.

R9 - Easter and Wester Aberchalder and Migovie

4.5.44 This grouping is representative of views obtained from properties to the south-east of Loch Mhor, at base of Carn Liath. During the daytime there are open main views north-west across the loch over moorland and farmland, with the turbines of Millennium Wind Farm visible on skyline to the south-west, and the tips of the Operational Development just perceptible on the skyline to the north-west. Baseline artificial lighting is largely limited to the properties themselves and vehicles accessing these properties. The details of the view would fade during the hours of darkness leaving a generally dark landscape apart from baseline artificial lighting around properties. It was therefore considered that this grouping would have a Medium-High sensitivity.

4.5.45 The ZTV shows that 1-3 lit turbines would be visible from this receptor grouping, seen on the skyline in main, side or oblique views. They would introduce lights to an otherwise dark part of the view, resulting in a Low-Medium magnitude of change. It was judged that this would lead to a **Minor-Moderate** (not significant) effect.

R14 - Knockie Estate Cottages, and properties in the vicinity including Knockie Lodge Hotel

4.5.46 This grouping is representative of views obtained from properties situated within a wooded area near Loch Knockie and properties situated by the B862 junction with Knockie Estate. Daytime views from these properties are largely enclosed by woodland, although some properties have views of Loch Knockie, whilst others near the B862 road have views east across the road. From one property which is located in a more open context, there are some potentially open elevated views north-west towards Loch Ness, although nearby trees may partially screen views. Existing artificial lights are limited to the properties, and passing vehicles on the B862. The wooded context reduces the visibility of lights from surrounding properties, resulting in a landscape largely characterised by darkness. Sensitivity is considered to range from Medium for these properties.

4.5.47 The ZTV shows that the aviation lights on all 5 of the lit turbines would be theoretically visible from this receptor grouping. Where visible from properties with open, elevated views towards Loch Ness they would be seen above the skyline introducing artificial light into a part of the view were artificial lights are currently not present. However, visibility would generally be limited by woodland, and night-time views would be largely inward looking from the majority of these properties. It is considered that this would result in a localised Low-Medium magnitude of change for properties with potential for open views across Loch Ness, and Negligible for other properties within this grouping. This would lead to a locally **Minor-Moderate** (not significant) effect for properties with open views towards Loch Ness, and a **Negligible** (not significant) effect for other properties within this grouping.

Routes

B862

4.5.48 This route is a B-road to the east of Loch Ness that is partially single carriageway / single track road from Fort Augustus to Inverness via Stratherrick and Dores. Daytime views feature a mix of open and enclosed views, with extensive views from some elevated points over glens and lochs, particularly north-east of Fort Augustus. More enclosed, framed scenic views are obtained near Loch Duntelchaig, with views near Dores extending across Loch Ness. Wind farms (including the Operational Development) can be seen from parts of the route. These views would be more limited during the hours of darkness. This road is generally dark with no street lighting and limited artificial light from sources other than vehicle headlights. The sensitivity of the route is considered to be Medium. Driving this road during the hours of darkness or even low light, requires the full attention of the driver on the road ahead. Passengers' views would occasionally open up over the dark landscape.

4.5.49 The ZTV indicates some theoretical visibility of the aviation lights from the route to the south of Dores near VP17, to the south of Loch Mhor near VP7, and near Suidhe viewpoint (VP5). Fewer aviation lights (2-3) would be visible to the south of Dores, while the aviation

lights of all 5 lit turbines would be visible on the skyline to the north-west from Suidhe viewpoint. They would introduce light into a part of the view where no artificial light is currently visible. They would usually be seen in side-on views to the direction of travel from relatively short sections of this route. Near VP17, they could be seen in oblique views for a short section when travelling south. Whilst the aviation lighting would be theoretically visible from sections of this road, drivers' attention would generally be focused on the immediate area in front of the car illuminated by the headlights. As a result, the aviation lighting would be somewhat more likely to be perceptible by passengers in side or oblique views as part of the wider background sometimes filtered by vegetation. It is considered that this would result in a Low magnitude of change, predicted to result in a **Minor** (not significant) effect for this route.

Core Path IN12.04 - Kindrummond to Dirr Wood

4.5.50 This is an elevated route to the east of VP 17, from B862 to Dirr Woods, on the eastern slopes of the Great Glen, which also forms part of the Trail of the Seven Lochs. During the daytime it has elevated views to the west and north-west over Loch Ness towards Urquhart Bay and Drumnadrochit, with the Operational Development turbines visible on skyline. Further east on this route, when passing through Dirr Woods, trees enclose views. As for VP17, nearby properties and farms as well as intermittent lights from passing cars along the B862 are the main sources of artificial light. Lights from settlements and from passing cars along the A82 can be seen across Loch Ness from the southern section of this route, located mainly at lower level. However the route itself is generally dark. Anyone walking this route during hours of darkness would be likely to carry their own light source. Sensitivity is considered to be Medium as a result of valued views over Loch Ness.

4.5.51 3 of the lit hubs would be visible from open sections of the route, seen above the skyline to the south-west. While artificial lights may be visible in this direction at lower level, the aviation lights would introduce light into a part of the view where they are currently not visible. Although they would be seen against the darkening sky above the ridgeline, they would be over 20km away. This is considered to result in a Low-Medium magnitude of change. It was judged that this would result in a **Minor-Moderate** (not significant) effect.

Core Path IN25.02 - Garthbeg to Errogie, south side of Loch Mhor

4.5.52 This is a marked route running on the eastern side of Loch Mhor, which also forms part of the Trail of the Seven Lochs. Daytime views are over fields and moorland with main views focussed along the route and across Loch Mhor towards forested hills in the midground and distant uplands. The Operational Development turbines are visible from a large section of this route, and Millennium Wind Farm can also be seen on the skyline to the south-west. Corriegarth Wind Farm turbine blades are occasionally visible to the south-east behind nearby hills. Views would become more limited during the hours of darkness. Baseline lighting consists mainly of lights from nearby properties and farms situated along/close to this route. Intermittent lights from passing vehicles along the B862 may also be visible across Loch Mhor from sections of this route. Anyone walking along this route during hours of darkness would be likely to carry their own light source.

4.5.53 The ZTV shows that 1-3 lit turbines would generally be visible from sections of this route, with all 5 lit turbines visible from a short section to the south near Garthbeg. Visibility would generally reduce when traveling north along this route. As the aviation lights would be noticeable on the skyline to the west in a part of the view where currently no other

artificial light is visible, it is considered that this would lead to a Medium magnitude of change for the southern section of this route, ranging to a Low magnitude of change further north where only 1 lit turbine would be occasionally visible. It was judged that this would result in a **Minor-Moderate** (not significant) effect.

Table 6: Visible Aviation Lighting Effects on Landscape Receptors Summary

	Not Significant				**Significant**		
	Negligible	**Negligible - Minor**	**Minor**	**Minor - Moderate**	**Moderate**	**Moderate - Major**	**Major**
Viewpoints							
VP1 - Track to Loch Liath			x				
VP2 - Old Bridge, Invermoriston			x				
VP3 - Meall Fuar-mhonaidh					x		
VP5 – Suidhe Viewpoint, B862					x		
VP6 - Summit by Suidhe Viewpoint, B862				x			
VP7 – B862 south of Foyers					x		
VP8 – Lochside picnic layby on B852			**x**				
VP10 - Great Glen Way near Carn a' Bhodaich			**x**				
VP12 – Creag Dhubh				**x**			
VP14 – Meall Dubh			**x**				
VP15 – Poll-gormack Hill				**x**			
VP17 - B862 south of Dores			**x**				
VP20 - Path north of Affric Lodge			**x**				
VP21 – Toll Creagach				**x**			
VP26 - A87 Bun Loyne			**x**				
Residential Receptors							
R7 - Properties south of Dores			**x**				
R9 - Easter and Wester Aberchalder and Migovie				x			
R12 - Garthbeg, Corriegarth Lodge and nearby properties					x		
R13 - A range of properties on or in the vicinity of the B862 minor public road in the area near Whitebridge	L		L	L	L		

	Not Significant				Significant		
	Negligible	Negligible - Minor	Minor	Minor - Moderate	Moderate	Moderate - Major	Major
R14 - Knockie Estate Cottages, and properties in the vicinity including Knockie Lodge Hotel	x			L			
Routes							
B862			x				
Core Path IN12.04 - Kindrummond to Dirr Wood				x			
Core Path IN25.02 - Garthbeg to Errogie, south side of Loch Mhor				x			
Great Glen Way	x		L		L		

L – denotes that the effect would be localised to only part of the landscape resource.

5. Conclusion

5.1.1 While the aviation lights would be theoretically visible from large parts of the Study Area, the majority of landscape and visual receptors are located over 5 km away, meaning that they would only ever perceive the aviation lighting at lower levels of intensity. The aviation lights would generally represent a small but perceptible change within the wider landscape and views. Given the rural nature of the Study Area, there are relatively few places outside of the settlements and routes, where receptors would regularly be present to experience the effects of the aviation lights.

5.1.2 However, as summarised in **Tables 5 and 6** above, significant effects (i.e. Moderate or above) were identified for localised parts of 1 LCT and 1 Designated Area. Significant effects were also identified for 3 viewpoints, 2 residential groups and 1 route included in the assessment of visible aviation lighting. These effects would largely be due to the proximity of these receptors to the Proposed Varied Development, open views towards the Site and the absence of other artificial light within the surrounding area.