

CHAPTER A15: COMPARATIVE ENVIRONMENTAL ASSESSMENT

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A.15. COMPARATIVE ENVIRONMENTAL ASSESSMENT

A.15.1 Introduction

- A.15.1.1 Chapter 15 of the EIA Report (January 2019) provides a summary comparative environmental assessment between the proposed varied development and the Consented Development.
- A.15.1.2 Chapter 15 of the EIA Report (January 2019) remains relevant and should be referred to.
- A.15.1.3 The focus of this Chapter is to demonstrate any change in the environmental impacts that would result from the changes introduced by the Proposed Varied Development (Addendum) since submission of the EIA Report (January 2019).

A.15.2 Summary of Potential for Significant Effects as a Result of Proposed Variation

- A.15.2.1 Table 15.1 and Table 15.2 of the EIA Report (January 2019) provides a summary of the likely significant environmental effects identified for the Consented Development, any likely significant effects from the Proposed Varied Development and any associated differences. Table 15.1 and Table 15.2 are repeated as Table A15.1 and Table A15.2, which comprises an additional column to summarise any further changes from the Proposed Varied Development (Addendum).

Table A15.1: Summary Comparison of Effects of the Consented Development Compared to the Proposed Varied Development

Technical Chapter	Consented Development Likely Significant Effects	Proposed Varied Development Likely Significant Effects	Conclusion	Changes as a result of the Proposed Varied Development (Addendum)
Chapter 7: Landscape and Visual	<p>The assessment of effects on landscape character types concluded that there would be some significant direct and indirect effects up to a maximum distance of approximately 6.5km, and considerably less in some directions. Beyond this distance, it was concluded that the Consented Development would be a relatively minor influence in the setting of landscape character types. Some limited parts of the Loch Fleet, Loch Brora and Glen Loth SLA were assessed to receive potentially significant effects, but there were no significant effects predicted on wild land areas (WLA), Gardens and Designed Landscapes (GDL) or National Scenic Areas (NSA).</p> <p>The visual assessment found significant effects on two hilltop viewpoints (Beinn Smeorail and Ben Horn); intermittent significant effects on up to 3km of the minor road from Brora to Rogart travelling eastwards only; intermittent significant effects on approximately 5.6km of core path SU06.02 on the west side of Loch Brora; intermittent significant effects on approximately 100-150m of core path SU06.14 on the east side of Loch Brora; and a significant effect on a part of the access track to Ben Armine Lodge. There were no significant effects predicted on other routes, including the A9, A836, A839, A897, A949, national cycle routes, long distance walking routes and railway lines.</p> <p>The assessment further concluded that the addition of the Consented Development to operational and consented wind farms would result in potentially significant cumulative effects on the landscape character of small parts of Strath Brora, including one very small part of the Loch Fleet, Loch Brora and Glen Loth SLA; the minor road from Brora to Rogart, travelling eastwards only; and on the view from Creag nam Fiadh. The consideration of application stage wind farms did not lead to</p>	<p>The changes proposed would result in a minor decrease in the occurrence of significant effects, including cumulative effects. This is due to the removal of the four southernmost turbines from the Consented Development, which has reduced visibility, particularly from Strath Brora, and reduces the extent of the Proposed Varied Development across views.</p> <p>The following effects which were assessed to be significant for the Consented Development, are now assessed to be not significant:</p> <ul style="list-style-type: none"> • The area of <i>Strath (Strath Brora)</i>: eastern section Landscape Character Type (LCT) around Killin Rock; • The area of the Loch Fleet, Loch Brora and Glen Loth Special Landscape Area (SLA) around Killin Rock; • Approximately 1km of the eastbound Brora - Rogart minor road, between Balnacoil and graveyard; • Approximately 1km of Core Path SU06.02 ('Loch Brora - West Track') as it passes the property at Kilbraur; and • Approximately 100-150m of Core Path SU06.14 ('Doll Bridge – Loch Brora'). <p>The assessment also concluded that the following cumulative effects would become not significant:</p> <ul style="list-style-type: none"> • The cumulative effect at Viewpoint 13. Creag nam Fiadh; and • The cumulative effect on the eastbound Brora - Rogart minor road, other than a stretch of 	<p>Some significant effects were predicted to arise as a result of the Consented Development, but there are no instances of additional significant effects, or an increase in the extent of significant effects arising as a result of the Proposed Varied Development.</p>	<p>The proposed relocation of Turbine 4 and minor revisions to infrastructure will not result in any changes to the findings of the assessment that was carried out for the Proposed Varied Development. Overall, effects would therefore remain the same.</p>

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	any additional significant cumulative effects.	approximately 2km between Sciberscross and Point.		
Chapter 8: Ecology	Assessment of effects in the 2015 ES and 2016 FEI Report showed that, after mitigation is taken into account, residual effects of the Consented Development on habitats, protected species and salmonids were not significant. Cumulative effects of the Consented Development were also not considered to be significant, with total combined loss / damage of bog and heath habitat for the Consented Development and Gordonbush Wind Farm amounting to 0.003% and 0.0008% of the national peatland and heath resource respectively. Effects on the Gordonbush Estate HMP management objectives were also assessed as not significant.	The effects on ecological features from the Proposed Varied Development have been assessed, taking into account consultation feedback from SNH. At its request, an up-dated otter survey was carried out to inform the assessment. The results confirm that there would be no likely significant effect on this species, allowing the conclusion to be reached that it would have no adverse impact on the integrity of the Caithness and Sutherland Peatlands SAC. There would be no negative effect on implementation of the Gordonbush Habitat Management Plan.	Overall, the effects of the Proposed Varied Development would remain similar to those of the Consented Development.	The effects of the Proposed Varied Development (Addendum) would remain as predicted for the Proposed Varied Development and Consented Development, with no significant impacts on designated sites, species or habitats.
Chapter 9: Hydrology, Hydrogeology and Geology	<p>One licensed surface water abstraction and six private water supplies were identified within 5km of the site boundary. None of these water supplies were identified as at risk from the Consented Development.</p> <p>A number of potential groundwater dependent terrestrial ecosystems (GWDTE) were identified within the site boundary. The Consented Development was designed to avoid any direct impacts on potential highly dependent GWDTE habitats. Further detailed assessment was undertaken and mitigation measures proposed where appropriate to avoid potential effects on areas of possible GWDTE.</p> <p>With the adoption of the proposed mitigation measures, such as the implementation of a site specific CEMP (see Condition 23), no significant effects to hydrological, hydrogeological or geological receptors as a result of the Consented Development were identified.</p>	The assessment has confirmed, subject to best practice mitigation measures, that the Proposed Varied Development will not have any significant effects on hydrology, hydrogeology and geology. All mitigation measures previously identified within the 2015 ES and 2016 FEI Report are recorded within a Schedule of Mitigation (see Appendix 4.2) and are secured through appropriate Conditions of Consent.	Overall, the effects of the Proposed Varied Development would remain similar to those of the Consented Development.	The effects of the Proposed Varied Development (Addendum) would remain as predicted for the Proposed Varied Development and Consented Development.

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Chapter 10: Ornithology	<p>Surveys to inform the 2015 ES confirmed that the bird species found breeding in the survey area were of Local or Low conservation value, with the exception of skylark, which was considered to have a site population of Regional conservation value. Potential effects of the Consented Development on breeding birds within 500m of the proposed turbine positions were assessed.</p> <p>It was considered that there would be no significant negative effect of the Consented Development on birds through habitat loss or disturbance outside the bird breeding season or collision risk. With the implementation of mitigation measures required through the conditions of consent (see Condition 25), any residual effects from disturbance would be of low magnitude and not significant. Consequently, there would be no adverse effect on the integrity or bird populations of the Caithness and Sutherland Peatlands SPA. There would also be no negative effect on the bird populations of the Gordonbush Habitat Management Plan area.</p>	<p>It is considered that there would be no likely significant effect of the Proposed Varied Development on birds through habitat loss, disturbance outside the bird breeding season or collision risk. Potential disturbance of nesting birds, if construction is carried out during the bird breeding season, would be mitigated by appropriate deterrence and nest protection measures as outlined in the HMP as required by Condition 25.</p> <p>Consequently, it is considered that there would be no likely significant residual effects on birds through habitat loss, disturbance or collision risk.</p> <p>Furthermore, there would be no adverse effect on the integrity or bird populations of the Caithness and Sutherland Peatlands SPA or on the bird populations of the Gordonbush Habitat Management Plan area.</p>	Overall, the effects of the Proposed Varied Development would remain similar to those of the Consented Development.	The effects of the Proposed Varied Development (Addendum) would remain as predicted for the Proposed Varied Development and Consented Development
Chapter 11: Cultural Heritage	<p>In terms of direct effects, the Consented Development was designed to minimise effects as far as practicable. As a result, only a few minor features of low sensitivity/importance would be directly impacted by the Consented Development. With the mitigation set out in Condition 22 these effects were deemed to be not significant.</p> <p>Significant indirect effects were however predicted at two Scheduled Monuments (Balnacoil Cairn and Duchary Rock Fort). Whilst considered significant, effects were considered to be within an acceptable level given that views from these Scheduled Monuments were seen in the context of the existing Gordonbush Wind Farm.</p> <p>In addition, Duchary Rock Fort and Kilbraur Hut Circle were predicted to receive significant cumulative effects as a result of the Consented Development in combination with other wind</p>	<p>Chapter 11 assessed the likely significance of visual effects on cultural heritage sites within 15km of the Proposed Varied Development.</p> <p>The assessment concludes that there would be a significant visual impact at two SMs (Balnacoil Cairn and Duchary Rock Fort), although the impact is considered to be acceptable in both cases. The visual impact on all other Sites would be Minor or Negligible, and not significant, due principally to screening effects from topography. On potential cumulative effects, the assessment concluded that the Proposed Varied Development would result in significant cumulative effects at two SMs (Kilbraur Hut Circle and Duchary Rock Fort).</p>	No new significant effects have been identified for the Proposed Varied Development that were not already assessed for the Consented Development. Those significant effects that have been identified are therefore considered to be acceptable.	The effects of the Proposed Varied Development (Addendum) would remain as predicted for the Proposed Varied Development and Consented Development

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	farm developments. These were again deemed to be within an acceptable level.			
Chapter 12: Traffic and Transport	Based on existing traffic data and the estimated construction vehicle movements, the 2015 ES concluded that no significant detrimental effects were predicted as a result of construction traffic associated with the Consented Development. A cumulative assessment was also undertaken which concluded that no significant cumulative effects were predicted on the local roads network.	The assessment of residual effects has been based on: existing traffic data; the estimated volume of construction traffic; and the implementation of mitigation measures, such as an appropriate traffic management plan and suitable liaison with the relevant authorities. The residual traffic and transport effects are temporary and have been assessed as having no significant effect.	Overall, the effects of the Proposed Varied Development would remain similar to those of the Consented Development.	The effects of the Proposed Varied Development (Addendum) would remain as predicted for the Proposed Varied Development and Consented Development.
Chapter 13: Noise	<p>Construction noise, by its very nature, tends to be temporary and highly variable and therefore much less likely to cause adverse effects. Various mitigation methods were suggested to reduce the effects of construction noise, the most important of these being suggested restrictions of hours of working. These were confirmed through Condition 25 of the Conditions of Consent. It was concluded that noise generated through construction activities would have a slight effect and therefore not significant.</p> <p>Noise levels from the operation of the wind turbines were assessed for noise sensitive receptors within the vicinity of the Consented Development. Noise limits were derived from data about the existing noise environment following the method stipulated in national planning guidance. Predicted noise levels took full account of the potential combined effect of the noise from the Consented Development along with the existing Gordonbush Wind Farm, the Kilbraur Wind Farm and its extension. Other, more distant wind farms were not considered in this assessment as they would not make an acoustically relevant contribution to cumulative noise levels. Predicted operational noise levels were compared to the limit</p>	<p>The construction noise assessment has determined that associated levels would be lower than for the Consented Development due to the reduced amount of activities and increased separation distances between construction works and noise sensitive properties. Although construction noise could be audible at various times throughout the construction programme, noise levels would remain within acceptable limits such that their temporary effects are considered slight at most and therefore not significant. Various mitigation methods were previously suggested to reduce the effects of construction noise and these remain applicable. The most important of these being restrictions of hours of working which is covered by Condition 25.</p> <p>The predicted wind turbine operational noise levels are within the ETSU-R-97 criteria at all receptors and for all wind conditions, as such, residual operational noise impacts are acceptable according to current guidance and are therefore not significant.</p>	Noise levels would be lower for the Proposed Varied Development than for the Consented Development due to the reduced amount of activities and increased separation distances between construction works, operational turbines and noise sensitive properties. Overall, the effects of the Proposed Varied Development will remain similar to	The effects of the Proposed Varied Development (Addendum) would remain as predicted for the Proposed Varied Development and Consented Development.

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	values to demonstrate that turbines of the type and size proposed for the Consented Development could operate within the limits so derived as outlined in Condition 25.		those of the Consented Development.	
Chapter 14: Other Issues	<p>Telecommunications, Television / Radio</p> <p>No disruptions to telecommunications, such as television and radio reception were anticipated as a result of the Consented Development.</p> <p>Aviation (Civil and Military)</p> <p>The Consented Development was not within line of sight to the HIAL Inverness Airport or the RAF Lossiemouth Primary Surveillance Radars (PSRs) and no effects were anticipated. Assessment showed that no radar line of sight exists between the Consented Development and the Perwinnes and Allanshill PSRs or NATS air to ground communications facilities. This indicated that there would be no technical impact on NATS operated aviation navigational facilities. As such, there were no anticipated effects predicted on aviation navigational equipment.</p> <p>The Consented Development lies within an area which is deemed a low flying area by the MOD and by aircraft transiting to and from the Tain Air Weapons Range. The Applicant agreed to review requirements for a suitable aviation lighting scheme with the Ministry of Defence (MOD).</p> <p>Shadow Flicker</p> <p>There were no potential impacts of shadow flicker predicted as a result of the Consented Development.</p> <p>Ice Throw</p> <p>Following the implementation of proposed mitigation measures, such as making operation crews and members of the public aware of the risks of ice throw, it was considered that the risk of ice throw would be very low.</p>	<p>The Proposed Varied Development is not anticipated to result in any change to the potential effects noted in the respect of:</p> <ul style="list-style-type: none"> • Telecommunications, Television / Radio • Aviation (Civil and Military) • Shadow Flicker • Ice Throw • Air Quality • Carbon Assessment <p>The potential savings in CO₂ emissions due to the Proposed Varied Development replacing other electricity sources over the 25 year lifetime of the wind farm are approximately:</p> <ul style="list-style-type: none"> • 74,305 tonnes of CO₂ per year over coal-fired electricity; • 22,735 tonnes of CO₂ per year over grid-mix of electricity; or • 37,234 tonnes of CO₂ per year over a fossil fuel mix of electricity. <p>The Proposed Varied Development has an expected payback time of between 0.9 to 2.9 years (using coal and UK grid supply mix CO₂ emission factors, respectively). This is a substantially shorter time period than the 25 year operational period applied for.</p> <p>Other factors introduced under the 2017 EIA</p>	<p>Overall, the effects of the Proposed Varied Development will remain similar to those of the Consented Development. Factors considered as new under the 2017 Regulations did not result in any likely significant effects.</p>	<p>The effects of the Proposed Varied Development (Addendum) would remain as predicted for the Proposed Varied Development and Consented Development</p>

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	<p>Air Quality With the implementation of mitigation measures to control dust, no significant effects on air quality were predicted.</p> <p>Carbon Assessment A carbon assessment was undertaken to estimate the potential savings in carbon dioxide (CO₂) emissions by the Consented Development replacing other electricity sources. This was calculated as approximately 126,564 tonnes of CO₂ saved per year (tCO₂yr⁻¹) through displacement of coal-fired electricity or 63,282 tonnes CO₂yr⁻¹ over grid-mix supply.</p> <p>The CO₂ payback time, which is the period of operation of the wind farm required before there is a net saving of CO₂ was also been calculated as between 1.3 to 2.6 years (using coal and UK grid supply mix CO₂ emission factors, respectively). This is a substantially shorter time period than the 25 year operational period consented.</p>	<p>Regulations, which were not required in the 2015 ES and 2016 FEI Report are also covered in this report in Chapter 14: Other Issues, and are described further in Table 15.2.</p>		
Socio Economic and Tourism	<p>Although none of the effects identified were assessed as significant, they would nevertheless likely have a notable positive effect on the local economy and the communities in the immediate vicinity of the site, principally during the construction phase of the project, but also over the longer term during operation.</p> <p>The conclusion of the assessment was that the Consented Development was not expected to have any significant tourism or socio-economic effects. As such it was unnecessary to consider mitigation and no residual effects were identified. The assessment did however conclude that the Consented Development could help to generate a moderate, positive, long-term, cumulative economic effect as a result of its contribution to the wind farm supply chain in the local area.</p>	<p>It is not anticipated that the Proposed Varied Development would result in any notable change to the assessment findings of the Consented Development. Therefore, a detailed assessment of socio-economics and tourism was scoped out from the EIA Report.</p>	<p>Overall, the effects of the Proposed Varied Development will remain similar to those of the Consented Development.</p>	<p>The effects of the Proposed Varied Development (Addendum) would remain as predicted for the Proposed Varied Development and Consented Development</p>

Table A15.2 Assessment of Factors Identified in Regulations 4(3), 4(4) and Schedule 4

Topic	Potential for Significant Effects	Changes as a result of the Proposed Varied Development (Addendum)
Population and Human Health	<p>Potential impacts on population and human health of relevance to the Proposed Varied Development include:</p> <ul style="list-style-type: none"> • Health and amenity impact associated with construction and operational noise, traffic and transport related effects, shadow flicker and visual amenity; and • Potential for impacts on recreational amenity and/or socioeconomic activity. <p>Noise, shadow flicker, visual amenity and socioeconomic effects are addressed in Table 15.1, with additional detailed assessment provided for visual effects (Chapter 7), traffic and transport (Chapter 12), noise (Chapter 13) and other issues (Chapter 14).</p> <p>On this basis, no additional environmental information is required to address the requirements of the 2017 EIA Regulations.</p>	No change.
Biodiversity (in Particular Species and Habitats Protected under Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora)	The requirement to consider impacts on biodiversity is addressed in this EIA Report in Chapter 8: Ecology and Chapter 10: Ornithology.	No change.
Land and Soil (and Natural Resources Availability)	The potential impacts on geological receptors, peat and groundwater resources are considered in Chapter 9: Hydrology, Hydrogeology, and Geology.	No change.
Water (and Natural Resource Availability)	The potential impacts on the water environment are considered in Chapter 9: Hydrology, Hydrogeology, and Geology.	No change.
Air and Climate	<p>The 2017 EIA Regulations require a consideration of climate change effects, both considering the greenhouse gas emissions, and the climate change vulnerability.</p> <p>The benefits for reducing greenhouse gas emissions associated with the proposed variations are considered in Chapter 14: Other Issues. On this basis, no additional environmental information is required to address the requirement of the 2017 EIA Regulations.</p> <p>The Proposed Varied Development is not considered vulnerable to climate change induced changes to the future baseline because, for example, the wind farm lies outwith the 1 in 200 year flood area boundary (see Chapter 9: Hydrology, Hydrogeology, and Geology), and in any event will be designed to be resilient to extreme weather. No changes are proposed to the locations of the 11 retained turbines. On this basis, no additional environmental information is required to address the requirements of the 2017 EIA Regulations.</p>	No change.
Material Assets, Cultural Heritage	Chapter 11: Cultural Heritage, includes an assessment of the potential for significant effects on material assets and cultural heritage including architectural and archaeological assets and historic landscape.	No change.
Landscape	Chapter 7: Landscape and Visual considers the potential impacts and potential cumulative impacts on landscape and	No change.

Topic	Potential for Significant Effects	Changes as a result of the Proposed Varied Development (Addendum)
	visual receptors. On this basis, no additional environmental information is required to address the requirements of the 2017 EIA Regulations.	
Major Accidents and Disasters	Chapter 14: Other Issues, includes an assessment of the potential for major accidents and disasters.	No change.
Interaction Between Factors (Cumulative Effects)	The potential for cumulative effects and the potential for interaction between factors is addressed in each of the chapters (Chapter 7 – 14) of this EIA Report. Based on the information provided, no additional environmental information is required to address the requirement of the 2017 EIA Regulations.	No change.