Gordonbush Extension Wind Farm

Further Environmental Information

October 2016

Volume 1: Further Environmental Information Report

Further Environmental Information Report (Volume 1)

Appendices

Figures

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Preface

SSE Generation Limited ("the Applicant") is proposing to construct an extension to the operational Gordonbush Wind Farm that is located near Brora, Sutherland.

In June 2015, SSE Renewables Developments (UK) Ltd, submitted an Environmental Statement ("ES") on behalf of the Applicant in support of an application made under section 36 of the Electricity Act 1989 to construct and operate an extension to Gordonbush Wind Farm (hereinafter referred to as "the proposed Development").

Since submission of the application, changes have been made to the layout of the proposed Development, which include removing Turbine 15, and reducing the height of Turbine 11 from 130m to 115m maximum blade tip height. An amendment to the track layout has been made as a result of the removal of Turbine 15, and all turbines are to comprise internal transformers, instead of external transformers as originally proposed.

This report has been prepared in response to a request by the Energy Consents Unit of the Scottish Government's Energy and Climate Change Directorate, under Regulation 13 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000. The purpose of the request for further information is to demonstrate the nature and extent of any change in the assessment of environmental impacts that would result from the proposed changes, or, record where there is no change. This review of the assessment contained in the ES has been requested in respect of each of the environmental topics that were assessed in the ES (June 2015).

This report is available for viewing at the following locations, as agreed with The Highland Council:

The Highland Council
Department of Planning & Development
Glenurquhart Road
Inverness
IV3 5NX
(open during normal office hours)

The Highland Council
Area Planning Office
Drummuie
Golspie
KW10 6TA
(open during normal office hours)

The report can also be viewed at the Scottish Government Library at Victoria Quay, Edinburgh, EH6 6QQ.

An electronic version is available online at www.sse.com/gordonbushextension

The report has been advertised in the following newspapers for two successive weeks:

- Edinburgh Gazette; and
- The Northern Times.

1. Introduction

1.1 BACKGROUND

1.1.1 The Applicant, SSE Generation Limited, is proposing to construct an extension to the operational Gordonbush Wind Farm, located on Gordonbush Estate, approximately 9.5km to the north-west of Brora, Sutherland, as illustrated in Figure 1.1: Site Context.

1.1.2 In June 2015, SSE Renewables Developments (UK) Ltd, submitted the Gordonbush Extension Wind Farm Environmental Statement ("the ES (June 2015)") in support of a Section 36 application made under the Electricity Act 1989 to construct and operate an extension to Gordonbush Wind Farm (hereinafter referred to as "the proposed Development"). At the time of submission of the application, the total installed capacity of the proposed Development was estimated as increasing the installed capacity of Gordonbush Wind Farm by up to 56 megawatts (MW). The layout comprised a total of 16 turbines, 13 of which would have a maximum tip height of 130 metres (m), whilst the remaining 3 turbines would have a maximum tip height of 115m.

1.1.3 On consideration of the application the relevant planning authority, The Highland Council, raised no objection subject to:

- An amendment of the project to remove Turbine 15 from the layout;
- A reduction in the height of Turbine 11 from 130m to 115m max blade tip height; and
- All turbines to use internal transformers only.

1.1.4 These changes were accepted by the Applicant.

1.1.5 By letter dated 15th March 2016, the Energy Consents Unit of the Scottish Government's Energy and Climate Change Directorate made a formal request to the Applicant under Regulation 13 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 for further information of relevance to matters dealt with in the ES (June 2015). In terms of that request the Applicant was advised that "*in order for Ministers to make an informed decision on the application, further information will be required to demonstrate that the impacts (environmental or otherwise) of the altered development are appropriately reflected and that all of the consultees, as well as members of the public, are afforded the chance to fully consider the amended application."* The letter is reproduced in Appendix 1 of this report for reference. In particular the following was requested: *"[a report] evidencing the extent of any change (or recording where there is no change) against each of the chapters that were included in the ES. This will include an updated site layout plan, a refreshed LVIA (to demonstrate that the proposed amendments achieve the desired effect) and a refreshed carbon payback calculation and Socio Economic chapter to reflect the slightly reduced scheme."*

1.1.6 This report has been prepared to provide the further information requested to demonstrate the nature and extent of any change in the assessment of environmental impacts that would result from the changes to the layout (as detailed in Section 1.2), or, record where there is no change. This review of the assessment contained in the ES has been provided in respect of each of the environmental topics that were assessed in the ES (June 2015), and takes account of any consequential changes or additional changes to the layout and associated infrastructure. It is hereinafter referred to as "the FEI Report".

1.1.7 The FEI Report comprises three volumes, as follows:

- Volume 1: Further Environmental Information Report
- Volume 2: Landscape and Visual Wirelines and Photomontages (SNH Methodology)
- Volume 3: Landscape and Visual Wirelines and Photomontages (THC Methodology)

1.2 REVISION TO DEVELOPMENT

1.2.1 The revised layout of the proposed Development, hereinafter referred to as the FEI Layout, is shown on Figure 1.2: Site Layout. The full revisions to the proposed Development as a result of the agreed changes, as well as from review of The Highland Council's suggested Conditions of Consent and comments from other statutory consultees, include:

- Removal of Turbine 15 from the layout;
- Reduction in the height of Turbine 11 from 130m to 115m max blade tip height;
- Revision to the access track layout to minimise track length where possible in the absence of Turbine 15;
- Repositioning of the Permanent Meteorological Mast; and
- Use of internal transformers at each turbine, as opposed to the use of external transformers originally proposed.

1.2.2 The application boundary, as illustrated on Figure 1.2: Site Layout, would not change as a result of the revisions. The proposed use of borrow pits as detailed in the ES (June 2015) would remain.

1.2.3 Access to the proposed Development site would utilise the same delivery route used for Gordonbush Wind Farm, including routes taken for abnormal loads (as shown on Figure 1.1: Site Context). This is as described in the ES (June 2015) and would remain unchanged.

1.3 ENVIRONMENTAL IMPACT ASSESSMENT

1.3.1 The ES (June 2015) was prepared in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (as amended). The ES (June 2015) documented the potential impacts of the proposed Development on the various aspects of the environment potentially affected through the construction and operation of the proposed Development.

1.3.2 The review of the following topics will be reported upon in subsequent sections of the FEI report to demonstrate where, and in what respects, the revisions to the proposed Development would result in a change to the predicted effects identified in the ES (June 2015), or record where no change is predicted**:**

- Landscape and Visual;
- Ecology and Nature Conservation;
- Hydrology, Hydrogeology and Geology;
- Ornithology;

- Cultural Heritage;
- Access, Traffic and Transport;
- Noise;
- Land Use, Socio-economics and Tourism; and
- Other Issues.

2. Landscape and Visual Impact Assessment (ES Chapter 7)

2.1 INTRODUCTION

2.1.1 This section provides the Landscape and Visual Impact Assessment (LVIA) for the FEI Layout of the proposed Development. This assessment should be read in conjunction with Chapter 7 of the ES (June 2015), which provides the LVIA for the original layout of the proposed Development. Section 1 of this FEI report describes the revisions to the proposed Development, and should be referred to in relation to this section.

2.1.2 This section is accompanied by a series of figures that replace in part the LVIA figures contained within the ES (June 2015), as agreed with SNH and THC (see Appendix 1). Wirelines and photomontages are included in Volumes 2 and 3 of this FEI Report.

2.1.3 This Section is set out under the following headings:

- Methodology;
- Assessment of physical effects;
- Assessment of effects on landscape character;
- Assessment of effects on wild land;
- Assessment of effects on views; and
- Summary and conclusions.

2.2 METHODOLOGY

2.2.1 The methodology used for the assessment of the FEI Layout is consistent with that used in the ES (June 2015), as described in full in Appendix 7.1 of the ES (June 2015).

2.2.2 In accordance with the ES (June 2015), this assessment of the FEI Layout of the proposed Development is presented in four categories of effects: physical effects, effects on landscape character, effects on wild land, and effects on views.

2.2.3 The cumulative landscape and visual assessment that was carried out in the ES (June 2015) is also updated in this section, in terms of how the cumulative effects will be affected by the layout revisions. However, the baseline cumulative situation has not been updated and cumulative wirelines have not been included in this FEI Report, in accordance with the request for further information (Appendix 1). There have been no notable changes to the landscape and visual baseline conditions of the study area, and these are therefore assumed to be consistent with the descriptions provided in Chapter 7 of the ES (June 2015).

2.2.4 The revisions to the layout have resulted in an overall reduction in visibility of the proposed Development. It has therefore not been considered necessary to consider the inclusion of additional receptors or viewpoints and only those landscape and visual receptors that were included in the ES (June 2015) have been included in the updated assessments.

2.3 ASSESSMENT OF PHYSICAL EFFECTS

2.3.1 Physical effects are direct effects on the landscape elements that comprise the fabric of the site, such as changes to ground cover. Physical effects are found only on the site, where existing landscape elements may be removed or altered by the proposed Development. There is one landscape element that may be affected by the proposed Development: *rough grassland/moorland ground cover*. Table 2.1 summarises the ES (June 2015) assessment of this element and updates this assessment in relation to the FEI Layout.

Table 2.1: Updated Assessment of Physical Effects

Landscape Element	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
Rough grassland/ moorland ground cover	**Sensitivity:** medium **Magnitude of change**: medium-low **Significance**: not significant	Minor reduction in magnitude of change due to slight reduction in area affected.	No change from findings of ES (June 2015) assessment. Effect remains **not significant**.

2.4 ASSESSMENT OF EFFECTS ON LANDSCAPE CHARACTER

2.4.1 Landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and the way that this pattern is perceived. Effects on landscape character occur both on the site, where the pattern of elements that characterises the landscape will be directly altered by the addition of the proposed Development to the landscape; and off-site, around the study area, where visibility of the proposed Development may alter the way in which this pattern of elements is perceived. The assessment of effects on landscape character covers two groups of receptors; landscape character types/units (shown on Figures 2.3a and 2.3b) and landscape planning designations (shown on Figure 2.4).

2.4.2 Table 2.2 summarises the ES (June 2015) assessment of landscape character receptors and updates this assessment in relation to the FEI Layout. The landscape character receptors that are included in this table are those that were considered in the ES (June 2015) to have potential to undergo a significant effect as a result of the proposed Development. Shaded boxes indicate those receptors where an effect has changed from significant to not significant, either wholly or partially, as a result of the layout revisions.

Table 2.2: Updated Assessment of Effects on Landscape Character

Landscape Character Receptor	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
Inland loch: Loch Brora	**Sensitivity:** high **Magnitude of change**: maximum: medium/ medium-low **Significance**: significant effect on part 3 (the second to southernmost part) the southern end of part 1 (northernmost) and the western side of	Removal of Turbine 15 and reduction in height of Turbine 11 will reduce overall visibility of the proposed Development from some eastern areas of part 3 of the loch, similar to the changes seen in Viewpoint 3. Visibility from some	Reduction in magnitude of change from findings of ES (June 2015) assessment on some eastern areas of part 3 of the loch and some western areas of part 2. Effect on these areas will become **not significant** as a result of layout

Landscape Character Receptor	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
	part 2 (the second to the north). **Cumulative effect**: not significant	western areas of part 2 will also be reduced. There will be a negligible change in visibility from the southern end of part 1. Magnitude of change on the eastern areas of part 3 and some western areas of part 2 will reduce to medium-low or low/medium-low; elsewhere it will remain medium/medium-low to medium-low.	revisions. Effect on the remaining areas as listed will remain **significant**. Cumulative effect remains **not significant**.
Small farms and crofts (fringe crofting and historic features subtype): Balnacoil area	**Sensitivity:** medium **Magnitude of change**: maximum: medium-high **Significance**: significant effect on the majority of the receptor. Not significant effect on the south-eastern end and along the Allt Ach a' Bhathaich valley. **Cumulative effect**: not significant.	Negligible reduction in magnitude of change.	No change from findings of ES (June 2015) assessment. Effect on the majority of the receptor remains **significant**. The listed areas remain **not significant**. **Cumulative effect**: remains not significant.
Strath (Strath Brora): eastern section	**Sensitivity:** high **Magnitude of change**: maximum: medium-high **Significance**: significant effect on areas around Sciberscross and south of the graveyard, lower slopes of Cnoc an t-Socaich and Carroll Rock; loch shore south of Carroll Rock; ridge line of Cnoc a'Ghrianain, and very small areas above Oldtown and on Killin Rock. Not significant elsewhere. **Cumulative effect**: significant effect on the area around and to the east of Sciberscross, the ridge line of Cnoc a' Ghrianain and a very small area above Oldtown. Not	Minor reduction in magnitude of change due to reduction in the number of turbines visible. Magnitude of change will reduce slightly, but remain at the levels previously assessed.	No change from findings of ES (June 2015) assessment. Effect on the listed areas of the receptor remains **significant**. Other areas remain **not significant**. Cumulative effect on the listed areas of the receptor remains **significant**. Other areas remain **not significant**.

Landscape Character Receptor	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
	significant elsewhere.		
Moorland slopes and hills: unit A	**Sensitivity:** medium **Magnitude of change**: medium **Significance**: significant effect **Cumulative effect**: not significant	Negligible reduction in magnitude of change.	No change from findings of ES (June 2015) assessment. Effect remains **significant**. **Cumulative effect**: remains not significant.
Moorland slopes and hills: unit B	**Sensitivity:** medium-high **Magnitude of change**: maximum: medium-high **Significance**: significant effect on west-facing slopes that gain high visibility of the proposed Development, including Cnoc Cragaidh, Beinn Smeorail, Col-bheinn, Meallan Liath Beg and Mor, Carn Garbh, and Cnoc a'Chrubaich Mhoir. Not significant elsewhere. **Cumulative effect**: not significant	Very minor reduction in magnitude of change due to reduction in the number of turbines visible. Magnitude of change will reduce very slightly, but remain at the levels previously assessed.	No change from findings of ES (June 2015) assessment. Effect on the listed areas of the receptor remains **significant**. Other areas remain **not significant**. **Cumulative effect**: remains not significant.
Moorland slopes and hills: unit C	**Sensitivity:** medium-high **Magnitude of change**: maximum: medium/ medium-low **Significance**: significant effect on north-facing slopes in the north-eastern part of the receptor (including Carroll Rock and Kilbraur Hill, and several unnamed hills and high points). Not significant elsewhere. **Cumulative effect**: not significant	Very minor reduction in magnitude of change due to reduction in the number of turbines visible. Magnitude of change will reduce very slightly, but remain at the levels previously assessed.	No change from findings of ES (June 2015) assessment. Effect on the listed areas of the receptor remains **significant**. Other areas remain **not significant**. **Cumulative effect**: remains not significant.
Moorland slopes and hills: unit D	**Sensitivity:** medium **Magnitude of change**: medium/medium-low **Significance**: significant effect on east-facing slopes of Meall na h-Amaite and Cnoc Cille Pheadair. Not significant elsewhere. **Cumulative effect**: not significant	Negligible reduction in magnitude of change.	No change from findings of ES (June 2015) assessment. Effect on the listed areas of the receptor remains **significant**. Other areas remain **not significant**. **Cumulative effect**: remains not significant.

Landscape Character Receptor	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
Sweeping moorland: unit A	**Sensitivity:** medium **Magnitude of change**: medium **Significance**: significant effect **Cumulative effect**: not significant	Very minor reduction in magnitude of change due to reduction in the number of turbines within the receptor. Magnitude of change will reduce very slightly, but remain at the level previously assessed.	No change from findings of ES (June 2015) assessment. Effect remains **significant**. **Cumulative effect**: remains not significant.
Sweeping moorland: unit B	**Sensitivity:** medium-high **Magnitude of change**: maximum: medium-high **Significance**: significant effects on east-facing slopes within the receptor that gain high visibility and lie within approx. 6km of the proposed Development. Not significant elsewhere. **Cumulative effect**: not significant	Very minor reduction in magnitude of change due to reduction in the number of turbines visible. Magnitude of change will reduce very slightly, but remain at the levels previously assessed.	No change from findings of ES (June 2015) assessment. Effect on the listed areas of the receptor remains **significant**. Other areas remain **not significant**. **Cumulative effect**: remains not significant.
Sweeping moorland: unit C	**Sensitivity:** medium-high **Magnitude of change**: maximum: medium/ medium-low **Significance**: significant effect on east-facing slopes of Meall na h-Amaite, Cnoc Cille Pheadair and Druim Torr nan Cliabh. Not significant elsewhere. **Cumulative effect**: not significant	Very minor reduction in magnitude of change due to reduction in the number of turbines visible. Magnitude of change will reduce very slightly, but remain at the levels previously assessed.	No change from findings of ES (June 2015) assessment. Effect on the listed areas of the receptor remains **significant**. Other areas remain **not significant**. **Cumulative effect**: remains not significant.
Loch Fleet, Loch Brora and Glen Loth SLA	**Sensitivity:** high **Magnitude of change**: maximum: medium-high **Significance**: significant effect on: • Some parts of Loch Brora; • Lower slopes of Carroll Rock and the southern loch shore around Carroll Rock; • Very small elevated	Removal of Turbine 15 and reduction in height of Turbine 11 will reduce overall visibility of the proposed Development from some areas of the SLA that are covered by *inland loch: Loch Brora* as described above (some eastern areas of part 3 of the loch and some western areas of part 2).	Reduction in magnitude of change from findings of ES (June 2015) assessment on some areas of Loch Brora (some eastern areas of part 3 of the loch and some western areas of part 2). Effect on these areas will become **not significant** as a result of layout revisions. Effect on the

Landscape Character Receptor	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
	areas above Oldtown and on Killin Rock; and • West-facing slopes close to the eastern edge of the Development. Not significant elsewhere. **Cumulative effect**: significant effect on a very small area above Oldtown. Not significant elsewhere.	Visibility in some other areas will reduce slightly. Magnitude of change on these areas of Loch Brora will reduce to medium-low or low/medium-low.	remaining areas as listed will remain **significant**. Cumulative effect on a very small area above Oldtown remains **significant**. Other areas remain **not significant**.

2.5 ASSESSMENT OF EFFECTS ON WILD LAND

2.5.1 Effects on wild land are assessed in relation to Wild Land Areas (WLAs) as identified in SNH's June 2014 mapping. There are five WLAs within or partially within the study area (as shown in conjunction with the blade tip ZTV on Figure 2.5a, and in conjunction with the cumulative ZTV for the proposed Development and the operational Gordonbush Wind Farm on Figure 2.5b).

2.5.2 One of these five WLAs (Ben Klibreck - Armine Forest WLA 35) was considered in the ES (June 2015) to have potential to undergo a significant effect as a result of the proposed Development, while the other four WLAs were discounted from the assessment. Table 2.3 summarises the ES (June 2015) assessment of effects on Ben Klibreck - Armine Forest WLA 35 and updates this assessment in relation to the FEI Layout.

Table 2.3: Updated Assessment of Effects on Wild Land

Wild Land Area	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
Ben Klibreck - Armine Forest WLA (Area 35)	**Magnitude of change:** medium-low magnitude of change on one physical attribute ('lack of constructions or other artefacts') and a minor reduction in one perceptual response ('arresting/ inspiring qualities, sense of awe – prospect'). Other physical attributes and perceptual criteria remain unchanged. **Significance**: not significant **Cumulative effect**: not significant.	Negligible reduction in magnitude of change.	No change from findings of ES (June 2015) assessment. Effect remains **not significant**. **Cumulative effect**: remains not significant.

2.5.3 Table 2.3 indicates that there will be a negligible reduction in the magnitude of change on Ben Klibreck - Armine Forest WLA 35 as a result of the layout revisions, and the effect on wild land will remain **not significant**.

2.6 ASSESSMENT OF EFFECTS ON VIEWS

2.6.1 Effects on views are the changes to views that result from the introduction of the proposed Development. The assessment of effects on views includes effects on the 17 viewpoints which represent visibility of the proposed Development from around the study area and effects on principal visual receptors such as settlements and routes.

2.6.2 Tables 2.4 and 2.5 summarise the ES (June 2015) assessment of effects on viewpoints and visual receptors and update this assessment in relation to the FEI layout. Table 2.4 includes the assessment of the 17 viewpoints that constitute the viewpoint assessment, while Table 2.5 includes the principal visual receptors that were considered in the ES (June 2015) to have potential to undergo a significant effect as a result of the proposed Development. Shaded boxes indicate those viewpoints or visual receptors where an effect has changed from significant to not significant, either wholly or partially, as a result of the layout revisions. Volumes 2 and 3 of this FEI Report include wirelines and photomontages from viewpoint locations.

Table 2.4: Updated Assessment of Effects on Views

Viewpoint	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
1. Beinn Smeorail	**Sensitivity:** medium-high **Magnitude of change**: high **Significance**: significant effect **Cumulative effect**: not significant	Removal of Turbine 15 will reduce the total number of turbines visible. Magnitude of change will reduce slightly, but remain at a high level.	No change from findings of ES (June 2015) assessment. Effect remains **significant**. Cumulative effect remains **not significant**.
2. Loch Brora (south-west side)	**Sensitivity:** high **Magnitude of change**: medium **Significance**: significant effect **Cumulative effect**: not significant	Removal of blade tip visibility of Turbine 15 will slightly reduce the overall visibility of the proposed Development. Magnitude of change will reduce very slightly, but remain at a medium level.	No change from findings of ES (June 2015) assessment. Effect remains **significant**. Cumulative effect remains **not significant**.
3. Brora - Rogart minor road south of Killin	**Sensitivity:** high **Magnitude of change**: medium **Significance**: significant effect **Cumulative effect**: not significant	Removal of Turbine 15 and reduction in height of Turbine 11 will reduce the overall visibility and benefit the consistency of the appearance of the proposed Development, particularly the relationship of the turbines with the landform. Visibility of the	Reduction in magnitude of change from findings of ES (June 2015) assessment. Effect will become **not significant** as a result of layout revisions. Cumulative effect remains **not significant**.

Viewpoint	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
		met mast will be reduced. Magnitude of change will reduce to medium-low.	
4. Brora - Rogart minor road north of Killin	**Sensitivity:** high **Magnitude of change**: With forestry - low/ medium-low Without forestry – medium **Significance**: With forestry - not significant Without forestry - significant **Cumulative effect**: not significant	Removal of Turbine 15 and reduction in height of Turbine 11 will reduce the overall visibility of the proposed Development. The met mast will no longer be visible. Magnitude of change will reduce to low (with forestry in place) and medium-low (without forestry in place).	Reduction in magnitude of change from findings of ES (June 2015) assessment. Effect without forestry in place will become **not significant** as a result of layout revisions. Effect with forestry in place will remain not significant. Cumulative effect remains **not significant**.
5. Strath Brora near Balnacoil	**Sensitivity:** high **Magnitude of change**: medium-high **Significance**: significant effect **Cumulative effect**: not significant	Removal of Turbine 15 and reduction in height of Turbine 11 (currently screened by forestry) will reduce the overall visibility of the proposed Development and improve the consistency/ balance of its appearance. Magnitude of change will reduce to medium/ medium-high.	Reduction in magnitude of change from findings of ES (June 2015) assessment. Effect remains **significant**. Cumulative effect remains **not significant**.
6. Brora - Rogart minor road near Sciberscross	**Sensitivity:** medium-high **Magnitude of change**: medium **Significance**: significant effect **Cumulative effect**: not significant	Removal of Turbine 15 will reduce clustering and reduce the total number of turbines visible at full height. Magnitude of change will reduce slightly, but remain at a medium level.	Reduction in magnitude of change from findings of ES (June 2015) assessment. Effect remains **significant**. Cumulative effect remains **not significant**.
7. Brora - Rogart minor road near Dalreavoch	This viewpoint was not considered to have potential to undergo a significant effect and was therefore not assessed in detail.	Removal of Turbine 15 will reduce clustering and reduce the total number of turbines visible at full height.	No change from findings of ES (June 2015) assessment. Effect remains **not significant**. Cumulative effect remains **not significant**.
8. Craggie Beg	**Sensitivity:** high **Magnitude of change**: low/medium-low **Significance**: not significant effect	Removal of Turbine 15 will reduce overlapping, reduce the total number of turbines seen at full height, and improve the appearance of the	No change from findings of ES (June 2015) assessment. Effect remains **not significant**.

Viewpoint	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
	Cumulative effect: not significant	proposed Development. Magnitude of change will reduce slightly, but remain at a low/medium-low level.	Cumulative effect remains **not significant**.
9. Ben Horn	**Sensitivity:** medium-high **Magnitude of change**: medium **Significance**: significant effect **Cumulative effect**: not significant	Removal of Turbine 15 will reduce clustering and reduce the total number of turbines visible at full height. Magnitude of change will reduce slightly, but remain at a medium level.	Reduction in magnitude of change from findings of ES (June 2015) assessment. Effect remains **significant**. Cumulative effect remains **not significant**.
10. Beinn Dhorain	This viewpoint was not considered to have potential to undergo a significant effect and was therefore not assessed in detail.	Removal of Turbine 15 will slightly reduce the overall visibility of the Development. Reduction in height of Turbine 11 will reduce its visibility to blade only.	No change from findings of ES (June 2015) assessment. Effect remains **not significant**. Cumulative effect remains **not significant**.
11. Hope Hill	**Sensitivity:** high **Magnitude of change**: medium-low **Significance**: not significant effect **Cumulative effect**: not significant	Removal of Turbine 15 and reduction in height of Turbine 11 will reduce clustering, reduce overall visibility, and benefit the consistency of the appearance of the proposed Development. Magnitude of change will reduce slightly, but remain at a medium-low level.	No change from findings of ES (June 2015) assessment. Effect remains **not significant**. Cumulative effect remains **not significant**.
12. Track to Ben Armine Lodge	**Sensitivity:** medium-high **Magnitude of change**: medium **Significance**: significant effect **Cumulative effect**: not significant	Removal of Turbine 15 will reduce clustering and reduce the total number of turbines seen at full height. Magnitude of change will reduce slightly, but remain at a medium level.	No change from findings of ES (June 2015) assessment. Effect remains **significant**. Cumulative effect remains **not significant**.
13. Creag nam Fiadh	**Sensitivity:** high **Magnitude of change**: medium-low **Significance**: not significant effect **Cumulative effect**: significant	Removal of Turbine 15 will reduce clustering and benefit the consistency of the appearance of the proposed Development. Magnitude of change will reduce slightly, but remain at a medium-low	No change from findings of ES (June 2015) assessment. Effect remains **not significant**. Cumulative effect remains **significant**.

Viewpoint	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
		level.	
14. Ben Bhraggie	This viewpoint was not considered to have potential to undergo a significant effect and was therefore not assessed in detail.	Removal of Turbine 15 and reduction in height of Turbine 11 will slightly reduce the overall visibility of the proposed Development.	No change from findings of ES (June 2015) assessment. Effect remains **not significant**. Cumulative effect remains **not significant**.
15. Ben Armine	This viewpoint was not considered to have potential to undergo a significant effect and was therefore not assessed in detail.	Removal of Turbine 15 will reduce clustering and reduce the total number of turbines visible at full height.	No change from findings of ES (June 2015) assessment. Effect remains **not significant**. Cumulative effect remains **not significant**.
16. Portmahomack	This viewpoint was not considered to have potential to undergo a significant effect and was therefore not assessed in detail.	Removal of Turbine 15 and reduction in height of Turbine 11 will reduce clustering and benefit the consistency of the appearance of the proposed Development.	No change from findings of ES (June 2015) assessment. Effect remains **not significant**. Cumulative effect remains **not significant**.
17. Ben Griam Beg	This viewpoint was not considered to have potential to undergo a significant effect and was therefore not assessed in detail.	Removal of Turbine 15 and reduction in height of Turbine 11 will benefit the consistency of the appearance of the proposed Development.	No change from findings of ES (June 2015) assessment. Effect remains **not significant**. Cumulative effect remains **not significant**.

Table 2.5: Updated Assessment of Effects on Principal Visual Receptors

Principal Visual Receptor	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
Brora - Rogart minor road	**Sensitivity:** medium-high **Magnitude of change**: Eastbound: maximum: medium with forestry and medium-high without forestry. Westbound: maximum: medium. **Significance**: Eastbound: intermittent significant effect on approx. 2km between Sciberscross and Point and very intermittent significant effect on approx. 1km between	Eastbound: removal of Turbine 15 and reduction in height of Turbine 11 will reduce the overall visibility of the proposed Development and improve the consistency/ balance of its appearance between Balnacoil and the graveyard, in the vicinity of Viewpoint 5. Removal of Turbine 15 will also reduce clustering and reduce the total number of turbines visible at full	Eastbound: reduction in magnitude of change from findings of ES (June 2015) assessment. Effects on approx. 2km between Sciberscross and Point (intermittent) and on approx. 1km between Balnacoil and graveyard (very intermittent) remain **significant**. Cumulative effect remains **significant**. Westbound: reduction in

Principal Visual Receptor	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
	Balnacoil and graveyard. Westbound: significant effect on approx. 1.4km between just south of Viewpoint 3 and just north of Killin. Potential for significant effect on a further several hundred metres to the north if forestry on the skyline is felled. **Cumulative effect**: significant effect on a 13km stretch between a point just to the south of Viewpoint 3 and a point approx. 1.2km west of Sciberscross.	height between Sciberscross and Point, in the vicinity of Viewpoint 6. Maximum magnitude of change will reduce to medium with forestry and medium/ medium-high without forestry. Cumulative magnitude of change will remain intermittently medium. Westbound: removal of Turbine 15 and reduction in height of Turbine 11 will notably reduce the overall visibility of the proposed Development and benefit the consistency of its appearance, as seen in Viewpoints 3 and 4. Maximum magnitude of change will reduce to medium-low. Cumulative magnitude of change will reduce to medium-low due to the reduced magnitude of change of the proposed Development.	magnitude of change and cumulative magnitude of change from findings of ES (June 2015) assessment. Effects for westbound travellers will become **not significant** as a result of layout revisions. Cumulative effect will also become **not significant**.
SU06.02 (Loch Brora - West Track').	**Sensitivity:** high **Magnitude of change**: maximum: medium/ medium-high **Significance**: significant effect on: • Approx. 4.6km (partly intermittent) of the path, between the coniferous forestry in the east and extending around Carroll Rock; • Approx. 1km near the western end of the path as it passes Kilbraur. **Cumulative effect**: not significant	Removal of Turbine 15 and reduction in height of Turbine 11 will reduce the overall visibility of the proposed Development and, in some views, improve the consistency/ balance of its appearance. Magnitude of change will reduce slightly, but remain at a maximum medium/medium-high level.	No change from findings of ES (June 2015) assessment. Effects remain **significant**. Cumulative effect remains **not significant**.

Principal Visual Receptor	ES (June 2015) Assessment	Changes Resulting From FEI Layout	FEI Layout Assessment
SU06.14 ('Doll Bridge – Loch Brora')	**Sensitivity:** high **Magnitude of change**: maximum: medium **Significance**: significant effect on approx. 300m at the northern end of the path. **Cumulative effect**: not significant	Removal of Turbine 15 and reduction in height of Turbine 11 will notably reduce the overall visibility from parts of the 300m stretch, and benefit the consistency of the appearance of the proposed Development, as seen in Viewpoint 3. Magnitude of change on some parts (approx. 150-200m) of the 300m stretch will reduce to medium-low; elsewhere it will remain medium.	Reduction in magnitude of change from findings of ES (June 2015) assessment on approx. 150-200m of the 300m stretch. Effect on this stretch of approx. 150-200m will become **not significant** as a result of layout revisions. Effect on the remaining approx. 100-150m will remain **significant**. Cumulative effect remains **not significant**.

2.7 CONCLUSIONS

2.7.1 Tables 2.1, 2.2, 2.3, 2.4 and 2.5 indicate that the layout revisions to the proposed Development will result in a reduction in the number and extent of significant effects on the landscape and visual resource. This is due to the reduced visibility of the proposed Development, particularly from Strath Brora and Loch Brora, and the benefit to its appearance in terms of balance and relationship to the landform setting in which it is seen.

2.7.2 The effects on the following receptors and viewpoints are now assessed to be not significant as a result of the layout revisions:

- The character of some central and southern areas of Loch Brora;
- The character of the Loch Fleet, Loch Brora and Glen Loth SLA where it covers these areas of Loch Brora;
- The outlook from Viewpoint 3 (Brora - Rogart minor road south of Killin);
- The outlook from Viewpoint 4 (Brora - Rogart minor road north of Killin);
- All views gained by westbound travellers on the Brora - Rogart minor road;
- Cumulative effects on views gained by westbound travellers on the Brora - Rogart minor road; and
- Views gained from approximately 100 – 150m of the SU06.14 ('Doll Bridge – Loch Brora') core path.

2.7.3 Effects on some other receptors that were assessed to be significant in the ES (June 2015) will also be reduced, whilst remaining significant. These include Viewpoint 5 (Strath Brora near Balnacoil), Viewpoint 9 (Ben Horn) and Viewpoint 12 (Track to Ben Armine Lodge).

3. Ecology and Nature Conservation (ES Chapter 8)

3.1 INTRODUCTION

3.1.1 This section provides a review of the assessment on the terrestrial and freshwater ecology of the site carried out in Chapter 8 of the ES (June 2015), in relation to the layout revisions of the proposed Development. This section should be read in conjunction with Chapter 8 of the ES (June 2015).

3.2 BASELINE CONDITIONS

3.2.1 Baseline conditions on site are as reported in the ES (June 2015), summarised here for reference.

3.2.2 Habitat on site is dominated by blanket bog and wet heath, with lesser amounts of dry heath and wet modified bog, the latter where past drainage has occurred. Potential areas of Groundwater Dependent Terrestrial Ecosystem (GWDTE) were identified, but subsequent investigation showed that the majority of potential GWDTE habitat was considered to be sustained by surface rainfall runoff rather than groundwater, with the exception of areas of high GWDTE along watercourses and a small area to the west of the site. No habitats are hydrologically connected to the adjacent Coir' an Eoin SSSI. No nationally Rare or Scarce plant species were recorded. Two plant species of restricted distribution, the moss Sphagnum fuscum and Great sundew (Drosera anglica) were recorded in the blanket bog habitat. The proposed Development site comprises a part of the upland management areas within the Gordonbush Estate Habitat Management Plan (HMP).

3.2.3 Five UK BAP animal species otter, water vole, bat, Atlantic salmon and brown trout were identified within the proposed Development site or its environs. Otter signs, including shelters, were restricted to the two watercourses just beyond the proposed Development site boundaries, the Allt a'Mhuilinn and the Allt Smeorail, and the lower part of the Allt nan Nathraichean in the north-west of the site. No natal (breeding) holts were identified. Apart from the Baden Burn in the east of the site, water vole evidences were restricted to tributaries on the western and south eastern site boundaries. No bat roosts were recorded on site, the nearest being a ruined cottage just beyond the south-east corner of the site, with several potential roosts identified in buildings in the Strath below. Bat activity on site was very low, with most bat flights occurring in the tributary valleys and edges of plantation blocks beyond the site boundaries. The other mammal species recorded on site was pine marten, with activity recorded from the plantation blocks in the south-east corner of the site and the Allt Smeorail valley, but with no dens recorded. The site was not found to support good reptile habitat and few sightings were made, although this may be partly due to the poor weather at time of survey.

3.2.4 No evidence of freshwater pearl mussel (FWPM) was recorded on site or its environs. The only fish species identified in the streams draining directly from the proposed Development site was brown trout. Access to the proposed Development by migratory fish species is prevented by obstacles on both the Allt a' Mhuilinn and Allt Smeorail. Waterfalls and a dam restrict migratory salmonids to the lower 1.2 km of Allt a'Mhuilinn, some 2km downstream of the nearest proposed wind turbine, while a waterfall restricts migratory salmonids to the lower 0.6 km of Allt Smeorail. Downstream of these obstacles both

streams support populations of Atlantic salmon, brown/sea trout and eels. Lampreys, most probably the brook lamprey, are also present in the accessible reaches.

3.3 REVIEW OF ASSESSMENT OF EFFECTS ON HABITAT

3.3.1 The ES (June 2015) assessment of habitat damage and loss found impacts for the site as a whole to be of Minor significance for both the dominant habitats on site; wet heath and blanket bog. As a result of the removal of Turbine 15, the proposed amendment to the internal track layout would result in a reduction in overall track length of approximately 700m, which therefore reduces the length of wet heath and blanket bog crossed. There is therefore a small reduction in overall habitat damage and loss, although the level of significance for the site as a whole on these receptors remains at Minor.

3.3.2 Effects on the Gordonbush Estate HMP management objectives were assessed as not significant in the ES (June 2015). There is no change from these findings as a result of the revisions to the proposed Development.

3.4 REVIEW OF ASSESSMENT OF EFFECTS ON FAUNA AND FRESHWATER ECOLOGY

3.4.1 The ES (June 2015) assessment of effects on fauna and freshwater ecology found there to be either no impacts, or non-significant impacts, following the implementation of mitigation measures. There are no additional impacts on fauna or freshwater ecology arising from the revisions to the proposed Development.

3.5 CONCLUSIONS

3.5.1 It can therefore be concluded that the revisions to the proposed Development would not result in a change to the predicted effects, as stated in the ES (June 2015).

4. Hydrology, Hydrogeology and Geology (ES Chapter 9)

4.1 INTRODUCTION

4.1.1 This section addresses the potential impact of the revisions to the proposed Development (as listed in Section 1.2) on hydrology, hydrogeology and geology. This section should be read in conjunction with Chapter 9 of the ES (June 2015).

4.2 HYDROGEOLOGY AND HYDROLOGY

4.2.1 A detailed review of the site hydrogeology and hydrology was undertaken as part of the ES (June 2015) and was informed by a comprehensive programme of site investigation. In particular the ES (June 2015) considered potential effects of the proposed Development on hydrogeology (groundwater), hydrology (surface water), Groundwater Dependent Terrestrial Ecosystems (GWDTEs) and Private Water Supplies (PWS).

4.2.2 The ES (June 2015) confirmed as a consequence of the embedded mitigation included in the site design and with the adoption of standard and best practice mitigation measures the proposed Development would, with reference to the EIA Regulations, not result in a significant impact on hydrogeology or hydrology.

4.2.3 The proposed revisions to the layout presented in this FEI do not alter the findings of the ES (June 2015). In particular, the proposed minor track re-alignment and re-positioning of the permanent meteorological mast will not result in an impact on PWS or GWDTEs, and subject to the adoption of standard good practice mitigation measures during construction and operation, as outlined in the ES (June 2015), there would be no significant effect on hydrogeology or hydrology (water flows, flood risk, quality and levels). Specifically the revisions to the layout will not encroach on areas of potential GWDTE identified on site.

4.2.4 Finally, the ES (June 2015) confirmed that measures required to safeguard the local hydrogeology and hydrology would be summarised in a site specific Construction and Environmental Management Plan (CEMP) which would be agreed with relevant consultees prior to any construction on site. The deployment and performance of the mitigation measures would be monitored by a site based Ecological Clerk of Works (ECoW) to ensure construction and operation of the proposed Development had no effect on hydrogeology and hydrology.

4.3 PEAT LANDSLIDE HAZARD AND RISK ASSESSMENT

4.3.1 A detailed review of the peat present on the site was undertaken as part of the ES (June 2015) and was informed by a comprehensive programme of peat probing and assessment. The ES (June 2015) considered potential effects of the proposed Development on peat and the potential peat landslide risk.

4.3.2 The original Peat Landslide Hazard and Risk Assessment undertaken and submitted as Appendix 9.1 of the ES (June 2015), indicated that the proposed Development posed an overall negligible to low peat landslide risk across the site.

4.3.3 It was concluded that construction of the proposed Development based on the final wind turbine positions and access track alignment presented in the ES (June 2015) would not result in any unacceptable hazards from potential peat instability.

4.3.4 As part of this FEI, minor alterations to the indicated infrastructure, primarily the reduced track length, removal of Turbine 15 and alteration of the meteorological mast has been considered with respect to the overall project. By removing tracks between Turbines 14 and 16, the overall track length on site has reduced by circa 700m. Considering the impact on the site due to track realignment, and subject to the adoption of standard good practice mitigation measures during construction and operation, as outlined in the ES (June 2015), there would be no significant effect on peat and a reduction in excavation of peat can be anticipated.

4.3.5 By removing Turbine 15 from the original layout, shorter track lengths to Turbines 14 and Turbine 16 are now required. In both instances there is no change to the peat landslide risk. The previous track was located on slopes which presented either a negligible or low peat landslide risk. By adjusting the alignment of tracks to both turbines the track is still located on negligible to low risk areas.

4.3.6 The turbine locations have not been moved so there is no change to risk assessed in the ES (June 2015). Both turbines were originally assessed as posing a negligible peat landslide risk.

4.3.7 In conclusion, the peat landslide risk on site has not changed due to revisions to the track layout. The conclusions from the ES (June 2015) therefore do not change and the proposed Development still presents an overall negligible to low risk of peat landslide.

4.4 PEAT MANAGEMENT PLAN

4.4.1 The original Peat Management Plan submitted as Appendix 9.3 of the ES (June 2015), indicated that the volumes of peat excavated on the proposed Development would be re-used without creating surplus materials which could be classified as waste.

4.4.2 Using site specific peat depth probing data, the potential volume of peat and soils that might be excavated as a consequence of constructing the proposed Development has been estimated. Excavated peat associated with development on peat is not classed as a waste provided it is suitable (from an engineering as well as environmental perspective) for a required and predetermined use as part of construction works and reinstatement on site[1] (SR, SEPA, January 2012).

4.4.3 It has been shown using best practice guidelines that as a result of the site design, the volume of peat and soils that would be excavated is low and can be readily reused on site as part of the site construction and restoration. As a result, no surplus peat would be generated.

4.4.4 It was concluded in the ES (June 2015) that all of the materials to be excavated on site would fall within the non-waste classification as all of the top soil and peaty soils would be re-used on site. Similarly the peat on site has been proven to be predominantly fibrous peat which would be readily re-used on site, with the deeper peat avoided through design (Figures 4.1 and 4.2). The excavated peat would therefore be entirely re-useable as it is predominantly fibrous and easily re-used on site.

[1] Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste (SR, SEPA, January 2012)

4.4.5 As part of this FEI, minor alterations to the indicated infrastructure, primarily the reduced track and removal of Turbine 15 has been considered with respect to the peat management on site. The removal of circa 700m of track and a turbine on site will have a positive impact resulting in an overall decrease in the volume of peat excavated on site.

4.4.6 To demonstrate the positive impact the materials balance for the site has been reworked for the revised FEI Layout (see Appendix 2). The total excavated materials, soils, peaty soils and peat originally quantified in the ES (June 2015) amounted to 139,248m^3. Modifications of the track and removal of a turbine, reduces the amount of excavated materials by almost 4,000m^3, to 135,455 m^3 (see Appendix 2). This decrease is entirely due to reduction of excavated peaty soils and peat at Turbine 15 and the reduction in overall track length.

4.4.7 Based therefore on the minor alterations to the site layout proposed there will be a reduction in excavated peat on site.

4.4.8 Appendix 2 demonstrates that the volume of peat excavated on site would be re-used without creating surplus materials which would require to be classified as waste. Post consent, the Stage 1 PMP and the outline Construction Environmental Management Plan (CEMP) would be updated with information obtained during detailed ground investigations and design stage.

4.5 CONCLUSIONS

4.5.1 The revisions to the layout do not change the findings of the ES (June 2015). It is confirmed, as a consequence of the site design, embedded mitigation and adoption of standard best practice construction techniques, that with respect to Hydrology, Hydrogeology and Geology there would be so significant effects associated with the proposed Development.

5. Ornithology (ES Chapter 10)

5.1 INTRODUCTION

5.1.1 This section provides a review of the assessment on birds carried out in Chapter 10 of the ES (June 2015), in relation to the layout revisions of the proposed Development. This section should be read in conjunction with Chapter 10 of the ES (June 2015).

5.2 BASELINE CONDITIONS

5.2.1 Baseline conditions on site are as reported in the ES (June 2015), summarised here for reference.

5.2.2 Birds breeding on the site of the proposed Development were surveyed in spring 2012 and spring 2013, in a survey area defined by a buffer of 500m around the proposed Development site boundary at that time. The results were supplemented by historical data and concurrent monitoring data from the adjacent Gordonbush Wind Farm. No bird species listed on Annex 1 of the Birds Directive or on Schedule 1 of the Wildlife and Countryside Act were found to be resident within the proposed Development site survey area, and no raptors were found to be breeding within 2km of the site boundary. No qualifying species of the nearby Caithness and Sutherland Peatlands Special Protection Area (SPA) was found to be using the Development site. In particular, no golden plovers were recorded foraging on the proposed Development site and only one short flight by this species was seen on the site during vantage point observations.

5.2.3 Observations of flight activity were carried out from two vantage points between April 2012 and March 2013. Three flocks of greylag geese, totalling 91 birds, and three flocks of pink-footed geese, totalling 606 birds, were recorded flying over the collision risk zone (within 253m of the proposed turbine positions) at risk height (20 – 150m). No raptors were detected flying over the proposed Development site.

5.3 REVIEW OF ASSESSMENT OF EFFECTS ON BIRDS

5.3.1 The ES (June 2015) assessed that all of the potential residual effects of the proposed Development on birds were not significant (see Table 10.15 in ES (June 2015), Chapter 10).

5.3.2 The subsequent revisions to the proposed Development, in particular the removal of a turbine and its associated hard standing area, and reduction in overall track length, will further reduce any potential effects of habitat loss and disturbance during construction.

5.3.3 In addition, the removal of one turbine and the lowering of another turbine will reduce the potential effect on collision risk, assessed as not significant (ES June 2015), even more.

5.4 CONCLUSIONS

5.4.1 It can therefore be concluded that the revisions to the proposed Development would not result in a change to the predicted effects, as stated in the ES (June 2015).

6. Cultural Heritage (ES Chapter 11)

6.1 INTRODUCTION

6.1.1 This section provides a review of the assessment of both direct and indirect impacts (including cumulative) upon archaeological sites and sites of historic or cultural heritage interest carried out in Chapter 11 of the ES (June 2015), in relation to the layout revisions of the proposed Development. This section should be read in conjunction with Chapter 11 of the ES (June 2015).

6.2 BASELINE CONDITIONS

6.2.1 Baseline conditions on site are as reported in the ES (June 2015), summarised here for reference.

6.2.2 The proposed Development extends into a landscape of sparse features of settlement and cultivation, dating from the Iron Age to the early 19th century. It lies within a wider area, Strath Brora and the surrounding high ground, which contains a number of cultural sites of national importance and with statutory protection, including Balnacoil Hill Cairn, Duchary Rock and Kilbraur Hut Circle Scheduled Monuments (SMs).

6.3 REVIEW OF ASSESSMENT OF DIRECT IMPACTS

6.3.1 Of the 72 archaeological features identified during the desk-based and field surveys, the ES (June 2015) assessed that only four (Sites 53, 55 63 and 71) would be directly impacted by construction of the proposed Development. Mitigation was proposed in the form of further investigation of Sites 63 and 71 to verify their identification as field clearance mounds.

6.3.2 The revision to the proposed Development would not change the predicted impacts or proposed mitigation for these sites, nor would it introduce any new impacts to known archaeological features (see Figure 6.1).

6.4 REVIEW OF ASSESSMENT OF INDIRECT IMPACTS

6.4.1 The ES (June 2015) assessed the potential for indirect, visual impact on the sites and buildings with statutory protection that fall within the Zone of Theoretical Visibility (ZTV) of the proposed Development. The assessment concluded that indirect visual impact would be Major for Balnacoil Hill Cairn SM and Moderate for Duchary Rock Fort SM. The impact was considered to be to acceptable levels in both cases as, although there will be a visual impact, this only takes the form of increasing the density and marginally increasing the visible extent of the existing group of turbines. None of the SMs are associated with significant visual relationships with other sites or natural features which would be interrupted by the proposed Development.

6.4.2 The revisions to the proposed Development would reduce the total number of turbines visible from these SMs, but the spread of the proposed Development viewed from these SMs would not reduce. The predicted effects as set out in the ES would therefore remain unchanged.

6.4.3 Likewise, all other indirect impacts assessed in the ES (including cumulative) would remain unchanged as a result of the revisions to the proposed Development.

6.5 CONCLUSIONS

6.5.1 It can therefore be concluded that the revisions to the proposed Development would not result in a change to the predicted effects, as stated in the ES (June 2015).

7. Access, Traffic and Transport (ES Chapter 12)

7.1 INTRODUCTION

7.1.1 This section provides a review of the assessment of main traffic and transport effects undertaken in Chapter 12 of the ES (June 2015), in relation to the layout revisions of the proposed Development. This section should be read in conjunction with Chapter 12 of the ES (June 2015).

7.2 REVIEW OF ASSESSMENT OF EFFECTS

7.2.1 The potential effects of the development traffic were drawn from the Guidelines for the Environmental Assessment of Road Traffic (IEA, 1993) including severance, driver delay, pedestrian delay, pedestrian amenity, fear and intimidation and accidents and safety.

7.2.2 The ES (June 2015) highlighted that a significant amount of material will be sourced from borrow pits on site and concrete will be batched on site, which will significantly reduce transport requirements. A number of mitigation measures were also proposed in the ES (June 2015) to reduce the adverse effects of the construction traffic, including traffic management measures and communications protocols.

7.2.3 Based on existing traffic data and the estimated construction vehicle movements, the ES (June 2015) concluded that no significant detrimental effects are predicted as a result of construction traffic associated with the proposed Development. A cumulative assessment was also undertaken which concluded that no significant cumulative effects are predicted on the local roads network.

7.2.4 The revisions to the layout would result in a very slight reduction in construction traffic numbers for the project as a whole, which would not alter the assessment of effects predicted in the ES (June 2015).

7.3 CONCLUSIONS

7.3.1 It can therefore be concluded that the revisions to the proposed Development would not result in a change to the predicted effects, as stated in the ES (June 2015).

8. Noise (ES Chapter 13)

8.1 INTRODUCTION

8.1.1 This section provides a summary of the ES (June 2015) findings of the predicted effects of construction and operational noise of the proposed Development on nearby dwellings, and evidences the extent of any change to these predicted effects as a result of the revisions to the layout. This section should be read in conjunction with Chapter 13 of the ES (June 2015), which provides a detailed assessment of the original layout of the proposed Development.

8.2 BASELINE CONDITIONS

8.2.1 Baseline conditions on site are as reported in the ES (June 2015), summarised here for reference.

8.2.2 The proposed Development is located in an area of relatively low population density. The noise environment in the surrounding area is generally characterised by 'natural' sources, such as wind disturbed vegetation, birds and farm animals. Other sources of noise include intermittent local road and agricultural vehicles.

8.2.3 A total of three noise monitoring locations were agreed with the Local Authority as being representative of the background noise environment for the nearest residences to the proposed Development site. The three survey locations comprised: Ascoile, Keepers Cottage and Home Cottage. In addition, three further residential properties in the vicinity were included in the assessment; Gordonbush Lodge, Moulin Cottage and Kilbraur.

8.3 SUMMARY OF ES (JUNE 2015) FINDINGS

8.3.1 The ES (June 2015) concluded that there would be no significant noise effects from the construction phase of the proposed Development, which by its very nature, would be temporary and highly variable. Various mitigation methods have been suggested to reduce the predicted slight effects of construction noise, the most important of these being suggested restrictions of hours of working.

8.3.2 Noise levels from the operation of the wind turbines (16 no.) were predicted for those locations around the proposed Development most likely to be affected by noise. Surveys were performed to establish existing baseline noise levels at a number of these properties, with appropriate noise limits derived from data about the existing noise environment. The minimum separation distance to the closest residential property with the proposed Development is approximately 2km. The ES concluded that wind turbines of the type and size which would be installed at the proposed Development can operate within the levels deemed, by national guidance, to be acceptable for wind energy schemes and the assessment of wind farm noise was therefore considered not significant in EIA terms.

8.4 REVIEW OF ASSESSMENT OF EFFECTS

8.4.1 A reduction in the number of turbines that would be installed at this site from 16 to 15 would result in a very slight reduction in operational noise levels for the proposed Development overall. This would not result in any change to the predicted effects as set out in the ES (June 2015).

8.4.2 During construction, the revisions to the layout would result in a very slight reduction in construction activity, and therefore noise. Again, this would not alter the assessment of effects predicted in the ES (June 2015).

9. Land Use, Socio-economics and Tourism (ES Chapter 14)

9.1 INTRODUCTION

9.1.1 This section provides a summary of the ES (June 2015) findings of the predicted effects of the proposed Development on socio-economics, and highlights the consequences of the revisions to the layout on the socio-economic impact assessment. This section should be read in conjunction with Chapter 14 of the ES (June 2015), which provides a detailed assessment of the original layout of the proposed Development.

9.2 POTENTIAL SOCIO-ECONOMIC EFFECTS

9.2.1 The socio-economic impact assessment considers the effects of the proposed Development on three study areas;

- Local Area - Caithness and Sutherland, as defined in ES Chapter 14 (June 2015);
- Highland Council Area; and
- Scotland.

9.2.2 The original layout for the proposed Development comprised 16 turbines. For the purposes of the socio-economic impact assessment, the original layout was assumed to have a total installed capacity of 36.8 megawatts (MW) (i.e. a 'worst case' scenario based on a turbine with a lower output capacity of 2.3MW).

9.2.3 The revised layout has 15 turbines and for the purposes of the socio-economic impact assessment is assumed to have a total installed capacity of 34.5 MW (based on the same 'worst case' scenario principle).

9.2.4 It was assumed that the level of capital expenditure (CAPEX) per MW installed would be in line with the original Gordonbush Wind Farm, which had £1.1 million CAPEX per MW. Therefore the total CAPEX required for the proposed Development is estimated to be £38.0 million.

Table 9.1 – Installed Capacity and CAPEX investment

	ES (June 2015)	Revised Layout
Number of Turbines	16	15
Total Installed Capacity	36.8 MW	34.5 MW
CAPEX per MW	£1.1 million	£1.1 million
Total CAPEX	£40.5 million	£38.0 million

Source: BiGGAR Economics

9.2.5 The split of the level of expenditure in different areas of the development and construction phase were assumed to be unchanged. Similarly, the potential geographic split of contracts was also assumed to be the same between the two iterations. The total economic effect during the development and construction of new design, with 15 turbines, is given in Table 9.2. This shows that the £38.0 million CAPEX would be expected to generate £18.2 million Gross Valued Added (GVA) in Scotland and support 160 job years. Of this, £7.9 million GVA and 60 job years would be expected in Highland, including £3.7 million GVA and 26 job years in the Local Area.

Table 9.2 – Economic effect during the Development and Construction

	Local Area	Highland	Scotland
GVA (£m)	3.7	7.9	18.2
Employment (Job Years)	26	60	160

Source: BiGGAR Economics

9.2.6 The economic effect during the operational phase would also be impacted by the change in the number of turbines. The annual investment in the OPEX is also assumed to be directly proportional to the installed capacity of a wind farm and the total annual OPEX estimated for the revised 15 turbine layout is estimated to be £2.2 million.

Table 9.3 – Installed Capacity and CAPEX investment

	ES (June 2015)	Revised Layout
Number of Turbines	16	15
Total Installed Capacity	36.8MW	34.5MW
Annual OPEX per MW	£64,930	£64,930
Annual OPEX	£2.4 million	£2.2 million

Source: BiGGAR Economics

9.2.7 It was assumed that the geographic split of the operations and maintenance contracts would not change as a result of the changes to the size of the proposed Development. The total economic effect during the operations and maintenance of the revised layout is given in Table 9.4. This shows that the £2.2 million annual OPEX would generate £2.3 million GVA in Scotland and support 26 jobs. Of this, £1.2 million GVA annually and 13 jobs would be expected in Highland, including £0.7 million GVA annually and 8 jobs.

Table 9.4 – Economic effect during the Operations and Maintenance

	Local Area	Highland	Scotland
GVA (£m)	0.7	1.2	2.3
Employment (Jobs)	8	13	26

Source: BiGGAR Economics

9.2.8 Similarly, the economic effect during the decommissioning of the wind farm is likely to be smaller as there would be one less turbine to decommission. The total decommissioning costs are estimated to be £1.3 million. The total economic effect during the decommissioning of the revised layout, with 15 turbines, is given in Table 9.5. This shows that the £1.3 million expenditure on decommissioning would be expected to generate £1.2

million GVA in Scotland and support 14 job years. Of this, £0.7 million GVA and 14 job years would be expected in Highland, including £0.4 million GVA and 4 job years in the Local Area.

Table 9.5 – Economic effect during Decommissioning

	Local Area	Highland	Scotland
GVA (£m)	0.4	0.7	1.2
Employment (Job Years)	4	7	14

Source: BiGGAR Economics

9.2.9 As predicted for the original layout, documented within the ES (June 2015), the long-term economic effect of the revised layout of the proposed Development would be negligible for the Scottish and Highland economics but minor positive for the economy of the Local Area.

9.3 CONCLUSIONS

9.3.1 It can therefore be concluded that the revisions to the proposed Development would not result in a change to the predicted effects, as stated in the ES (June 2015).

10. Other Issues (ES Chapter 15)

10.1 INTRODUCTION

10.1.1 The Other Issues Chapter of the ES considered potential effects of the proposed Development on telecommunications, television / radio, aviation (civil and military), shadow flicker, ice throw, air quality and carbon balance.

10.1.2 With the implementation of specific mitigation measures, no significant effects were predicted for these topic areas. There would be no change to these predicted effects as a result of the revisions to the layout of the proposed Development.

10.2 CARBON ASSESSMENT

10.2.1 A carbon assessment was undertaken in the ES (June 2015) to estimate the potential savings in carbon dioxide (CO2) emissions by the proposed Development replacing other electricity sources. For the original layout, 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.

10.2.2 The ES (June 2015) also estimated the CO2 payback time, which is the period of operation of the wind farm required before there is a net saving of CO2. This was calculated as between 1.3 to 2.6 years (using coal and UK grid supply mix CO2 emission factors, respectively) which is a substantially shorter time period than the 25 year operational period applied for.

10.2.3 An update to the carbon assessment has been completed for the revised FEI Layout (see Appendix 3[2]). This calculates that approximately 118,654 tonnes of CO2 saved per year (tCO2yr-1) through displacement of coal-fired electricity or 59,327 tonnes CO2yr-1 over grid-mix supply.

10.2.4 There is no change to the CO2 payback time of between 1.3 to 2.6 years (using coal and UK grid supply mix CO2 emission factors, respectively).

[2] The full version of the carbon assessment calculator is included on the electronic version of the FEI Report. The printed version of the FEI Report comprises the core input data and payback time and CO2 emissions tabs of the calculator only.

11. Conclusions

11.1.1 In June 2015, SSE Renewables Developments (UK) Ltd, submitted the Gordonbush Extension Wind Farm Environmental Statement ("the ES (June 2015)") in support of an application made under section 36 of the Electricity Act 1989 to construct and operate an extension to Gordonbush Wind Farm ("the proposed Development").

11.1.2 On consideration of the application the relevant planning authority, The Highland Council, raised no objection subject to:

- An amendment of the project to remove Turbine 15 from the layout;
- A reduction in the height of Turbine 11 from 130m to 115m max blade tip height; and
- All turbines to use internal transformers only.

11.1.3 These changes were accepted by the Applicant.

11.1.4 This report has provided the further information requested by the Energy Consents Unit of the Scottish Government's Energy and Climate Change Directorate to demonstrate the nature and extent of any change in the assessment of environmental impacts that would result from the changes to the layout (see Appendix 1), or record where there is no change.

11.1.5 For the majority of topics assessed in the ES (June 2015), the revisions to the layout would not result in any changes to the predicted effects assessed in the ES (June 2015). In many cases, the removal of one turbine and reduction in track length would result in a slight reduction of impact, but generally not enough to alter the assessed effects.

11.1.6 The exception to this is the Landscape and Visual Impact Assessment of the revised layout which concluded that a number of receptors or viewpoints would see a change in effect from significant to not significant as a result of the layout changes.

12. References

Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste (SR, SEPA, January 2012).

SSE Renewables Developments (UK) Ltd (June, 2015), Gordonbush Extension Wind Farm Environmental Statement.