

14 Other Issues

Introduction

- 14.1 This chapter considers the potential effects of the Development relating to:
- dust;
 - carbon balance (full details provided in **Appendix 14.1: Carbon Report**).
 - aviation and defence; and
 - telecommunications.
- 14.2 Planning policies of relevance to this assessment are identified in **Chapter 5: Policy Context**.
- 14.3 LUC completed the assessment of dust effects and the assessment of carbon balance was undertaken by Mouchel. NLEI Ltd completed the assessment of aviation and defence effects with input from Osprey Consulting and the telecommunications assessment was jointly completed by LUC and NLEI Ltd.
- 14.4 The assessments of potential effects on aviation, defence and telecommunications operations consider technical acceptability rather than following a strict EIA process of assessing the significance of effects. Such effects often require the implementation of technical mitigation solutions to ensure continued operation in the presence of a windfarm. The assessment of effects on these receptors is therefore one of technical analysis and consultation.
- 14.5 A number of additional potential effects, including those relating to radio broadcasting and turbine icing, have been scoped out of the assessment (see **Section 14.6** below).

Scope of the Assessment

Effects Assessed in Full

- 14.6 The following effects associated with the Development have been considered through consultation and, where necessary, through more detailed consideration of potential technical implications and assessment of effects where appropriate:
- The effect of dust on sensitive receptors within 200m of construction activities within the Development Area¹: construction activities can result in temporary effects if unmanaged, for example, nuisance effects such as soiling of buildings and, if present over a long period of time, can affect human health.
 - Carbon Balance: The carbon report uses site data to determine carbon losses associated with the Development. These losses are then considered against alternative generating methods to determine a carbon 'payback' period which represents the length of operational phase until the Development is considered to have offset the carbon losses associated with construction and installation.
 - Potential technical effects on aviation and defence once the Development is operational: wind turbines can affect navigation and surveillance systems (including radar) and can affect the use of aerodromes and airspace.
 - Effects on Military Low Flying during construction and operation.
 - Effects on Civil Aerodromes and Heliports and Civil Airport Air Traffic Control (ATC) radar during construction and operation: Prestwick Airport is located within 50km of the centre of the Development Area.

- Operational effects on telecommunications: wind turbines can potentially cause interference through reflection and shadowing to electro-magnetically propagated telecommunications signals including terrestrial fixed microwave links managed by telecommunications operators.

Effects Scoped Out

- 14.7 The following effects associated with the development have been scoped out of the assessment:
- Construction effects on telecommunications, television, aviation and defence.
 - Construction stage shadow flicker effects as these relate solely to the operation of turbines (see below).
 - Operational effects on television: analogue television broadcast has now been phased out and replaced by digital television, which is less likely to be affected by atmospheric conditions that rendered analogue television unwatchable and does not suffer reflection effects or ghosted image generation. Arqiva confirmed that the nearest TV link to Development Area is 2.4km west and so interference is considered unlikely. It is anticipated that an appropriate planning condition will be attached to any consent and will require NLEI Ltd to provide mitigation in the event that effects on television reception occur as a consequence of the operation of the Development.
 - Operational effects on unlicensed airfields as there are none within the specified consultation zone of 2km as specified in CAP 793: Safe Operating Practices at Unlicensed Aerodromes¹.
 - Effects on military Air Surveillance and Control Systems (ASACS) Radar, Military Precision Approach Radar (PAR) and Military Aerodromes during construction and operation.
 - Radio broadcasting: it is not considered likely that radio broadcasting signals will be affected by the development once operational. This is because i) the length of radio broadcast signal wavelengths are such that interference from wind turbines is unlikely and ii) any interference to the radio signal is unlikely to noticeably affect the audio signal.
 - Shadow flicker effects during operation: shadow flicker is an effect that can occur when the shadow of a moving wind turbine blade passes over a small opening (e.g. a window), briefly reducing the intensity of light within the room, and causing a flickering to be perceived. Shadow flicker effects occur only within 130 degrees of north and within ten rotor diameters of a turbine (i.e. 1,200m in the case of the Development). There are two properties within 130 degrees of north and within 1,200m of the turbines (Clackleith and Duntercleuch), both of which are owned by Buccleuch Estates and are unoccupied. Shadow flicker effects have therefore been scoped out of this assessment.
 - Turbine icing: the Scottish Government web based renewables advice for onshore wind turbinesⁱⁱ states "*The build-up of ice on turbine blades is unlikely to present problems on the majority of sites. When icing occurs, the turbines' own vibration sensors are likely to detect the imbalance and inhibit the operation of the machines*". In addition, the operators will implement measures to ensure the safety of workers and the general public in relation to ice throw and ice fall. These will comprise notices placed at access points (specifically along the SUW within the vicinity of the closest turbines (albeit over 150m away) 5, 16, 17, 25 and 26 alerting members of the public of the possible risk of ice throw and ice fall under certain conditions.
 - Dust effects during operation of the development: during operation there will be limited dust raising maintenance activities being undertaken and transport will be limited.
 - Cumulative Effects: No communication links effects are predicted as a result of operation of the Development; therefore, no cumulative effects are considered likely. In relation to television reception, any effects resulting from other schemes are likely to be already mitigated therefore it is considered unlikely that there will be any cumulative effects. Cumulative dust effects during construction and operation of the Development have been scoped out as dust generally settles locally and there will be no cumulative effect with other developments as there are no properties in close enough proximity to both the Development or other planned developments for cumulative effects to occur.

¹ This excludes any effects associated with dust from vehicles on the public road, an assessment of which has been undertaken separately in **Chapter 12: Access, Traffic and Transport**.

Assessment Methodology

Guidance

14.8 This assessment is carried out in accordance with the following guidance documents:

Dust

- Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1, HA207/07 Air Qualityⁱⁱⁱ; and
- PAN 50: Controlling the Environmental Effects of Surface Mineral Workings^{iv}.

Carbon Balance

- Carbon calculator technical guidance - Version 2.10.0^v;
- Scottish Government Carbon Calculator Tool V 1.0.1^{vi}; and
- SNH Technical Guidance Note on Wind Farms and Carbon Savings^{vii}.

Aviation and Defence

- CAP 764: Policy and Guidelines on Wind Turbines^{viii}; and
- CAP 793: Safe Operating Practices at Unlicensed Aerodromesⁱ.

Telecommunications

- Scottish Government Online Wind Turbines Planning Advice^{ix}; and
- Scottish Planning Policy 2014^x.

Consultation

14.9 Consultation has been undertaken to inform the assessment, a summary of which is provided in **Table 14.1** below. Consultation with the aviation agencies was undertaken jointly by NLEI Ltd and LUC. Consultation with telecommunications agencies was undertaken by LUC.

Table 14.1: Consultation Responses

Consultee	Scoping/Other Consultation	Issue Raised	Response/Action Taken
Joint Radio Company (JRC)	Consulted at Scoping	Highlighted the potential for interference with two radio links which cross the Development Area.	NLEI Ltd commissioned JRC to undertake a detailed coordination assessment to determine the likelihood of interference with radio infrastructure, the findings of which are included in this chapter.
Civil Aviation authority (CAA)	Consulted at Scoping	Suggested that consultation be undertaken with NATS, MoD and Glasgow Prestwick Airport. Highlighted potential for unlicensed airfields – recommended contacting local planning authority or use of aeronautical chart. Recommended consultation with emergency services. Stated that the CAA requires all structures above 150m to be fitted with safety lighting.	Consultation has been undertaken with NATS, MoD and Prestwick Airport and details are provided in this table. An unlicensed airfield has been identified approximately 3.4km north of the Development Area, although this is outwith the consultation zone for unlicensed airfields. Airwave Solutions were contacted for information to inform the EIA. Subsequent assessment undertaken and no effects considered likely. Requirement for aviation lighting to be confirmed post consent.
NATS En Route	Consulted at Scoping and consultation is ongoing	Provided general guidance regarding the potential impact upon NATS infrastructure and operations. Recommended further engagement with NATS as the Development was likely to be visible to the Lowther Hill	Noted. NLEI Ltd remains in consultation with NATS regarding the potential for an appropriate mitigation solution to be delivered for the Development.

Consultee	Scoping/Other Consultation	Issue Raised	Response/Action Taken
		radar.	
Ministry of Defence (MoD)	Consulted at Scoping	Stated that the Defence Infrastructure Organisation (DIO) had no objections to the Development. Requested that the perimeter turbines should be fitted with 25 candela omni-directional red lighting or infrared lighting and that the outer turbines should be fitted with 25 candela and infrared lighting. Recommended that the MoD is consulted again following any changes to the design layout.	Noted. Turbines will be fitted with lighting as required. The DIO will be consulted at the application stage.
British Telecom (BT)	Consulted at Scoping	Stated that there are two BT links that cross the Development Area which will be affected by turbines 3 and 4 of the Scoping layout and therefore object to the proposal. Highlighted that BT require, ideally, a 100m minimum clearance from blade tips to links.	Design layout has been modified to take into account 100m clearance requirement.
Prestwick Airport	Consulted outwith Scoping for information to inform EIA.	Indicated that turbine 5 (Scoping layout) may be within line of sight of radar and suggested that further line of sight analysis should be undertaken to confirm whether an effect is likely or whether a mitigation contract will be required.	Further modelling has been undertaken in consultation with Prestwick Airport. This shows that turbines in the application layout will not be visible to the radar and that no effect is likely to occur as a result of the Development. The results of this modelling have been provided to Prestwick Airport who confirmed that they have no objection to the Development.
Ofcom	Consulted outwith Scoping for information to inform EIA.	Identified one EE link within 5.5km radius Identified two Airwave Solutions links within 5.5km radius Identified two Arqiva links within 5.5km radius.	Link providers were contacted.
EE	Consulted outwith Scoping for information to inform EIA.	Objected to the location of turbine 4 and 19 of the Scoping layout. It was noted that this link is the same as the BT link.	The design layout has been modified to take into account 100m clearance requirement.
Airwave Solutions	Consulted outwith Scoping for information to inform EIA.	Response stated that details of links will only be disclosed if an analysis is undertaken.	LUC commissioned Airwave Solutions to undertake an analysis. Airwave Solutions provided a report which concluded that no effects are likely. Further details are provided in this assessment.
Arqiva	Consulted outwith Scoping for information to inform EIA.	Identified one link approximately 2.3km east of turbine 42(Scoping layout – see Figure 3.1) from Lowther Hill to Black Hill.	LUC requested more specific details of the identified link. Nearest link is 2.4km west. No further action was required.
Atkins	Consulted outwith Scoping for information to inform EIA.	Object to three turbine locations – turbine 11, 12 and 13 (Scoping layout) due to nearby Scottish Water links.	LUC contacted Scottish Water to obtain link details. Scottish Water responded to confirm that the links identified by Atkins are being decommissioned and will not be affected by the Development. No further action was required.

Study Area

Aviation and Defence

- 14.10 Aviation and defence stakeholders were consulted at the scoping stage to determine which installations had the potential to be affected by the Development.

Telecommunications

- 14.11 Telecommunications operators were consulted and information requested for telecommunications links within the vicinity of the Development Area (consultation was based on the scoping layout comprising 42 turbines):

Dust

- 14.12 The assessment of dust effects during construction has been undertaken for receptors within 200m of areas of construction within the Development Area in accordance with accepted good practice using a risk based approach (this is detailed further below).

Carbon Balance

- 14.13 The assessment of carbon balance focuses on the Development Area. It quantifies the sources of emissions resulting from construction of the Development and balances this against the predicted emissions avoided once the Development is operational.

Desk Based Research and Data Sources

- 14.14 The following data sources were used to inform the assessment of carbon balance². The other assessments considered in this chapter were informed primarily by consultation, technical review and the guidance documents referred to in paragraph 14.8 above:

- Digest of UK Energy Statistics 2016, DUKES Chapter 6: Renewable sources of energy: *Table 6.4: Capacity of, and electricity generated from, renewable sources*^{xi};
- Digest of United Kingdom Energy Statistics 2016, DUKES Chapter 6: Renewable sources of energy, *Table 6.5: Load factors for renewable electricity generation*^{xii};
- Digest of UK Energy Statistics 2016, (DUKES) Chapter 5: Electricity, Table 5.7: Plant capacity – United Kingdom^{xiii};
- Digest of UK Energy Statistics 2016, (DUKES) Chapter 5: Electricity, Table 5.1: Commodity balances^{xiv}; and
- Greenhouse gas reporting - Conversion factors 2016^{xv}.

Field Survey

- 14.15 Whilst no specific field surveys were required to inform the assessment, LUC have visited the Development Area, access routes and nearby properties to inform the baseline. In addition, peat probing was undertaken within the Development Area to inform the assessments within **Chapter 7: Hydrology, Hydrogeology, Geology and Soils** and this information was used to inform the Carbon Balance Assessment.

Assessing Significance

Dust

- 14.16 The risk based approach to assessing the effects of dust has been based on the likelihood of dust emissions causing nuisance (such as soiling of buildings) and the potential for effects on human health, with the aim of determining the level of mitigation, if required, to ensure that any potential effects are minimised. The Design Manual for Roads and Bridges (DMRB)ⁱⁱⁱ states that dust generated during construction should be mitigated and that the locations of 'sensitive receptors' within 200m of construction areas should be identified and mitigation measures to reduce dust effects be applied. As such, all receptors within 200m of potential dust raising activities such as the construction of onsite infrastructure and Access Points A and B have been considered as potential receptors. This excludes the

effects of dust from development traffic on the public road which has been considered in **Chapter 12: Access, Traffic and Transport**.

- 14.17 Sensitivity of receptors is determined through professional judgement based on sensitive receptors defined in the DMRB such as residential properties. Effect magnitude has been determined through consideration of the potential dust raising activities during construction. Activities with high dust raising potential include earthworks (e.g. earth moving and excavation), material handling (e.g. stockpiling and loading/unloading vehicles). Natural causes, e.g. wind blowing on stockpiles and uncovered vehicles can also potentially have a high dust raising potential. Material transport and traffic on unsurfaced roads are considered to have medium dust raising potential and the movement of dirty vehicles has a low dust raising potential.

- 14.18 Professional judgement is used to consider how receptor sensitivity and effect magnitude combine to affect potential receptors. Effects which are predicted to have an adverse effect on the amenity of the receptor or on human health are considered significant in the context of the EIA Regulations.

Carbon Balance

- 14.19 The carbon balance assessment was undertaken using the latest Scottish Government guidance. There is no formally established methodology or criteria for determining the significance of the carbon balance for a development. However, the shorter the 'payback time' of CO₂ emissions, the sooner the project becomes a 'net avoider' of CO₂ emissions, with the carbon balance being considered as a beneficial effect.

Aviation and Defence and Telecommunications

As set out in paragraph 14.4, the assessment of effects on aviation, defence and telecommunications infrastructure is based on the technical acceptability of a potential effect on the installation in question. This is determined through technical assessment and consultation and results in an effect either being acceptable or unacceptable. In some instances technical mitigation solutions are required to ensure that effects are acceptable and these must be agreed with the relevant operator of the installation. The assessment presented in this chapter therefore does not present an assessment of significance, but an indication of whether the effect is acceptable or unacceptable and whether a mitigation solution is required.

Assessment Limitations

- 14.20 The methodology used for the carbon balance calculation requires the measurement around the final constructed feature. Evidently this is not possible for a project still at the planning stage such as the Development. As such, where practical, actual data has been used in the assessment; however, where real data was not obtainable, either standard data or, in some cases, an estimate has been used. Further details are provided in **Appendix 14.1** and in each case, an explanation of the values used and their source is provided.
- 14.21 No other limitations have been identified in relation to the assessment of effects on dust, aviation and defence or telecommunications.

Existing Conditions

Aviation and Defence

- 14.22 Lowther Hill radar station is located approximately 1.6km east of the Development Area (3.3km east of the nearest turbine – T14) and is one of the systems used by NATS to ensure air safety. The Development Area is therefore within a NATS Primary Radar Safeguarding Area.
- 14.23 Prestwick Airport is approximately 46km north-west of the Development Area. Prestwick Airport was consulted following the request from the CAA to determine whether the Development is within line-of-sight of its radar and therefore has potential to cause interference with its radar.
- 14.24 The CAA highlighted the potential for unlicensed airfields to be within the vicinity of the Development Area however no airfields are located within the consultation zone (2km) for the Development.
- 14.25 The MoD responded at the scoping stage indicating that it did not anticipate that the Development will affect its operations.

² Full details of all references used to inform the carbon balance assessment are provided in **Appendix 14.1: Carbon Report**.

Telecommunications

- 14.26 Following consultation with Ofcom, BT, EE and JRC, it was established that four telecommunication links cross the Development Area and may have the potential to be affected once the Development is operational. Two of these are BT links; one of which connects Green Lowther radio station (approximately 2.7km east of the Development Area) to Todholes Hill radio station (approximately 5.4km west of the Development Area) with the other connecting Green Lowther radio station to Fingland Rig within the western side of the Development Area. Consultation with EE determined that mobile signals are transmitted via the Green Lowther and Todholes Hill radio stations.
- 14.27 JRC identified two ScottishPower radio links which pass through the Development Area. One of these is an Ultra High Frequency (UHF) telemetry link which connects Green Lowther radio station with Fauldhead substation, near Kirkconnel. The other is a point to point microwave which connects Green Lowther with Craigie Hill, near Prestwick.

Dust

- 14.28 There is one property located immediately adjacent to the Development Area (Nether Cog located near Access B) which is within 200m of the Development infrastructure and judged to be a potential receptor of dust emissions from onsite construction works as can be seen in **Figure 14.1**. Clackleith is also within 200m of proposed construction works, however this is within Buccleuch ownership and will not be occupied during the construction or operational phases and so is not classified as a receptor.

Carbon Balance

- 14.29 The results of onsite survey work have confirmed that peat is present across the Development Area. Whilst the final turbine and infrastructure layout of the Development has sought to avoid deeper areas of peat, some peat will be required to be removed during construction. Full details of the survey work undertaken and a description of the peat present within the Development Area are provided in **Chapter 7**. In addition, there will be a need to remove some forestry to facilitate construction and efficient operation of the Development. Full details of the felling required are provided in **Chapter 4: Scheme Description**. This has been taken into account in the carbon balance assessment.

NLEI Design Considerations

- 14.30 The layout was designed to avoid deep peat and overall, seek to minimise the loss of peat which is relevant to the carbon balance assessment. Further detail on the consideration of peat in the design process is provided in **Chapter 3**. The telecommunication links identified by BT were mapped and a setback distance of 100m has been maintained. In addition, increasing setback from nearby residential properties to improve amenity was a key factor in design. This has reduced the number of properties that could be subject to dust emissions.

Assessment of Effects

- 14.31 The assessment of effects is based upon the scheme description outlined in **Chapter 4** and considers the construction and operational effects of the Development. Unless otherwise stated, potential effects identified are considered to be negative.

Construction Effects

Dust

- 14.32 The nearest receptor to proposed construction works (Nether Cog) could be affected by dust from the construction of site Access B and associated access tracks and the movement of vehicles as they transport equipment and goods within the Development Area. The level and distribution of dust emissions will vary according to factors such as the duration of dust-generating activity and weather conditions.
- 14.33 Dust emitting activities generally respond well to appropriate dust control measures such as those outlined in PAN 50: Controlling the Environmental Effects of Surface Mineral Workings^{iv} and negative effects can greatly be reduced or eliminated. NLEI Ltd will commit to adopting good practice measures

for dust management during construction, focussing in particular on areas within 200m of Nether Cog, thereby controlling and reducing any potential effects on the potential receptors identified. Options available are:

- ensuring all loads which will enter the Development Area are covered where practicable;
- enforcing an appropriate speed limit;
- making the use of netting screens for construction activities within 200m of Nether Cog.

- 14.34 With adherence to these good practice measures, the predicted magnitude of the temporary dust effects will be reduced and will be not significant.
- 14.35 The effects of dust from development traffic on the public road has been considered in **Chapter 12**.

Proposed Mitigation

- 14.36 No mitigation beyond the adoption of good practice measures for dust management is required.

Residual Effects

- 14.37 The predicted residual effect of the Development on dust receptors remain not significant with the implementation of the good practice measures proposed.

Operational Effects

Aviation and Defence

- 14.38 NATS En Route Plc has indicated that the Development will be visible to the Lowther Hill radar. Without mitigation, effects on Lowther Hill from the Development will be unacceptable.
- 14.39 More detailed modelling of visibility of the Development to Prestwick Airport has shown that the turbines will not be visible to its radar and that effects are unlikely. Based on this it is concluded that the effect of the Development on Prestwick Airport will be acceptable and that no mitigation will be required. Details of the more detailed modelling have been provided to Prestwick Airport who have confirmed that they have no objection to the Development.
- 14.40 To date, the MoD has not raised any concerns regarding the potential for the Development to affect its infrastructure and no unacceptable effects on defence interests are anticipated.

Telecommunications

- 14.41 As part of the design process, a minimum setback distance of 100m from the turbines to the BT links traversing the Development Area has been maintained. Given that this distance was recommended by both BT and EE to minimise the potential for interference, it is judged that there will be no effect of the operational Development on these links.
- 14.42 The Detailed Coordination study undertaken by JRC on an earlier layout identified that the position of two turbines (8 and 9) would fail the JRC diffraction criteria and would likely cause interference with the UHF telemetry link transmitting between Green Lowther radio station with Fauldhead substation. JRC subsequently recommended that turbine 8 be moved 30m south and turbine 9 moved 35m south to reduce the potential for interference. This was considered as part of the iterative design, however, given that both of these turbines are adjacent to steep slopes to the south, it was considered that relocating to these locations would represent a significant health and safety risk. As a result, there is the potential for an unacceptable effect on this link in the absence of mitigation.

Carbon Balance

- 14.43 A copy of the carbon balance assessment report is provided at **Appendix 14.1** and a summary of the findings is provided below. In compiling carbon data, a conservative approach has been taken; therefore, little allowance has been made for CO₂ gains due to activities which may lead to improvements in the carbon balance of the Development. Specifically, forestry replanting data, which is likely to have a positive effect on carbon savings for the Development, has not been included in the calculator.
- 14.44 The detailed methodology and assumptions used within the assessment are presented in **Appendix 14.1**. Total carbon losses associated with the Development are shown in **Table 14.2** below.

Table 14.2: Total Carbon Losses Due to Development

Source of Losses	Carbon losses (tCO ₂ yr ⁻¹)		
	Expected Value*	Minimum Value	Maximum Value
Turbine life cycle	120,985	107,904	120,985
Balancing capacity	103,340	0	103,340
Reduction in carbon fixing potential	3,599	998	7,455
Soil organic matter	34,343	-171	143,109
Dissolved Organic Carbon (DOC) & Particulate Organic Carbon (POC) leaching	32	0	220
Felling of forestry	12,081	7,652	15,504
Total	274,380	116,383	390,613

14.45 Based on the figures input to the carbon calculator, the outcome of this analysis is that there is an expected carbon loss of 274,380tCO₂, primarily due to turbine lifecycle and requirement for balancing capacity of electricity grid. Given that the 'Grid-mix' will involve renewable energy developments that are operational, the 'Fossil fuel-mix' represents the most likely scenario in terms of the existing capacity to be replaced by electricity generated from the Development.

14.46 The expected carbon payback period is calculated to be approximately 1 year (12 months) if replacing the 'Fossil Fuel Mix' as shown in **Table 14.3** below. Based on the worst case scenario, represented by the maximum values entered in the calculator across all generation source types and also taking account of a requirement for balancing capacity, the payback time is calculated to be 3 years (36 months).

Table 14.3: Carbon Payback Period

Generation Source	Counterfactual emission factors (t CO ₂ MWh ⁻¹)	Carbon Payback Period (years)		
		Expected Value	Minimum Value 0% Balancing Capacity	Maximum Value 5% Balancing Capacity
Coal Fired	0.903	0.7	0.3	1.4
Grid Mix	0.410	1.5	0.6	3.0
Fossil Fuel Mix	0.642	1.0	0.4	1.9

Proposed Mitigation

Aviation and Defence

14.47 NLEI Ltd, along with its appointed technical consultants, is currently in discussions with NATS to identify a potential mitigation solution for the effect to be mitigated to an acceptable level. This is a process which involves complex radar modelling and iterative discussions with the aim of arriving at a mutually agreeable solution. NLEI Ltd is currently exploring options for mitigating the effects of the Development on the Lowther Hill radar and will continue discussions with NATS in a constructive manner with the aim of reaching an agreed technical mitigation solution.

14.48 No mitigation will be required in relation to effects on Prestwick Airport or defence interests.

Telecommunications

14.49 NLEI Ltd is committed to ensuring that any interference caused by the Development on the UHF link is minimised. NLEI Ltd will continue to engage with JRC following submission of the application for consent to establish the likelihood and extent for interference to occur and for a technical mitigation solution to be agreed if this is necessary. JRC has undertaken similar studies for other windfarm developers, which have resulted in mitigation proposals that have been agreed by all parties. Following the implementation of such mitigation, effects on the link operated by JRC will be acceptable.

Carbon Balance

14.50 The carbon offset by the Development will contribute positively to meeting Scotland's targets for reducing greenhouse gas emissions. No mitigation measures in relation to carbon balance are required.

Further Survey Requirements and Monitoring

14.51 Effects on television reception will be confirmed following a pre-construction onsite signal strength survey. No additional survey requirements or monitoring is proposed.

Summary of Significant Effects

14.52 In relation to other issues, the assessment of effects considers technical acceptability rather than following the EIA method of identifying significant effects. On this basis, there are predicted unacceptable aviation and defence effects on the Lowther Hill radar and telecommunication effects on the JRC UHF Link (telecommunications). These effects will be mitigated through technical solutions such that there will be no unacceptable, or EIA significant, residual effects.

ⁱ CAA (2010), CAP 793: Safe Operating Practices at Unlicensed Aerodromes
ⁱⁱ The Scottish Government (2014) 'Onshore Wind Turbines' Web Based Renewables Advice (updated 28 May 2014)
ⁱⁱⁱ Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment Techniques, Part 1, HA207/07 Air Quality
^{iv} The Scottish Executive (1996), PAN 50: Controlling the Environmental Effects of Surface Mineral Working
^v The Scottish Government (2016), Carbon calculator technical guidance - Version 2.10.0
^{vi} The Scottish Government (2016), Carbon Calculator Tool Version 1.0.1
^{vii} Scottish Natural Heritage (2003). *Wind Farms and Carbon Savings, SNH Technical Guidance Note:* <http://www.gov.scot/Resource/0045/00455955.pdf> (Accessed 22nd March 2017)
^{viii} Directorate of Airspace Policy (2012), CAP 764 CAA Policy and Guidelines on Wind Turbines 4th edition
^{ix} Scottish Government Online Wind Turbines Planning Advice
^x The Scottish Government (2014), Scottish Planning Policy (SPP).
^{xi} Department for Business, Energy & Industrial Strategy (DBEIS) (2016b). *Digest of UK Energy Statistics 2016, DUKES Chapter 6: Renewable sources of energy: Table 6.4: Capacity of, and electricity generated from, renewable sources:* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/577712/DUKES_2016_FINAL.pdf (Accessed 22nd March 2017)
^{xii} Department for Business, Energy & Industrial Strategy (DBEIS) (2016a). *Digest of United Kingdom Energy Statistics 2016, DUKES Chapter 6: Renewable sources of energy, Table 6.5: Load factors for renewable electricity generation:* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/577712/DUKES_2016_FINAL.pdf (Accessed 22nd March 2017)
^{xiii} Department for Business, Energy & Industrial Strategy (DBEIS) (2016c). *Digest of UK Energy Statistics 2016, (DUKES) Chapter 5: Electricity, Table 5.7 Plant capacity - United Kingdom:* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/577712/DUKES_2016_FINAL.pdf (Accessed 22nd March 2017)
^{xiv} Department for Business, Energy & Industrial Strategy (DBEIS) (2016d). *Digest of UK Energy Statistics 2016, (DUKES) Chapter 5: Electricity, Table 5.1: Commodity balances:* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/577712/DUKES_2016_FINAL.pdf (Accessed 22nd March 2017)
^{xv} Department for Business, Energy & Industrial Strategy (DBEIS) (2016e). *Greenhouse gas reporting - Conversion factors 2016:* <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2016> (Accessed 22nd March 2017)