

# Chapter 16 Summary of Residual Effects

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## 16 Summary of Residual Effects

### 16.1 Introduction

16.1.1 **Table 16.1** and **16.2** provide a reference to any significant residual environmental effects identified in the technical sections of this Environmental Impact Assessment (EIA) Report, as well as a cross reference to the relevant mitigation measures identified.

16.1.2 The residual effects are highlighted in **bold** where an effect is considered to be significant.

16.1.3 **Table 16.3** provides a summary of the cumulative effects of the Proposed Development in combination with other proposed, consented and operational developments within the local area

**Table 16.1: Summary of Construction and Decommissioning Effects**

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
<b>Construction Effects</b>					
<b>Landscape and Visual</b>					
Effects on existing landscape features including existing vegetation, watercourses and drainage channels	Not significant	Moderate to minor adverse	Mitigation by design	Not significant	Moderate to minor adverse
Effects on the Landscape Character Types (LCTs) within which the Proposed Development is partially located including LCT 266 Plateau Moorland - Lothians and LCT 269 Upland Fringes - Lothians	<b>Significant</b>	Moderate to major adverse	Mitigation by design	<b>Significant</b>	Moderate to major adverse
Effects on LCTs within which the Proposed Development is partly located including parts of LCT 270 Lowland River Valleys - Lothians and LCT 272 Lowland Hills and Ridges	Not significant	Moderate to minor adverse	Mitigation by design	Not significant	Moderate to minor adverse
Visual effects	<b>Significant</b>	Major to moderate adverse	Mitigation by design	<b>Significant</b>	Major to moderate adverse
<b>Archaeology and Cultural Heritage</b>					
Sheepfold (SLR35)	Minor	Adverse	Fencing off and appropriately worded Planning Condition	Minor	Adverse
Enclosure (SLR42)	Minor	Adverse	Targeted Watch Brief	Minor	Adverse
<b>Ecology</b>					

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Wet dwarf shrub heath	Not significant	Minor adverse	In addition to embedded mitigation, the implementation of a Biodiversity Enhancement Management Plan (BEMP) which includes bog and upland habitat restoration	Not significant	Minor adverse
Wet modified bog and dry modified bog	Not significant	Minor adverse	In addition to embedded mitigation, the implementation of a BEMP which includes bog and upland habitat restoration	Not significant	Minor adverse
<b>Ornithology</b>					
Habitat loss: construction of infrastructure including wind turbine foundations and access tracks	Negligible	Adverse	Avoidance of more sensitive habitats in design process	Not significant	Adverse
Disturbance to Schedule 1 and Annex 1 breeding species	Negligible	Adverse	Development and implementation of Breeding Bird Protection Plan, to include pre-construction survey checks; if present avoid disturbing activity in proximity with species-specific buffer zone implemented.	Not significant	Adverse
Disturbance to other breeding species	Negligible	Adverse	Pre-construction survey and active nests avoided	Not significant	Adverse
Disturbance to wintering birds	Negligible	Adverse	None required	Not significant	Adverse
<b>Geology, Hydrology and Hydrogeology</b>					
Degradation of peat and carbon rich soils	Not significant	Adverse	Mitigation by design and good practice measures. Final Construction Environmental Management Plan (CEMP) to be submitted for the written approval	Not significant	Negligible

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
			of Midlothian Council, the Scottish Environmental Protection Agency (SEPA) and NatureScot prior to construction commencing. A Geotechnical Risk Register and Peat Management Plan will also be implemented		
Generation of Pollution Impairing Surface Water, Groundwater, Habitat and Water Supplies	Not significant	Adverse	Final CEMP to be submitted for the written approval of Midlothian Council, SEPA and NatureScot prior to construction commencing	Not significant	Negligible
Erosion and Sedimentation Impairing Surface Water, Groundwater, Habitat and Water Supplies	Not significant	Adverse	Final CEMP to be submitted for the written approval of Midlothian Council, SEPA and NatureScot prior to construction commencing	Not significant	Negligible
Drainage and Dewatering Impairing Surface Water, Groundwater, Habitat and Water Supplies	Not significant	Adverse	Final CEMP to be submitted for the written approval of Midlothian Council, SEPA and NatureScot prior to construction commencing	Not significant	Negligible
<b>Traffic and Transport</b>					
Severance	Minor	Adverse	Construction Traffic Management Plan (CTMP) proposals via a condition of consent. CTMP to be agreed with Midlothian Council prior to construction activities commencing	Not significant	Adverse
Driver Delay	Minor	Adverse	CTMP proposals and improved signage via a condition of consent. CTMP to be agreed with Midlothian Council prior to construction activities commencing	Not significant	Adverse

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Pedestrian Delay	Minor	Adverse	CTMP and PMP proposals via a conditions of consent. CTMP and PMP to be agreed with Midlothian Council prior to construction activities commencing	Not significant	Adverse
Non-motorised user amenity	Minor	Adverse	CTMP and PMP proposals via a condition of consent. CTMP to be agreed with Midlothian Council prior to construction activities commencing	Not significant	Adverse
Fear and intimidation	Minor	Adverse	CTMP and PMP proposals via a condition of consent. CTMP to be agreed with Midlothian Council prior to construction activities commencing	Not significant	Adverse
Road Safety	Minor	Adverse	CTMP and PMP proposals via a condition of consent. CTMP to be agreed with Midlothian Council prior to construction activities commencing. Access junction designed in accordance with Midlothian Council design guidelines	Not significant	Adverse
Large Loads	Minor	Adverse	CTMP and Abnormal Indivisible Loads (AIL) TMP proposals via a condition of consent. CTMP to be agreed with Midlothian Council prior to construction activities commencing	Not significant	Adverse

**Acoustic Assessment**

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Potential for noise and vibration to be created during general construction activities and by construction traffic	Not significant	Negligible	Noise mitigation measures would be implemented as part of the Construction and Environmental Management Plan which would be required to be agreed as a condition of consent	Not significant	Negligible
<b>Socio-economics, Recreation and Tourism</b>					
£10.2 million Gross Value Added (GVA) and 135 jobs in Midlothian	Minor and not significant	Beneficial	N/A	Negligible and not significant	Beneficial
£37.2 million GVA and 543 jobs in Scotland	Negligible and not significant	Beneficial	N/A	Negligible and not significant	Beneficial
<b>Other Issues</b>					
No aviation effects expected during construction.					
No shadow flicker effects expected during construction.					

**Table 16.2: Summary of Operational Effects**

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
<b>Landscape and Visual</b>					
Effects on LCTs within which the Proposed Development is partially located including LCT 266 Plateau Moorland - Lothians and LCT 269 Upland Fringes - Lothians	<b>Significant</b>	Adverse	Mitigation by design	<b>Significant</b>	Adverse

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Indirect effects to other LCTs including parts of LCT 104 Upland Fringe Rough Grassland, LCT 270 Lowland River Valleys - Lothians and LCT 272 Lowland Hills and Ridges	Significant	Adverse	Mitigation by design	Significant	Adverse
Effects on LVIA viewpoints during daylight hours	Significant	Adverse	Mitigation by design	Significant	Adverse
Effects on LVIA viewpoints during dark sky others	Significant	Adverse	Reduced aviation lighting scheme agreed with the Civil Aviation Authority (CAA)	Significant	Adverse
Effects on settlements during daylight hours	Significant	Major to moderate adverse	Mitigation by design	Significant	Major to moderate adverse
Effects on settlements during dark sky hours	Significant	Major to moderate adverse	Reduced aviation lighting scheme agreed with the CAA	Significant	Major to moderate adverse
Effects on users of Core Paths during daylight hours located within 5 km during daylight hours	Significant	Major Adverse	Mitigation by design	Significant	Major Adverse
Effects on users of Core Paths during daylight hours located 5km and 7.5 km during daylight hours	Significant	Major to moderate Adverse	Mitigation by design	Significant	Major to moderate Adverse
Effects on users of Core Paths during daylight hours located within 5 km during dark sky hours	Significant	Moderate Adverse	Reduced aviation lighting scheme agreed with the CAA	Significant	Moderate Adverse
Effects on users of Core Paths during daylight hours located 5 km and 7.5 km during dark sky hours	Significant	Moderate Adverse	Mitigation by design	Significant	Moderate Adverse



Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Effects on users of cycle routes during daylight hours	Significant	Major Adverse	Mitigation by design	Significant	Major Adverse
Effects on users of cycle routes during dark sky hours	Significant	Major to moderate Adverse	Reduced aviation lighting scheme agreed with the CAA	Significant	Major to moderate Adverse
Effects on road users during daylight hours	Significant	Major to moderate Adverse	Mitigation by design	Significant	Major to moderate Adverse
Effects on road users during dark sky hours including from B7007	Significant	Moderate Adverse	Reduced aviation lighting scheme agreed with the CAA	Significant	Moderate Adverse
Effects on Special Landscape Areas including parts of Gladhouse Reservoir & Moorfoot Scarp SLA, South Esk Valley and Carrington Farmland SLA, Tyne Valley SLA and a very limited part of The Pentland Hills SLA	Significant	Adverse	Mitigation by design	Significant	Adverse
<b>Archaeology and Cultural Heritage</b>					
Moorfoot Chapel, monastic grange and chapel (SM5976)	Minor	Adverse	N/A	Very minor	Adverse
Loquhariot, fort 500m SW of (SM6260)	Very Minor	Adverse	N/A	Very Minor	Adverse
Jeffries Corse Cairn (SM3527)	Moderate	Adverse	N/A	Moderate	Adverse
Dundreich, cairn (SM2777)	Moderate	Adverse	N/A	Moderate	Adverse
Falla Luggie Tower, towerhouse (SM5653)	Negligible	Adverse	N/A	Negligible	Adverse
Hirendean Castle (SM5608)	Minor	Adverse	N/A	Minor	Adverse

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Corsehope Rings, fort (SM1166)	Very Minor	Adverse	N/A	Very Minor	Adverse
Halltree Rings, settlement, Chapel Hill (SM1170)	Very Minor	Adverse	N/A	Very Minor	Adverse
Soutra Aisle, burial aisle and part of site of medieval hospital (SM3067, SM7573)	Very Minor	Adverse	N/A	Very Minor	Adverse
Gladhouse Villa (LB14633) And Gladhouse Reservoir Including Dam, Weirs, Revetments, Gangway, Measuring House, Tweeddaleburn Aqueduct And Bridges Over Tributaries (LB45811)	Very Minor	Adverse	N/A	Very Minor	Adverse
Mauldslie Farmhouse And Steading (LB45814)	Negligible	Adverse	N/A	Negligible	Adverse
Middleton Hall, Including Gatepiers, Gates, Ha-Ha And Boundary Walls (Lb806)	Very Minor	Adverse	N/A	Very Minor	Adverse
Borthwick and Crichton Conservation Area (CA343), including Crichton Castle (SM13585)	Negligible	Adverse	N/A	Negligible	Adverse
Temple and Arniston Conservation Area (CA342):	Not significant	N/A	N/A	Not significant	N/A
Arniston Inventoried Garden And Designated Landscape (GDL00029)	Minor	Adverse	N/A	Minor	Adverse
<b>Ecology</b>					
Bats (high-risk collision species/genus: common pipistrelle,	Not significant	Minor adverse	In addition to embedded mitigation (i.e., maintenance of a 50 m buffer from turbine blade tip to feature	Not significant	Minor adverse

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
soprano pipistrelle, Nyctalus spp., Nathusius' pipistrelle)			height and feathering whilst idling), proposals included as part of biodiversity enhancements detailed in the oBEMP ( <b>Technical Appendix 8.6</b> ) would create and improve bat foraging habitat and corridors		
<b>Ornithology</b>					
Displacement of birds from zone around wind turbines	Negligible	Adverse	BEMP and additional measures to offset potential losses	Not significant	Adverse
Disturbance to Schedule 1 and Annex 1 breeding species	Negligible	Adverse	N/A	Not significant	Adverse
Disturbance to other breeding species	Negligible	Adverse	N/A	Not significant	Adverse
Disturbance to wintering birds	Negligible	Adverse	N/A	Not significant	Adverse
Mortality through bird collision with wind turbines	Low/negligible	Adverse	N/A	Not significant	Adverse
<b>Geology, Hydrology and Hydrogeology</b>					
Degradation of Peat and Carbon Rich Soils	Not significant	Adverse	Mitigation by design and good practice measures. Final CEMP to be submitted for the written approval of Midlothian Council, SEPA and NatureScot prior to construction commencing. A Geotechnical Risk Register Peat Management Plan will also be implemented	Not significant	Negligible

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/Adverse
Generation of Pollution Impairing Surface Water, Groundwater, Habitat and Water Supplies	Not significant	Adverse	Final CEMP to be submitted for the written approval of Midlothian Council, SEPA and NatureScot prior to construction commencing	Not significant	Negligible
Erosion and Sedimentation Impairing Surface Water, Groundwater, Habitat and Water Supplies	Not significant	Adverse	Final CEMP to be submitted for the written approval of Midlothian Council, SEPA and NatureScot prior to construction commencing	Not significant	Negligible
Drainage and Dewatering Impairing Surface Water, Groundwater, Habitat and Water Supplies	Not significant	Adverse	Final CEMP to be submitted for the written approval of Midlothian Council, SEPA and NatureScot prior to construction commencing	Not significant	Negligible
<b>Traffic and Transport</b>					
N/A	N/A	N/A	N/A	N/A	N/A
<b>Acoustic Assessment</b>					
Potential impact on residential amenity due to operational noise	Not significant	Minor	N/A	Not significant	Minor
<b>Socio-economics, Recreation and Tourism</b>					
£1.1 million GVA and nine jobs in Midlothian	Negligible and not significant	Beneficial	N/A	Negligible and not significant	Beneficial
£2.3 million GVA and 25 jobs in Scotland	Negligible and not significant	Beneficial	N/A	Negligible and not significant	Beneficial
£540,000 annual community benefit payments	Negligible and not significant	Beneficial	N/A	Negligible and not significant	Beneficial
Payment of non-domestic rates	Negligible and not significant	Beneficial	N/A	Negligible and not significant	Beneficial



Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Effect on local tourism economy	Negligible and not significant	Adverse	N/A	Negligible and not significant	N/A
<b>Other Issues</b>					
False targets and returns on air traffic control radars	Negligible and not significant	Adverse	Reduced visible aviation lighting scheme has been agreed with the CAA. The reduced scheme means only seven wind turbine needs to be lit and no tower lights are required provided an infrared scheme is agreed with the Defence Infrastructure Organisation (DIO)	Negligible and not significant	N/A
Aviation and Radar: Impact upon Eskdalemuir Seismic Array (EKA)	Negligible and not significant	Adverse	The Military of Defence (MoD) maintains that the Eskdalemuir 'noise budget' will apply to the Proposed Development via an appropriately worded planning condition	Negligible and not significant	N/A
Shadow flicker	<b>Significant</b>	Adverse	Planting of tree belts or the shutting down of individual turbines during periods when shadow flicker could theoretically occur	Negligible	N/A

**Table 16.3: Summary of Cumulative Effects**

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
<b>Landscape and Visual</b>					
<p>There would be potential for cumulative effects to arise within LCT 90 Dissected Plateau Moorland in that part of the landscape which lies between the Proposed Development and Wull Muir. There would also be increased visibility of turbines within that part of LCT 269 Upland Fringes - Lothians which lies immediately to the north-east of the Proposed Development. In these areas the main assessment has however already identified that there would be a significant effect on landscape character as a result of the Proposed Development and so there would be no additional significant cumulative effects. No other additional significant cumulative landscape or visual effects are considered to arise in relation to other in-planning schemes.</p>					
<b>Archaeology and Cultural Heritage</b>					
Jeffries Corse Cairn (SM3527)	Moderate	Adverse	N/A	Minor	Adverse
Dundreich, cairn (SM2777)	Moderate	Adverse	N/A	Minor	Adverse
<b>Ecology</b>					
Bats (high-risk collision species/genus: common pipistrelle, soprano pipistrelle, Nyctalus spp., Nathusius' pipistrelle)	Not significant	Minor adverse	In addition to embedded mitigation (i.e., maintenance of a 50 m buffer from turbine blade tip to feature height and feathering whilst idling), proposals included as part of biodiversity enhancements detailed in the oBEMP ( <b>Technical Appendix 8.6</b> ) would create and improve bat foraging habitat and corridors	Not significant	Minor adverse
<b>Ornithology</b>					
Pink-footed goose cumulative collision risk	Negligible	Adverse	N/A	Not significant	Adverse
Curlew cumulative disturbance risk	Low	Adverse	N/A	Minor and not significant	Adverse
Goshawk cumulative collision risk	Low	Adverse		Not significant	Adverse

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
<b>Geology, Hydrology and Hydrogeology</b>					
N/A	N/A	N/A	N/A	N/A	N/A
<b>Traffic and Transport</b>					
Impact on local road network	N/A	N/A	Inclusion of additional vehicular flows to the baseline such as committed development trips, will dilute the potential impact. Should any of the proposals (non-wind farm developments and wind farm developments) be constructed at the same time as the Proposed Development, the effects would be mitigated through the use of an overarching Traffic Management Plan (oTMP) for all of the sites and by introducing a phased delivery plan which would be agreed with the local roads departments and Police Scotland	N/A	N/A
<b>Acoustic Assessment</b>					
Cumulative noise levels of the Carcant Wind Farm and Wull Muir Wind Farm developments during operation	Not significant	Adverse	N/A	Not significant	Adverse
<b>Socio-economics, Recreation and Tourism</b>					
Economic benefits during operation - development of local supply chain and diversification of local businesses during construction	Negligible and not significant	Beneficial	N/A	Negligible and not significant	Beneficial

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/Adverse
Economic benefits during operation - diversification and investment within local companies	Negligible and not significant	Beneficial	N/A	Negligible and not significant	Beneficial
Tourism and recreation assets	Negligible and not significant	Adverse	N/A	Negligible and not significant	N/A

**Other Issues**

It is considered that there will be no significant cumulative effects on aviation or radar as a result of the Proposed Development.

There is no potential for cumulative shadow flicker effects.