Chapter 16 Conclusion and Residual Effects

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List of Abbreviations

Abbreviation	Description
AIL	Abnormal Indivisible Load
BESS	Battery Energy Storage System
CAA	Civil Aviation Authority
CEMP	Construction Environment Management Plan
ECoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GWDTE	Groundwater Dependant Terrestrial Ecosystem
ha	hectare
HES	Historic Environment Scotland
HER	Historic Environment Records
HGV	Heavy Goods Vehicles
IOF	Important Ornithological Feature
Km	Kilometre
LCT	Landscape Character Type
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
m	metre

OEMP	Operational Environmental Management Plan
SBC	Scottish Borders Council
SPP	Species Protection Plan
SuDS	Sustainable Drainage System
TMP	Traffic Management Plan
WSI	Written Scheme of Investigation

Glossary

Abbreviation	Definition
The Applicant	Fred. Olsen Renewables Limited
EIA Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to of the likely significant environmental effects arising from a proposed development
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017
Natural Power	The lead consultant EIA co-ordinator is Natural Power Consultants Limited.
Proposed Development	The proposed Lees Hill Renewable Energy Park as described in Chapter 4, Volume 2 of this EIAR
Proposed Development Site	The project development area within the site boundary as shown in Figure 1.2., Volume 3a

16. Conclusion and Residual Effects

16.1. Introduction

16.1.1. This chapter presents: a summary of the topics scoped into and included in the Environmental Impact Assessment (EIA) for Lees Hill Renewable Energy Park (the Proposed Development). All chapters note the consultees that were consulted/responded during the EIA process. The Environmental Impact Assessment Report (EIAR) details where these responses have been addressed, if applicable; the results of the EIA assessments where these are potentially significant; any mitigation proposed; and any residual effects. These topics are outlined in Table 16.1 below.

Table 16.1: Summary of residual effects, mitigation and enhancement for Lees Hill Renewable Energy Park

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
LVIA	Design Evolution	Design aimed to avoid overly complex or visually confusing layout and minimise overall impact when viewed from local settlements. Key design consideration was relationship between Proposed Development and residential areas nearby. Design aimed to reduce potential cumulative effects between Proposed Development and nearby windfarm developments. To reduce the Landscape and Visual effects of the Proposed Development, the following changes were made throughout the design evolution process: • Overall reduction number of turbines from seven (scoping layout) to six (design freeze). • Reduction of solar area to 69.83 ha search area after feedback from public consultation. • A reduced lighting scheme for the turbines.	A reduced lighting scheme was agreed with the Civil Aviation Authority (CAA) on 12/12/23 to include the following on site: • Medium intensity steady red (2000 candela) lights on the nacelles of turbines T1, T4 and T5. • A second candela light on the nacelles of the above turbines to act as alternates in the event of a failure of the main light. • The lights on these turbines to be capable of being dimmed to 10% of peak intensity when the lowest visibility as measured at suitable points around the wind farm by visibility measuring devices exceeds 5km. • Infra-red lights to MoD specification installed on the nacelles of turbines T1, T2 T3, T4, T5 and T6.	Significant landscape effects identified in the LVIA for three Landscape Character Types (LCT's) within approximately 6km of the outermost turbines of the Proposed Development, and are limited to the slopes of Hardens Hill and the Dirrington Laws, down to Greenlaw Moor and Gavinton west of Duns. This is considered to be a contained extent of significant landscape effects for the scale of development proposed. Significant visual effects will occur within 11km, although most significant effects will occur within 7km. • 18 out of 23 viewpoints were identified to have significant visual effects, 11 of these were within 5 km of the Proposed Development and were selected in order to explore visibility of the ground level solar arrays from nearby. • More prolonged visibility will be experienced from routes over the Inch and

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
				Greenlaw Moors to the south-west of the Proposed Development Site. Significant effects on the experience of routes (generally for intermittent route sections with visibility), are judged to occur within 7 km of the site, also reflecting topography, woodland cover, and more open prolonged views from the south-west.
Ecology	Design Evolution	A minimum distance of 50 m has been maintained between the Proposed Development and watercourses as far as practicably possible with the exception for locations where tracks cross watercourses. The layout of the Proposed Development has avoided impacts to sensitive habitats where possible (e.g. blanket bog), and areas of peat, taking into account other constraints, as such no solar arrays or access tracks will be constructed over the blanket bog. Where avoidance has not been possible, the infrastructure will be constructed in such a way as to maintain the integrity and connectivity of the hydrology of hydrologically sensitive habitats. New access tracks		Not significant.

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
		would be designed to keep with good practice guidance. Turbine locations are over 100 m from key habitat features for bats (woodland or scrub) which is more than the 86 m buffer set out by NatureScot. Should micrositing be required the distance will be maintained and overseen by and Environmental Clerk of Works (ECoW). The solar array has been designed with the option of grazing and the leading edge (lowest edge) of the panels will be 0.8 m above the ground, allowing enough space for maintenance of the vegetation and minimal shading of the grassland below the panels. The perimeter fencing is 6 ft deer fencing with wooden posts, it will not be concreted in at the base enabling medium-small mammals to continue to move through and within the area to maintain habitat connectivity.		
	Pre-construction and construction	Preconstruction surveys for protected species. Where possible an allowance of 50 m micrositing of infrastructure will be considered to ensure construction does not impact on the most sensitive habitats and any other identified	Species Protection Plan (SPP) implemented and secured via planning condition. CEMP secured via planning condition.	Minor Adverse – Not significant.

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
		ecological constraints and will be completed in consultation with the ECoW. Any land degraded by construction and not required for the operation of the Proposed Development, such as temporary crane hard standings, would be restored as soon as possible after construction is completed. Site activities have the potential to cause pollution through dust, siltation, leaks and spillages associated with plant and materials during the construction and operational phases mitigated through the Construction Environment Management Plan (CEMP). Pollution incidents may occur during construction as well as within the operational phase during maintenance works, mitigated via CEMP. Accidental or incidental injury and mortality of protected species during construction, mitigated via Species Protection Plan and CEMP. Loss of habitat compensated via biodiversity net gain included in the Operational Environmental Management Plan (OEMP).	Presence of ECoW on site secured via planning condition. OEMP secured via planning condition.	

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
		Direct and indirect loss of blankety bog and wet modified bog habitat mitigated through the OEMP via restoration of bog and upland habitat.		
	Operation	Potential bat collisions for high collision risk bat species. There will be little on-site activity during the operational phase, any routine maintenance works will take place during the day where practicable to minimise the potential for disturbance to protected species within the Proposed Development in accordance with the OEMP.	OEMP secured via planning condition.	Minor adverse – Not significant.
	Decommissioning	Good practice measures as described in the construction stage will be followed, which includes specific guidance for the restoration and decommissioning of wind farms. New guidance available at the decommissioning phase would be adopted if appropriate, and a decommissioning plan will be drafted for agreement by consultees prior to commencement of decommissioning.	Complete decommissioning in line with specific up to date guidance and secured via condition.	Not significant.
Ornithology	Design Evolution	The layout has been designed to minimise the potential for any negative effects associated with the Proposed Development, as well as potentially providing positive effects in the longer term.		Not significant.

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
		Various measures will be proposed to provide compliance with legislation, and to follow good practice guidance and consultation recommendations with regards to breeding birds. Where experience of developing projects of this nature has shown that embedded mitigation is sufficient to prevent significant adverse effects on Important Ornithological Feature (IOFs), this has been built into the assessment.		
	Pre-construction and construction	Prior to the start of construction, contractors will be made aware of the ornithological sensitivities within the area of the Proposed Development (particularly with regard to the potential presence of Schedule 1 breeding species) during toolbox talks as part of the CEMP. Legal compliance regarding breeding birds will be adhered to including good practice via timing of works and pre-construction surveys will be necessary to reduce the possibility of illegal damage, destruction or disturbance to occupied bird nests during the construction phase. Felling of trees, and construction of turbine bases, access tracks and other structures will lead to direct habitat	OEMP secured via planning condition. Presence of ECoW on site secured via planning condition.	Minor adverse – Not significant.

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
		loss, mitigated via CEMP and enhanced via the OEMP. Disturbance and displacement - potential impacts of associated noise and visual disturbance could lead to the temporary displacement or disruption of breeding and foraging birds. The potential impacts associated with construction activities are only likely to occur for as long as the construction phase continues. They are thus short-term and can be readily mitigated by avoiding sensitive areas (through the implementation of appropriately defined buffer zones), and by timing construction activities to avoid periods where sensitive species are present (if and where possible) such as the breeding season.		
	Operation	The operation of turbines and associated human activities for maintenance purposes also has the potential to cause disturbance and displace birds from the development. Disturbance impacts during the operational phase may be less than during the construction phase, as species may become habituated to turbines and disturbance due to human activities will be considerably reduced.	OEMP secured via planning condition.	Minor adverse – Not significant.

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
		Collision risk. With the exception of the operation of the wind turbines and general maintenance of the turbines, there will be little on-site activity during the operational phase and therefore levels of disturbance will be considerably reduced relative to the construction period.		
	Decommissioning	Good practice measures as described in the construction stage will be followed, including specific guidance for the restoration and decommissioning of renewable energy developments. New guidance available at the decommissioning phase would be adopted if appropriate, and a decommissioning plan will be drafted for agreement by consultees prior to commencement of decommissioning.	Complete decommissioning in line with specific up to date guidance and secured via condition.	Minor adverse – Not significant.
Hydrology, Geology and Hydrogeology	Design Evolution	All mapped watercourses are marked and were given a 50 m buffer where possible to protect them from disturbance and potential effects on water quality during construction and operation. With the exception of on-site water crossings. Phase 1 peat surveys were conducted and areas of deep peat were avoided where practical. Due to the minimal areas of peat across the site a Phase 2 peat survey was scoped out.		Not Significant.

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
		Groundwater Dependant Terrestrial Ecosystem (GWDTE's) were identified and avoided where possible.		
	Pre-construction and construction	Risk of chemical pollution, erosion and sedimentation, flood risk and reduced water quality for surface watercourses mitigated by adherence to the CEMP, maintaining 50 m watercourse buffer, Sustainable Drainage System (SuDS) and appropriate water course crossing design. Risk of chemical pollution, changes to flow, reduced water quality and quantity of groundwater units mitigated by adherence to the CEMP, maintaining 50 m watercourse buffers and SuDS.	Maintain 50 m watercourse buffer where possible. CEMP secured by planning condition. SuDS secured by planning condition.	Moderate/Minor – Not significant.
	Operational	The effects identified as likely in the operational phase will be significantly lower than the constructional phase. Implementation of good practice guidance and embedded mitigation would lessen this	OEMP secured though planning condition	Moderate/Minor – Not significant.
	Decommissioning	Good practice measures as described in the construction stage will be followed, including specific guidance for the restoration and decommissioning of renewable energy developments. New guidance available at the decommissioning phase would be adopted if appropriate, and a decommissioning plan will be drafted	Complete decommissioning in line with specific up to date guidance and secured via condition.	Moderate/Minor – Not significant.

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
		for agreement by consultees prior to commencement of decommissioning.		
Cultural Heritage	Design Evolution	Direct physical impacts upon known heritage assets within the Proposed Development Site have been minimised through the design process. The proposed infrastructure layout including the OEMP has been designed to avoid as far as possible known heritage assets identified. In relation to the setting of Heritage assets and the operation of the Proposed Development, following engagement and consultation with Historic Environment Scotland (HES), the Applicant committed to a redesign as reflected in the submitted layout which aimed to mitigate potential adverse impacts upon SM4638 Dirrington Little Law, cairn on summit of as viewed from HER 57449 Twin Law, Twinlaw Cairns. The Applicant considers that through the relocation of Turbine 2 100 m to the north, such that it would not directly backdrop SM4638, any perceived adverse impacts upon the cultural significance of heritage assets assessed has been minimised as far as reasonably possible, to a magnitude that is not significant in EIA,		Not significant.

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
		The solar developments would cover an area of rig and furrow and four sheepfolds but the effect on these would not be significant.		
	Pre-construction and construction	Physical impact on archaeological remains mitigated via an appropriate level of survey, excavation, recording, analysis and publication of the results, in accordance with a written scheme of investigation. It is proposed that mitigation focuses on any groundworks within areas of peat. It is proposed a 30 m buffer is applied to heritage assets within OEMP areas. Fencing off assets to protect them from accidental damage.	A Written Scheme of Investigation (WSI) which will be submitted to SBC and HES for approval and secured via condition.	Negligible/No adverse – Not significant.
Noise	Design Evolution	The layout, turbine size and turbine specification proposed has reduced the impact of noise on potential residential receptors. The removal of one turbine from seven (scoping) to six (design freeze)		
	Pre-construction and construction	Construction noise associated with the Proposed Development. The locations adopted for noise assessments are representative of neighbouring noise sensitive receptors to the Proposed Development. Properties within proximity will	CEMP secured via planning condition. Construction works are to be undertaken during typical working hours (08:00-19:00 Monday to Friday and 08:00-13:00 Saturday.).	Not significant.

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		experience sound levels associated with construction that are no greater than existing ambient sound levels.		
	Operation	Operational cumulative noise level predictions determined compliance with the requirements of ETSU-R-97. Mitigation to specific turbines (dependent on final chosen turbine model) may be needed to achieve proposed noise limits at all neighbouring noise sensitive receptors.	Compliance with relevant guidance - ETSU-R-97. Compliance with agreed noise limits secured via condition.	Not significant.
	Decommissioning	Anticipated noise levels will be similar to those generated through construction.	Complete decommissioning in line with specific up to date guidance and secured via condition. Decommissioning works to be undertaken during typical working hours. (08:00-19:00 Monday to Friday and 08:00-13:00 Saturday.)	Not significant.
Traffic and Transport	Design Evolution	Through the design evolution process a transport route has been investigated and assesses to minimise negative effects associated with the Proposed Development.		
	Pre-construction and construction	There will be increased traffic flows and slow moving vehicles on the highway links utilised by vehicles associated with the Proposed Development, mitigated via construction TMP. Measures include: Scheduling Abnormal Indivisible Load (AIL) and Heavy Goods Vehicles (HGV) deliveries to avoid peak times.	CEMP secured via planning condition. Construction TMP (AIL and HGV) secured via a planning condition.	Not significant.

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
		Temporary signage to direct drivers to the Proposed Development and advise of routes not permitted. Temporary signage to warn other road users and pedestrians. Scheduling construction activities, with focus on concrete and AIL deliveries to reduce deliveries whilst key activities are occurring. Reduced speed limits. Trial run for AIL movements including convoys, holding points and specific laybys. Consultation with highway authorities and police to coordinate AIL deliveries, including local community via media outlets and individuals. If the need was identified cumulative construction TMPs for the Proposed Development and other relevant cumulative developments would be agreed through discussion between the developers and other relevant parties (including the roads authorities).		
	Operation	With the exception of the operation of the wind turbines and general		Not significant.

EIAR Chapter	Phase	Consideration for Mitigation/Enhancement	Commitment securing mechanism for Mitigation/Enhancement	Residual Effects
		maintenance of the turbines, solar and Battery Energy Storage Systems (BESS) there will be little on-site activity during the operational phase and therefore traffic volumes will be considerably reduced relative to the construction period.		
Aviation and other considerations	Design Evolution	The design and placement of infrastructure has been influenced by the potential for effects on shadow flicker, glint and glare and other population and human health factors. Scheme to alleviate shadow flicker at any affected premises lawfully in existence at the date of this permission to within the guidance thresholds to be agreed with the Local Planning Authority (LPAs) prior to commissioning.	Shadow Flicker mitigation secured through planning condition.	Not significant
	Operation	Aviation lighting scheme	Aviation lighting scheme has been agreed with CAA and implementation will secured via condition.	Not significant
Socio-economics	Pre-construction and construction	Pre-construction checks would be completed to confirm all baseline data was still correct nearer the time of construction.		Not significant
	Decommissioning	Decommissioning will be managed in accordance with a decommissioning plan to be agreed with the relevant authorities at the time.	Complete decommissioning in line with specific up to date guidance and agreed with Local Planning Authority LPA.	Not significant.

16.2. Conclusion

16.2.1. This Chapter of the EIAR summarises the potential residual effects of the Proposed Development. The residual effects identified within Table 16.1 are a result from the implementation of additional mitigation measures that will reduce or off-set the significant effects or the effects that are identified in each chapter.

16.2.2. The residual effects resulting from the Proposed Development as summarised in Table 16.1, should also be considered and balanced against the wider environmental benefits which will also include the considerable contribution to Scotland and the UK's targets for reducing carbon emissions from electricity generation.