



SP MANWEB

The North Wales Wind Farms Connection Project

Environmental Statement Chapter 15 - Summary of Environmental Effects

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March 2015



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Environmental Statement Documents

Volume 6: Environmental Statement		
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6.3	3	Alternatives and Design Evolution
6.4	4	EIA Methodology
6.5	5	Planning Policy Considerations
6.6	6	Ecology and Biodiversity
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This Chapter has no Appendices.

1 INTRODUCTION

1.1 Overview

1.1.1

1.1.2 This chapter provides a summary of the likely significant environmental effects associated with the Proposed Development identified within the individual topic chapters of the ES.

1.1.3 This chapter then provides an assessment of the likelihood of any intra-project effects arising from the interaction between effects of the Proposed Development and any inter-project effects associated with the Wider Scheme and the other developments identified.

1.1.4 NPS –EN1 refers to the following:

“The Infrastructure Planning Commission (IPC) should consider how the accumulation of, and interrelationship between effects might affect the environment, economy or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place”.

1.1.5 PINS Advice Note 9 states that:

“The ES should not be a series of separate unrelated topic reports. The inter-relationships between aspects of the proposed development should be assessed and careful consideration should be given by the developer to explain how inter-relationships have been assessed in order to address the environmental impacts of the proposals as a whole”.

1.2 Summary of Environmental Effects

1.2.1 Table 15.1 below summarises the likely significant environmental effects, specific mitigation measures and residual effects identified within the individual topic chapters of the ES (DCO Document Refs 6.6 – 6.14).

Table 15.1 Summary of Environmental Effects

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
Ecology and Biodiversity (DCO Document Ref 6.6)				
Ecology and biodiversity	Effects on international or nationally designated wildlife sites due to construction/operation/decommissioning.	None	None required	Not significant
	Effects on ancient woodland within non-statutory Local Wildlife Sites caused by loss of vegetation for construction and wayleave maintenance during operation.	Moderate – a total of 1.10ha of ancient woodland would be lost.	None proposed	Moderate (significant)
	Effects on other woodland within non-statutory Local Wildlife Sites caused by loss of vegetation for construction and wayleave maintenance during operation.	Moderate – a total of 0.05ha of broad-leaved woodland would be lost in seven Local Wildlife Sites.	Introduce and maintain a rotational coppice maintenance regime.	Minor (not significant)

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Effects on broadleaved woodland and plantation on ancient woodland caused by loss of vegetation for construction and wayleave maintenance during operation.	Moderate – a total of 0.67ha of plantation on ancient woodland and broadleaved woodland would need to be felled in five separate areas.	Introduce and maintain a rotational coppice maintenance regime.	Negligible (not significant)
	Loss of mature trees for construction and wayleave maintenance during operation.	Minor – the numbers of trees that would be lost is relatively low and is in an area of overall high tree cover.	None proposed	Minor (not significant) although in the long term two-for-one replanting will replace the effects of those lost.
	Effects on hedgerows due to temporary removal or cutting back.	Minor – assuming implementation of measures in CEMP and Ecological Management Plan.	Additional hedgerow planting to increase overall length of hedgerows in area.	Negligible as the new hedge planting matures.

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Effects on great crested newts (potential death, injury and loss of habitat) directly caused by construction and indirectly caused by loss of vegetation for construction and wayleave maintenance during operation.	Minor – loss of suitable habitat but assuming implementation of measures in CEMP and Ecological Management Plan death or injury should be prevented.	None proposed	Minor (not significant)
	Effects on dormouse habitat caused by loss of vegetation for construction and wayleave maintenance during operation.	Moderate – loss of woodland habitat.	Changing mature woodland to scrub would diversify habitat.	Minor Beneficial (not significant)
	Effects on bat habitat caused by loss of vegetation for construction and wayleave maintenance during operation.	Minor - felling of trees with bat roost potential.	Further survey work and implementation of appropriate mitigation measures prior to construction.	Negligible (not significant)

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Effects on common lizard (potential death, injury and loss of habitat) directly caused by construction and indirectly caused by loss of vegetation for construction and wayleave maintenance during operation.	Minor – loss of suitable habitat but assuming implementation of measures in CEMP and Ecological Management Plan death or injury should be prevented.	None proposed	Minor (not significant)
	Effects on otter due to habitat loss and disturbance, particularly around the River Elwy and associated woodlands.	Negligible – assuming holts or laying up sites are retained or replaced.	Further survey work and implementation of appropriate mitigation measures prior to construction.	Negligible (not significant)
	Effects on farmland birds due to habitat loss, nest destruction and disturbance.	Negligible – assuming implementation of measures in CEMP and Ecological Management Plan including avoidance of bird nesting season for construction.	None proposed	Negligible (not significant)

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Effects on badger due to habitat loss, sett destruction and disturbance.	Negligible – assuming implementation of measures in CEMP and Ecological Management Plan.	Further survey work and implementation of appropriate mitigation measures prior to construction.	Negligible (not significant)
Landscape and Visual (DCO Document Ref 6.7)				
Landscape	Construction/decommissioning activities may have effects on the landscape and how it is perceived.	Negligible – due to temporary short term nature of effects (tree loss covered under operational effects).	None required	Negligible (not significant)
	Operational effects on Snowdonia National Park or the Clwydian Range and Dee Valley AONB.	None	None required	Not significant

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Operational effects on landscape due to appearance of proposed 132 kV Overhead Line on LANDMAP VSAs - <i>Denbigh and Derwen Hills, Llanefydd Lowlands, Afon Elwy Valley and Cefn Meiriadog Ridge.</i>	Moderate – due to the appearance of a new man-made structure in the landscape.	None proposed	Moderate (significant)
Visual	Construction/decommissioning activities may have effects on views.	Negligible to Minor – depending on the proximity to works, the amount of activity which would be visible and how long works would continue in any location.	None proposed	Negligible to Minor (not significant)
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views around Saron where the proposed 132 kV Overhead Line would run north from Tir Mostyn across the Saron valley and heads up over the ridge east of Foel Gasyth.	Hedgerow improvements, hedgerow tree planting, woodland edge improvements.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views from the northern slopes of the ridgeline east of Foel Gasyth and Peniel.	New woodland edge planting.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views from roads, lanes, footpaths and settlement near the B4501, Plas Captain, Ty Coch and Pandy Wood.	Hedgerow improvements, hedgerow tree planting, including along roadsides. Woodland edge improvements.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views from the A543 near Groes as the Proposed Development crosses the road.	Hedgerow improvements, hedgerow tree planting, including along roadsides.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views near Eriviat Park, Eriviat Bach Isaf, local footpaths and nearby woodland as the Proposed Development leaves Eriviat Park, and crosses the B5382.	Hedgerow improvements, hedgerow tree planting, including along roadsides. Woodland edge improvements.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views near Hafod and Lechryd Bach, and the Clwydian Way, as the Proposed Development heads north through Hafod Dingle.	Hedgerow improvements, hedgerow tree planting, including along roadsides. Woodland edge improvements.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views near Berain, as the Proposed Development heads north towards Tyddyn Bartley.	Hedgerow improvements, hedgerow tree planting, including along roadsides. Woodland edge improvements.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views near Croen Llwm Mawr, Bryniau Bychain and the Pilgrim's Way Long Distance Trail as the Proposed Development heads northwest towards the Elwy.	Hedgerow improvements, hedgerow tree planting, including along roadsides. Woodland edge improvements.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views near Bodysgawen Isaf and Nant y Graig Wig on the southern slopes of the Elwy valley.	Hedgerow improvements, hedgerow tree planting, including along roadsides. Woodland edge improvements.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views from the well-treed areas of landscape (where tree felling would be required) and undulating landform near the Afon Elwy Valley, near Coed Wigl.	Hedgerow improvements, hedgerow tree planting, including along roadsides. Woodland edge improvements.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views near Plas Hafod and the footpath network on the northern slopes on the Elwy valley.	Hedgerow improvements, hedgerow tree planting, including along roadsides.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Operational effects on views due to appearance of proposed 132 kV Overhead Line.	Moderate effect on views from the network of public footpaths on the northern slopes of the Cefn Meiriadog ridge, where a short section of the proposed 132 kV Overhead Line would be seen on the skyline as it crossed the ridge.	Hedgerow improvements, hedgerow tree planting.	Moderate (significant) would remain moderate, but would reduce over time as the planting matured.
Historic Environment (DCO Document Ref 6.8)				
Historic Environment	Direct impacts during construction and decommissioning on 94 undesignated heritage assets which lie within or extend partially into the Order Limits	Major magnitude of impact on 34 of these assets, moderate (22), minor (34) and negligible (4)	Watching brief for 85 assets and preservation in situ and demarcation for 9 assets	Neutral/slight (not significant)

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Direct impacts during construction and decommissioning on up to 40 sections of historic hedgerows	Minor – only small sections of each hedgerow potentially affected	None proposed	Minor (not significant)
	Direct impacts during construction and decommissioning on undiscovered buried archaeological sites and peat deposits	Minor – given relatively small size of pole foundations	None proposed	Minor (not significant)
	Indirect visual effects on the setting of heritage assets during construction and decommissioning	Negligible magnitude - as short-term and temporary.	None required	None (not significant)
	Direct effects on historic assets within the Order Limits during maintenance visits	None - due to only occasional maintenance and inspection visits	None required	None (not significant)

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Indirect visual effects on the setting of three Registered Historic Landscapes (Denbigh Moors, Lower Elwy Valley and Vale of Clwyd)	Negligible - due to distant views, intervening landform and vegetation.	None required	No change or negligible (not significant)
	Indirect visual effects on the setting of Scheduled (Ancient) Monuments (SAMS)	No change or negligible - except for Tyddyn Bleiddyn Burial Chamber where the effects would be minor .	No additional mitigation proposed	No change or negligible except for Tyddyn Bleiddyn Burial Chamber where the effects would be minor (not significant).
	Indirect visual effects on the setting of Henllan Conservation Area	Negligible – views are distant and there is intervening landform and vegetation, and modern infrastructure present	None proposed	Negligible (not significant)
	Indirect visual effects on the setting of listed buildings	Various but none more than minor except for four listed buildings at Berain where the effects would be moderate/large	No additional mitigation proposed for Berain	Various but only one, Berain, moderate /large (significant)

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Indirect visual effects on the setting of five Registered Parks and Gardens (in some cases the house and parkland were assessed separately)	Various but none more than minor due to intervening landform and vegetation, or modern infrastructure present depending on the park in question	No additional mitigation proposed	Various but none significant
	Indirect visual effects on the setting of undesignated historic assets classified as medium value or higher	Various but none more than minor due to intervening landform and vegetation, or modern infrastructure present	No additional mitigation proposed	Various but none significant
Flood Risk (DCO Document Ref 6.9)				
Water quality	Construction/decommissioning activities may have effects on water quality and water resources, principally through the release of sediment into watercourses but also through the potential release of oils and constructional chemicals including cementitious products.	Negligible – assuming implementation of measures in CEMP.	None required	Negligible (not significant)

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Penetration of an aquifer during excavation for poles.	Negligible – relatively shallow excavations with small volumes of material.	None required	Negligible (not significant)
Flood risk	Temporary bridges constructed for access and storage of materials becoming mobilised during a flood and causing blockages downstream	Negligible - access tracks are not in any floodplains and temporary storage areas at Clocaenog and St Asaph Substations, are sited away from sources of flood risk.	None required	Negligible (not significant)
	Operational effects of siting one pole within the floodplain of the Afon Elwy which could lead to a small potential increase in flood risk downstream if an extreme flood event caused it to be swept away.	Negligible - as this possible flood risk effect was confined to an area upstream of a weir and the Bont-newydd road bridge and there are no properties at risk in either location.	None required	Negligible (not significant)
Land Use and Agriculture (DCO Document Ref 6.10)				
Land use and agriculture	Short term loss of grazing areas along access tracks and within working areas	Negligible - Areas of land affected only temporarily during construction.	None required	Negligible (not significant)

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	surrounding pole locations.			
	Long term loss of small areas of operational agricultural land associated with the footprints of the wood poles and stays.	Negligible - Design and routeing of the 132 kV Overhead Line has minimised likely impacts Negotiations with landowners will seek to locate poles close to field boundaries.	Further discussions will be held with landowners and tenants on an individual basis to optimise pole locations within the Limits of Deviation, and further lessen long term agricultural effects.	Negligible (not significant)
	Permanent loss of best and most versatile agricultural land.	None identified/ necessary.	None required	None (not significant)
	Impact on the commitments made by the by landowners with respect to agri-environmental stewardship schemes.	Negligible - Areas of land affected only temporarily during construction. Reinstatement will restore the land to its previous condition.	No further mitigation required	Negligible (not significant)

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Increased risk of disease transmission and transfer of invasive weeds associated with vehicle movements along the working corridor.	None - following implementation of biosecurity measures outlined in CEMP.	None required	None (not significant)
	Maintenance of safety clearances to conductors may limit use of certain types of agricultural equipment or operations under or adjacent to the 132 kV Overhead Line	Negligible - To compensate the landowner for effects upon the agricultural land, a capital payment would be made in return for the granting of permanent easement. An element of these payments would reflect any crop losses and disturbance suffered during normal agricultural use of the land.	None required	None (not significant)
Geology and Ground Conditions	Direct impacts on the Coedydd ac Ogofâu Elwy a Meirchion SSSI (designated because of its geology).	Not significant due to the distance between the Proposed Development and the Coedydd ac Ogofâu Elwy a Meirchion SSSI.	None required	None (not significant)

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Land safeguarded for mineral resources.	Minor – due to small area of land which may affect future mineral extraction.	No additional mitigation proposed	Minor (not significant)
Socio-economics and Tourism (DCO Document Ref 6.11)				
Economic effects	Employment opportunities during construction/decommissioning.	The construction phase will mainly use specialised SP Manweb staff and is unlikely to require many local workers.	None required	Not significant
	Benefits created by workforce spending in the local area.	Low numbers of incoming workforce are unlikely to benefit local accommodation providers.	None required	Not significant
	Use of local workforce during operation and maintenance.	The operational phase will mainly use specialised SP Manweb staff and is unlikely to require many local workers.	None required	Not significant

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
Tourism effects	Possible long term effects on one tourism business (accommodation provider) which lies close to the Proposed Development.	Moderate – due to views of the proposed 132 kV Overhead Line affecting numbers of visitors to area.	No additional mitigation proposed	Moderate (significant)
	Effects on other tourism providers.	Not significant – due to the nature of the Proposed Development and the local tourism offering.	None required	Not significant
Traffic and Transport (DCO Document Ref 6.12)				
Traffic and transport	Construction/decommissioning traffic accessing the local road network.	Minor as the additional traffic movements would be under the '100 two-way trip daily threshold'.	None required	Minor (not significant)
	Operational traffic.	Negligible – in normal operation, the Proposed Development would require intermittent access maintenance vehicles.	None required	Minor (not significant)

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
Emissions (DCO Document Ref 6.13)				
Noise and vibration	Construction noise at poles 50 and 214.	Significant - the ground conditions are rock and would require the use of an excavator with hydraulic jackhammer.	The use, where practicable, of a portable noise screen close to the hydraulic jackhammer.	Not significant
	Construction noise elsewhere.	Not significant – assuming implementation of measures in CEMP.	None required	Not significant
	Operational effects of noise.	Not significant – scoped out	-	-
	Noise and vibration effects resulting from decommissioning.	Not significant – assuming implementation of measures in CEMP.	None required	Not significant
Vibration	Vibration effects at pole 85 due to need for piling by impact hammer.	Not significant – due to distances between construction works (350m) and residential properties.	None required	Not significant

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
	Vibration effects during construction elsewhere.	Not significant – assuming implementation of measures in CEMP.	None required	Not significant
	Operational vibration effects.	Not significant – scoped out	-	-
Air quality	Dust (PM ₁₀) and nitrogen dioxide (NO ₂) emitted by vehicles both on and off-site during construction and decommissioning.	Negligible – assuming implementation of measures in CEMP.	None required	Negligible (not significant)
	Operational air quality effects	Not significant – scoped out	-	-
Waste	Off-site disposal of waste generated during construction.	None – assuming implementation of measures in CEMP and Site Waste Management Plan.	None required	None (not significant)
	Operational waste effects	Not significant – scoped out	-	-
	Off-site disposal of waste generated during decommissioning.	Due to operational life – not possible to assess at this stage.		

PROPOSED DEVELOPMENT: SUMMARY OF ENVIRONMENTAL EFFECTS				
TOPIC	ISSUE	LIKELY IMPACT	SPECIFIC MITIGATION	LIKELY RESIDUAL IMPACT SIGNIFICANCE
Electric and Magnetic Fields (EMFs) (DCO Document Ref 6.14)				
Health effects	Construction/ decommissioning effects.	Not significant – scoped out.	-	-
	Health effects arising from short-term exposure to EMFs.	Not significant – as the Proposed Development complies with the current public exposure guidelines as detailed in NPS (EN-5).	None required	Not significant
	Health effects arising from long term exposure to EMFs.	Not significant - NPS (EN-5) states “ <i>The balance of scientific evidence over several decades of research has not proven a causal link between EMFs and cancer or any other disease.</i> ”	None required	Not significant

2 INTRA-PROJECT EFFECTS

2.1 Introduction

- 2.1.1 Intra-project effects occur where a single receptor is affected by more than one source of effect arising from different aspects of the project arising from any interactions.
- 2.1.2 The assessment of intra-project effects has identified shared receptors which could be affected by sources of effects identified in the various environmental topics in the ES.
- 2.1.3 Intra-project effects primarily occur as a result of a combination of visual effects, ecology and biodiversity and cultural heritage.

2.2 Shared Receptors

Human Receptors

- 2.2.1 Human receptors have been identified within the 'landscape and visual assessment'. These receptors have the potential to also experience 'cultural heritage', 'traffic and transport', 'noise and vibration' and 'air quality' effects.
- 2.2.2 The Historic Environment assessment has identified significant indirect effects on the setting of listed buildings at Berain arising from the Proposed Development.
- 2.2.3 The 'Traffic and Transport' and Air Quality assessments have identified no significant effects arising from the Proposed Development.
- 2.2.4 The noise and vibration assessment has identified three locations requiring specific noise mitigation measures and one location where vibration effects may potentially be experienced due to the construction methods. These locations would not experience any other significant effects
- 2.2.5 No intra-project effects are therefore predicted for human receptors.

Pandy Wood

- 2.2.6 Moderate significant visual effects (see Chapter 7 'Landscape and Visual') have been identified in the vicinity of Pandy Wood, in addition to moderate adverse significant effects on ancient woodland (including plantation on ancient woodland) caused by loss of vegetation for construction and wayleave maintenance during operation (see Chapter 6 'Ecology and Biodiversity'). Intra project effects are considered **moderate** as they are very localised and contained, and mitigation planting will assist in alleviating effects over time.

Eriviat

- 2.2.7 Moderate significant visual effects (see Chapter 7 'Landscape and Visual') have been identified in the vicinity of Eriviat near the A543 to Groes, and the B5382 near Eriviat Bach Isaf. In addition, moderate adverse significant effects have been identified on ancient woodland (including plantation on ancient woodland) and a Local Wildlife Site, both located in woodland to the north east of Eriviat Bach Isaf, and caused by loss of vegetation for construction and wayleave maintenance during operation (see Chapter 6 'Ecology and Biodiversity'). A moderate significant effect on a local business located within the grounds of Eriviat Park (at Eriviat Hall) has also been identified (see Chapter 11 'Socio economic and Tourism'). Intra project effects are considered **moderate** since these effects occur in isolated locations over a 2km section of the Final Route Alignment, and mitigation planting will assist in alleviating effects over time.

Hafod

- 2.2.8 Moderate significant visual effects (see Chapter 7 'Landscape and Visual') have been identified in the vicinity of Lechryd Bach, Hafod Dingle and the Clwydian Way. In addition, moderate adverse significant effects have been identified on ancient woodland (including plantation on ancient woodland) and a Local Wildlife Site, both located at Hafod Dingle, and caused by loss of vegetation for construction and wayleave maintenance during operation (see Chapter 6 'Ecology and Biodiversity'). Moderate slight effects on the setting of cultural heritage assets have been identified, including grade II listed Lechryd house and barn, and Lechryd Cave within Hafod Dingle (see Chapter 8 'Historic Environment'). Intra project effects are considered **moderate** since the geographic extent, reach and scale of these effects are localised and largely contained, and affect a relatively small number of receptors. Mitigation planting (including woodland edge improvements) will assist in alleviating effects over time.

Berain

- 2.2.9 Moderate significant visual effects have been identified in the vicinity of Berain (see Chapter 7 'Landscape and Visual'). In addition, moderate adverse significant effects have been identified on ancient woodland (including plantation on ancient woodland) (see Chapter 6 'Ecology and Biodiversity'). Moderate/slight effects on the setting of cultural heritage assets have been identified at Berain, including the grade II* listed house, the carthouse, brewhouse and pigsty (see Chapter 8 'Historic Environment'). Intra project effects are considered **moderate** since these effects are localised, and contained by topography and intervening vegetation along hedgerow boundaries. This is a quiet location subject to mostly local traffic, and a relatively small number of receptors. Mitigation planting (including woodland edge improvements) will help alleviate effects over time.

Croen Llwm Mawr

- 2.2.10 Moderate significant visual effects have been identified in the vicinity of Croen Llwm Mawr and the Pilgrim's Way Long Distance Footpath (see Chapter 7 'Landscape and Visual'). In addition, moderate adverse significant effects have been identified on ancient woodland (including plantation on ancient woodland) and a Local Wildlife Site, both located in woodland close to Croen Llwm Mawr and Bryniau Bychain, and caused by loss of vegetation for construction and wayleave maintenance during operation (see Chapter 6 'Ecology and Biodiversity'). Moderate/ slight effects on the setting of cultural heritage assets have been identified in the neighbouring vicinity at Tal y Bryn and Bodysgawen Isaf grade II houses (see Chapter 8 'Historic Environment'). Intra project effects are considered **moderate** since the effects occur in isolated locations of a stretch of the Final Route Alignment that is over 1km in length. The geographic extent, reach and scale of these effects is localised and largely contained, and affect a relatively small number of receptors. Mitigation planting (including woodland edge improvements) will help alleviate effects over time.

Elwy Valley

- 2.2.11 Moderate significant visual effects have been identified in the vicinity of the Elwy valley slopes (see Chapter 7 'Landscape and Visual'). In addition, moderate adverse significant effects have been identified on ancient woodland (including plantation on ancient woodland) and at the Local Wildlife Sites located at Coed Wig and Coed Y Fadir adjacent to the Afon Elwy (see Chapter 6 'Ecology and Biodiversity'). These effects are caused by loss of vegetation for construction and wayleave maintenance during operation. Moderate/ slight effects on the setting of cultural heritage assets have been identified at Plas Newydd grade II* listed house (see Chapter 8 'Historic Environment'). Intra project effects are considered to be **moderate** since these effects are localised, and contained by the sloping topography of this distinctive river valley, and by the intervening vegetation (including many mature oaks) along hedgerow boundaries. This is a quiet location subject to mostly local traffic, and a relatively small number of receptors. Mitigation planting (including woodland edge improvements) will help alleviate some effects over time.

Summary

- 2.2.12 There are six locations where intra-project effects are considered to be **moderate** and therefore significant.

3 INTER-PROJECT EFFECTS

3.1 Introduction

- 3.1.1 Inter-project effects are the cumulative effects that may result from the individual project being assessed (in this case the Proposed Development) interacting with the effects of other proposed developments in the area.

- 3.1.2 Chapter 4 'EIA Methodology (DCO Document Ref 6.4) describes the two stage approach adopted for the cumulative assessment, i.e.

Stage 1 – The Wider Scheme, the Wind Farms and the Proposed Development;

The Collector Substation, works within St Asaph substation, the underground cabling and the proposed lower voltage diversions are referred to as the "Wider Scheme".

Stage 2 – The Wider Scheme, the Wind Farms, the Proposed Development and any other relevant developments (which includes developments already in existence, together with committed developments and for projects where consent is being sought).

- 3.1.3 Potential inter-project effects have therefore been considered using this same approach.

3.2 Stage 1 Wider Scheme

- 3.2.1 The potential cumulative effects of the Wider Scheme are summarised below.

Ecology and Biodiversity

- 3.2.2 The Proposed Development is not envisaged to have any cumulative impacts when considered alongside the Wider Scheme and the Wind Farms.

Landscape and Visual

- 3.2.3 The felling of commercial forestry at Clocaenog Forest would affect the local landscape character of the forest which would have a direct cumulative effect on one of the main landscape elements of Clocaenog Forest LANDMAP Visual and Sensory Aspect Area (VSAA) (DNBGHVS068). This is not, however, considered to be significant because large scale rotational felling is a normal feature of most commercial forests.
- 3.2.4 The landscape in and around Clocaenog Forest would change to a landscape with more wind farms, the Collector Substation and the 132 kV Overhead Line. The result would be a significant change in landscape character.
- 3.2.5 North of Clocaenog Forest cumulative effects may arise in the lower lying areas but these are not considered to be significant.
- 3.2.6 Overall the significance of total cumulative effect on the landscape is considered to be of medium magnitude and **moderate** significance particularly around the Clocaenog Forest, the Denbigh and Derwen Hills and Llyn Brenig, although this would result more from the presence of large wind turbines and the Collector Substation than from the Proposed Development. Elsewhere the total cumulative effect is not considered to be significant.

Historic Environment

- 12.1.1 The Collector Substation will have an indirect visual affect on one high-value designated asset, one high-value registered asset and one medium-value, undesignated asset. The Brenig and Cloganeog Forest wind farms are predicted to have an indirect visual effect on one high-value registered asset, in the defined Study Areas of the Proposed Development. In summary:
- The Proposed Development is considered to have a 'slight' visual effect on the Mynydd Hiraethog (Denbigh Moors) Historic Landscape, as too is the Collector Substation, whilst the Brenig wind farm and Cloganeog Forest wind farm are both predicted to have a 'moderate/slight' effect.
 - The combined effects would likely be 'moderate/slight' and therefore not significant.
 - The Proposed Development is considered to have a 'slight' visual effect on the Twr yr Hill Round Barrow: no other components of the Wider Scheme are predicted to have an effect therefore the combined effects would remain 'slight' and therefore not significant.
 - The Proposed Development is considered to have a 'slight' visual effect on the Tir Mostyn stone settings. No other components of the Wider Scheme are predicted to have an effect therefore the combined effects would remain 'slight' and therefore not significant.
- 12.1.2 The underground cabling and works at St Asaph substation will not lead to cumulative effects on heritage assets.

Flood Risk and Water Quality

- 3.2.7 Implementation of the measures set out in the Design and Construction Report, the CEMP and the draft Construction Environmental Plan for the Collector Substation will ensure that there are no potential cumulative effects for flood risk, water quality or ground water.

Land use and Agriculture

- 10.1.1 Overall the combined effects of the Wider Scheme, although they result in a greater combined permanent and temporary land take, are considered to be minor for land use and geology. Although the Collector Substation requires a permanent land take of 0.4ha, this is within an area of commercial forestry. The footprint of the individual turbines for the wind farms is relatively small and is within areas of upland and commercial forestry. Land take for other elements of the Wider Scheme, for example the underground cable and the lower voltage diversions, are also limited.

Socio Economics and Tourism

- 3.2.8 The Proposed Development requires a minimal level of specialist labour which is likely to be temporarily imported to the area. Combining the Proposed Development with the Wider Scheme still creates only negligible employment impacts.
- 3.2.9 Visual impact is the most commonly cited factor by business survey respondents when asked to explain their reasons for perceived impact. The LVIA identifies that cumulative effects would primarily be due to the additional visual impacts of the wind farms and that the contributions of the Wider Scheme to the total cumulative landscape and visual effects are not significant. The overall tourism impacts are therefore considered to be not significant.

Traffic and Transport

- 3.2.10 The potential effects of the Proposed Development and the Wider Scheme are considered to be minor/negligible and not significant.

Emissions

- 3.2.11 Due to the separation distances between the construction for the Collector Substation and local receptors, and the absence of other development in the area, there would be no cumulative effects.
- 3.2.12 Due to the linear nature of the works associated with the Proposed Development and the relatively rapid rate of progress past any sensitive receptor, any noise and vibration exposure or potential air quality effects would be limited to a brief period of time unlikely to exceed a few days in the total construction contract, and there would be little risk of this coinciding with noise from other construction works associated with the Wider Scheme causing cumulative effects.
- 3.2.13 Likewise, due to the separation distances between the modifications for the St Asaph Substation and local receptors, and the greater contribution from other ambient noise, vibration, air quality and dust sources, such as road traffic, there would be no cumulative effects.

Assessment of Inter-project Cumulative Effects (Stage 1)

- 3.2.14 The topic specific cumulative assessments identified potentially significant effects for landscape character arising from the Proposed Development and the Wider Scheme. These effects were limited to the northern extent of the Proposed Development.
- 3.2.15 No other significant effects were identified.
- 3.2.16 It is therefore considered that no further significant cumulative effects would arise, in combination.
- 3.2.17 In addition consideration has been given to the potential for combining intra-project and inter-project effects. The location of those areas with the potential for intra-project effects has been identified in Section 2 of this Chapter. Given the location of those areas it is considered that no further effects arise when considering the Wider Scheme in combination with the Proposed Development

3.3 Stage 2

3.3.1 The development identified in Chapter 4 'EIA Methodology' (DCO Document ref 6.4) are primarily located at the southern and northern extents of the Proposed Development and the Wider Scheme.

3.3.2 To the south, there are a number of small wind turbines proposals in the vicinity of the Proposed Development and the Collector Substation.

3.3.3 To the north there are a number of development proposals mainly situated in the vicinity of the A55 corridor and with the potential for interactions with the Proposed Development, the underground cabling and the works at the existing St Asaph Substation.

3.3.4 The developments identified in Chapter 4 are as follows:-

- Hafod Ty Ddu Wind Turbine (single wind turbine);
- Tyn y ffynnon Wind Turbine (single wind turbine);
- Meifod Farm Wind Turbine (single wind turbine);
- Pant y Maen Wind Farm (8 no. wind turbines in SSA A);
- Bryn Cocyn Wind Turbine (single wind turbine)
- Burbo Bank Extension (extension to an existing offshore wind farm and an onshore substation);
- Crematorium proposal on land to south of Glascoed Road;
- Pilkington Playing fields (St Asaph Business Park) (development of 3.9ha of land for office/light industrial use);
- Bodelwyddan Key Strategic Site (Development Plan allocation in for a mixed use development); and
- Former H M Stanley Hospital site, St Asaph (application for residential development).

3.3.5 The potential cumulative effects of these development proposals are summarised below.

Ecology and Biodiversity

3.3.6 No significant cumulative effects have been identified, due to the nature of the proposed developments themselves and their distance to the Proposed Development and the Wider Scheme.

Landscape and Visual

3.3.7 At the southern end of the Proposed Development, the landscape in and around Clocaenog Forest, which currently has one operational wind farm (Tir Mostyn and Foel Goch) would change to a landscape with four more wind farms, plus the proposed Collector Substation, a 132kV Overhead Line and 3 single turbines, which are located in prominent positions along ridgelines to the north of Clocaenog Forest. The result would be a significant change in landscape character, although this would result more from the presence of the wind farms with their large turbines, than from the Proposed Development.

- 3.3.8 North of Clocaenog Forest cumulative effects may arise in the lower lying areas, however these are not considered to be significant.
- 3.3.9 Overall the significance of total cumulative effect on the landscape is considered to be of medium to large magnitude, particularly around the Clocaenog Forest area and at the higher end of moderate significance. Elsewhere the total cumulative effect is not considered to be significant.
- 3.3.10 Three LANDMAP Visual and Sensory Aspect Areas (VSAAs) were identified with moderate significance:
- Clocaenog Forest;
 - Llyn Brenig Moorland/ Forest; and
 - Denbigh and Derwen Hills.
- 3.3.11 However when considering the contribution of the Proposed Development and the Wider Scheme to total cumulative effects, the turbines being proposed for the wind farms are considerably larger and would be more prominent landscape features than the Proposed Development and the Collector Substation. Similarly the three proposed single turbines will also be more prominent although their influence may not extend as far as the larger wind farm turbines.
- 3.3.12 Although significant cumulative landscape effects are identified at the southern end of the study area around Clocaenog Forest, the Denbigh and Derwen Hills and Llyn Brenig, the contribution of the Proposed Development and the Wider Scheme to the total cumulative effects is considered to be small.
- 3.3.13 Two of the representative viewpoints were identified with moderate significance. These were:
- B4501 east of Foel Gasyth; (Moderate to Major (significant)) and
 - Nantglyn (Moderate to Major (significant)).
- 3.3.14 As above, for the landscape assessment the wind turbines are considerably larger and would be visually more prominent features. The presence of a 132 kV Overhead Line, underground cable section, collector substation and associated infrastructure would be perceived as subsidiary structures which contribute to a smaller change in views compared to the turbines.
- 3.3.15 The cumulative viewpoint assessment indicates that at the southern end of the Proposed Development, there may be moderate to major cumulative visual effects. These are considered significant. These would, however, primarily be due to the additional visual impacts of the wind farms and the single wind turbines (Tyn y ffynnon, Meifod Farm and Hafod Ty Ddu) being located close to the Proposed Development rather than the Proposed Development itself which would be viewed as a subsidiary structure.
- 3.3.16 Viewpoint locations around the middle section and northern end of the Proposed Development may experience a small degree of cumulative visual effects, however, it is considered that this is highly unlikely to be significant.

Historic Environment

- 3.3.17 No significant cumulative effects are predicted.
- 3.3.18 For six assets, 'moderate/slight' cumulative effects are predicted, however these are not significant. These six assets are:
- Mynydd Hiraethog (Denbigh Moors) Historic Landscape
 - Bodelwyddan Castle, grade II*
 - Bodelwyddan, LS II park wall and cottages
 - Bodelwyddan Park, Bryn Celyn Lodge, grade II
 - Bodelwyddan Park, Gors Mill Cottage, grade II
 - Bodelwyddan Castle, grade II park and gardens

Flood Risk and Water Quality

- 3.3.19 The developments identified are not in any of the catchments crossed by the Proposed Development, the Wider Scheme and the Wind Farms. Any effects arising on surface waters in relation to other development within the vicinity will not interact in any way with those identified in relation to the Proposed Development, the Wider Scheme and the Wind Farms. Similarly, there are no groundwater bodies which are effected by the Proposed Development, the Wider Scheme, the Wind Farms and other identified developments, therefore no cumulative effects are anticipated.

Socio Economics and Tourism

- 3.3.20 The Proposed Development, the Wider Scheme and the Wind Farms require a minimal level of specialist labour which is likely to be temporarily imported to the area. Combining the Proposed Development with the Wider Scheme, the Wind Farms and the identified Stage 2 'cumulative' developments, combines negligible employment impacts with potentially significant employment impacts from larger scale projects requiring unspecialised local labour, and would therefore provide misleading results.
- 3.3.21 As above visual impact is the most commonly cited factor by business survey respondents when asked to explain their reasons for perceived impact. The LVIA identifies cumulative effects would primarily be due to the additional visual impacts of the Wind Farms and that the contributions of the Proposed Development and Wider Scheme to the total cumulative landscape and visual effects are not significant. The overall tourism impacts are therefore considered to be not significant.

Traffic and Transport

- 3.3.22 The potential effects of the Proposed Development and the Wider Scheme and are considered to be minor/negligible and not significant.
- 3.3.23 Due the small scale nature of the identified developments to the south of the Proposed Development and the locations of the identified developments to the north of the Proposed Development, in the vicinity of the A55 corridor, the potential cumulative effects are considered to be minor/negligible and not significant.

Emissions

- 3.3.24 Potential cumulative effects could arise during the construction of this development, if it occurs within the same timescales. Construction effects would however be short term, temporary and localised and no significant cumulative effects are predicted to arise.

Assessment of Inter-project Cumulative Effects (Stage 2)

- 3.3.25 The topic specific cumulative assessments identified potentially significant effects for landscape character and representative viewpoints arising from the Proposed Development and the Wider Scheme. These effects were limited to the northern extent of the Proposed Development.
- 3.3.26 No other significant effects were identified.
- 3.3.27 It is therefore considered that no further significant cumulative effects would arise, in combination.
- 3.3.28 As above consideration has been given to the potential for combining intra-project and inter-project effects. Given the location of the areas identified and the nature of the effects it is considered that no further effects arise when considering the identified developments in combination with the Wider Scheme and the Proposed Development.