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1. INTRODUCTION

1.1.1 RES (Renewable Energy Systems) UK & Ireland Ltd has submitted a planning application to Northumberland County Council for consent to build and operate a wind farm on land at Park Head Farm near Pie Hill between the villages of Netherwitton and Wingates, north of Morpeth, Northumberland.

1.1.2 Enviro Consulting Ltd (Enviros) was appointed by RES to co-ordinate the Environmental Impact Assessment (EIA) and prepare the Environmental Statement (ES) for the proposed development. This Non-Technical Summary (NTS) makes up Volume 1 of the ES which is contained within three separate volumes:

Volume I - is a Non-Technical Summary of the EIA;

Volume II - contains the full EIA including technical and supporting information in appendices; and

Volume III - contains figures and plans referred to in the text of Volume II.

Separate Planning Policy and Design & Access Statements have also been prepared to accompany the planning application.

1.1.3 The contact address for the project is:

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1.1.4 The main purpose of the ES is to report on any potential environmental effects of the proposed Park Head Wind Farm. It describes the background to the project, provides details of the proposed development and the results of specific studies commissioned to assess the various environmental effects.

1.1.5 Paper copies of the full ES are available from RES priced £150 each and CD copies are £25 each. A loan copy of the full ES can be supplied free-of-charge for a limited duration. Copies of the Non-Technical Summary are available free-of-charge. The Non-Technical Summary can also be viewed on the RES Park Head Wind Farm website at www.parkheadwindfarm.co.uk. Requests for either document should be made in writing, including payment if purchase of the full ES is required, to RES UK & Ireland Ltd at the address above.

- 1.1.6 The ES and Planning Statement can be viewed during normal opening hours at the following locations:

Northumberland County Council County Hall Morpeth Northumberland NE61 2EF	Rothbury Library Front Street Rothbury Morpeth Northumberland NE65 7TZ	Area Planning Team Northumberland County Council Allerburn House Denwick Lane Alnwick Northumberland NE66 1YY
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- 1.1.7 RES is one of the world's leading wind energy companies and is part of the Sir Robert McAlpine Group, a British, family owned construction firm. At the time of writing, RES has successfully constructed over 4,000 Mega Watts (MW) of wind power capacity around the world and has developed or constructed over 10% of the UK's installed wind power capacity. From long involvement in the wind industry, RES has gained a high level of expertise in the technical, environmental and financial disciplines essential for the development of a successful wind farm.
- 1.1.8 RES has recently been awarded a Queen's Award for Enterprise in the Sustainable Development category recognising the company's "*comprehensive approach to the environmental and social impact assessment prior to the commencement of every wind farm project*". This also applies to RES's award winning eco-friendly headquarters and education centre in Kings Langley, Hertfordshire.

2 OUTLINE OF PROPOSAL

2.1 THE PROPOSAL

- 2.1.1 The Park Head proposal is for a wind farm comprising of nine (9) wind turbines nominally rated at 1.8MW and associated infrastructure. Each turbine would have a tapered tubular tower and be three bladed with an overall height to blade tip not exceeding 127m.
- 2.1.2 Based upon a maximum rated capacity of 16.2MW, every year the Park Head Wind Farm would produce sufficient electrical energy to satisfy the average requirements of approximately 9,270 homes, equivalent to over 46% of the annual consumption of all the houses in Northumberland (2001 UK census data), see Appendix 1.1 Volume II for further details. This would allow for significant reductions in the emissions of greenhouse gases and other pollutants released through alternative means of electricity generation.
- 2.1.3 The wind farm is planned to be operational for 25 years.

2.2 SITE SELECTION

- 2.2.1 The selection of an appropriate site for a wind farm has involved examining and balancing a number of technical, environmental and planning issues. In assessing the suitability of a site for wind farm development, RES considers a range of factors relating to economics, natural and built heritage, visibility, existing land-use, technical issues and topographic suitability.
- 2.2.2 Site identification and grading has involved a comprehensive national review and site selection that has recognised environmental, technical and economic constraints. RES has built a portfolio of sites in England, resulting from a thorough and pro-active prospecting exercise involving grading the suitability of potential sites, designed to be thorough, robust and consistent. This process ultimately led to a short-list of sites that included Park Head as being one of the more suitable sites in the Northumberland area.

- 2.2.3 The proposed site is approximately 2km north of the village of Netherwitton and 11km north-west of Morpeth. The nearest hamlets/villages to the site are Nunnykirk, Wingates, Netherwitton and Longhorsley. The A697 is approximately 4km east of the site and the unclassified public West Road between Longhorsley and Netherwitton runs adjacent to the eastern edge of the site (Figure 1.1).
- 2.2.4 The site is primarily mixed use farmland with some areas of marshy grassland, woodland and coniferous plantation, covering an area of approximately 2.64km² (264ha). The site consists of small to medium sized fields broken by boundaries of fences and occasional hedgerow.
- 2.2.5 Rayburn Lake is a permanent water feature situated in a hollow in the centre east of the site covering approximately 8ha. The lake is dammed on the north-eastern side and has a spillway at either end into the Ray Burn.

2.3 SITE SELECTION & DESIGN EVOLUTION

- 2.3.1 The layout of the wind farm has been through a design process to minimise negative impacts and to maximise the production of clean renewable energy. Various criteria, including wind speed, site area, grid and road access, distance from houses and avoidance of important natural features were considered to establish the areas of the site that would be suitable for turbines. RES commissioned a constraints study for ecology, archaeology and hydrology which initially indicated that a 12 turbine layout might be possible, however after constructive dialogue with Natural England and the RSPB, the site was further refined and the number of turbines dropped from 12 to nine. As there was a possibility that bird populations visited Rayburn Lake from Druridge Bay and Lindisfarne, the turbines were moved out and away from the eastern side of Rayburn Lake to facilitate easy movement between the Lake and the east coast.
- 2.3.2 The North East of England Regional Spatial Strategy to 2021 (2008) indicates that the Proposal falls within the vicinity of a “*broad area of least constraint for medium scale wind energy development*” according to the key diagram of the Regional Spatial Strategy (RSS) as cited within Policy 41: Onshore Wind Energy Development. Also identified in Castle Morpeth Local Plan Policies RE2 and RE3 (adopted Feb 2003) is support of the development of wind energy resources and identifies Castle Morpeth as a preferred area for wind farms.

2.4 PROJECT DESCRIPTION

- 2.4.1 The proposed wind farm development at Park Head will comprise of:
- Nine three-bladed horizontal axis wind turbines of up to 127m tip height, nominally rated at 1.8MW;
 - turbine foundations;
 - hardstanding areas for erection cranes at each turbine location;
 - two control buildings to accommodate metering equipment, switchgear, electrical control panels and welfare facilities for maintenance personnel;
 - a substation compound to house a grid transformer, up to two auxiliary transformers and possibly a spare turbine transformer;
 - transformers for each turbine and switch gear located externally in a high voltage enclosure on a concrete plinth (3.5m x 5.7m each) adjacent to turbine towers;
 - borrow pit;
 - on site access tracks of 5m wide and approximately 4800m in length;
 - a site access route from the main road network along the A1 and A697 from Morpeth to the unclassified public West Road between Longhorsley and Netherwitton where the site entrance works will be placed;

- temporary construction compound including site offices, tool storage, vehicle parking and welfare facilities;
 - an on-site electrical and control network of buried cables laid in trenches adjacent to the new track (routed to the substation);
 - a permanent wind monitoring (MET) mast; and
 - two temporary guyed wind monitoring (MET) masts up to 80m in height.
- 2.4.2 Whilst not forming part of this application, a connection to the local grid network will also be required.
- 2.4.3 A site layout plan is shown in Figure 3.2. The total permanent land take from tracks, cable trenches, hardstandings, MET mast, substation compound, control buildings and turbines is estimated at 4.38ha; approximately 1.7% of the total site area shown within the red line boundary in Figure 1.1 (Volume III).
- 2.4.4 The landscape, visual and noise impact assessments have been based upon nine turbines of 1.8MW nominal rating, with a nominal hub height of 80m and a blade diameter of 93m.
- 2.4.5 Each turbine would begin generating power automatically at a wind speed of around 3-4m/s (6.71 - 8.95mph) and would shut down at a wind speed of around 25m/s (56 mph). Figure 3.7 illustrates a typical turbine and the associated transformer unit. The colour and finish of the wind turbines has been agreed as a pale grey semi-matt finish.
- 2.4.6 Approximately 4800m of hard-core access tracks would be required onsite, connecting the wind turbines and the main access route for the purposes of construction and maintenance. A borrow pit will be included in the site which has been assessed as having the potential to yield stone which could be used in the construction of the site infrastructure. Should the borrow pit not yield sufficient stone or if it is not fit for purpose then a local quarry will be identified to source stone.
- 2.4.7 Electrical connections between the wind turbines and the switchgear in the control buildings on site will be underground, with cables being laid in trenches directly adjacent to access tracks. The two control buildings will comprise two small single storey buildings.
- 2.4.8 Investigations to identify the most appropriate grid connection indicate that the wind farm could be connected to the Linton - Stobswood 66kV circuit, approximately 16km by road to the east of the site. The environmental effects of the grid connection are addressed in the Chapter 14 (Grid Connection) although the grid connection itself would be subject to a separate planning application under the Electricity Act 1989.
- 2.4.9 The construction programme is expected to last up to 12 months following the main phases set out below:
- site establishment, including improvements to the selected access route, construction of tracks and temporary construction compound;
 - civil works, including construction of foundations, on site access tracks, crane hardstandings and fencing;
 - excavate and construct turbine foundations;
 - construct the substation and install the grid connection;
 - excavate the borrow pit;
 - excavate the cable trenches and lay the power and instrumentation cables;
 - turbine delivery, erection and commissioning; and
 - land reinstatement, remove temporary construction accommodation and reinstatement of temporary compound and crane hardstandings, clear site.
- 2.4.10 Construction of tracks and foundations would be progressive, minimising the number of simultaneously active locations and ensuring that traffic density is kept low.

- 2.4.11 A compound will be required to house site offices, welfare facilities and to store equipment and materials during construction and decommissioning.
- 2.4.12 HGV traffic into the site is estimated at an average of 20 vehicles of all types per day over the construction period.
- 2.4.13 Once operational, the wind turbines will operate automatically, requiring limited maintenance and inspection visits to the site by operations staff as the wind farm will be monitored remotely. However, unsheduled maintenance may be required.
- 2.4.14 A restoration plan will be prepared to return the site to an agreed condition at the end of the wind farm's planned 25 year operating life.

3 CONSULTATION

- 3.1.1 Consultation with Northumberland County Council (NCC) and Castle Morpeth Borough Council (CMBC) has been an ongoing part of the project development. In April 2006 planning permission was granted for the erection of a temporary MET mast (80m height) on the proposed Park Head site to monitor wind speeds and planning permission has been re-applied for to retain the mast onsite. In January 2006 a Scoping Opinion was sought from CMBC and a partial response received in April 2006. The EIA process adopted by RES and Enviros follows guidelines to predict and evaluate the impact of a Proposal on the environment in a systematic and transparent manner.
- 3.1.2 Extensive consultations with various statutory and non-statutory organisations have been undertaken to understand local issues and to ensure that any negative effects of the proposal on the local or wider community are minimised.
- 3.1.3 RES engaged proactively with the local community, identifying and engaging with key stakeholders. Stakeholders were identified at varying levels from community/parish level such as local residents, to regional level such as NCC and the local media. Engagement was carried out in the form of initial consultations with statutory and non-statutory consultees, meetings with key stakeholders, direct leafleting to all 1968 households within 5km of the site, questionnaires for local stakeholders, the inauguration of a proposal website, public exhibitions and press releases. In addition, a visit to an operational wind farm site was offered to local residents which is being progressed in collaboration with NCC.
- 3.1.4 Public exhibitions were undertaken by RES on the 23rd and 24th April 2009 at Wingates and Netherwitton villages respectively. This aimed to provide information on the proposed wind farm to the public and to give members of the local community an opportunity to engage with RES staff and pose questions. This enabled RES to gain information from local knowledge and provided the local residents with an insight into the potential views of the wind farm from various locations.
- 3.1.5 A website has been created in order for people to view details and information on the project. RES will keep the website updated with recent news about the project and key events, and it will allow visitors to provide feedback. This can be accessed at <http://www.parkheadwindfarm.co.uk/>
- 3.1.6 Where appropriate RES will meet with key consultees and interested parties, and encourage dialogue with regard to the proposals during the planning process.

4 ENVIRONMENTAL IMPACT ASSESSMENT

4.1 LANDSCAPE VISUAL IMPACT ASSESSMENT

- 4.1.1 A Landscape and Visual Impact Assessment has been undertaken for the Proposal in order to identify significant effects on the landscape and visual receptors. These receptors have been identified through consultation with statutory consultees including CMBC and desk study/fieldwork.

- 4.1.2 The proposed wind farm is situated within an area of improved pasture and arable farmland interspersed with frequent tree belts and small coniferous plantations, set within the Wingates Ridge and focussed around Rayburn Lake. The site is within an open landscape approximately 2km to the north of the village of Netherwitton, Northumberland. The site is not covered by any national or local landscape designations and comprises landscape features commonly found within the wider study area.
- 4.1.3 This assessment reviewed the potential effects on the landscape fabric, landscape character and effects on visual amenity within a 30km radius of the Proposal. Cumulative effects were also considered following the identification of other wind farm sites within the 30km study area.

Direct Effects on Landscape Resource

- 4.1.4 The direct effects on the fabric of the landscape will be limited in extent and will be largely reversible at the end of the operational phase of the wind farm. The direct changes to the landscape, such as the construction of site access tracks, turbines and the control building and removal of sections of hedgerow for site access will affect only a small portion of the overall site (1.4% of the total area), leaving the majority of the existing landform, fields and vegetation structure unaffected.

Assessment of Indirect Effects on the Landscape Resource

- 4.1.5 It is considered that the proposed construction of the Proposal is compatible with the large scale robust landscape character of the Wingates Ridge. A wind farm in this location is considered to be appropriate to the prevailing landscape pattern, characterised by large arable/pasture fields with frequent mature forestry blocks and shelter belts providing structure and containment, across a very undulating landscape.
- 4.1.6 Specifically, within 5km of the Site the assessment has concluded there will be significant effects upon the Wingates Ridge Local Landscape Character Area in which the Proposal will be sited. The Proposal will be viewed from much of this character area which has a moderate degree of intervisibility. Within this area effects on the receptor population is focussed on the settlements of Wingates, Netherwitton, Longhorsley and Longwitton. Where visible, the Proposal will change the environs, introducing a new feature and foci within the Wingates Ridge. Effects upon landscape character will be significant within the vicinity of the Proposal.
- 4.1.7 Within the wider study area views across the prevailing landscape towards the Proposal are increasingly restricted by the oblique nature of the views, with visibility limited by the intervening landform, built form and vegetation cover. Locally there are opportunities for visibility of the Proposal from ridges, however, the Proposal will be viewed within a wider landscape setting, simultaneously with other developments, and because of this, potential effects on landscape character are diminished.
- 4.1.8 It was concluded that there will be no significant effects on any of the National Parks or AONBs including Northumberland National Park and Northumberland Coast Areas of Outstanding Natural Beauty (AONB). Views from landscapes on the Register of Parks and Gardens are generally limited, distant or do not occur at all, and as such no significant effects were found on their setting or quality.

Assessment of Effects on Visual Amenity

- 4.1.9 Within the study area a number of settlements were identified that may have visibility of the Proposal. Significant local effects on visual amenity were identified in Wingates, Stanton and Longwitton where there will be opportunities for direct local views to the Proposal from the edges of these settlements where the Proposal will be seen as a prominent new element in the landscape with a significant effect on views. From slightly further afield, there will

be opportunities for direct visibility from the exposed edges of Longhorsley, Longframlington and Tritlington.

- 4.1.10 Effects on visual amenity from principal transport corridors within the study area were also assessed including the A1, A697, A698, A189, A1068, A696, A68 and the East Coast Mainline Railway. It was concluded that there are no significant effects from these route corridors.
- 4.1.11 Effects on the visual amenity from long-distance footpaths/cycleways within the study area were also assessed. It was concluded that there are no significant effects from long distance routes however it is acknowledged that there will be a significant local effect on footpaths within the core 5km radius of the site with the turbines remaining prominent in the majority of local views.
- 4.1.12 The nature of the visibility of the Proposal was also assessed from 18 viewpoints which were agreed with CMBC and NCC. The assessment concluded that there will be significant effects on six of these viewpoints, all of which are confined to locations within 5.5km of the Site and the elevated viewpoint at Simonside 8.5km from the site.

Assessment of Cumulative Landscape and Visual Effects

- 4.1.13 When considering the cumulative effects of wind farm developments within the study area, the baseline built and consented schemes and also the schemes currently in planning, were assessed together with the Proposal itself. In the context of the Proposal viewed locally in conjunction with the Wingates and the slightly more distant Todd Hill site the addition of Park Head is considered to have only a moderate cumulative effect.
- 4.1.14 The cumulative assessment concluded that the addition of the Proposal to the baseline will extend the possible areas from which a wind farm may be seen. Within the Wingates Ridge there will be locally significant effects on the character of the landscape however, the landscape is considered to be appropriate to accommodate the scale of development proposed.
- 4.1.15 No significant cumulative effects are predicted on landscape designations or the listed gardens of historic interest in the study area, or on route corridors or long distance footpaths or cycle routes in the surrounding area.
- 4.1.16 Whilst there will be locally significant effects on the Wingates Ridge and at Simonside Hills, overall in consideration of the above, the addition of the Proposal to the existing cumulative baseline is acceptable in terms of cumulative landscape and visual effects.

Conclusion

- 4.1.17 The assessment has established that the proposed development would change the landscape and visual baseline conditions during the operational phase of the Park Head Wind Farm.
- 4.1.18 The proposed turbines have been designed to be a strong and positive statement within the landscape. Any new wind farm development may result in potentially significant effects to the landscape quality and visual amenity of the locality. In the case of the proposed Park Head Wind Farm, based on viewpoint assessment, significant effects on the landscape character and visual amenity will exist within 5km of the site.
- 4.1.19 The Landscape and Visual Assessment has assessed the potential effects of the Proposal on landscape and visual receptors within a 30km radius study area. The assessment has followed best practice guidance and on balance, has not identified any over-riding landscape or visual effects which will merit refusal of the application.

4.2 ECOLOGY - HABITATS AND PROTECTED SPECIES

- 4.2.1 The ecological assessment has considered the potential of the Proposal to affect habitats in and around the Site, and also potential effects on various protected species.
- 4.2.2 The ecological and ornithological (see below) assessments were undertaken in close consultation with Natural England and RSPB with the scope of the survey being agreed with these consultees.
- 4.2.3 An extended Phase 1 habitat survey, otter, bat and water vole survey were carried out on 15th August 2006. Further bat surveys were carried out in June 2006 along with Great Crested Newt surveys, and extended otter, water vole and red squirrel surveys were performed on the 13th November 2006. Standard methodologies were used and surveys were undertaken during the recommended optimal survey seasons.
- 4.2.4 The site was found to contain a variety of UK Biodiversity Action Plan (BAP) priority habitats including purple moor grass and rush pasture, species-rich hedgerow, wet woodland and upland mixed ash woodland. These are all classified as 'Medium' sensitivity habitats, however the species-rich hedgerows on the site are also protected under the Hedgerow Regulation which is classified as 'important'.
- 4.2.5 Otters were found to have a strong presence within the study area with spraints and feeding remains recorded at Rayburn Lake and Ray Burn. Evidence suggests a corridor exists between the River Coquet through Todd Burn and onto Rayburn Lake.
- 4.2.6 Several areas within and around the study site were identified as likely to contain bat roosts including Newpark Wood to the south of the site, ancient woodland to the north of the site and at Park Head farmhouse and out buildings. Pipistrelle spp., Daubenton's and Myotis spp. were recorded during activity and roost emergence studies, with the majority of recordings taken on the fringes of the site in woodland, at Park Head farmhouse or at Rayburn Lake.
- 4.2.7 No evidence of red squirrel, badger, Great Crested Newt or water voles was recorded within the study site.
- 4.2.8 As a result of design mitigation including avoidance of important areas of ecological interest, and proposed mitigation measures, there would be no significant residual effects of the Proposal on any non-avian ecological interest feature during any phase of the development. Overall it is concluded there would be no significant primary or residual ecological effects.

4.3 ECOLOGY - ORNITHOLOGY

- 4.3.1 Breeding bird monitoring was performed between April and June 2006 to determine the overall breeding population within the proposed site. Wintering bird monitoring took place between September 2005 and April 2006 with a follow up survey in 2008 - 2009 including a field survey to gain bird counts and a vantage point survey to determine flight lines of the species present to ascertain the risk of collision with the proposed wind turbines.
- 4.3.2 Survey and reporting took full consideration of the latest relevant methodologies and local and national policies/legislation relating to birds. This took account of specific protected species and consultation responses from consultees which included the RSPB, CPRE, English Nature (now Natural England) and Northumberland Wildlife Trust.
- 4.3.3 Distributions of breeding birds of conservation importance can be found in Figures 7.1 to 7.13.
- 4.3.4 No species were observed regularly flying over the study area in important numbers and no important regular flight lines were reported.
- 4.3.5 The conservation importance of wintering bird populations was assessed and five sensitive species were identified, namely Greylag goose, Pink-footed goose, Whooper swan, Golden plover and lapwing. There was no evidence that the study area was particularly important

for any of these species with no notable concentrations of these birds and no important wintering bird habitats occurred within the study area.

- 4.3.6 Rayburn Lake however, supports a regionally important wintering bird community, so and following a recommendation from Natural England a turbine-free buffer zone was implemented around the lake to reduce the potential impact of the Proposal.
- 4.3.7 Mitigation during construction includes phasing proposed works and restricting vehicular access to designated routes as far as possible. Although no Schedule 1 breeding bird species under the Wildlife and Countryside Act were found during these surveys, it is important not to disturb these species during the breeding season, therefore further surveys will be carried out on the site if construction is planned between April and July.
- 4.3.8 No significant effects are likely on breeding birds, however a habitat enhancement programme is to be implemented which includes the establishment of grassland strips between fields and access tracks, hedgerow restoration, planting of field margin strips and enhancement of plantation woodland. A net conservation gain may result. No mitigation is necessary during operation and during decommissioning the same mitigation as for construction should be applied.
- 4.3.9 With relevant mitigation measures, the residual impact of the wind farm would be a small loss of agricultural habitat to turbine bases and tracks. The Proposal has been designed to avoid loss of high value habitat, so Low/Negligible conservation value habitat will be lost. It is therefore unlikely that the Proposal will have an impact on the integrity of the ornithology of the site or its conservation status.
- 4.3.10 An ornithological monitoring programme will be implemented to indicate the effects of the proposed Park Head Wind Farm on the local bird populations and on the habitat enhancement programme. The baseline surveys in this ES will provide a baseline for a post-construction monitoring programme. This work will continue when the wind farm has been commissioned, to determine the effects that the wind farm has on the local bird populations. Breeding and wintering bird surveys will be carried out to standard methodologies.
- 4.3.11 Overall, no ornithological impacts are likely to occur as a result of the Proposal that would be considered significant.

4.4 ARCHAEOLOGY & CULTURAL HERITAGE

- 4.4.1 An assessment was carried out to determine the potential impacts of the proposed wind farm on surrounding cultural heritage features. Cultural heritage, as it is interpreted here includes all types of historic buildings and archaeological sites, including Registered Battlefields and sites which might be considered to be of palaeo-archaeological interest.
- 4.4.2 A baseline survey was undertaken comprising documentary research and field surveys to determine the direct and indirect effects of the development on cultural heritage features and determine the potential impact on previously unrecorded features.
- 4.4.3 Construction impacts on cultural heritage features have been assessed and appear restricted to 18th/19th century field boundary banks which will be crossed by the proposed access track. Such banks are common and are considered to be of Minor sensitivity to construction impacts. The impact will involve localised loss of sections of bank, which will constitute an impact of Negligible magnitude resulting in negligible significance. No mitigation is proposed in relation to this impact.
- 4.4.4 There is moderate potential for previously unrecorded archaeological features to be present on those parts of the site potentially directly affected by construction activities. This primarily relates to sites of the prehistoric and Roman periods. Therefore a programme of archaeological works will be implemented to mitigate construction impacts through

excavation and recording. The first phase of this programme will be evaluation trenching which will determine the need for and type of further work.

- 4.4.5 Potential operational impacts upon the setting of cultural heritage features were considered in relation to cultural heritage features present within an inner study area, the nine scheduled monuments and 81 Listed Buildings in a middle study area and one scheduled monument and Hadrian's Wall World Heritage Site in an outer study area. It is predicted that there will be no impacts upon the setting of these features.
- 4.4.6 It is predicted that there will be no impacts upon the setting of cultural heritage features from the proposal in terms of EIA Regulations 1999, nor any impacts resulting from decommissioning.

4.5 HYDROLOGY, HYDROGEOLOGY & GEOLOGY

- 4.5.1 An assessment including desk based research and field studies provided baseline information and identified potential impacts of the wind turbines on geological, hydrogeological, hydrological and flood risk receptors based on IEMA Environmental Impact Assessment (EIA) Guidance (IEMA, 2004). Site visits were carried out in July 2006 and December 2008.
- 4.5.2 The solid geology consists of bedrock of the Namurian Millstone Grit Series. Drift geology of the site comprises of boulder clay. There are also isolated areas of peaty organic material associated with areas of marshy grassland.
- 4.5.3 The site is not within a Groundwater Protection Zone as defined on the EA website.
- 4.5.4 Known private water supply abstractions were identified within 3km of the centre of the site and information supplied by Castle Morpeth and Alnwick Borough Councils. Further details can be found in Table 9.5 of Chapter 9 (Hydrology, Hydrogeology and Geology) and the locations are shown in Figure 9.2.
- 4.5.5 The site lies on the boundary of two major surface water catchments (see Figure 9.1). The western half of the site is in the River Wansbeck catchment with flow directed towards the Coal Burn and onto the River Font, and the eastern half in the River Coquet catchment with flow directed towards the Ray Burn.
- 4.5.6 There are no licensed surface water abstractions or consented discharges to surface waters recorded within 2km of the centre of the site.
- 4.5.7 An assessment of the Environment Agency website found that the whole site is defined as Flood Zone 1 (low risk).
- 4.5.8 Receptors with potential sensitivity to changes in the hydrological regime on the site include:
- Coal Burn, Cowclose Burn and the River Font;
 - Rayburn Lake and Ray Burn;
 - marshy grassland; and
 - all BAP priority habitat.
- 4.5.9 During the construction period there will be some activities which, if not properly managed, would have the potential to lead to impacts on hydrological receptors. The main activities which can impact on hydrology and hydrogeology are: construction of onsite tracks, turbine foundations and hardstandings, excavation of the borrow pit and cable trenches and construction of the control building, sub-station and construction compound. These activities could result in:
- potential erosion and sedimentation;
 - pollution;
 - alteration to natural drainage patterns; and

- flood risk.
- 4.5.10 Prior to mitigation, there would be the potential for effects of Moderate significance to occur from the identified activities during construction.
- 4.5.11 Mitigation and management measures have been incorporated in the design stages of the Proposal and through each phase of the proposed development. The management of erosion, sedimentation and pollution during construction is now standard practice. Accordingly, all potential effects are able to be mitigated and eliminated providing appropriate provisions are made in the design, construction planning and methodology.
- 4.5.12 Following planning permission, more detailed site investigations and drainage design and a Construction Method Statement will be prepared in consultation with the EA, to be submitted to the Local Planning Authority prior to commencement of construction. This includes, regular water sampling and inspection of drainage features through construction, operation and decommissioning phases.
- 4.5.13 During the operation of the wind farm there will be no or few regular works and therefore the risk of impacts from erosion, pollution from spillage or alteration of the drainage patterns is negligible. The risk from flooding will not be higher than during the construction phase, therefore the significance of flood risk during operations (on downgradient receptors) is assessed to be Minor.
- 4.5.14 During decommissioning potential impacts will be similar to those identified during the construction phase.
- 4.5.15 With the proposed mitigation and management in place the significance of the residual effects of the proposed development on the water environment would be Negligible or Minor.

4.6 NOISE

- 4.6.1 An assessment was carried out to determine the potential effects of noise and vibration from construction, operation and decommissioning of the Proposal on the surrounding environment, primarily residential properties. The noise impact has been assessed in accordance with current government guidance on wind farm noise (ETSU-R-97 Assessment and Rating of Noise from Wind Farms).’ (ETSU, 1996).
- 4.6.2 Any noise effects resulting from construction will occur through the operation of large items of plant such as excavators, dump trucks and cranes. However noise will be intermittent during this period, and there will be agreed working hours, and as the construction period is temporary and short-term it is considered that these impacts are not significant. Decommissioning impacts will be similar to those occurring during construction.
- 4.6.3 Background noise surveys have been carried out by RES at three nearby properties. Information from this survey have been used to determine appropriate noise limits. The predicted noise levels from the assessment are within both day-time and night-time noise limits at all considered wind speeds. The proposed Park Head Wind Farm therefore complies with the relevant guidance on wind farm noise and the impact on the amenity of all nearby properties would be regarded as acceptable.
- 4.6.4 No mitigation measures are therefore required.

4.7 EMI & AVIATION

- 4.7.1 An assessment was carried out to determine the potential effects of the Proposal on television and telecommunications infrastructure in and around the Park Head site.
- 4.7.2 Consultation was carried out regarding electro-magnetic interference and aviation issues with telecommunication organisations, the Defence Estates and Civil Aviation Authority.
- 4.7.3 RES performed a full technical assessment through prediction modelling of the scale and location of TV interference that might occur as a result of the proposed wind farm. The

prediction model is based upon International Telecommunication Union (ITU) recommendations on signal propagation and impairment to television reception by wind turbines.

- 4.7.4 Application of the model showed that there may be some interference, particularly for those viewers tuned to the Pontop Pike transmitter, and also to some viewers tuned to the Chatton, Newton and Fenham transmitters. In all areas of predicted interference, mitigation can be achieved either by an improved aerial installation, aerial redirection or by conversion to digital.
- 4.7.5 Two microwave links were identified within the proposed area. Following correspondence with the operators of these links, it was established that given the separation between the link and the proposed wind farm site, there was no risk of interference that could not be covered through any mitigation measures.
- 4.7.6 During construction and operation there is predicted to be no significant permanent effect on television or telecommunications. Mitigation measures for any potential effects should be agreed between RES and the Local Planning Authority, ensuring that any remedial measures are carried out at the Applicant's expense.
- 4.7.7 Consultation with the MoD confirmed on 19th December 2008 that a wind farm at this location would not impact on the operations of their Air Defence Radar at Brizlee Wood. A few turbines were identified as being within line of sight of the Spadeadam Air Traffic Control radar at Deadwater Fell. The CAA identified that the wind farm would have an effect on the radar at Newcastle International Airport, therefore further discussions have been entered into with both consultees.
- 4.7.8 The MoD and CAA have not raised any physical safeguarding concerns with respect to en-route obstructions, therefore the turbines at Park Head will not have aviation obstruction lights installed.
- 4.7.9 Mitigation measures were incorporated into the siting and design process for the wind farm so as to avoid electromagnetic interference effects.
- 4.7.10 To address potential interference to television reception, RES would commission a benchmark site survey of television reception quality in the area around the wind farm site between obtaining planning permission and starting construction.
- 4.7.11 Given the range of available mitigation measures for potential effects on television reception it is concluded that there would be no significant residual effects.

4.8 ACCESS, TRAFFIC & TRANSPORT

- 4.8.1 The nature and volume of the traffic that would be generated by the construction of the wind turbines and the delivery and erection of the turbines have been identified. During construction, conventional tipper and ready-mix delivery vehicles will form the bulk of the traffic activity. The traffic assessment has assumed that aggregate for track construction and other activities will be sourced offsite based on the fact that the borrow pit might not yield sufficient stone or stone which is considered fit for purpose.
- 4.8.2 The main potential impact examined is related to traffic volume and the size of some of the vehicles which is predicted to be of Minor significance because of the low volumes of traffic and the temporary nature of the anticipated 12 month construction period.
- 4.8.3 Traffic entering the site is estimated at an average of 20 return journeys per day. During short periods of the construction phase, such as concrete pouring for turbine foundations, around 40-50 deliveries of ready-mix concrete are likely to be required per day.
- 4.8.4 During delivery and erection of turbines, an estimated 85 abnormal loads will be generated and will require special arrangements with the Highways Agency and police. Although limited in number and duration, these movements pose specific challenges in terms of physical manoeuvring. Potential routes to the site from the A697 and along the unclassified public

Longhorsley-Netherwitton road have been identified and analysed for these abnormal loads and an identified route from Morpeth selected.

- 4.8.5 The study concludes that traffic levels will be subject to minor increases during the 12 month construction period on the proposed access route, which comprises use of mainly the A697 and the unclassified West Road between Longhorsley and Netherwitton.
- 4.8.6 The increase in traffic on the Longhorsley - Netherwitton unclassified road may at times be higher than 10%, reflecting the low nature of traffic volumes on this road. However all traffic levels along the access route would return to their baseline levels following the end of the forecast 12 month construction period.
- 4.8.7 Traffic generated during the operation and maintenance of the the proposed wind farm is Minor and will not result in any significant effect.

4.9 SOCIO-ECONOMIC

- 4.9.1 An assessment of the socio-economic impacts of the Proposal has concluded that the construction and operation of the Proposal would have a positive effect on the local economy, in terms of local employment during the construction phase, and also in the longer term from the landowner rentals, business rates, local services, and employment of maintenance staff.
- 4.9.2 On a national level the UK demand for wind farms will help establish, mainly via inward investment, a substantial new UK industry providing long term skilled jobs serving both the home and overseas markets. Manufacturing benefit is already being experienced.
- 4.9.3 Locally and regionally sourced personnel, materials and services will be used where available throughout the construction, operation and decommissioning phases. A temporary workforce of 20 to 60 people will be required during the 12 month construction period and one permanent post would be created for operation and maintenance long term. Some longer term benefits will also result in the local community from use of local services and amenities by construction staff.
- 4.9.4 An indicative capital-cost for a typical UK wind farm project such as the 16.2MW proposal at Park Head is between £25 and £30 million. Of this the civil engineering element (roads, foundations etc) accounts for approximately 10% and the grid connection a further 3-5%.
- 4.9.5 Additional benefits will be realised by the project owing to its embedded generation, lack of fuel cost inflation, low decommissioning costs and no associated costs from pollution.
- 4.9.6 The wind farm will become a feature of the area, and is likely to attract interest from locals and visitors alike. RES is also prepared to commit to direct community benefits from the operation of the wind farm through a Community Benefits Fund.
- 4.9.7 Modern wind turbines are remarkably safe given their size and relatively short evolution. Safety of the Park Head Wind Farm will be ensured through adherence to relevant design standards, construction practices and operational procedures.
- 4.9.8 Several public rights of way have been identified across the Park Head site with potential effects on users from the construction of the wind farm. To mitigate any impacts during construction a temporary closure or diversion will be applied as a temporary measure, and a replacement bridleway will be made available.
- 4.9.9 Given the likelihood of local and visitor interest in the wind farm, RES is currently assessing the potential of providing resources such as information boards and other interpretative material.
- 4.9.10 A shadow flicker assessment concluded that the Proposal will not cause a material reduction to amenity owing to reflected light or shadow flicker.

4.10 GRID CONNECTION

- 4.10.1 For wind farms less than 50MW as is the case with the Park Head Wind Farm proposal, consent for grid connection must be sought from the Local Planning Authority (LPA) through the Town and Country Planning Act 1990.
- 4.10.2 Grid connection consent is sought by the relevant operator of the local operation or distribution network, in this case CE Electric UK who are the parent company of the local distribution network operator NEDL.
- 4.10.3 An initial assessment of the site by RES identified its potential for energy generation of around 20MW considering the size and location of the site. RES appointed specialist generation connection electrical consultants Econnect to assess the local grid network and identify the most technically viable connection. A review of the local grid infrastructure in the area of the site indicates that the local 66kV network is likely to be able to accommodate the generation.
- 4.10.4 Studies have concluded that the most likely point of connection is to the Linton-Stobswood 66kV circuit approximately 16km to the east of the proposed wind turbine locations. It is proposed that underground cabling will be used to restrict or eliminate any long term effects on landscape character or visual amenity.
- 4.10.5 The connection route will be determined by NEDL who have their own established methodologies for minimizing the impact of the connection. The indicative route will take into account: avoiding skyline backdrops against the substation, avoiding potential conflicts with features of ecological or heritage value and following field boundaries where possible.
- 4.10.6 The potential effect on the landscape resource and visual amenity associated with the proposed grid connection would be Negligible and can be considered as not significant. The substation and indicative cable route have been located and designed to minimize or eliminate any adverse effects and avoid any national or local landscape designations.
- 4.10.7 Potential impacts on archaeology and cultural heritage is predicted to be Negligible.
- 4.10.8 It is predicted that the development of the grid connection will result in ecological, hydrological and hydrogeological effects of Minor significance. A mitigation strategy will be informed by the results of the general programme of ecological works discussed in Chapters 6 & 7 (Habitats & Protected Species and Ornithology) relating to the wind farm and a mitigation strategy as described in Chapter 9 (Hydrology) would be applied to ensure the correct management of excavated soils, surface water and backfill material.

5 CONCLUSIONS

- 5.1.1 In summary the main conclusions of the environmental impact assessment are:
- the Landscape and Visual Assessment has assessed the potential effects of the Proposal on landscape and visual receptors within a 30km radius study area. The assessment has followed best practice guidance and on balance, has not identified any overriding landscape or visual effects which will merit refusal of the application;
 - the site consists of improved grassland of low ecological value, mixed woodland and conifer plantations, a freshwater lake and marshy grassland. This will not be significantly affected in terms of direct habitat loss or disturbance due to the development;
 - protected species were identified on the site including otters around Rayburn Lake and bats within the woodland boundaries and Park Head farmhouse. Mitigation measures have been proposed to minimise the potential for effects on protected species during construction and operation;
 - the potential for the development to affect bird species of conservation interest has been carefully assessed. No significant effects have been predicted;

- no significant direct effects have been identified on cultural heritage features and no mitigation is necessary;
 - the development would have a Minor effect on water and geology of the area. Private Water Supplies within the site will not be significantly affected. A Construction Method Statement will be prepared and mitigation will include the implementation of a drainage management plan and appropriate site construction practices;
 - socio-economic impacts will include a positive effect on jobs in the local/regional area during construction and operation and for associated commercial activity. Income to the landowners involved will represent an important source of diversification. National benefits resulting from increased UK demand for wind turbines and wind farms will help establish, mainly via inward investment, a substantial new UK industry providing long term skilled jobs serving both the home and overseas markets. Manufacturing benefits are already evident.
 - existing traffic levels will not be significantly affected by construction traffic and only minor road alterations are required during turbine delivery. Operational traffic will be negligible.
 - no adverse effects have been identified in terms of interference with telecommunications and radar that cannot be overcome by appropriate mitigation;
 - a suitable grid connection route has been identified and subject to a desk study in terms of potential constraints. No significant constraints have been identified; and
 - the construction and operation of nine wind turbines at Park Head is anticipated to have no health or safety implementations.
- 5.1.2 In summary, the Proposal will make a contribution towards clean energy generation in the North East. It will produce a significant quantity of electricity, with consequent savings in emissions of greenhouse gases, which is beneficial in terms of the climate change agenda.
- 5.1.3 For the reasons listed above, it is concluded that the Park Head Wind Farm proposal would be acceptable in terms of its effects on the environment, planning policy and national energy policy.

5.1 FIGURES

- 5.2.1 The following summary figures have been extracted from the Environmental Statement for reference and are reproduced below.
- Figure 1.1: Site location
 - Figure 3.1: Site Infrastructure Layout
 - Figure 3.7 : Typical Turbine