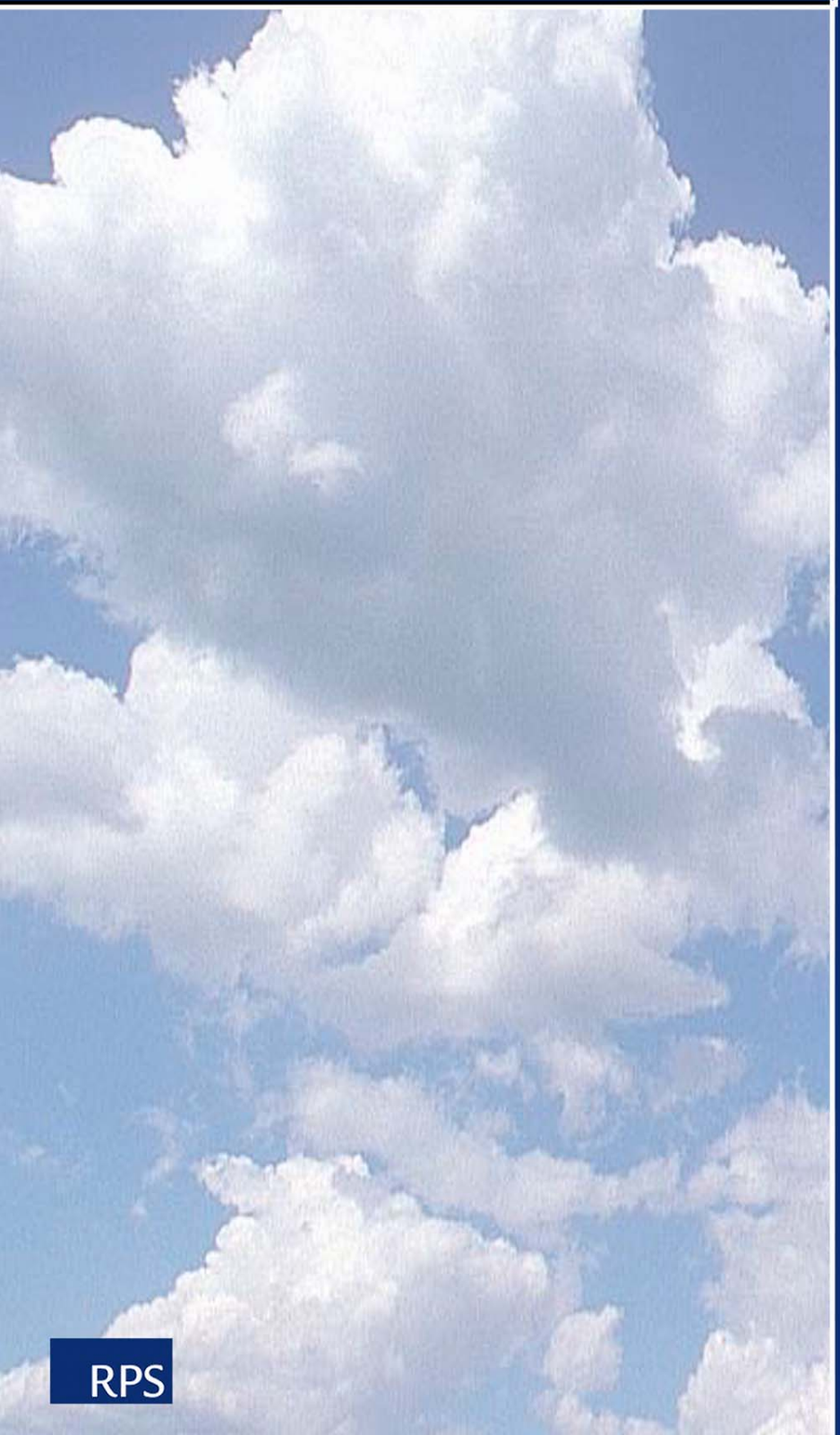
# Barmoor Wind Farm

CATAMOUNT ENERGY LIMITED

force 9 energy



## Non-Technical Summary

RPS

February 2006

# PREFACE

An Environmental Statement (ES) has been prepared to accompany the planning application to Berwick-upon-Tweed Borough Council to develop a windfarm at Barmoor between Lowick and Ford in Northumberland.

This Non-Technical Summary (NTS) forms part of the ES and provides an 'executive summary' of the ES and its findings presented in a non-technical manner. The NTS is also available as a separate document which is free of charge. The Environmental Statement comprises the following documents:

- Volume I: The Environmental Statement
- Volume II: Figures
- Non-Technical Summary; and
- Technical Appendices

The ES is supported by a Planning Statement, available on request from Catamount Energy Limited, which explains why it is considered that the proposed wind farm complies with the Development Plan. It also describes other material considerations, including such matters as international and national policy on sustainability and the reduction of emissions of carbon to the atmosphere and explains why the proposal should be granted planning permission.

The ES can be viewed, along with the other documents referred to in this section, at the following locations during the statutory consultation period:

Berwick-upon-Tweed Borough Council
Council Offices
Wallace Green
Berwick-upon-Tweed
Northumberland
TD15 1ED

Telephone: 01289 330044

Berwick Library
Walkergate
Berwick-upon-Tweed
Northumberland
TD15 1DB

Telephone: 01289 334051

Printed copies of the NTS are available free of charge and printed copies of the ES may be purchased for £250 each (including Figures and Appendices) or £2 for a CD-ROM from:

RPS Planning, Transport & Environment
Wellfield House
33, New Hey Road
Huddersfield
Yorkshire
HD3 4AL

Telephone: 01484 543124

The CD-ROM version also includes the Planning Statement.

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# NON-TECHNICAL SUMMARY

## BACKGROUND

This Non-Technical Summary (NTS) forms part of the Environmental Statement (ES) for the proposed nine turbine Barmoor Wind Farm which is located some 14km south-south-west of Berwick-upon-Tweed, Northumberland. Figure 1.1 shows the area in which the Environmental Impact Assessment process has been carried out.

Awareness of energy production from renewables sources such as that derived from the operation of wind farms has increased as a result of concern over the rise in atmospheric levels of carbon dioxide ($CO_2$) and other greenhouse gases and the consequent changes in global climate which could be occurring. The burning of fossil fuels such as coal, oil and gas contributes significantly to the emission of greenhouse gases. Reducing their use and increasing the proportion of energy generated from renewable sources is perceived to be vital in reducing these emissions.

In order to meet the UK's international obligations in regard to climate change the Government is committed to reducing greenhouse gas emissions. The Renewables Obligation has been placed on all electricity suppliers to increase the proportion of power which they supply from renewable sources and includes a system of targets and financial penalties to be imposed if these targets are not met. The Government expects that much of the new power generation capacity required to meet the Renewables Obligation will come from wind farms and that, in the short term, these will be primarily located onshore rather than offshore. The UK has one of the windiest climates in Europe giving great potential for the use of this resource for generating electricity.

## BARMOOR WIND FARM

The proposed development is described in detail in the ES. A brief description of the proposal is given below.

The proposed wind farm comprises nine wind turbine generators with a maximum height to hub of 65.5m and to blade tip of 110.5m. In addition, ancillary equipment comprising unit transformers, one permanent meteorological mast, access tracks, sub-station and a temporary site compound form part of the planning application.

Access to the assessment area will be via the A698, the A697 and the B6353 using lengths of upgraded existing and new tracks. The wind farm will connect into the electricity distribution system via a new sub-station and a length of predominantly overhead line to an existing Scottish Power sub-station at Berwick-upon-Tweed. The grid connection will be the subject of a separate application under s37 Electricity Act 1989.

The electrical output of the wind farm will be a maximum output of 27MW, sufficient, on average, to supply the equivalent of the domestic needs of more than 15,000 homes. The windfarm would operate for a period of 25 years after which the turbines would be de-commissioned, or subject to the grant of a new permission retained or replaced.

# ENVIRONMENTAL IMPACT ASSESSMENT

Environmental Impact Assessment (EIA) is a process through which information about the likely significant environmental impacts of a project is collated, analysed and taken into account in its design, the decision as to whether it should be granted consent and, if it is granted consent, how it is to be built, operated and de-commissioned. The ES reports on the findings of the objective identification and assessment of likely significant effects; these are summarised in this NTS.

In order to evaluate environmental effects assessment criteria are identified and thresholds of significance are then used to make explicit the conclusion of the assessment process. These are identified as; Not significant (no detectable or material change to location, environment or species), Minor (a detectable but non-material change to a location, environment or species), Moderate (a material, but non-fundamental change to a location, environment or species), and Major (a fundamental change to a location, environment or species).

### Consultation

A key aspect of EIA is consultation both to agree the scope of the ES and to understand the public's perception of the wind farm in order to inform the design process. Organisations consulted in the case of the Barmoor project included Berwick-upon-Tweed Borough Council, Northumberland County Council, Northumberland National Park Authority, Scottish Borders Council, Ford, Lowick and Bowsden Parish Councils, English Nature, Environment Agency, RSPB, Countryside Agency, English Heritage and many others.

Public consultation included three public exhibitions at Lowick, Ford and Bowsden in September 2005 at which members of the public were invited to express their views and comment on the proposal.

# SITE SELECTION, DESIGN AND DESCRIPTION

Force 9 Energy undertook a national site finding exercise in 2001 and 2002 to identify areas with greatest potential for wind energy development. Amongst many other factors the search excluded from consideration any sites located within areas with national or international landscape or nature conservation designations, including National Parks, Areas of Outstanding Natural Beauty, Sites of Special Scientific Interest, Candidate and designated Special Areas of Conservation, Proposed and notified Special Protection Areas, National Nature Reserves and RAMSAR sites.

Within Berwick-upon-Tweed Borough relatively few locations were unconstrained and only a few locations offered the potential for schemes in the 20 MW to 30 MW range, notably near Ford, Etal, Lowick, Bowsden and Duddo.

The North East Renewable Energy Strategy, March 2005, identifies a number of areas of least constraint within the region one of which includes the area to the south and west of Berwick-upon-Tweed; the proposed Barmoor Wind Farm falls within this. The strategy also established a sub-regional target for Northumberland of 212MW from renewable energy by 2010.

The Barmoor Wind Farm has been through a detailed iterative site design process. Following the completion of data collection for each of the environmental topic areas, all environmental constraints were identified and evaluated. This information has influenced the final proposed layout together with such factors as the assessment of wind yield. The principal environmental issues influencing design of the windfarm have been the potential effects on landscape and visual amenity, cultural heritage and noise.

The final layout, as shown in Figure 1.2, represents the best environmental fit within the technical parameters of the development.

### Project Description

Construction of the windfarm would follow a rolling programme over an anticipated nine month period with the following infrastructure being constructed within the assessment area:

- Nine turbines comprising three-bladed rotor, nacelle and tower reaching a total height to blade tip of up to 110.5m;
- Temporary contractor's compound and turbine storage areas for use during construction;
- One permanent and one temporary Meteorological mast;
- New and upgraded site tracks;
- Underground cabling and unit transformers; and
- A sub-station incorporating a control building.

The following activities would take place during the construction period; which is expected to last approximately nine months:

- Stone for site tracks would be sourced from an off-site commercial stone quarry and from excavation of turbine foundations;
- Concrete would be brought in from local suppliers for the construction of turbine foundations;
- Turbines would be delivered via the A698, A697 and B6353 on semi-low extendable trailers and erected using a large crane in conjunction with a smaller crane; and
- Construction of infrastructure and erection of turbines**,** upgrade of existing site tracks where necessary, laying out of new tracks and construction of a sub-station.

On-going maintenance would be carried out throughout the 25-year operational life of the windfarm. De-commissioning of the windfarm would involve the dismantling and removal of the turbines and sub-station. Tracks would be retained for the on-going use by the landowners. Turbine foundations would be partially removed and the remaining portion covered in topsoil.

## ENVIRONMENTAL EFFECTS

As a result of the wide-ranging series of consultations all the relevant environmental effects were subject to assessment during the preparation of the ES. The following sections provide a summary of the main findings of the ES.

## LANDSCAPE AND VISUAL ASSESSMENT

A landscape and visual impact assessment (LVIA) of the proposed Barmoor Wind Farm has been carried out which considers the effects of the development on landscape features, landscape character and visual amenity within a study area of 30km radius from the centre of the wind farm assessment area. The assessment was carried out by Chartered Landscape Architects using established best practice for the assessment of wind farms.

The LVIA has demonstrated that there would be effects on the landscape character of the surrounding area and views of it ranging from minor to major in terms of significance. An iterative design process was adopted to minimise landscape and visual effects.

### Landscape Assessment

Landscape effects are defined as changes to landscape features or landscape character as a result of development.

The wind farm is located almost entirely in an area of landscape character described as Open Rolling Farmland. Although the southern tip of the assessment area falls within the Outcrop Hills and Escarpment character type, field surveys suggest that the landscape within this small area is actually more characteristic of the adjacent Open Rolling Farmland type. For the purpose of this assessment it has therefore been decided to assess the area as falling entirely within the Open Rolling Farmland Character Type which the *Landscape Appraisal for Onshore Wind Development* document concludes is of medium sensitivity to wind energy development.

There would be no significant loss of existing landscape features on the site. The main cause of change in landscape character would arise out of the introduction of nine wind turbines. Whilst they would unarguably be tall structures the open rolling farmland would be sufficiently robust to accommodate them without altering the landform, pattern and general land cover or the fundamental sense of openness. It has been assessed that there would be a moderate effect on the landscape character of the Open Rolling Farmland character area although there would be a major/moderate effect locally on the landscape character of the assessment area.

The turbines would not obscure the characteristic views either towards the Cheviot Hills or the Northumberland Coast or prevent an appreciation of the underlying and surrounding landscape. It has been assessed that there would be only minor effects on the landscape character of the Northumberland National Park and the Northumberland Coast Area of Outstanding Natural Beauty (AONB).

### Visual Assessment

Visual effects are concerned with the effects of the development on views and general visual amenity. It has been assessed that the most significant visual effects would occur within approximately 2km of the assessment area. Within this distance there would be major visual effects at residential properties and along public rights of way where there are clear views of the turbines including from the village of Bowsden and along the bridleway which crosses Broom Ridge. However, at no location would they obstruct any long distance views or prevent an appreciation of the underlying landscape. Due to the landform and vegetation west of the assessment area there would be no view of the development from the villages of Ford and Etal and there would be no visual effect on the tourist corridor between the two villages including the mill and train station at Heatherslaw. There would also be no view of the development from the centre of Lowick.

Between approximately 2km and 5km from the assessment area there would be major/moderate effects on the most highly sensitive, residential visual receptors and public rights of way. Where visible at this distance the turbines would be prominent but not detract from the wider panoramic views. Beyond approximately 5km, the assessment area would be visible from a number of viewpoints but the turbines would not result in any greater than a moderate/minor visual effect.

During construction and de-commissioning there would be temporary effects on the landscape and on visual amenity. However, these are considered to be temporary in nature, localised in terms of extent of the impact and, hence, of only minor additional significance.

It has been assessed that the proposed Moorsyde wind farm (3.5km to the north-west of Barmoor), if approved, would increase the overall magnitude of landscape and visual effects. However at no location is it considered that the cumulative visual impacts would be more significant than the impacts associated with solely the Barmoor assessment area.

It has been assessed that the Barmoor Wind Farm assessment area would, inevitably have some major landscape and visual effects locally. However, it is considered that the size of the

development is appropriate to the scale of the baseline landscape and could be accommodated without detrimental effect on landform, pattern or the rural sense of openness. The changes to the landscape and views may be perceived by some to be adverse, but to others, they would be considered beneficial and add to the visual experience.

# ECOLOGY

Ecological effects are any impact upon habitats, plants or animals likely to occur as a result of the development proposals. The scale and significance of any predicted impact is assessed as part of the EIA process.

An ecological assessment was carried out involving desk and field studies of the assessment area to assess the existing conditions with regard to habitats and protected species.

A detailed habitat survey was undertaken of all land located within the proposal assessment boundary during April 2005. Badger, bat, otter and water vole surveys were also carried out.

A comprehensive desk study exercise was conducted with all relevant statutory and non statutory data holders including English Nature, Environment Agency, Northumberland Wildlife Trust and Northumberland County Council. The aim of the exercise was to review existing information available on the ecological status of the assessment area and to supplement and inform the field surveys.

The desk study revealed that there are no statutory or non-statutory designated sites for nature conservation located within the proposal assessment boundary. The nearest statutory designated site is Ford Moss SAC and SSSI. The nearest proposed turbine (turbine 4) is located approximately 250m north-east of the boundary of this site and it is considered that no significant impact from the development will occur to this designated site. The surveys revealed evidence of protected species using the site and this is described in the following paragraphs.

Bat activity surveys confirmed low numbers of common pipistrelle bats flying and foraging along vegetation features such as hedgerows and along woodland edges. The proposed turbine locations are located outside main areas of bat activity. No suitable locations which could support a bat roost were recorded any part of the site directly affected by the proposals. In addition pipistrelle bats are low flying species and are not at risk of collision with the turbines. There will be no significant impact upon bats as a result of the development proposals.

Badger activity has been confirmed within the assessment boundary. However no setts are present where there is considered to be a significant risk of disturbance from the development proposals.

The hedgerows and woodland blocks were identified as being ecologically important features forming the main bat foraging routes and functioning as green corridors and ‘islands’ for species such as badgers. These areas will not be affected by the development proposals

The wind turbines, access tracks and other structures have been located in order to minimise disturbance of protected species and important habitats.

The ecological appraisal assessed the likely significance of effects of the development with regard to habitats and species. All of the effects are assessed as being not significant in terms of the EIA regulations.

# BIRDS

Consecutive annual breeding bird surveys of the proposed Barmoor Wind Farm assessment area and its surrounds were carried out in 2004 and in 2005. The area studied was defined to include all areas in which wind turbines may be located and the areas which could be affected by them plus a buffer zone of 300m for breeding birds and 1km for wintering birds around this.

Breeding bird populations within the zone of potential effect of the wind farm were generally low as the wind farm has been designed to avoid any areas where important populations live as well as protected areas. There are, however, still several species of conservation importance present in the study area. The breeding bird community included a typical range of farmland species including two species listed on Schedule 1 of the Wildlife and Countryside Act (barn owl and crossbill). There was no evidence of either of these species breeding within the potential disturbance zone.

Breeding waterfowl included shelduck, teal, oystercatcher, lapwing, snipe, and curlew, although numbers within the 300m potential disturbance zone were low.

Seven further species were breeding in regionally important numbers within the Study Area (buzzard, barn owl, long-eared owl, redstart, stonechat, yellowhammer and reed bunting), however none of these were breeding in significant numbers within the 300m disturbance zone.

Eight UK BAP priority species were found of which five were within the 300m disturbance zone (skylark, song thrush, linnet, bullfinch and reed bunting). None of these were breeding in significant numbers within this area. Mitigation measures will be implemented to ensure that any Schedule 1 species, if present during construction, are not disturbed.

No adverse effects on breeding bird populations are likely to occur which are considered significant under the EIA Regulations.

Any potential impact upon wintering birds will be addressed in a separate addendum to this ES following completion of wintering bird surveys in April 2006.

# WATER ENVIRONMENT

It is not anticipated that the construction, operation or de-commissioning of the proposed windfarm would result in an adverse effect on Ford Moss Site of Special Scientific Interest (SSSI) in terms of hydrology. Ford Moss is rain fed and managed using dams to restore the watertable. The topography of the area means that the proposed windfarm will not affect this designation or its management. The drainage of the area means that surface run-off from the assessment area would flow into watercourses downstream of Ford Moss.

Surface water run-off from the proposed wind farm has the potential to enter the River Till which has both SSSI and Special Area of Conservation (SAC) status. However, run-off must travel a minimum of 4.5km prior to reaching the River Till and, in most cases, the distance is significantly further. Surface water run-off from the assessment area also has the potential to enter the Lindisfarne coastal area having flowed a minimum of 11.5km. With the mitigation measures proposed implemented on assessment are it is not anticipated that the River Till would be affected by the proposed wind farm.

A Pollution Prevention Plan will be produced and implemented on during the construction period and all site personal and contractors would be instructed in its use. An Incident

Response Plan would also be drawn up detailing the procedure to be undertaken if a spillage was to occur. These plans would be reviewed and updated to ensure that they are relevant and specific enough to be most effective.

## CULTURAL HERITAGE

Assessment was made of the potential effects upon various cultural heritage assets (including buried archaeological sites as well as historic buildings) using data held in the Sites and Monuments Record maintained by Northumberland County Council and records held by English Heritage.

Through careful design the proposed development would not cause any direct effects (for example, physical damage during construction) upon known cultural heritage resources. Indirect effects upon the settings of cultural heritage features may be expected in terms of visual impact (that is the presence of the turbines in views to and from the proposed assessment area). The assessment took into account the visibility of the wind farm from Scheduled Monuments and Listed Buildings (against the theoretical zone of visual influence used for the Landscape and Visual Assessment). This initial assessment was used to predict which sites or buildings might receive greater potential effects. These sites were then further assessed in terms of their archaeological setting or in terms of their character and appearance.

Whilst assessment against the wind farm's zone of visibility predicted a "major" impact upon the (visual) setting of the Ford Colliery Scheduled Monument due to the proximity of the turbines further consideration shows that there will be no effect upon the archaeological setting of the monument (that is upon the archaeological features within the scheduled area or upon the relationship of those features to each other and to other archaeological features outside of the scheduled area). No significant effects are anticipated upon the archaeological settings of any other scheduled monument although the turbines may be visible in views to and from those monuments.

No significant effects are anticipated upon the character and appearance of any listed buildings although some listed buildings may receive effects of "medium" significance in terms of visual setting. The effect of the presence of the turbines upon listed buildings will not detract from physical appearance and character of those buildings nor interfere with their relationship to their immediate surroundings.

No significant effect upon the setting of the Flodden Battlefield is anticipated. Whilst the turbines may be visible in views to the east from the Memorial on the battlefield they will not intrude upon the immediate setting of the field nor prevent an understanding of the events which took place there in 1513.

No specific mitigation is proposed for any indirect effects. The anticipated indirect effects are, in any case, temporary for the life of the wind farm only and are easily reversible.

## NOISE

Noise will be emitted by equipment and vehicles used during construction of the wind farm and by the turbines during operation. The level of noise emitted by the sources and the distance from those sources to the receiver locations are the main factors determining levels of noise at receptor locations.

### Construction Noise

Construction noise has been assessed by a desk based study of a potential construction programme and by assuming the wind farm is constructed using standard and common methods. Noise levels have been calculated for receiver locations closest to the areas of work and compared with guideline and baseline values. Construction noise, by its very nature, tends to be temporary and highly variable and, therefore, much less likely to cause an adverse impact. Various mitigation methods have been suggested to ensure the impact of construction noise is kept to a minimum the most important of these being suggested restrictions to hours of working to 08:00 to 18:00 Monday to Friday and 08:00 to 13:00 on Saturdays. It is concluded that overall impacts relating to noise generated through construction activities will be minor.

De-commissioning is likely to result in less noise impact than during construction of the wind farm. The construction phase has been considered to have a minor noise impact, therefore, de-commissioning will, in the worst case, also have a minor noise impact.

### Operational Noise

Operational turbines emit noise from the rotating blades as they pass through the air. This noise can sometimes be described as having a regular 'swish'. The amount of noise emitted tends to vary depending on the wind speed. When there is little wind the turbine rotors will turn slowly and produce lower noise levels than during high winds when the turbine reaches its maximum output and maximum rotational speed. Background noise levels at nearby properties will also change with wind speed increasing in level as wind speeds rise due to wind in trees and around buildings, etc.

Noise levels from operation of the turbines have been predicted for those locations around the assessment area most likely to be affected by noise. Surveys have been performed to establish existing baseline noise levels at a number of these properties. Noise limits have been derived from data about the existing noise environment following the method stipulated in national planning guidance. Predicted operational noise levels have been compared to the limit values to demonstrate that turbines of the type and size which would be installed can operate within the limits so derived. It is concluded therefore that operational noise levels from the wind farm will be within levels deemed, by national guidance, to be acceptable for wind energy schemes.

There is no evidence to suggest that low frequency noise or vibration, either ground borne or airborne, due to the operation of modern wind farms are potential problems.

## TRAFFIC

A desktop route appraisal was undertaken to provide information on the proposed route for delivery of the turbine components and agencies were consulted on the suitability of the route. The route proposed is from Berwick-upon-Tweed port along the A698 to the A697 and on to the B6353 to the proposed assessment area entrance. However, given the location of the assessment area in relation to the A1 and the A697 other deliveries would approach the assessment area from a variety of routes depending on their point of origin.

A nine month construction programme is proposed. Vehicle movements will vary according to activities being undertaken and will include movements of site personnel, deliveries of turbine components, construction vehicles, deliveries of stone for access track foundations and fuel deliveries.

Maximum construction traffic volumes are anticipated to occur during months 2 to 5 mainly associated with deliveries of ready-mixed concrete for the turbine foundations and deliveries

and deliveries of stone for the construction of access tracks. During the peak month daily mean HGV traffic is estimated at around ninety-one vehicle movements per day.

These increases are not considered significant for the majority of the length of the route. An impact of major short-term significance is likely along the B6353 during this period due to the low number of HGVs recorded as currently using this road.

There is predicted to be approximately one movement per day of abnormal loads delivering turbine components over three months of the construction period. The presence of abnormal loads has been assessed as a short-term adverse effect which may cause localised disruptions whilst the movement takes place.

Measures to reduce these effects will include the adoption of a traffic management plan, an escort with the abnormal loads, temporary diversions and signage. Traffic generation during the operational phase will be significantly lower and predicted to have a negligible impact on the local traffic network.

# EFFECTS ON PEOPLE AND BUSINESS

There is expected to be a beneficial impact on the local economy occurring from the construction of the wind farm due to the opportunity for local employment and construction contracts. It is expected that the capital cost of the Barmoor Wind Farm would be of the order of £25 million.

Information relating to tourism and recreational activities in and around the assessment area has been collected and analysed. Tourist attractions in the area include Etal Castle, Holy Island, Heatherslaw Corn Mill and Light railway, National Cycle Routes 1: Coasts and Castle and National 68: The Pennine Cycleway.

Over the years there has been extensive research conducted on the public's attitudes to wind farms. An assessment of available information on the most recent research into public attitudes towards wind farms has been carried out including those of tourists and visitors. It is considered that the development of the wind farm at Barmoor would not result in any adverse impact on the local tourist industry.

Footpaths and bridleways within the assessment boundary may be diverted where necessary during construction and de-commissioning but would be fully restored following the completion of construction and de-commissioning operations. Any temporary diversions and re-routing of paths would be agreed with the appropriate authorities and clearly signposted and adhere to construction guidelines. It is expected that public rights of way around the assessment area would not be significantly impacted.

The farming activities on assessment area will continue during the operation of the wind farm. It is estimated that the total land take of the wind farm comprising of turbines, access tracks, operations compound and hard standings, would be approximately 7.1ha.

# OTHER ISSUES

### Aviation

There are no significant effects predicted on civil aviation. Defence Estates, which is responsible for safeguarding Ministry of Defence radar communications, low flying and other activities has indicated that it has no objections to the proposal.

### Telecommunications and TV Reception

The potential exists for interference with TV signals in the vicinity of the wind farm. Properties are more likely to be affected if they lie within 500m of a turbine or within a 'shadow' 5km long on the opposite side from the transmitter.

The effects on television reception are relatively straightforward to mitigate through the re-siting of existing aerial arrays or change in aerial height, the replacement of receiving aerials, the re-tuning of television receivers or the provision of satellite or cable services. Mitigation will be secured through a legally binding agreement with the local authority. Therefore it is predicted that the wind farm would not cause any significant negative effects on television and radio.

### Shadow Flicker

Shadow flicker may occur under certain combinations of geographical position and time of day when the sun passes behind the rotors of a wind turbine and casts a shadow over neighbouring properties. The effect only occurs inside buildings where the flicker appears through a narrow window opening. As the blades rotate the shadow flicks on and off producing an effect known as shadow flicker. In the UK only properties within 130 degrees either side of north, relative to the turbines can be affected as turbines do not cast long shadows on their southern side.

The operational frequency of the candidate turbines are below those which cause disturbance to health. Therefore, no adverse health effects will occur as a result of shadow flicker.

The assessment calculates the dates and times when the shadow of a wind turbine's rotor could fall on to a window. However, factors such as the living areas within properties, the size of windows and the presence of intervening structures blocking the lines of sight to turbines can reduce or eliminate effects.

Prior to commencement of development a further property specific shadow flicker assessment would be undertaken. If significant effects were predicted from this assessment then mitigation measures would be undertaken. This could include operational control of individual turbines to avoid or reduce shadow flicker. Following implementation of mitigation there would be no significant effects from shadow flicker.

### Health and Safety

During construction the assessment area would be managed and operated in accordance with Health and Safety at Work etc Act 1974 and comply with relevant Health and Safety Regulations. As a number of public rights of way cross the assessment area a variety of security measures including warning signage and security infrastructure will be in place around the control building, individual turbines and the sub-station to ensure public safety and security of the wind farm.

It is not predicted that the Barmoor Wind Farm would affect driver concentration or road safety.

### Air Quality and Climate

Potential air quality impacts associated with construction of the wind farm include dust generation from traffic movements, earthwork and exhaust emissions from plant, equipment and vehicles. Exhaust emissions during construction and de-commissioning would be localised and short-term. Effects on local air quality would be negligible. As such the effect of such emissions is assessed as not significant.

Dust nuisance at nearby properties could only occur during construction in dry windy conditions. In this event water sprays will be used. Due to the effective mitigation measures,

the specific conditions of occurrence and the short-term nature of the construction period residual effects are assessed as negligible.

Displacement of other forms of generation will reduce national emissions of pollutants resulting from the combustion of fossil fuels. This will have a positive long-term effect on national emissions of greenhouse gases and pollutants which cause acid rain. This effect is classified as significant and positive.

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# BARMOOR WIND FARM

## FIGURE 1.2
### Constraints Plan

BOWSDEN CP

LOWICK CP

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9

**Key**

- Assessment Boundary
- Turbines
- Tracks
- Met Mast
- Sub-Station
- Contractors Compound
- Public Bridleway with 200m buffer zone
- Public Footpath within Site Boundary
- Site of Special Scientific Interest (SSSI) + Special Area of Conservation (SAC)
- Ancient Woodland
- Site of Importance for Nature Conservation (SINC)
- Peat
- Flood Plain
- Water Courses (with 50m buffer for standing water & 20m buffer for running water)
- Archaeology Exclusion Zone
- Sites & Monuments (with 50m buffer)
- Scheduled Ancient Monument
- Non-Statutory Nature Reserve

RPS

**Scale:**

**1:25,000 @ A3**

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