NON-TECHNICAL SUMMARY

INTRODUCTION

Enertrag UK is proposing to develop a wind farm at a site NW of the village of Hempnall. The location of the proposed site is shown on Figure 1.

The proposed wind farm would comprise of seven wind turbines, a small switch-house, a series of interconnecting cables and permanent access tracks. The switch-house would be linked to the national grid. The proposed site layout is illustrated on Figure 2.

Once operational the wind farm would have a maximum generating capacity of up to 14 megawatts (MW), depending on turbine model, and would generate enough electricity to supply up to 7,000 homes and the equivalent to the removal of 1,333 cars from the road (BWEA 2008). The working life of the wind farm would be 25 years, after which point the turbines would be decommissioned.

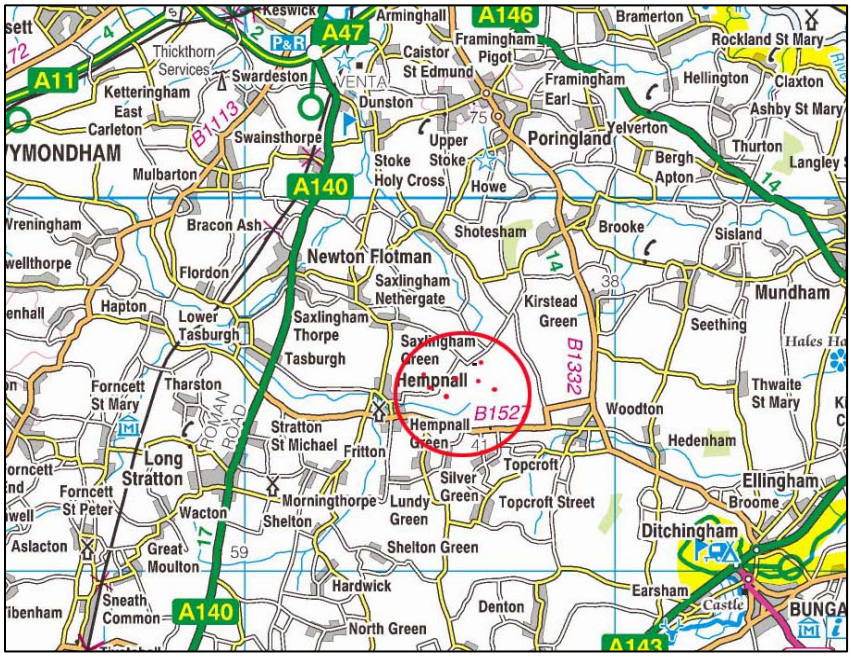


Figure 1 Location of the proposed wind farm at Hempnall

ENERGY AND PLANNING POLICIES

The objectives of the Government's renewable energy policy are set out in the 2007 Energy White Paper. The Renewables Obligation is the key policy mechanism by which the Government is encouraging the growth necessary to reach the UK's renewable energy targets. Targets have been set to increase the contribution of renewables from the current 3%, to 10% by 2010 and 15% by 2015. The UK aims to cut its carbon dioxide emissions by some 60% by 2050 (with real progress by 2020), as

committed to by the signing of the United Nations Framework convention on Climate Change, and to maintain reliable and competitive energy supplies.

The most relevant recent Government paper to be published is a supplement to Planning Policy Statement (PPS) 1 which states; *"Climate change represents a potentially catastrophic threat, but it is within our control to address it – and address it we must."*

PPS1, 'Planning and Climate Change' sets out how planning should contribute to reducing emissions and stabilising climate change and take into account the unavoidable consequences, it should read along side the national PPS/G series and where there is any difference in emphasis on climate change between the policies this is intentional and this PPS takes precedence.

At present, alongside hydroelectric power, wind turbines are by far the most developed renewable energy technology in the UK. They provide electricity that is inexhaustible and creates none of the harmful by-products associated with fossil fuels and nuclear energy.

The proposed wind farm would produce over 35,000 megawatt hours (MWHr) of clean electricity per year, saving over 28,000 metric tones of CO_2, compared to the equivalent fossil fuel production each year.

SITE SELECTION AND ENVIRONMENTAL SETTING

The site at Hempnall has been identified as a viable wind farm opportunity and has been evaluated in detail to confirm it has potential for the proposed development, based on the size of the site, the ability to export power and the local wind resource.

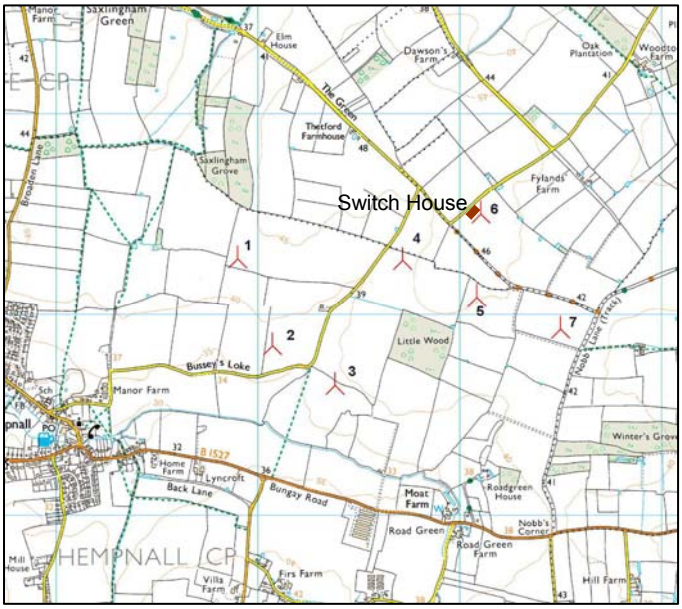


Figure 2 Proposed site layout

DESCRIPTION OF THE PROPOSED WIND FARM

Turbines and Foundations

The proposed layout of the seven turbines is shown in Figure 2. The location of the turbines can be seen in Table 1. Each of the seven turbines would have a maximum power output of up to 2 megawatt (MW), with a hub height of up to 85 metres and a rotor diameter of up to 90 metres. The height of each turbine to blade tip would depend on the turbine model selected but would be a maximum of 125 metres to blade tip.

The turbines would not oversail any areas accessible to the public and will be a matt colour in order to minimise any startling effect on horses and passers-by. The potential impact is considered to be of negligible significance.

Turbine number	Easting (m)	Northing (m)
1	624900	295281
2	625072	294846
3	625382	294648
4	625717	295258
5	626085	295088
6	626105	295504
7	626500	294928

Table 1 Wind Turbine positions

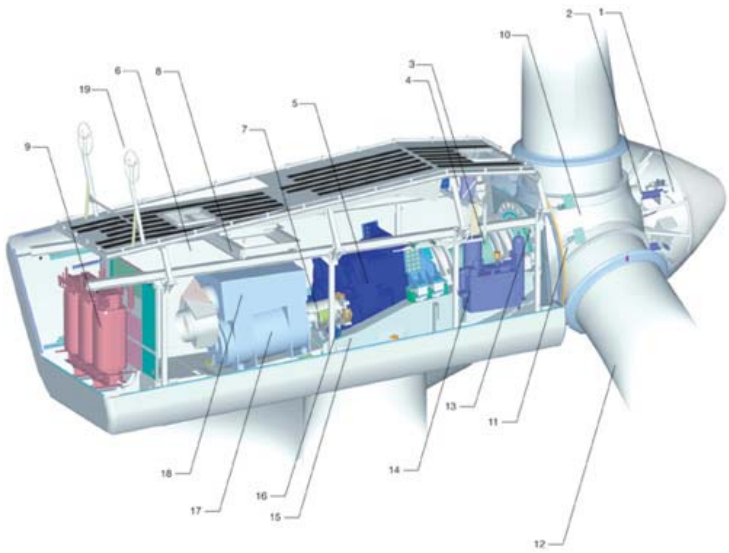
Figure 3 A typical turbine unit

The turbines comprise of steel towers and three rotor blades made from fibreglass reinforced epoxy resin, which maximises efficiency and minimises noise production and vibration. The direction of the turbines is automatically adjusted according to the prevailing wind conditions. Start up and shut down is determined by wind speed.

The diameter of the towers at the base is approximately four metres. The turbine foundations would be buried and generally comprise of 20 meter diameter, steel reinforced concrete 'pancake' bases, set just below the ground surface. Once operational, the land would continue to be farmed right up to the turbine tower.

Figure 4 Excavating for a foundation

A general diagram of a wind turbine is provided as Figure 5.



1 Hub controller
2 Pitch cylinder
3 Main shaft
4 Oil cooler
5 Gearbox
6 VMP-Top controller with converter
7 Parking break
8 Parking break Service crane
9 Transformer
10 Blade hub
11 Blade bearing
12 Blade
13 Rotor lock system
14 Hydraulic unit
15 Machine foundation
16Yaw gears
17 OptiSpeed^{TM} generator
18 Ultra-sonic sensors

Figure 5 Turbine components (Source: Vestas, 2007)

On-site Cables and Grid Connection

Buried cables would connect each turbine to an on-site switch-house within the Hempnall complex. The switch-house would consist of a small, single-storey building, as shown on figure 2, close to turbine 6. This would house the switch gear, meter and cable connections.

The route option to connect the wind farm switch house to the national grid at Alpington Sub-station, via a buried 33 kv cable, will be finalised by the District Network Operator (DNO) following consent. The DNO would be responsible for obtaining all necessary consents. This option would involve the least interruption to local services and give the required capacity. The EIA does not include an assessment of the impact of the grid connection cable from the wind farm switch-house to the national grid. All cabling on and off site will be buried. The on site cable route can be seen in Figure 7. Figure 6 shows the typical technique used to bury the cable.

Figure 6 The on site laying of the underground cable

Access route

The access route would run along the field edge parallel to Nobbs Lane as far as the turbine number 7 before branching off round the site, See Figure 7. This would be made up of shale construction, as a semi-permanent road. The site entrance would be accessed off the B1527 at grid reference TM263939. All abnormal and HGV loads would approach the site from the east side, thus avoiding the narrow road through Hempnall. The turbine components would require 7 abnormal loads each. These would travel along the A47 from Great Yarmouth, south along the B1332 then west along the B1527 (from the north of Woodton) to the site.

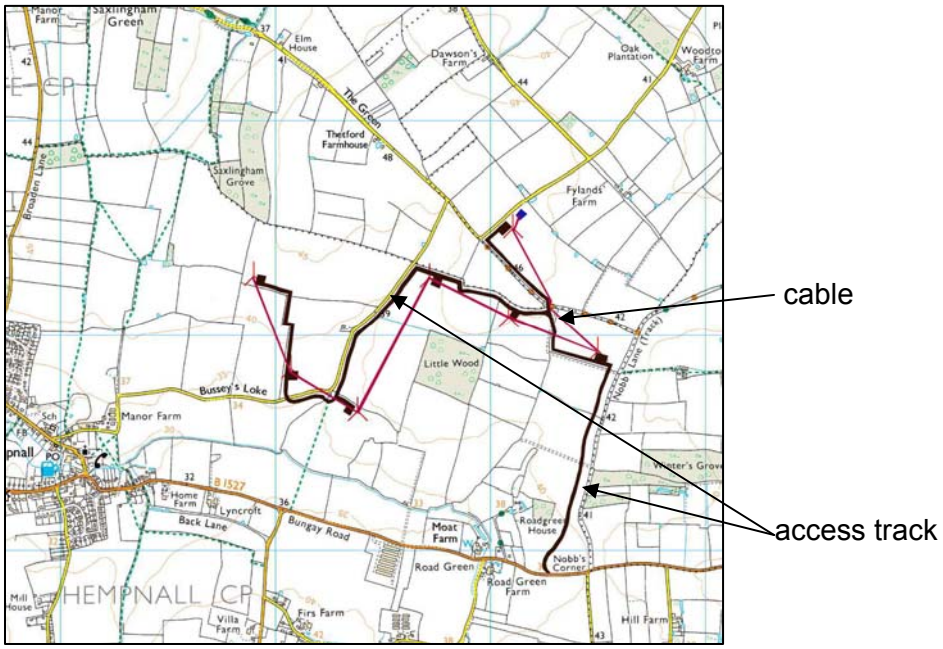


Figure 7 Cable and access routes

Construction Programme

The total on-site construction period would be approximately eight to nine months. Transportation of the turbine components would require special vehicles which can transport long and heavy loads. The junction from the B1332 to the B1527 will require widening to accommodate the abnormal loads carrying the turbine components. Once the construction is complete the corner widening will be “mothballed”, so that should a major component need to be replaced it could be used again.

Maintenance

During the operation of the wind farm, the turbines would be subject to a minimum biannual scheduled service and maintenance programme along with unscheduled maintenance to optimise turbine performance or replace components.

Decommissioning

At the end of the working life of the wind farm, the turbines would be decommissioned. It is not proposed to remove the below ground structures, however there is a commitment to remove all elements to a sufficient depth to ensure that the site can revert to its former agricultural use.

All operations would be carried out in accordance with the relevant Environmental, Health and Safety Regulations and requirements, as well as good working practices.

LEGISLATIVE CONTEXT AND THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

Prior to construction of the proposed wind farm, planning permission is required under the Town and Country Planning Act 1990. In addition, the wind farm proposal has been assessed on the basis of a range of technical and environmental criteria in accordance with the requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 1999. Enertrag UK has commissioned various consultants to carry out their relevant sections of the Environmental Impact Assessment (EIA) and the findings reported within the Environmental Statement (ES) that accompanies this planning application.

As part of the EIA process, and as required by the EIA Regulations, a 'Scoping Opinion' was requested from South Norfolk Council. The process of scoping aims to ensure that all of the impacts and issues that are of concern to the local authority and other stakeholders are addressed in the EIA.

Consultation was carried out as part of the EIA process through written correspondence, telephone conversations and meetings with statutory and non-statutory bodies representing key interest groups. Site specific surveys were undertaken as part of the EIA and included ecological, archaeological and background noise surveys, landscape, traffic, shadow flicker and radar and airspace assessments.

A review of the policy and planning guidance with which the development would be required to comply, at the national, regional, county and local level, was also undertaken. The key Government policy guidance is set out in Planning Policy Statement 22: Renewable Energy (PPS22).

SUMMARY OF ENVIRONMENTAL IMPACTS

Introduction

A summary of the environmental investigations and main findings of the EIA are set out below according to the environmental parameters covered in the assessment process.

A number of criteria have been utilised to determine the significance of the environmental impacts. These are:

- Magnitude of the impact (local/strategic);
- Spatial extent of the impact (small scale/large scale);
- Duration of the impact (short term/long term);
- Reversibility of the impact (including species or habitat recoverability);
- Conservation or protected status;
- Probability of occurrence of the impact;
- Confidence in the impact prediction; and
- The margins by which set values are exceeded.

Mitigation

Where potentially significant adverse impacts have been identified, mitigation measures have been described, either as part of the design, or as a measure implemented during construction or operation. Each impact assessment section assigns a significance level to the impact described following assumed implementation of the stated mitigation measures.

An amenity mitigation package is also put forward as part of this proposal. It would involve making the meadow between The Street Hempnall and Mill Road Hempnall available for public access to all. It would include decked walk ways suitable for wheel chairs and push chairs as well as seating and display boards noting wildlife and other features. There will also be a pond dipping area made available for local schools.

Ecology

Ecological assessment was undertaken, which included detailed surveys, data collection and consultation, to identify any nature conservation designations within the vicinity of the site and to establish the presence or absence of any habitats or species of ecological significance within the study area. In consultation with Natural England, a year of survey work was carried out from autumn 2006 to autumn 2007 in order to ascertain usage of the site. A desk-based assessment, involving the collation of data from the surrounding designated sites and other sources was undertaken to provide context, and regular surveys around the site were carried out throughout the year, particularly focusing on bird and bat species potentially vulnerable to wind farm developments and any other species of conservation importance or concern.

The proposed site is located within an area of intensive arable farmland with three SSSI sites which form the Shotesham – Woodton Hornbeam Woods SSSI. The only other area in the vicinity of the site of interest is Nobbs Lane, a long green lane flanked by thick overgrown hedges which form an overhead canopy. There are also fragmented hedgerows across the site with varying amounts of species-diversity, as well as, scattered broad-leaved trees and scrub, dry and wet ponds and several wet and dry drainage ditches. The surveys confirmed the presence of potential habitat for water vole, bats, birds (including owls and raptors) reptiles and invertebrate assemblages.

The construction of the proposed turbines and associated works would mainly impact upon land under arable cultivation which is of low ecological value. Three sections of hedgerow would be permanently lost in order to allow for access round the site. The potential impact to faunal species and groups during construction is mainly associated with the loss and disturbance of these areas of habitat. The following mitigation measures have been outlined to minimise the loss and disturbance of habitat.

Ecological mitigation measures during the construction and operation phase
• Potential for disturbance of roosting bats during construction of the access track alongside Nobb's Lane. An access track some 50 m from the hedgerow trees along Nobbs Lane, is thought likely to reduce vibration and noise to within the range of that experienced during noisy agricultural practices. • Potential collision risk to Common Pipistrelle and Barbastelle. If the hedges on site are substantially improved in certain areas, then the bats will concentrate

around these routes. Since bats are known to commute through the site between the remaining fragments of woodland, the “safe flight route” designed is to enable them to do so as safely as possible. This takes the form of a 2.8 km long, 2.5m tall and >2m thick hedge planted with native trees, which passes through the site as far away from the turbines as possible.

Overall, taking into account the mitigation measures that will be incorporated during the construction phase, the residual potential impact to habitats is negligible. The ‘safe flight route’ for bats, the additional wildlife corridor outside the site in combination with the buffer strip alongside Nobbs Lane is anticipated to result in a **negligible** impact.

There would be negligible to no impact to any habitats or plant species during the operation of the wind farm with the mitigation in place. No impact during the operation of the wind farm is envisaged to the other species and groups, including water vole, brown hare, reptiles or invertebrate assemblages. The level of impact expected and mitigation requirements during the decommissioning stage is considered to be similar to that discussed for the construction phase.

Ornithology

An Ornithological assessment was undertaken at the same time as the ecological assessment. The proposed site is located within an area of intensive arable farmland with no nature conservation designations for birds within 20km. In consultation with Natural England, a year of survey work was carried out from winter 2006 to winter 2007. Surveys aimed to determine numbers of breeding and wintering birds on site and to assess the passage rates, flightlines, heights and directions of species passing through the area. Species specific monitoring to determine the number and locations of nests of owls and raptors was also undertaken. For the purposes of almost all of the survey work the site was defined as the area within a 500m radius of the turbines. The exception to this was the targeted work relating to owls and raptors. Natural England specified a particular interest in the potential impact of the proposed site on raptors and owls, which structured the nature of the survey programme. The area within a 1 km buffer of the turbines was used in the assessment of these species.

The intensive survey programme generated a list of 85 species with five other non-specific bird types. This included species considered as vagrants such as Whooper Swan and Pink-footed Goose. Twenty-eight species were either confirmed breeding or thought likely to breed on the site, with Sky Lark (51 singing males), Chaffinch (maximum of 32 pairs), Wren (27 pairs) and Yellowhammer (25 pairs), the most abundant Amongst raptors and owls, up to three pairs each of Barn Owl, Little Owl and Tawny Owl and two pairs of Kestrel were thought to breed in the wider area. A pair of Buzzards, an uncommon breeding species in Norfolk probably bred within the site itself. Other raptors recorded included Sparrowhawk, Marsh Harrier and Hobby. A total of 18 sensitive receptors were recognised, virtue of their conservation status and numbers on the site.

In winter, Woodpigeon, Fieldfare and Black-headed Gull were by far the most abundant species recorded. The latter, along with other gull species such as Lesser Black-backed Gull crossed the site in a pattern suggesting dispersal from roost. Numbers of

Common Gulls and Golden Plovers made use of the site by feeding and resting in the fields along with a range of passerines.

The key impacts assessed were:

- Mortality as a result of collision with turbine blades, towers and ancillary structures during the operational life of the wind farm;
- Disturbance and displacement from preferred areas used for feeding, roosting, resting, moulting or passage, during construction, operation and decommissioning phases.
- Indirect effects, through for example, changes in habitat conditions on the site such as fragmentation and reduced connectivity.

Mortality through collision is the more emotive impact as the death of any bird is regrettable. However, it is important to place this into context with other forms of mortality such as predation, disease, food shortage and collision with road traffic, buildings and power lines. Many birds rapidly acclimatise (habituate) to novel structures and after a short period of time learn to live alongside them, safely navigating between turbines within the wind farm when in flight and perhaps feeding or even nesting close to turbines.

If some birds are displaced from what were preferred areas on a more permanent basis, this may only be a problem if alternative areas are not available, a disturbance event may simply cause a bird to change its behaviour in a subtle way, such as increased vigilance, as well as resulting in an actual response, such as flying away from the perceived threat. Even if this is undertaken relatively frequently, it may have no detectable impact on the bird. However, disturbance may have more important consequences, if for example, construction activity is undertaken close to nesting birds, there is the danger they may not subsequently incubate eggs or feed chicks properly with a reduced chance of successfully fledging their chicks. Many birds, especially small ones, are adapted to such circumstances and may quickly re-nest after the disturbance ends.

Indirect effects may occur as a result of construction activity leading to removal of hedgerows for access tracks and subsequent changes in land use of particular fields.

As well as re-location of individual turbines by the developers during the development of this ES, a package of different mitigation elements was proposed, building on that already described in the ‘Ecology’, especially aimed at reducing any impacts on birds.

Ornithological mitigation measures during the operation phase
• **Safe flight corridor,** a long (2.8 km) and substantial (2.5m tall and >2 m thick) hedge planted with native trees to provide a safe flight route through the site and provide some mitigation against habitat fragmentation. Especially if flanked with a 6m conservation headland, this feature would also provide appropriate mitigation for many bird species on site, most notably foraging owls and raptors: a wide strip of conservation headland providing rough grassland capable of supporting the small mammal prey species on which these birds depend. The use of standards in the hedge is also recommended

to provide perches where species such as Buzzard and Tawny Owl may 'look-out' for prey.

- **Wildlife corridor**. A wildlife corridor in the west of the site is proposed as a means of improving that habitat value outside of the main turbine area. The corridor provides a route from Manor Farm to Saxlingham Grove, and by increasing habitat connectivity outside of the main area, will encourage birds away from the main turbine fields. The corridor is to consist of a ditch flanked by a tall (<2.5m) and substantial (2m thick) hedge flanked by a ditch and strip of conservation headland. A historic pond will also be re-instated, of considerable use for drinking birds, foraging bats and aquatic life (e.g. newts and a range of invertebrates).
- **Mitigation meadows**. Two meadows planted with native wild flowers and grasses are to be re-instated to provide extra foraging habitat for a variety of species outside of the main turbine areas. It is anticipated that the meadows will also considerably enhance general wildlife value (e.g. for invertebrates, small mammals etc), enhance landscape and visual interest and connect habitat fragments particularly in the case of the meadow to the south of the site near Winter's Grove. In general terms, it is imagined that the larger mitigation meadow will be maintained as a relatively short sward with high floral diversity with meadow 1 developing more rank vegetation suitable for Field Vole (Microtus agrestis) the main prey of birds of prey such as Barn Owl and Kestrel. However, soil characteristics and nutrient load in particular will determine the strategies used to develop these meadows as well as the nature of the vegetation community.
- **Buffer strip** between access track and Nobb's Lane. To prevent disturbance of nesting birds in Nobb's Lane during construction of the access track, a 50m wide buffer between Nobb's Lane and the track is suggested. This is thought likely to reduce vibration and noise to within the range of that experienced during noisy agricultural practices (e.g. ploughing or harvesting) in the adjacent fields. The resultant strip of land between the access track and Nobb's Lane should then be allowed to develop naturally into a further wildlife habitat building out from the important wildlife corridor of Nobb's Lane.

A combination of different elements effectively covers the different impacts on each species, with a resultant predicted **negligible residual impact** of the development. Indeed, the mitigation package is predicted to considerably reduce the scale of past intensification and by building on existing habitat fragments, would reduce fragmentation and enhance connectivity. Investment on this scale may then provide the impetus to adopt conservation-led management prescriptions for the woodlands on site, which appear to be performing below their potential.

Whilst the possibility of a collision cannot be entirely discounted during the operation of the wind farm, studies indicate that raptors and skylarks are the most likely species to be within turbine strike range but the mitigation measures will encourage them away from the windfarm.

Given the mitigation and the resumption of intensive agricultural activities at the site, a **minor adverse** impact is envisaged relating to collision and mortality. The effects of

disturbance and habitat fragmentation during the operation of the wind farm are considered negligible.

When considering the potential impacts of the proposed development it is important to note that the wind farm will help to reduce CO_2 emissions, the main driver of climate change which scientists, including those from RSPB, consider to be the single greatest threat to bird life.

Post-construction ornithological monitoring
• Once the turbines become operational, a programme of post-construction ornithological monitoring will be undertaken in consultation with Natural England, so that any effect of the wind farm on populations and behaviour around the site can be quantified.

In conclusion, such is the value of the mitigation package it is predicted the current conservation value of the site will be **significantly enhanced** following the development.

Geology and Hydrology

No impacts are anticipated to groundwater hydrology and its quality during the construction phase. The Chalk with high permeability is located from between 18m to 32m to a depth of 36m to 46m in depth below ground surface. The removal or displacement of soil for the foundation construction and cable laying is considered to be of negligible impact. Mitigation measures would be incorporated during the construction phase in order to minimise impacts relating to soil compaction and increased sedimentation and to prevent the occurrence of potential contamination or pollution incidents impacting upon soil and surface water hydrology. This would include the use of Environmental Best Practice and sensitive construction methodologies, and adherence to Environment Agency Pollution Prevention Guidelines. The residual effects are anticipated to be of **negligible** significance.

During operation, no impact is anticipated on geological resources and groundwater. In addition, the presence of the turbine foundations and on-site access tracks are not anticipated to affect the site drainage or increase flood risk. Although the proposed site is not at risk of flooding, the Tas Tributary to the south west of the site is prone to flooding in severe weather. This will be taken into account at the detailed design stage during ground investigations.

Landscape and Visual Character

The area of the proposed development and its surroundings contain a mix of rural character types, varying from open agricultural farmland to enclosed and inaccessible river valleys. The dominant influence on character is the scale and pattern of agricultural production, and the associated nature of enclosure. Landform exerts a subtle influence, creating variations between the flat clayland plateau top, to gentle undulations around the tributary valleys to the River Tas. Settlements, based on a series of small villages, and are regularly spaced across the study area.

The majority of the landscape is in good or moderate condition. The medium and large scale agricultural landscape offers a similar scale to the proposed wind farm. The structure of the landscape is defined by strong, larger-scale landscape elements that produce a robust character that is capable of accommodating the turbines without detriment. The strong vegetation presence over much of the area means the turbines are in scale with the pattern of the landscape. It is a remote and sparsely settled landscape; the nature of the dispersed villages, located at generally reduced levels across the landscape, tending to be inward-looking and well enclosed by vegetation. The impact of the proposed wind farm would be reduced and localised as a consequence of these characteristics, confined to breaks in this pattern of enclosure, glimpses of the turbines would be available in views out to the wider countryside.

Mitigation measures are minimal due to the size of the turbine towers within their setting, so Enertrag UK propose that the lower sections of the towers will be painted green, in order that they blend more acceptably into the background.

Figures 9 and 10 illustrate the computer generated view that would be experienced from two of the representative viewpoints.

Figure 9 Photomontage view from Hugmore Pond Lundy Green Hempnall south of the site

Figure 10 Photomontage view from S^{t}. Margaret's Church Churchyard Hempnall west of the site

Archaeology

An archaeological desk-based assessment and on-site archaeological survey were carried out during the EIA. Norfolk Landscape Archaeology were consulted, who had no objection to the proposal. NAU Archaeology (part of NPS Property Consultants Ltd) was commissioned to undertake all elements of the specialist assessment and evaluation.

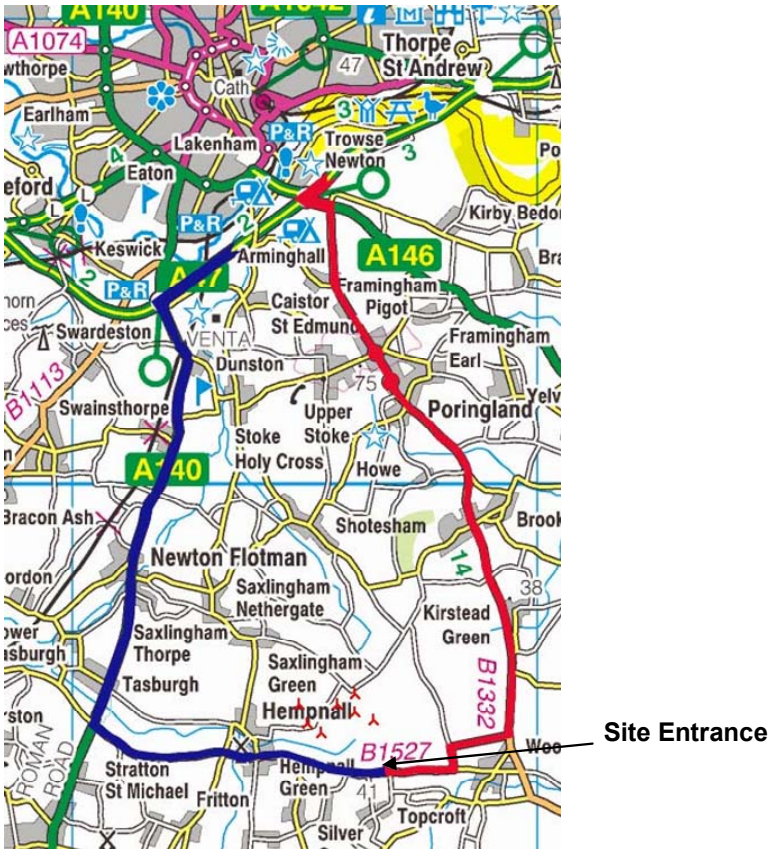
All potential impacts to possible archaeological resources would occur during the construction phase. The movement of heavy construction vehicles, construction of access routes, cable trenching, and turbine foundation excavation could potentially result in disturbance within the soil, where potential archaeological features and finds may be present. Excavations of depth for the turbine foundations would be 20m diameter wide, and the underground cable trench would be 1.5m deep and up to 1m wide. No obvious earthworks or outstanding features were noted during desk top studies and field walk over. The fields proposed for development are currently used as arable land and had been planted with crops. A pond surrounded by a bank and ditch and crop discolouration might indicate early habitation, lies adjacent to the proposed site of Turbine 6 and forms part of the field boundary; this did not appear to form any coherent shape or pattern. All recorded findings are out of the site area; these do not amount to anything too significant. The field in which turbine 4 is located was a decoy airfield during the Second World War, there is no evidence left. A photograph taken by the RAF shows an area near turbine 3 could have prehistoric activity, though there have been no findings or documentation to prove it.

During the operational phase of the wind farm, there would be no impact to any archaeological features. At the end of the working life of the wind farm (25 years) the turbines would be decommissioned and the ground reinstated. This would primarily involve disturbance to previously excavated land, therefore there would be **no impact** to archaeology.

Traffic and Access

The traffic and access assessment involved consultation with Norfolk County Council (NCC), Highways Authorities and the Highways Agency (HA) along with a Construction Access Route Assessment to identify the preferred route for the delivery of the turbine units and for general construction traffic.

The route for delivery of the rotor blades and tower sections must accommodate an ultra long vehicle of up to 48m in length, including rear overhang, which has a wide turning circle and swept path. The access routes selected for the general construction traffic must be suitable for use by HGVs. The assessment concluded the preferred route for the delivery of the turbine units and for general Heavy Goods Vehicle (HGV) construction traffic would be Route 2 (Figure 11), which exits the A47 at the A146 junction then south on the B1332 to the north of Woodton then west on the B1527 to the site entrance. The route does not go through the village of Hempnall.



Key: Route 1

Route 2

Figure 11 The options of routes for HGV traffic to the site. Route 2 is the chosen route.

Modifications involving highway widening works are required at the B1527-Shotesham Road junction and at the site access off the B1527, both constructed to the NCC standards. The verge hardening works required to accommodate the abnormal load vehicles and will be constructed at the B1332/B1527 junction and at both the B1527-Shotesham and B1527-Hempnall road bends. These hardened areas are to be constructed in 'Grasscrete' which becomes grassed over and hidden from view but remains usable for abnormal loads during the wind farm operational period without additional site works.

The generated construction traffic amounts to approximately 11,000 vehicle movements; a movement being either a trip 'to' or 'from' site, hence a delivery and return equates to 2 movements. The highest average value of 107 vehicle movements per day is made up of 47 heavy goods vehicle (HGV) and 60 light commercial vehicle (LCV) movements per day. These figures are used for traffic impact calculations and consideration of any impacts and mitigation measures in order to adopt a conservative approach.

Other than maintenance vehicles accessing the site (one to three visits per year), and possible repair works, there would be no significant traffic movements associated with the wind farm during its operational phase.

At the end of the working life of the wind farm (25 years), the turbines would be decommissioned and the site reinstated to its former condition. This would involve similar access requirements as the construction phase, although as it is not intended to remove the turbine foundations, the numbers of HGV movements would therefore be considerably reduced compared to the construction phase. Some abnormal load vehicles would be required in order to remove the turbines off site.

Noise and Vibration

During the construction phase the movement of general construction vehicles along the proposed route has been assessed to have a **minor to moderate**, short-term, adverse impact. The low-loader vehicles would be very slow moving and would use Route 2 which does not pass through residential areas that are already used to regular HGV movements. The on-site construction activities are predicted to have a negligible to moderate, short-term, adverse impact on the surrounding community. Mitigation measures would include controlling the movement of vehicles to the site, agreeing the working hours with the local authority and informing local residents and parish councils of the construction timetable.

A background noise survey programme was undertaken at the proposed site to establish the existing background noise levels within the study area. The survey was undertaken between November 14th and 28th 2007. Measurements were carried out at five noise sensitive receivers identified within the vicinity of proposed site, as detailed within Table 5 and shown relative to the site in figure 12. These locations were agreed with South Norfolk District Council's Environmental Health Officer.

Number	Description	Nearest turbine
I	Road Green House Hempnall	5
2	Dawsons Farm Shotesham	6
3	21 Old Market Way Hempnall	1 and 2
4	Private meadow Bungay Road Hempnall	2
5	Thetford Farmhouse Saxlingham	4 and 6

Table 2 Noise monitoring positions

An assessment of the potential noise impact associated with the proposed wind farm development was performed under the guidance contained within ETSU-R-97 and with reference to Planning Policy Statement 22 Renewable Energy (PPS22) and Planning Policy Statement 24 Planning and Noise (PPS24). The assessment established the existing background noise levels at the five representative residential properties

surrounding the proposed site. Computer modelling was then carried out to calculate the expected noise levels at residential properties during the operation of the wind farm. The assessment found that the probability of the turbines noise exceeding the noise levels required by ETSU–R-97 was minimal. Low frequency noise, infrasound, amplitude modulation and tonal noise are judged to have **no impact** on the surrounding community.

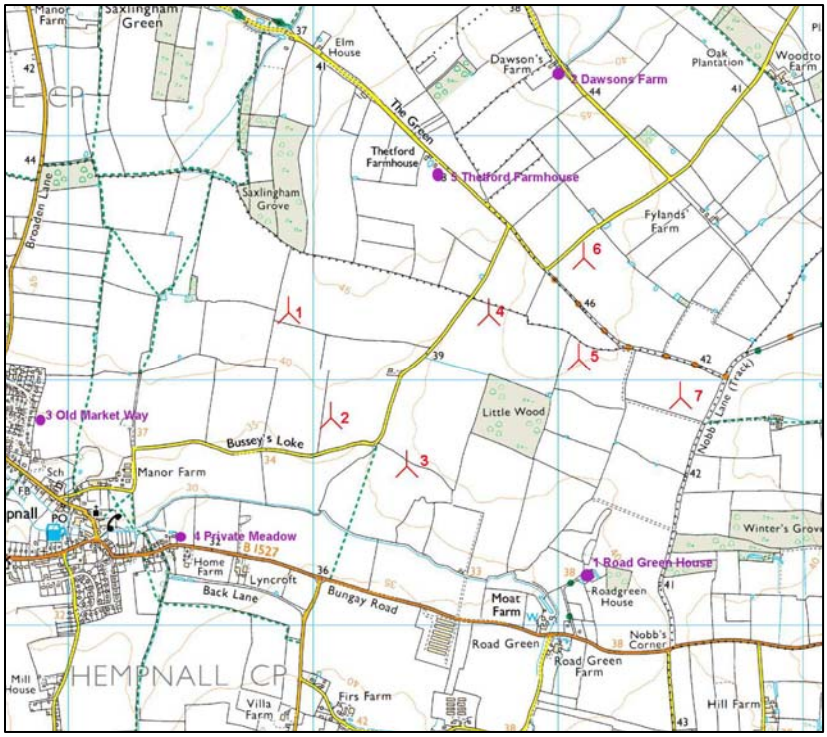


Figure 12 Noise monitoring properties and turbine positions

Once operational, monitoring would take place and would involve a background noise survey if required.

Shadow Flicker

The rotating blades of a wind turbine can cast a moving shadow on the surrounding countryside when the sun is strong and at a particular angle in the sky. When viewed from inside a building through a narrow window opening this can create a 'shadow flicker', which can become a nuisance under certain circumstances.

Computer modelling was carried out to assess the impact. This is done using a 'worst case' scenario, assuming the sun is always shining and the wind is always blowing to cause the worst shadow. The reality is that the results in real life would amount to about 25% of the 'worst case' scenario figures.

Enertrag UK would rectify any effects that are deemed to be unacceptable. A **negligible impact** is therefore anticipated during the operation of the proposed wind farm. No impacts would occur during the construction or decommissioning phases.

Electromagnetic Interference

Wind turbines can potentially affect electromagnetic interference in two ways; by blocking or deflecting line of sight radio or microwave links; or by the 'scattering' of transmission links.

Ofcom has indicated that no civil fixed links are likely to be affected by the project. This has been confirmed by the mobile-communications operators consulted during the EIA process.

Crown Castle and the BBC have reported that the development should not affect television and radio reception in the area, however there is the potential for television viewers to experience reflected signals or, for those living in the shadow of the turbines, to have the signal scattered. Enertrag UK would mitigate for any adverse effect to television reception by providing the affected households with the installation of a suitable alternative system.

Aircraft Routes and Airspace

Consultation was undertaken with the Ministry of Defence (MoD) Defence Estates, Civil Aviation Authority (CAA) and National Air Traffic Services (NATS) during the EIA process to determine whether the proposed wind farm would have any impact on their operations. Potential impacts of wind turbines to aviation safety relate to the potential collision risk with low flying aircraft and interference with radar. As all turbines are below the low flying limit collision risk is not an issue.

Correspondence with the CAA was less forth coming so the possibility of any mitigation should it be required, was not possible to negotiate. The Windfarm is approximately 20km from Norwich Airport, without confirmation from the CAA, it is presumed there would be some line of site of the Wind Farm. The turbines will be properly charted on aviation maps.

The MoD Defence Estates has reported that the proposed wind farm is within line of sight of the following radars:

- RAF Air Traffic Control at RAF Honington
- Air Defence radar at RAF Trimmingham

The MoD Defence Estates has reported that as long as the proposed turbines are located as stated and charted as required the wind farm is acceptable.

No impact is envisaged during the construction or decommissioning stage, however Enertrag UK would ensure that the regulatory organisations are properly informed of the status and location of the wind turbines and the height of construction equipment as required.

CONCLUSION

Given the successful implementation of the stated mitigation measures, as well continued liaison with interested parties and regulators, it is not predicted that the project would result in any unacceptable residual impacts. The applicant is committed to implementing best practise during construction, operation decommissioning, in order to minimise adverse impacts. On a larger scale, the project would make contribute towards the national and regional 2010 targets for renewable energy.
It must not be forgotten that this project is designed for 25 years and once decommissioned would return the landscape and environment to its former state.