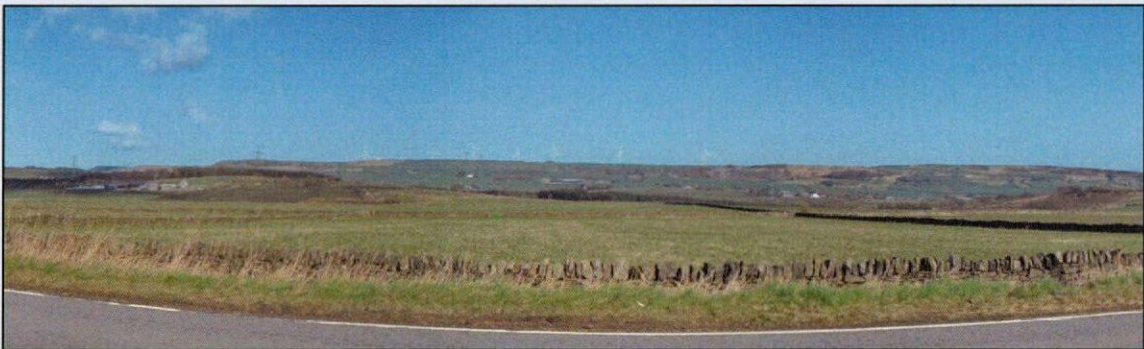




SPICER HILL WIND FARM EXTENSION

Volume IV: Non-Technical Summary

October 2014



Prepared for:
JG Pears Ltd

SPICER HILL WIND FARM EXTENSION

Prepared By:
Green Cat Renewables

Volume IV: Non-Technical Summary

October 2014



Green Cat Renewables

Edinburgh Office
Midlothian Innovation Centre
Roslin
EH25 9RE

Tel: 0131 440 9053

Checked By: Glen Moon	Date: 08/10/14
Approved By: Stephanie Ewing	Date: 22/10/14

Preface

This Non-Technical Summary (NTS) provides a concise overview of the Spicer Hill Wind Farm Extension Environmental Statement (ES).

Green Cat Renewables Ltd (GCR) is a consultancy which is acting on behalf of the applicant, JG Pears Ltd. GCR is responsible for the studies compiled in the ES. The ES package comprises the following documents:

- Volume I - Environmental Statement (ES) and Appendices;
- Volume II - LVIA Figures;
- Volume III – Other Technical Figures; and
- Non-Technical Summary (NTS).

Hard copies of the planning application and supporting EIA documents can be viewed at:

The Civic Centre	Penistone Library
Eldon Street	High Street
Barnsley	Penistone
S70 2JL	S36 6BR

Hard copies of the Non-Technical Summary (NTS) can be provided for £5 and the full Environmental Statement (ES) for £250 per hard copy. Electronic copies (CD-ROM) of the ES package can be purchased for £10. Please contact:

Green Cat Renewables Ltd

Address: Stobo House, Midlothian Innovation Centre, Roslin, EH25 9RE

Email: info@greencatrenewables.co.uk

Tel: 0131 440 9053

Table of Contents

1	INTRODUCTION	1
2	THE PROPOSED DEVELOPMENT.....	4
3	PLANNING AND ENVIRONMENTAL POLICY.....	9
4	PROJECT DESIGN CONSIDERATIONS	10
5	ECOLOGY	12
6	LANDSCAPE AND VISUAL IMPACT.....	14
7	NOISE.....	17
8	CULTURAL HERITAGE	18
9	HYDROLOGY	20
10	SHADOW FLICKER	22
11	INFRASTRUCTURE	24
12	CLIMATE CHANGE	26
13	CONCLUSION.....	27

1 INTRODUCTION

Background

The Spicer Hill extension is being proposed by JG Pears Ltd, an established business in the South Yorkshire area and the operators of the Spicer Hill Wind Farm. Having expanded its farming base, in recent years J G Pears Ltd has been actively seeking opportunities to diversify this core business, with renewable energy being one of areas that has been targeted.

Green Cat Renewables is a UK based environmental consultancy that has been commissioned by Rural Wind Farms Ltd to undertake the required environmental assessments in support of the application.

Overview

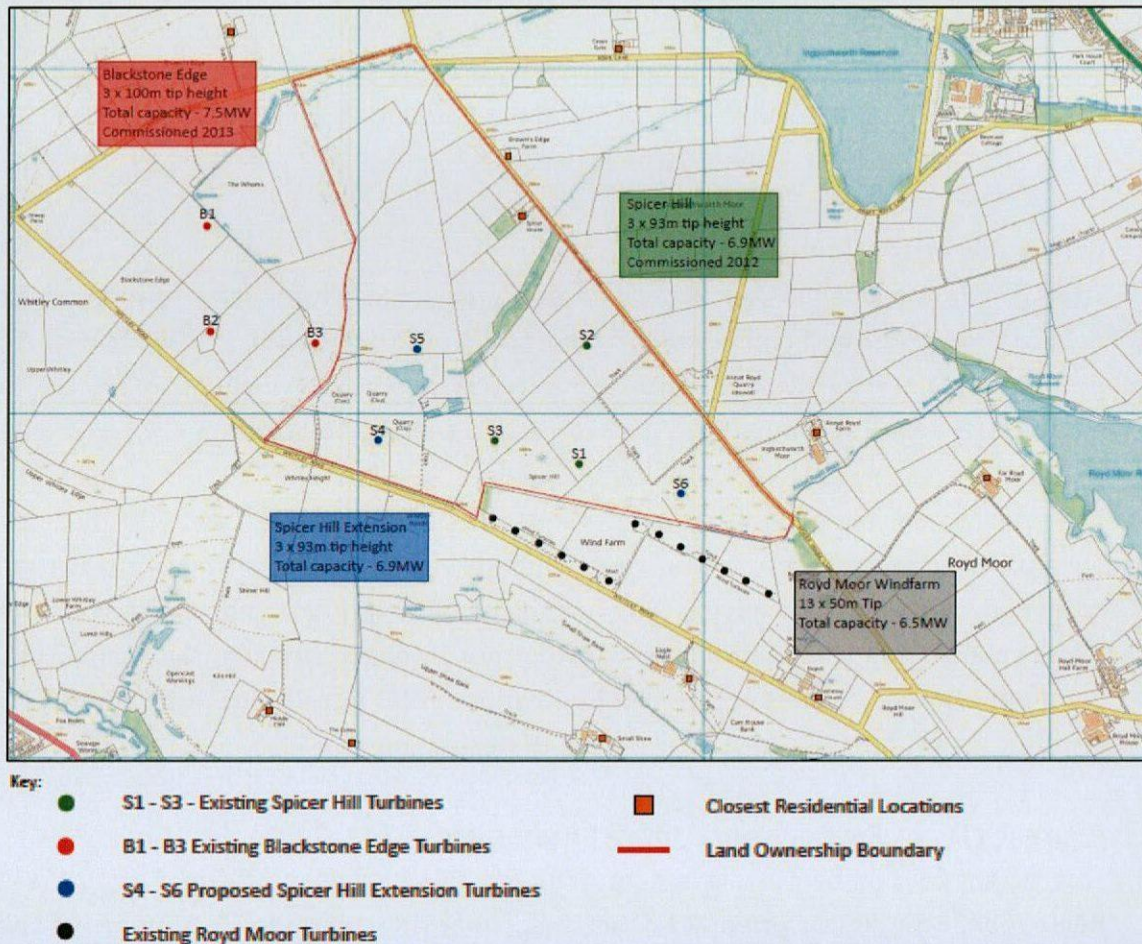
The Spicer Hill extension project proposes an additional three turbines of 93m to tip that would be located adjacent to the existing Spicer Hill Wind Farm, as shown in **Figure 1.1**. There are two other wind developments in the area, both of which are operated by third parties:

- Blackstone Edge, consisting of three 100m turbines which sits 800m to the north-west of Spicer Hill, and
- Royd Moor, consisting of thirteen 53m turbines which are adjacent to the southern edge of the Spicer Hill development.

Two of the Extension turbines would be located on land between Spicer Hill and Blackstone Edge, whilst the third would sit to the east of the easternmost Spicer Hill turbine. The existing and proposed Spicer Hill turbines would appear as a coherent wind farm.

The Royd Moor development was consented in 1993, and is nearing the end of its 25 year consent period, which is due to expire in 2018. **An integral part of the proposal is that the Spicer Hill Extension would not be constructed until the existing Royd Moor turbines are decommissioned.**

Figure 1.1 – Wind Farm overview map



Summary of Impacts

Should the Spicer Hill Extension be consented the overall outcome in the area would be to:

- Replace thirteen 53m turbines with three 93m turbines.
- Replace 6.5MW (13 x 500kW) of installed capacity with 6.9MW (3 x 2.3MW). The proposed turbines are taller than those in operation at Royd Moor and would also be expected to be more efficient than these older models. Both of these factors mean that electrical output would increase by an estimated 46%.
- Visually 'de-clutter' the area. There would be fewer turbines than at present, and the remaining turbines will be of a similar scale to each other, rather than the current contrast between 53m turbines and 93m/100m turbines.
- Provide a more coherent layout than at present. The Royd Moor turbines are laid out in two straight rows with minimal spacing between the turbines. This creates a 'corridor effect' which contrasts with the more contemporary triangular designs of Blackstone Edge and Spicer Hill. The

Spicer Hill Extension turbines have been designed to fit in to this triangular pattern.

- Reduce noise levels at most nearby properties, with the exception of two properties to the north of the development. Noise constraints would be met at both of these two properties.

Renewable energy in the UK

The UK Climate Change Act 2008 sets out a clear, legally binding framework to reduce greenhouse gas emissions by at least 80% by 2050 (based on 1990 levels). To provide certainty to investors and decision-makers, the Act includes a system of binding five-year 'carbon budgets', set at least 15 years in advance.

The Government has committed to interim targets of 34% by 2020 and 50% by 2025. The Act also brought into being the Committee on Climate Change, a powerful independent body, to advise on future carbon targets and to assess the Government's progress against them. Furthermore, and of particular significance in a planning context, the Act set up a framework to require relevant public bodies to introduce plans to adapt to the impacts of climate change.

Approach to the Environmental Impact Assessment (EIA)

This is an Environmental Statement (ES) for the purposes of the Planning EIA Regulations (the Environmental Impact Assessment Regulations 2011) covering the major environmental effects arising from this proposal.

The ES addresses the social, economic and environmental issues associated with the proposal, in line with the relevant environmental policies, planning guidance and requirements of the planning authority. The scope of the ES was discussed and agreed with Barnsley Metropolitan Borough Council (the Council), statutory consultees (such as English Heritage) and a wide range of other potentially interested parties.

The ES includes a description of how the work was undertaken and the assumptions that have been made. It sets out the results of the assessment of likely impacts of the development on the environment and describes measures proposed to reduce any environmental impacts identified (known as 'mitigation').

2 THE PROPOSED DEVELOPMENT

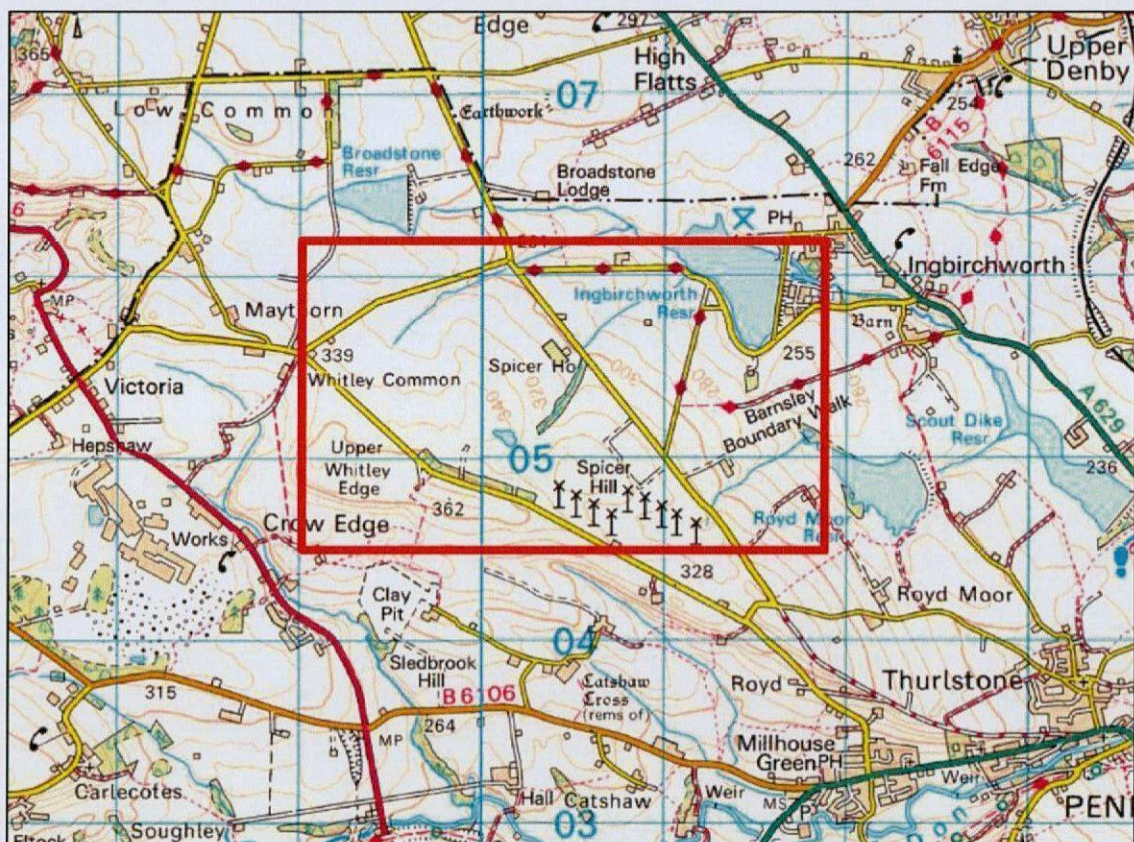
The proposal is for three commercial scale wind turbines that would be of the same design and located next to the existing three turbines at Spicer Hill Wind Farm. The proposed turbine model is the Enercon E70, which has a hub height of 57m and a height to blade tip of 92.5m.

The turbines are rated at 2.3MW each, and would together generate an annual electricity output equivalent to the average domestic consumption of about 4,000 homes.

Site Location

The Spicer Hill Extension site is situated 2km to the north-west of Millhouse Green in the Penistone area of Barnsley, as shown in **Figure 2.1**.

Figure 2.1 - Site Location



The area within 5km of the site is typified by 'Gritstone' towns, villages and hamlets such as High Flatts, Millhouse Green, Upper Denby and Penistone. The nearest settlements are Ingbirchworth, a small village clustered at a lower elevation around Ingbirchworth Reservoir, and Crow Edge, which sits to the west below a steep escarpment.

Site Description

The site lies within an area of upland farmland and occupies a locally prominent ridge of high ground. It sits between the high moorland areas of the Peak District to the south-west and the urban conurbations of Huddersfield, Barnsley and Sheffield to the north, east and south.

The three extension turbines are proposed on two parcels of land. The western portion, which would contain two of the extension turbines, sits between the Blackstone Edge and Spicer Hill Wind Farms, and is bounded by Whitley Road to the south and Brown's Edge Road to the north. The eastern portion contains the existing Spicer Hill Wind Farm.

Greenley Carr Quarry is located centrally in the western portion of land, 330m north of Whitley Road. The Quarry became active in 1986, and supplied shale to the local clay pipe works at Crow Edge. At present the quarry is dormant, and a new application would be needed to excavate further stone reserves. Any new quarrying activity would not affect any areas where turbines are proposed.

Other man-made features in the immediate vicinity of the site include a coal depot and a small nursery with several polythene tunnels, both adjacent to Whitley Road.

The immediate area is typified by scattered properties and clusters of properties which abound the minor roads which criss-cross the higher ground between Penistone and Holmfirth. These residences bound the site to some degree to the north, east and south.

These include Brown's Edge Farm, Spicer House (owned by the applicant) and Annat Royd Farm on Spicer House Lane and Whitley House, Whitley Road Farm and Eagle Nest off Whitley Road. Slightly further to the west, below the Whitley Height escarpment are Small Shaw and Middle Cliff.

The main roads in the area typically run through the valleys. The closest 'A' Roads are the A616 1.2km to the west and the A629 1.6km to the east, which both link Sheffield and Huddersfield.

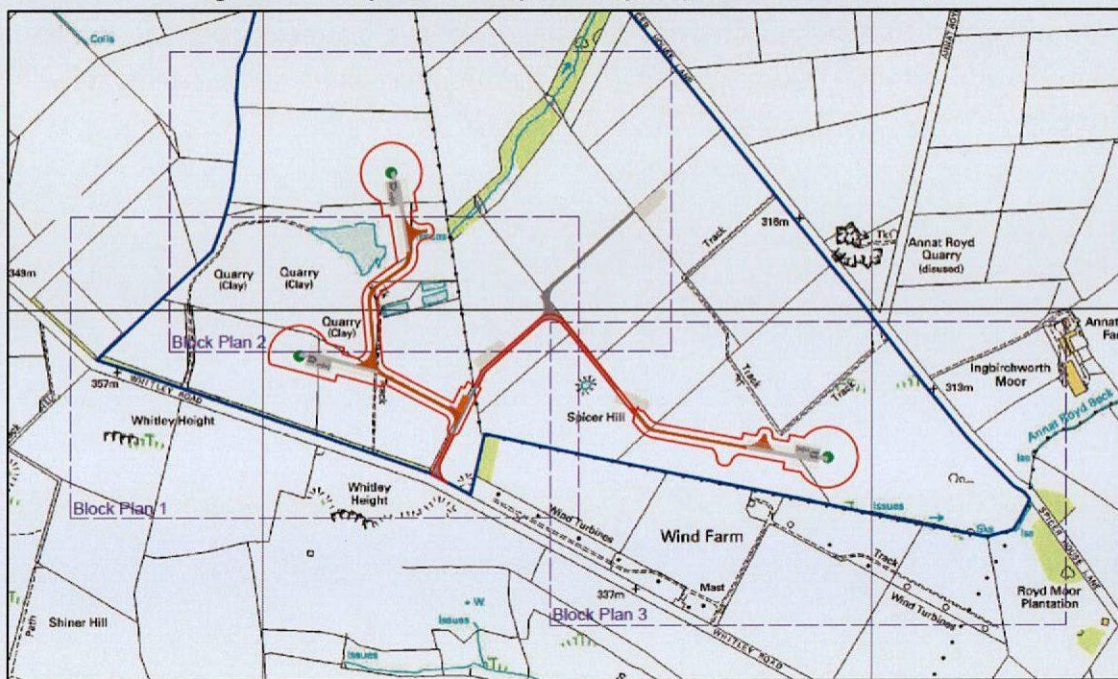
The Barnsley Boundary Walk passes within 400m of the north of the site as it runs to the south of Ingbirchworth Reservoir. A well-maintained viewing platform sits on Royd Moor Hill to the east of Spicer House Lane and south-west of the site.

There are numerous footpaths and bridleways in the area. The most notable is a path that runs from Royd Moor reservoir past the viewing platform located to the south-east of the site before dropping down Crow Edge via Carr House.

Site Layout

Figure 2.4 shows the location of the Spicer Hill Extension site infrastructure, including the turbines, access tracks and control building/sub-station compound. More detail is provided in drawing **APP-001** and associated Block Plans.

Figure 2.4 – Proposed Development Layout (Extract from APP-001)



KEY

- PROPOSED TURBINE / FOUNDATION
- CRANE HARD-STANDING
- JIB ASSEMBLY AREA
- NEW ACCESS TRACK
- EXISTING ACCESS TRACK
- ELECTRICAL SUB-STATION
- EXISTING WIND TURBINE/HARD-STANDING
- SPICER HILL LANDHOLDING
- CONSTRUCTION COMPOUND
- APPLICATION BOUNDARY (5.32 Ha)

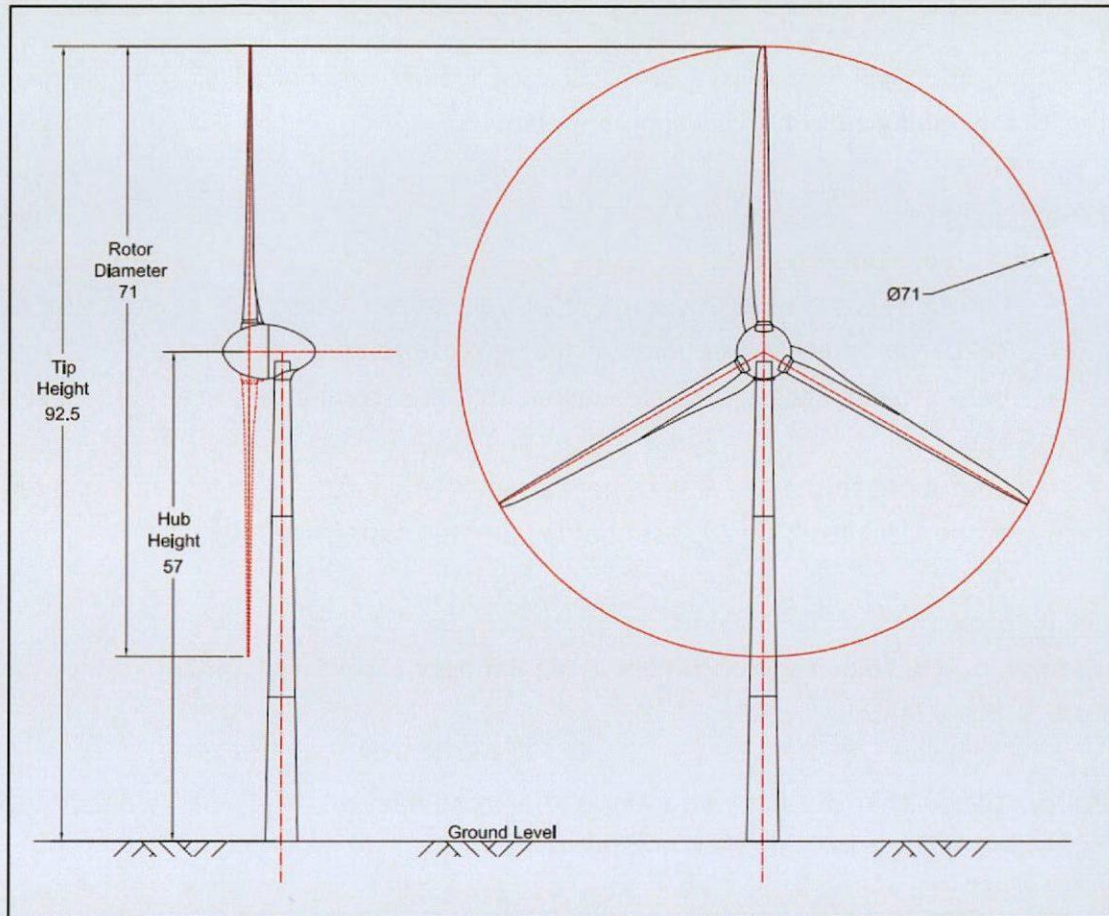
New access tracks would link each of the turbine locations, and a substation building would be located near to the site entrance. The construction of approximately 900m of new on-site track would be required for the purposes of providing access to the wind turbines, although the development makes as much use as possible of the existing Spicer Hill tracks.

The development would have a lifespan of 25 years. At the end of the project's operational life the wind turbines would be decommissioned, all elements removed, and the site restored leaving little visible trace.

Proposed Turbine Model

The proposed turbine has a hub height of 57m and a rotor diameter of 71m, producing a maximum tip height of 92.5m. Each turbine has a power rating of 2.3MW. The nacelle housing contains the generator and other operating equipment. The transformer of this turbine type is usually contained within the tower base. It is proposed that the finish of the wind turbine, tower and blades will be semi-matt and pale grey in colour. **Figure 2.5** below shows the dimensions of the candidate wind turbine.

Figure 2.5 –Principal dimensions of the proposed turbine



Community Consultation

JG Pears Ltd was keen to provide as much information as possible to members of the public prior to the application being lodged. A well-publicised public exhibition was held on Wednesday 17th September at the St John's Community Centre in Penistone. The drop-in event ran from **3pm to 8pm** and provided details about the proposed scheme, and presented the findings of the environmental studies that had been carried out to date. Mr Pears and members of the Green Cat Renewables project team were on hand to answer any questions members of the public had about the scheme.

The exhibition material was left in the hall until midday on Thursday 18th September, when the weekly market was held in the Upper Hall. The exhibition was not staffed during this period, but members of the public were free to browse the stands.

3 PLANNING AND ENVIRONMENTAL POLICY

The application will be assessed by the Council against national policy and guidance; the local planning authority development plan.

National Policy

The Spicer Hill Extension will:

- Contribute to the UK Government's target of producing 15% of electricity by 2020 from renewable sources, including onshore wind;
- Help provide secure, diverse, sustainable and competitive energy supplies; and
- Contribute to the UK Government's target of an 80% reduction in emissions of the 1990 levels by 2050 set out in Climate Change Act 2008.

Local Policy

The key local development document is the Barnsley Local Development Framework Core Strategy (adopted 2011)

Policy CSP6 within the Core Strategy is the most relevant, and relates directly to renewable energy development. It states that:

"We will allow development that produces renewable energy as long as there is no significantly harmful effect on:

- *The character of the landscape and appearance of the area;*
- *Living conditions;*
- *Biodiversity, geodiversity and water quality;*
- *Heritage assets, their settings and cultural features and areas;*
- *Highway safety, and*
- *Infrastructure including radar.*

Proposals must be accompanied by information that shows how the local environment will be protected, and that the site will be restored when production ends".

Paragraph 9.37 sets out the local targets for installed grid-connected renewable energy within Barnsley. The target figures are for 15 MW of installed renewable capacity by 2010 and 34 MW by 2021. Should the Spicer Hill Extension be consented it would provide 6.9MW of capacity, 20% of the target.

4 PROJECT DESIGN CONSIDERATIONS

Introduction

The design of any wind farm is achieved through a process that aims to strike the right balance between minimising environmental impact and achieving the best engineering and technical solutions. The design process involved two main phases:

- Confirmation of the suitability of the site for wind development through a review of the planning and technical issues; and
- The design phase which looked at site-specific constraints and opportunities.

Overall suitability of the site

The existing Spicer Hill Wind Farm was granted planning permission by the Council following a thorough programme of environmental assessments and a consideration of the benefits and impacts by both internal and external consultees within the planning process.

This suggests that in planning terms the site is suitable for wind development, with the caveat that planning policies can change over time, and that one of the main issues for any new development near the site would be the cumulative impacts of the proposal.

All of the planning issues likely to be relevant to the extension turbines were reviewed and overall it was concluded that in principle, as per the original Spicer Hill Wind Farm, a wind development on the site would be able to comply with the relevant policy and guidance.

The electrical output of the current Spicer Hill turbines demonstrates that the site has a good wind resource. In 2013/14 the three Spicer Hill turbines produced 20,945 MWh of electricity¹, enough to power just over 4,700 homes². The average capacity factor of the development since construction is 31.9%, which compares to a UK average for onshore wind of 25.8%³. The comparable capacity factor of the Royd Moor Wind Farm is 20.1%.

Detailed Design

From the outset it was determined that the preferred turbine design would be the Enercon E70 with a tower height of 57m and a tip height of 92.5m. This model was

¹ Source: Renewable Energy Foundation

² Based on an average UK household consumption of 4,432kWh as presented in Table 3.07 of DECC's 'Energy Consumption in the UK 2014'.

³ Source: RenewableUK.

chosen in order to fit with the existing Spicer Hill Wind Farm. No other turbine models or heights were considered. The following hard constraints (constraints that must be met) are present on the site:

The main considerations in terms of turbine locations were:

- Respecting noise limits at the nearest properties;
- Ensuring a sufficient spacing between the existing Blackstone Edge and Spicer Hill turbines to reduce turbulence effects;
- Ensuring a sufficient distance of over 100m (turbine height plus 10%) from public roads;
- Ground stability in terms of distance from the on-site quarry; and
- The appearance of the wind farm from private houses, public roads and key viewpoints.

The following considerations were part of the overall design strategy

- **Achieving consistency of design.** The existing Spicer and Blackstone Edge turbines are laid out in a broadly 'triangular' design.
- **Fine tuning the turbine locations** so that the layout appears balanced from the most viewpoints.
- **Making as much use of existing infrastructure as possible.** The existing site access junction will be used for the extension turbines, and the need for new on-site tracks has been minimised as much as possible in the design.
- **Ensuring that the selected turbine locations satisfy construction criteria** in terms of foundation design and space for crane hard-standings.

Conclusion

A balanced scheme has been created that meets all of the identified constraints, and which appears as a coherent whole when viewed alongside the existing Spicer Hill and Blackstone Edge developments. The final layout has been designed in line with best practice wind farm design guidelines and fully takes into consideration the pre-application advice received from all consultees.

5 ECOLOGY

Introduction

The Council Ecologist were consulted to define an appropriate scope and methodology for assessing ecological and ornithological issues potentially associated with the proposal. An extensive programme of survey work was agreed and these surveys were carried out by GLM Ecology, an experienced consultancy that specialises in assessing the impact of wind farms.

Methodology

The following ecological surveys have been undertaken:

- Breeding birds;
- Bats;
- Phase 1 Habitat Survey and National Vegetation Classification (NVC); and
- Badgers, Otters and Water Vole;

Data records were obtained from the following local organizations:

- Barnsley Biological Records Centre (BBRC)
- South Yorkshire Badger Group
- South Yorkshire Bat Group

Main Findings

Breeding birds: Small numbers of breeding waders such as lapwing and oystercatcher breed on the site around the existing wind turbines. Small numbers of skylark, willow warbler and meadow pipit were present. The species of breeding birds recorded on and around the site would be considered as typical for the habitat and of low sensitivity.

Bats: Around the area of the proposed turbines very little activity of bats was recorded. Small numbers of common pipistrelle and a single noctule bat were recorded. The bat recorders recorded very small numbers of common pipistrelles bats commuting across open areas of the site. No roosts are present on site. No trees or buildings are to be removed for construction and therefore no significant impact on bats is expected from the turbines.

Phase 1 Habitat Survey: The vegetation throughout the survey area is a mixture of grazing and arable grassland surrounding a quarry. This habitat is extremely common and considered to have low ecological value. No significant impacts on any sensitive habitats are predicted.

Badger: Signs of badger were recorded, however no active setts were found. Badger setts were identified in the wider area, and as badger are known to wander widely suitable mitigation measures will be implemented during the construction stage to ensure that the risk of impact to badgers will not be significant.

Otter and Water Vole: No signs of either species were recorded during surveys.

Mitigation

Good construction site management will be implemented to reduce any impact on wildlife, which includes measures to minimise generation of litter, dust, noise and vibration.

6 LANDSCAPE AND VISUAL IMPACT

Introduction

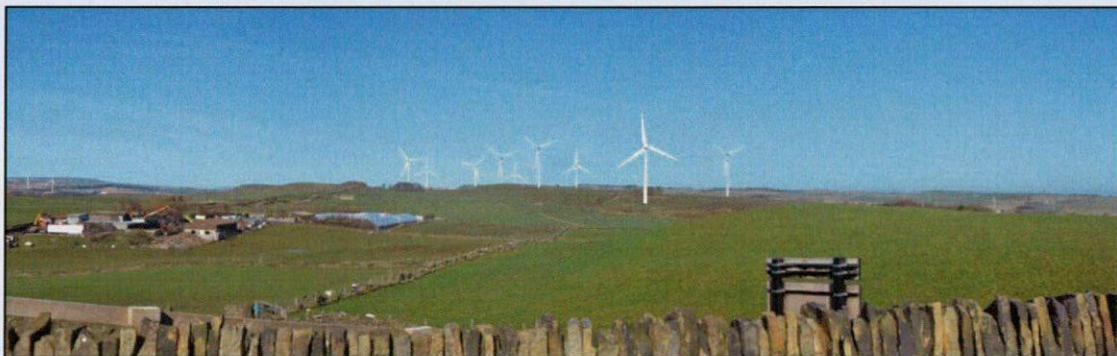
An LVIA was undertaken to assess the potential effects of the proposed Spicer Hill Extension on the character of the site and the surrounding landscape.

Methodology

The methodology for the LVIA adopted the guidelines set out by the Landscape Institute and the Institute for Environmental Management and Assessment, as well as other guidance from the Council and Scottish Natural Heritage (SNH), who provide guidance for siting wind farms within England and Scotland. The study considered an area of 15 km radius around the site. The assessment focussed on four main areas:

- The effects on landscapes;
- The effects on local communities and residents, including a detailed assessment on all properties within 1km of the turbines;
- The effects on those using roads and footpaths;
- The 'cumulative' effect of the development alongside existing wind farms and those that are consented or planned within a 15km radius.

Figure 6.1 – Predicted view from the Royd Moor Viewing Platform



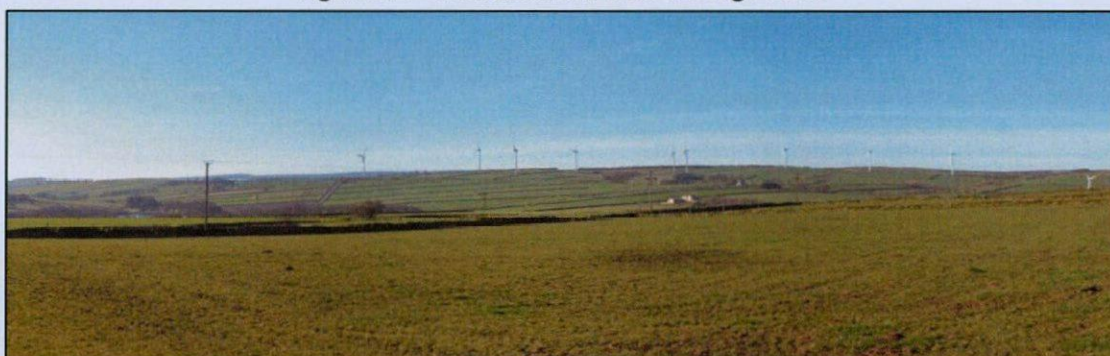
Photomontages for 15 viewpoints were produced and assessed, comprising a selection of settlements, recreational areas and key transport routes. These viewpoints are presented in **Table 6.1**.

Table 6.1 – Viewpoint locations

1. World War 2 Bunker on Whitley Road	9. Transpennine Trail
2. Spicer House	10. Carlecotes Village
3. Barnsley Boundary Walk	11. Millhouse Green
4. Crow Edge Village	12. Hoylandswaine
5. Victoria	13. Hollin Lane
6. Windmill Lane, Low Common	14. A629 Ingbirchworth
7. Royd Moor Wind Farm	15. A628 Daisy Hill Farm
8. High Flatts	

These photomontages are presented in the separate **Volume II - LVIA Figures** document, and a selection is shown within this section.

Figure 6.2 – Predicted view from the High Flatts



Main findings

The assessment found that the proportion of views containing wind turbines would not increase with the Spicer Hill Extension due to the visual location between the existing turbines at Blackstone Edge and Spicer Hill respectively. As a result, very few locations would gain views of wind turbines as a result of the Spicer Hill Extension. As they are of a similar scale to the Blackstone and Spicer Hill turbines, the Extension turbines would combine well with these developments to effectively form a single coherent wind farm from most locations.

The removal of the Royd Moor turbines, which are of a different scale and layout (in two lines rather than in triangles) would simplify the views from most locations.

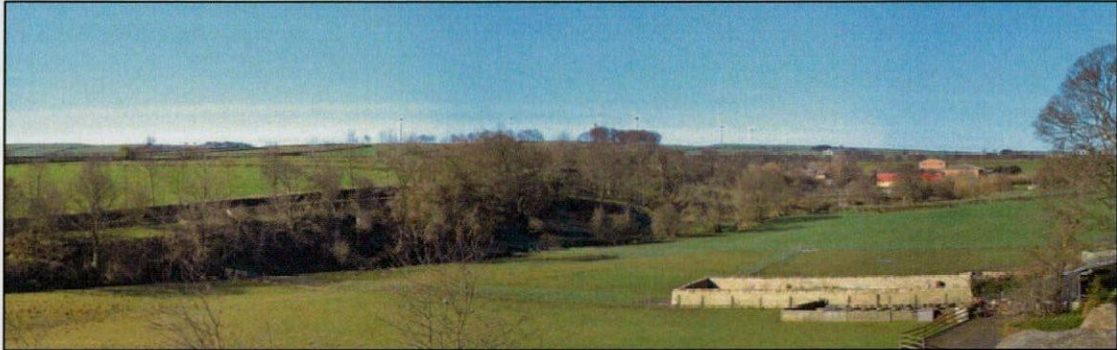
No significant impacts were found on any properties, settlements or transport routes. Of the 15 viewpoints assessed, only two were found to have significant impacts.

Conclusion

The LVIA concluded that the project can be accommodated within the surrounding landscape, with no significant effects being found on either the landscape character or on any designated landscapes.

Overall the project was deemed to have a low level of impact on the landscape, settlements, transport routes and properties.

Figure 6.3 – Predicted view from Ingbirchworth



7 NOISE

Introduction

Noise can have an effect on the environment and on the quality of life enjoyed by individuals and communities. The impact of noise is therefore a material consideration in the determination of wind planning applications.

The aim of the noise assessment is to demonstrate that the turbine noise levels, in conjunction with other existing wind developments will not exceed recommended limits at nearby properties. This is based upon a measurement of existing background noise levels at identified properties, and then a calculation of the additional noise expected to result from the turbines.

Methodology

Historical background noise measurements undertaken as part of the original Spicer Hill development were used to build a noise model of the area both with and without the Spicer Hill development. Noise levels were then compared to the limits set out in national guidance to demonstrate that the development would comply with these.

The methodology was agreed with the Environmental Health team at the Council.

Main findings

The noise assessment showed that the project will not breach recommended noise limits at any of the 17 properties assessed within 1.5km of the development. The measurements and calculations show that noise levels from the turbines are predicted to remain below the calculated constraints in the quietest periods of the daytime and night-time, at the full range of wind speeds.

The analysis also showed that the removal of the Royd Moor turbines and replacement with the three Extension turbines would reduce noise levels at 12 properties, with no perceptible change at the remaining 5 properties.

Conclusion

Noise from the turbines is not expected to have an unacceptable adverse impact on any nearby residents.

8 CULTURAL HERITAGE

Introduction

Cultural heritage is represented by a wide range of features, both above and below ground, which result from past human use of the landscape.

These include standing buildings, sub-surface archaeological remains and artefact scatters. These also include earthwork monuments as well as landscape features such as field boundaries and industrial remains.

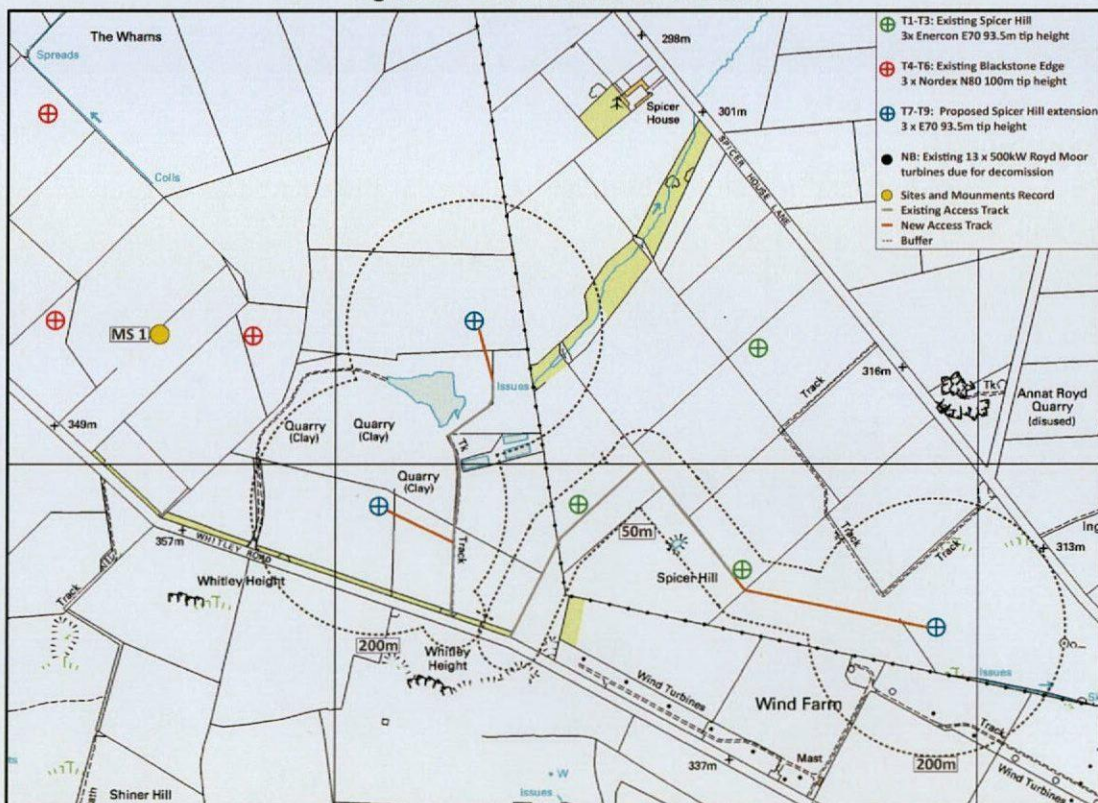
Methodology

English Heritage (EH) was consulted with regards to the proposed extension. They highlighted the potential visual impact of the proposed extension upon Castle Hill, a Scheduled Monument. The assessment therefore focused on this Monument, as well as the potential for the direct impact upon on site features.

Main findings

The assessment showed that there were no on-site features at risk of disturbance from the construction of the development.

Figure 8.1 - On site historical features



The Scheduled Monument of Castle Hill is a late prehistoric enclosed settlement, situated on Denby Common, on the south side of Windmill Lane approximately 1.7km from the development. The enclosure survives as an upstanding earthwork on the south west and west sides. The upstanding remains of the rest of the enclosure have been flattened by ploughing in the past, but the edges of the enclosure are just traceable as a slight break of slope on the north side and a very faint bank on the east side.

Views from the monument already contain the existing Blackstone Edge, Spicer Hill and Royd Moor wind farms. The Spicer Hill Extension would sit within Blackstone Edge and Spicer Hill, and not increase the horizontal spread of turbines in the view from Castle Hill.

Figure 8.2- Predicted view from Castle Hill



Conclusion

No significant impacts on cultural heritage features are predicted as a result of the scheme.

9 HYDROLOGY

Introduction

Surface water includes watercourses, water bodies and runoff. Groundwater includes all water stored in permeable underground strata (or aquifers). Understanding surface and groundwater environments is critically important to designing a successful project.

Methodology

The method adopted to assess the impact on the water environment was:

- Determination of the baseline hydrological conditions and the sensitivity of the site and adjacent receptors;
- Review of the proposed development to determine the predicted impacts posed by the development itself;
- Evaluation of the significance of predicted impacts, taking into account impact magnitude (before and after mitigation) and baseline environmental sensitivity.

The assessment is based on:

- A desk-based study using information from published material;
- Consultations with statutory bodies, principally the Environment Agency and the Local Planning Authority;
- The land owner's own knowledge of the site; and
- A site walkover undertaken by a suitably qualified engineer to support these findings and to check for any hydrological features on site that may be missing from the desk-based study.

Main Findings

Five wells and four springs were identified within the Study Area. None of these potential water supplies is predicted to be impacted by the development.

The most disruption, and therefore the greatest risk of impact to the water environment, will occur during the construction phase of the project.

Mitigation

A combination of access track construction options, and construction and operational management strategies have been developed to minimise potential hydrological impacts of the development.

These measures include:

- The use of the existing Spicer Hill Wind Farm infrastructure as far as possible, including the site access junction and tracks;
- The micro-siting of the turbines and access tracks;
- The provision of adequate bunding and storage of any potentially polluting substances;
- The minimisation of individual drain lengths and gradients; and
- Directing the flow of surface water drainage through swales, infiltration trenches and soakaways.

Intrusive ground investigations will be completed prior to final design, to confirm groundwater levels, soil permeability and geology. Mitigation measures will be designed according to industry best practice.

An emergency response plan for potential pollution incidents would be produced as a matter of course.

10 SHADOW FLICKER

Introduction

Rotating wind turbine blades can cast moving shadows which can affect neighbouring properties. As the blades rotate, alternating light and shadow can result inside buildings, particularly those with small windows. The effect can only occur when the sun is shining or when it is bright, and is worst when the turbine blades are facing the windows concerned.

Methodology

Planning for Renewable Energy, 'A Companion Guide to Planning Policy Statement 22 ("PPS") provides technical information on a range of renewable energy technologies, including onshore wind power. This information is relevant throughout the UK.

The guidance further states that flicker effects are known to occur within ten rotor diameters and 130 degrees either side of north relative to wind turbines.

Northern Ireland's Best Practice Guidance to Renewable Energy⁴, which has been approved by DECC⁵, states that an acceptable shadow flicker level at residential properties is 30 hours per year.

A shadow flicker model has been produced using ReSoft's WindFarm software to assess whether any properties could potentially experience more than 30 hours of shadow flicker per year. This model is based on a conservative approach which assumes that the sun is always shining, and that the turbine blades are always rotating and facing towards each property.

The impact of the Spicer Hill Extension alone and in conjunction with the Spicer Hill and Blackstone Edge Wind Farms was assessed.

⁴ Best Practice Guidance to Planning Policy Statement 18: Renewable Energy, Department of the Environment (Northern Ireland), (2009).
http://www.planningni.gov.uk/index/policy/policy_publications/planning_statements/planning_policy_statement_18__renewable_energy__best_practice_guidance.pdf

⁵ Update of UK Shadow Flicker Evidence Base, DECC (2011)
<http://www.decc.gov.uk/assets/decc/What%20we%20do/UK%20energy%20supply/Energy%20mix/Renewable%20energy/ORED/1416-update-uk-shadow-flicker-evidence-base.pdf>

Main findings

The model results showed that:

- Only two properties, Spicer House and Brown's Edge Farm are predicted to experience shadow flicker impacts as a result of the development.
- Brown's Edge is predicted to experience 4.4 hours of effects per year from the Extension turbines, when realistic factors are taken into account. In reality the property would receive some screening from nearby mature vegetation is taken into account.
- Spicer House is predicted to experience 8.6 hours of effects per year from the Extension turbines. This property has a financial interest in the project.
- When existing wind projects are taken into account, the total level of shadow flicker at Brown's Edge Farm and Spicer House is expected to rise to 9.5 hours and 19.1 hours respectively.
- No third party properties are likely to experience shadow flicker in excess of 30 hours per year as a result of the development.

Conclusion

There are not expected to be any significant shadow flicker impacts on the nearest residential properties a result of the scheme. It is expected that the amount of shadow flicker nuisance will be low at surrounding residential receptors.

11 INFRASTRUCTURE

Introduction

Operational wind turbines have the potential to interfere with:

- Communication networks that use electromagnetic signals;
- Civil aviation radars;
- Safeguarding radars operated by the MOD; and
- Other types of infrastructure such as high pressure gas, water pipes or electricity lines and cables.

Methodology

Organisations with local interests in telecommunications, television, aviation, safety, defence and infrastructure were consulted to determine whether their systems would be affected.

Main findings

Civil aviation

Consultation with both Leeds Bradford Airport and Doncaster-Sheffield Robin Hood Airport generated no objections, and established that the current plans are unlikely to impact upon current operations.

Consultation with National Air Traffic Service (NATS) regarding the Claxby radar will take place post-submission, should an objection be received. Although the new turbines fall within the bounds of disturbance caused by the existing turbines, an objection due to cumulative clutter is possible. In the event that this objection cannot be successfully challenged then a mitigation option would be agreed with NATS. This is likely to involve the introduction of a 'blank' covering the new turbines, with the area effectively being in-filled using data from the Manchester Airport radar.

Ministry of Defence (MoD)

No MoD objection is expected. The site is beyond the safeguarding areas associated with the MoD technical sites to the east and out of range of air defence radar. It is in a low priority military low fly zone and amongst existing turbines, so an objection against low flying impacts is extremely unlikely.

Telecommunication

Four operators who have communication links that pass close to the site were contacted regarding the scheme. All confirmed that their assets would be unaffected.

Television

In the unlikely event that the wind turbines are found to cause some interference to TV signals there are a number of options open to mitigate the effects.

It is standard practice for the Council to request a television survey as one of the planning conditions. This is undertaken soon after the turbines are built, and if there are found to be any problems then these must be remedied at the developer's expense.

Conclusion

There is a possibility that NATS may object to the development based upon the potential impact to the radar at Claxby. Should this be the case, a mitigation measure would be agreed with NATS at the post-planning stage.

12 CLIMATE CHANGE

Introduction

Wind developments impact upon CO₂ emissions at two stages of their lifecycle:

- During wind turbine manufacture, construction and decommissioning; and
- During wind turbine operation.

The wind farm manufacture, construction and decommissioning phases will lead to the emission of greenhouse gases.

During operation, the turbines will lead to a reduction in CO₂ levels when compared to the production of electricity by conventional sources such as coal-powered power stations.

Main findings

Estimates show that the Spicer Hill Extension development would result in a saving of ~9,000 tonnes of CO₂ per year when compared to overall grid mix electricity generation.

In addition, the operation of the scheme would also reduce the emissions of the 'acid rain' gases sulphur dioxide and nitrogen oxides.

Conclusion

The development will make a small positive contribution to the reduction of carbon emissions over its 25 year lifecycle.

13 CONCLUSION

An extensive programme of environmental assessment has been carried out in relation to this proposed development at Spicer Hill. No unacceptably adverse effects have been predicted and it is concluded that the project could be successfully accommodated into the local area.