

# Kype Muir

## Wind Farm Proposal

Non Technical Summary • July 2011



# Introduction

## Kype Muir

Banks Renewables are proposing to develop a 26 turbine wind farm at Kype Muir, which is located within South Lanarkshire to the south of Strathaven. If consented, the development would utilise the area's natural wind resource to provide renewable energy to the national grid.

The proposals presented have been through a thorough assessment and design iteration process to ensure that they represent the optimal development for the site. The feedback from community and stakeholder consultation has been fed into this process.

## Banks Renewables

Banks Renewables is part of the Banks Group, which has been successfully developing a range of projects for over 35 years and employs around 360 people.

Banks Renewables identifies suitable sites for onshore wind farms as well as looking at opportunities for other forms of renewable energy generation. The company currently has renewable projects throughout the UK at various stages of the development process ranging from just being identified as a suitable site, to being fully operational.

The Banks Groups success at delivering large projects has largely been attributed to our development with care approach which ensures that sites are developed in close consultation with the community, as well as carrying out extensive environmental assessments.

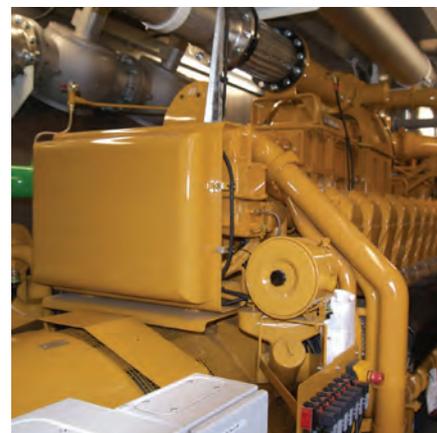
The approach ensures that our developments have a positive long term effect on the environment and local communities within which we are working. Local communities are actively encouraged to become involved at all stages of the development process.



Wind farm development



Solar energy



Delivering energy from waste solutions

# Key facts

## Site area:

In total the application site covers an area of 883 ha, of which only around 60ha will be occupied by the wind turbines and their associated infrastructure, which includes access tracks.

## Number of turbines: 26

## Rated output of turbines: 2.5 - 4MW

Development has been assessed using a 3.4MW turbine as felt to be most representative of the most likely development

## Dimensions of turbines:

Turbines will all be of the same height, with a hub height of around 80m and a maximum height to blade tip of 132m. (Minimum height of 125m to blade tip)

## Length of access tracks:

Approximately 15km of on-site access tracks comprising 13km of new on-site access tracks and the upgrading of 2km of existing forest tracks.

## Life span:

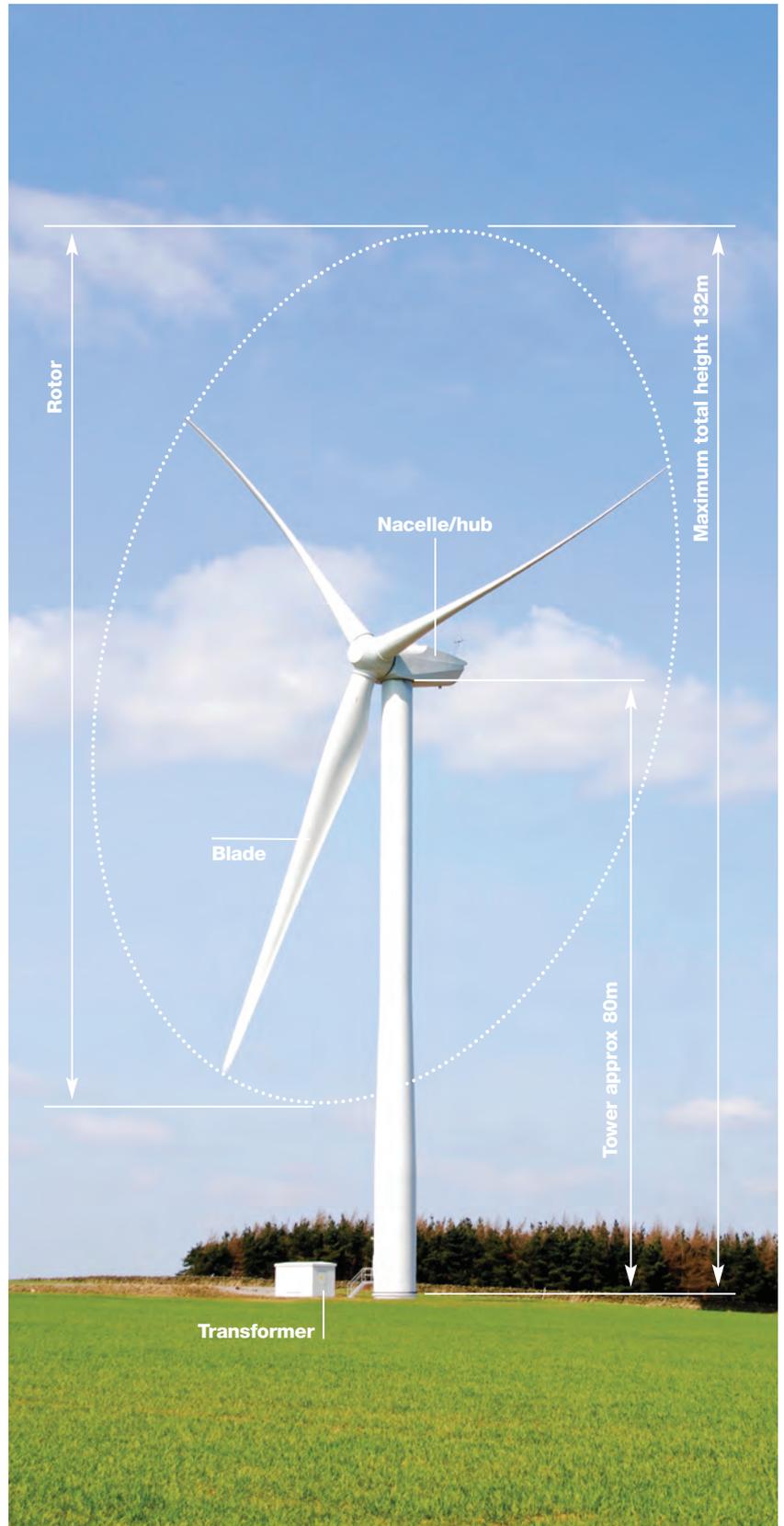
25 years operational plus two years construction and two years decommissioning periods.

## Job creation:

On average between 25-50 jobs will be created during the construction and decommissioning phases. In addition there will be indirect economic benefits which will benefit local businesses. During operation it is envisaged that a senior technician will be employed on a full time basis and two maintenance staff who would not be based at that site all the time but would work around a group of wind farms.

## Heavy goods traffic:

A maximum of around 173 vehicle movements per day during the construction period are anticipated. The number of daily loads will vary considerably over the construction period. Average daily heavy goods vehicle movements calculated over the construction period would be around 65.



Height and components of proposed wind turbines. Photo for illustrative purposes only. Image shows a turbine at Tow Law, County Durham with dimensions: 100m to tip, rotor diameter 82m, tower height 60m.

# Benefits of the project

The proposed development will contribute significant environmental and socio-economic benefits at both a national and local level.

The scheme will:

- Reduce greenhouse gas emissions by harnessing power from the wind to generate electricity for approximately 50,000 homes.
- Make a contribution to the recently increased Scottish Government target that 100% of Scotland's electricity consumption is produced from renewable sources by 2020.
- Produce an indigenous energy supply, reducing reliance on imported fossil fuels.
- Support Scotland's growing renewables industry which has the potential to be world leading. Up to 130,000 jobs\* could be created in the low carbon sector in Scotland by 2020 according to the SNP.
- Generate new construction contracts which will provide jobs, training and skills development during the construction period. Where possible contracts are granted to locally based companies which will also support local construction jobs and training opportunities.
- Create an opportunity for indirect economic benefits through local sourcing of materials and increased trade from construction workforce.
- Establish a community benefits package of approximately £6.5 million to finance projects identified by local communities surrounding the wind farm.

\*SNP "Our Ambitions for clean, green energy – Scotland's electricity capacity in 2020"



Employment and investment through renewable energy



Supporting local communities



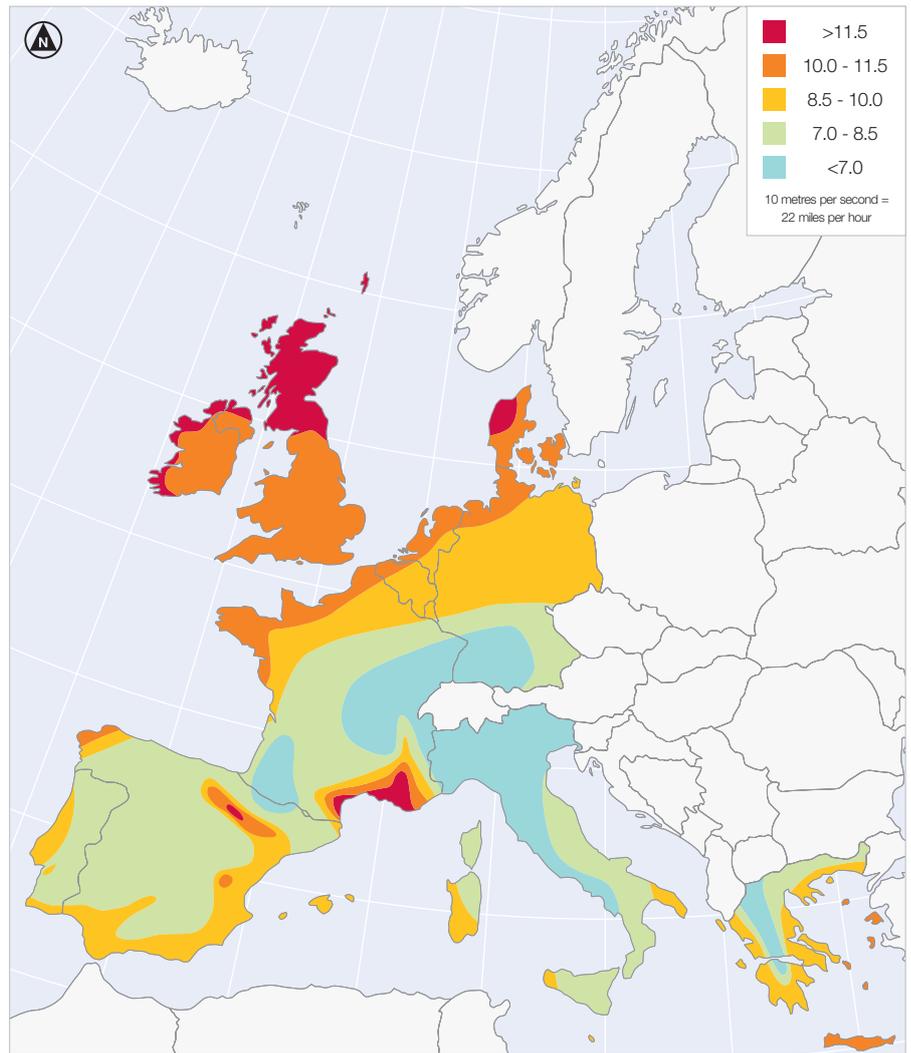
Delivering community benefits

# Why wind energy?

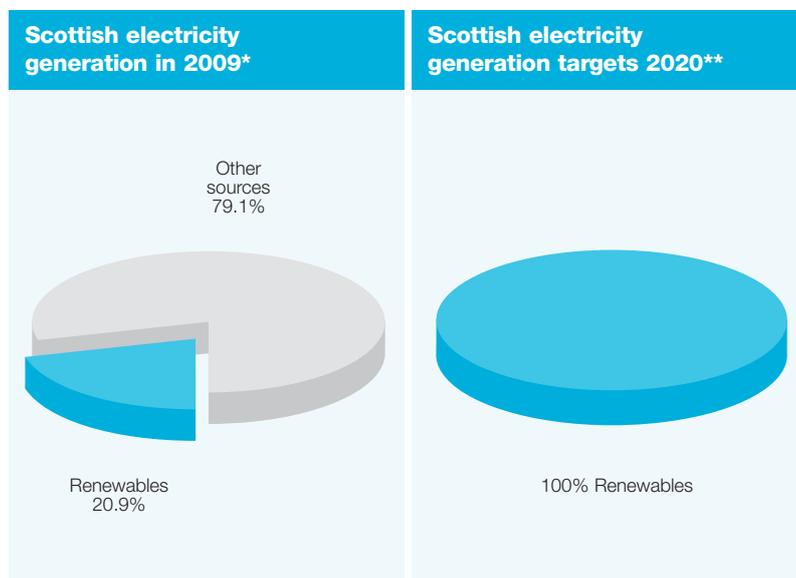
Climate change is a global issue that needs to be addressed. The need to reduce CO<sub>2</sub> (carbon dioxide) emissions is widely accepted due to the increasing changes to our climate and the impact it is already having on wildlife species, ecosystems, the weather and sea levels.

The UK government has signed up to a number of international agreements and has a legally binding obligation to increase its share of renewables in our energy mix to 15% by 2020 in order to address climate change. In addition to these UK figures, the Scottish Government have recently increased the target for the amount of Scotland's electricity consumption produced by renewable energy in 2020 to 100%.

Capturing the winds natural energy is the most proven form of renewable electricity generation in the UK. It therefore provides the opportunity for the most immediate way of reducing CO<sub>2</sub> emissions from our electricity use and assisting in meeting the international and national targets that have been set. Within 14 months it is anticipated the wind farm will have paid back the carbon used in its construction. For the remainder of its 25 year operational life all electricity generated by Kype Muir Wind Farm would be carbon neutral.



Wind speeds across Europe - 50m above ground level in metres per second



\*Scottish Renewables

\*\*SNP pre election manifesto

Aside from this, within the next 20 years the indigenous fossil fuels which we currently use to provide our energy will become scarcer and we will become ever more reliant on imports from overseas. This proposal will provide a secure, reliable energy supply in line with the Government's national energy goals.

Kype Muir Wind Farm will provide, on average, enough electricity to meet the domestic needs of approximately 50,000 homes (based on an installed capacity of 88MW). This represents 37% of South Lanarkshire households.

Scotland has the best wind resource in Europe and capturing this to provide indigenous green energy, whilst continuing research into energy efficiency and other renewable sources is a logical step forward.

# Why Kype Muir?

Wind farms can only be developed in areas where the wind resource can be converted into sufficient electrical output. Wind monitoring at Kype Muir has confirmed that there is a sufficient resource at the site. The Kype Muir site is not subject to any international or national landscape, ecological or cultural heritage designations. The environmental statement demonstrates that the site has suitable highway access and is a sufficient distance from residential properties to protect residents from unacceptable noise and shadow flicker effects.

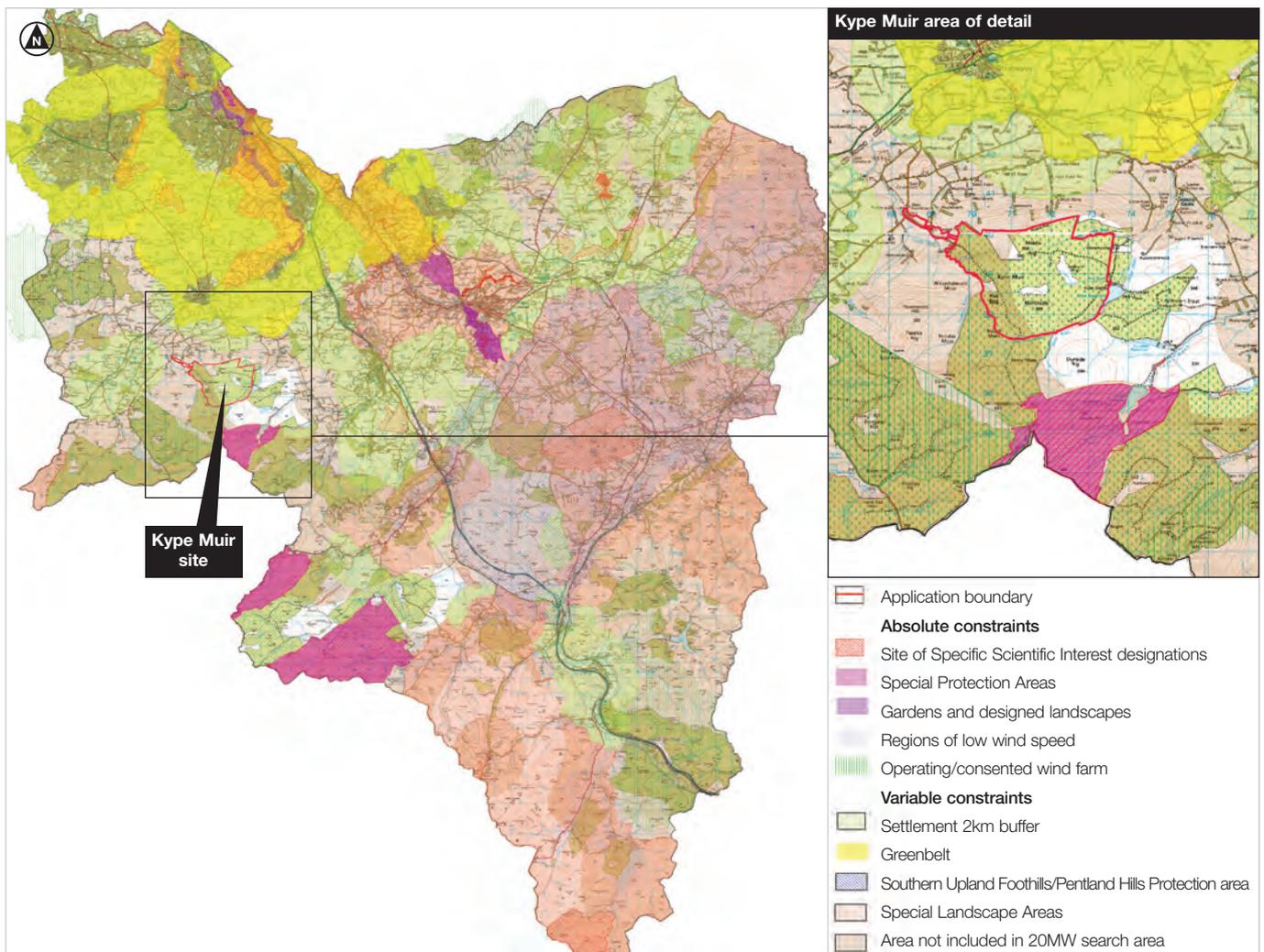
A detailed mapping exercise undertaken by Banks Renewables has highlighted that there are few suitable sites for commercial wind energy development in South Lanarkshire. Once the various constraints to development were combined onto one map only three areas within the authority were identified as being suitable for the proposed scale of wind farm development. This illustrates the relative scarcity of unconstrained sites.

South Lanarkshire Council recently adopted a Renewable Energy Supplementary Planning Guidance which identified Kype Muir

and its surrounding area as a Broad Area of Search for wind farm development. These areas are South Lanarkshire Council's preferred location for wind farm developments. They were identified following a robust review of South Lanarkshire's landscape character and its capacity for wind farms, as well as a full round of public consultation.

The area around Kype Muir was identified as a search area in the Structure Plan and Local Plan prior to this review. Unlike some of the other areas previously identified as being preferred locations for wind farm development, the area around Kype Muir has emerged from the recent review as still having the capacity for wind farm development.

National planning policy sets out that within development plans planning authorities should provide a clear indication of areas with potential for wind farm development and that they should support wind farms in locations where the technology can operate efficiently and environmental and cumulative impacts can be addressed.



Banks Renewables' sieve map showing constraints within the South Lanarkshire area

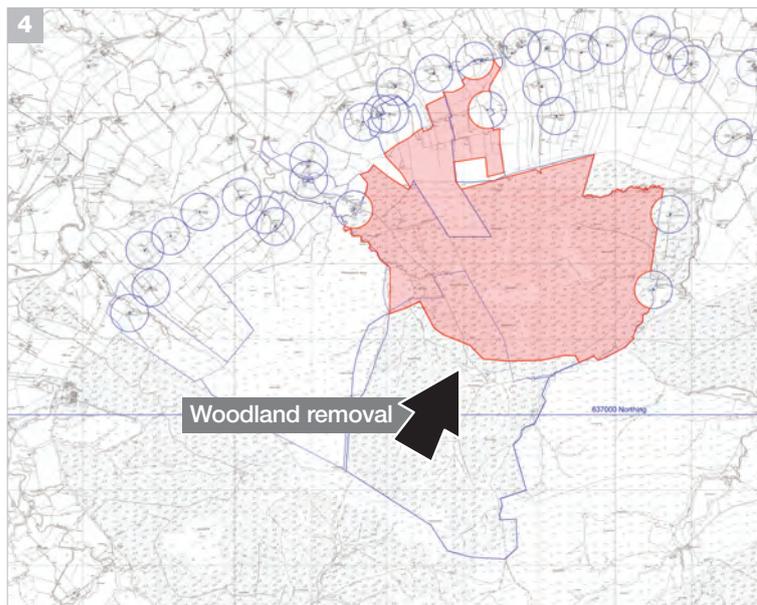
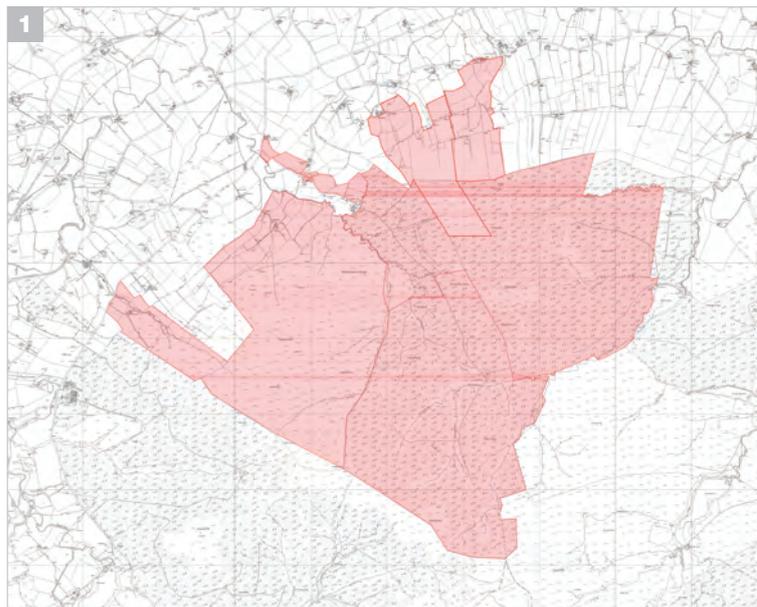
# Design iteration

The proposed site layout has been developed and refined. This process has been informed by site assessments and feedback from community and stakeholder consultation. It has taken into account and responded to the site constraints. As a result of this process Banks Renewables believe that the proposed site layout offers the best option for development of the site.

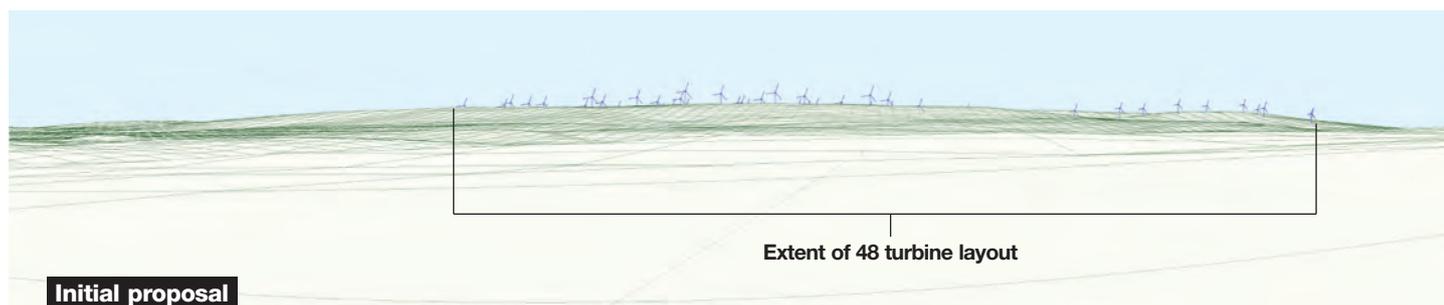
At the scoping stage a large study area was identified with a capacity of between 35 to 45 turbines, up to a maximum height of 140m. The final layout comprises 26 turbines with a maximum height of 132m. There are a number of reasons for the substantial reduction in the number of turbines proposed.

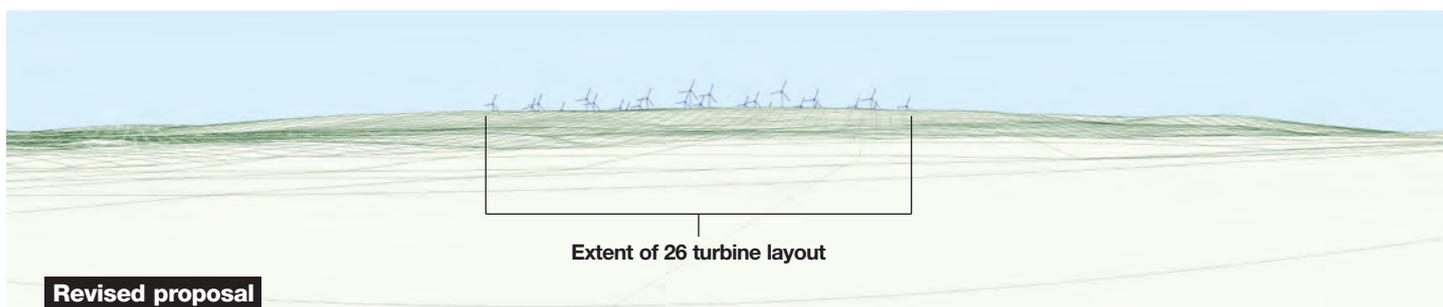
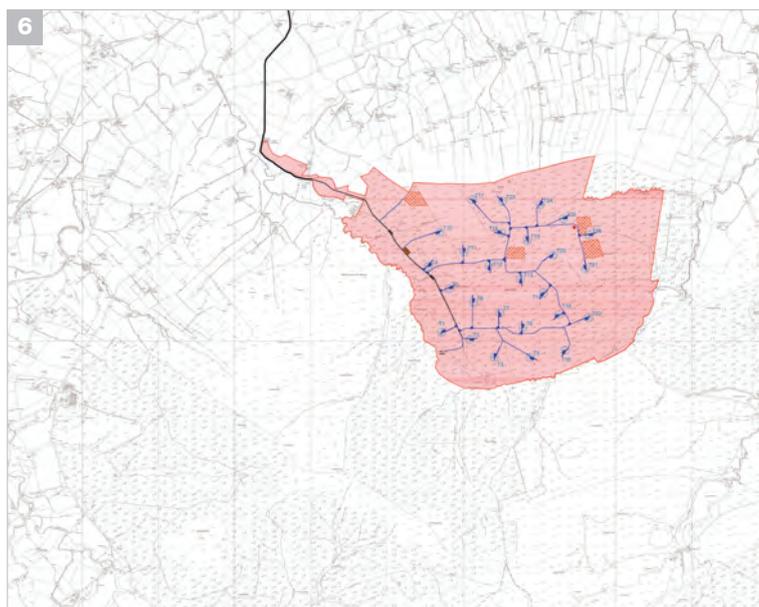
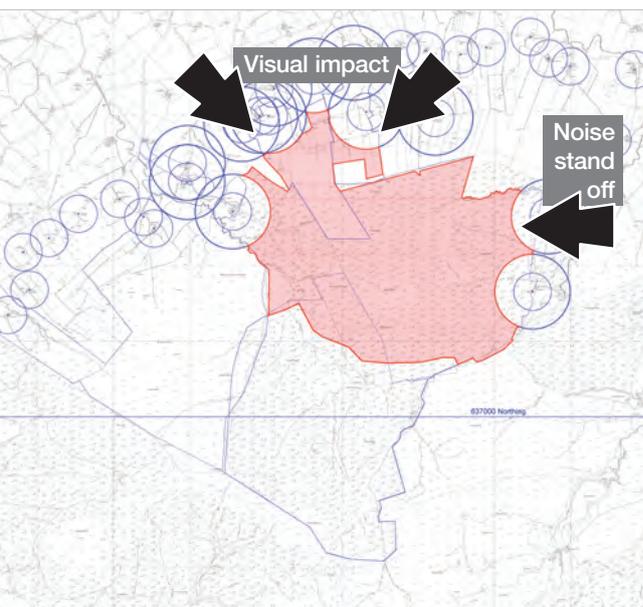
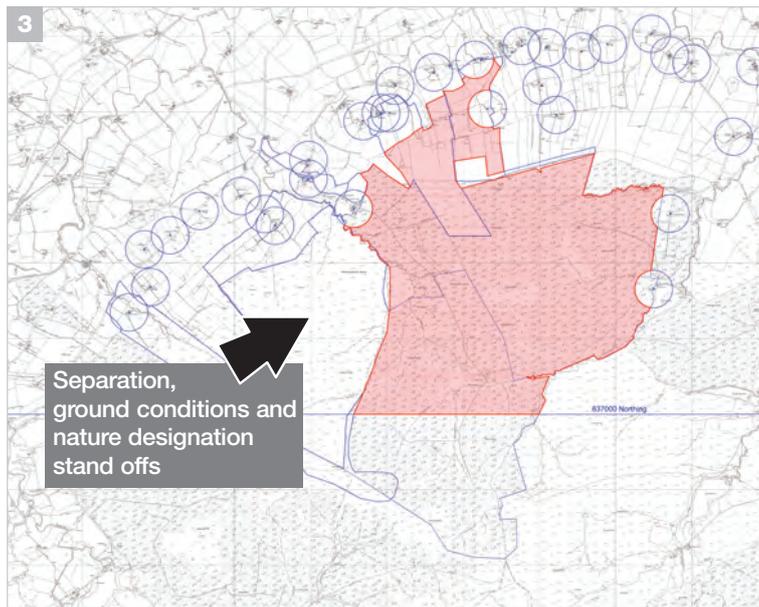
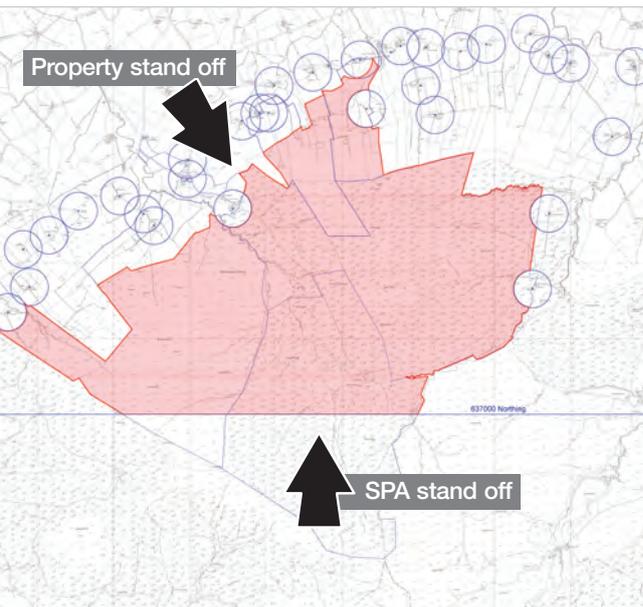
The main change was the removal of turbines from the western part of the study area following consultation feedback relating to the landscape and visual impact and feedback from initial ornithological, peat landslide hazard and ecology assessments. Through the initial period of consultation it was drawn to Banks Renewables attention that there was concern regarding the lack of separation distance between Dungavel Wind Farm and Kype Muir. Dropping the westerly turbines increased the separation distance between the 2 wind farms as well as reducing the visual extent of the development.

The design was then refined to ensure noise limits could be achieved at surrounding properties and design principles could be achieved. During the design process the height of the turbines has been reduced to a maximum tip height of 132m.

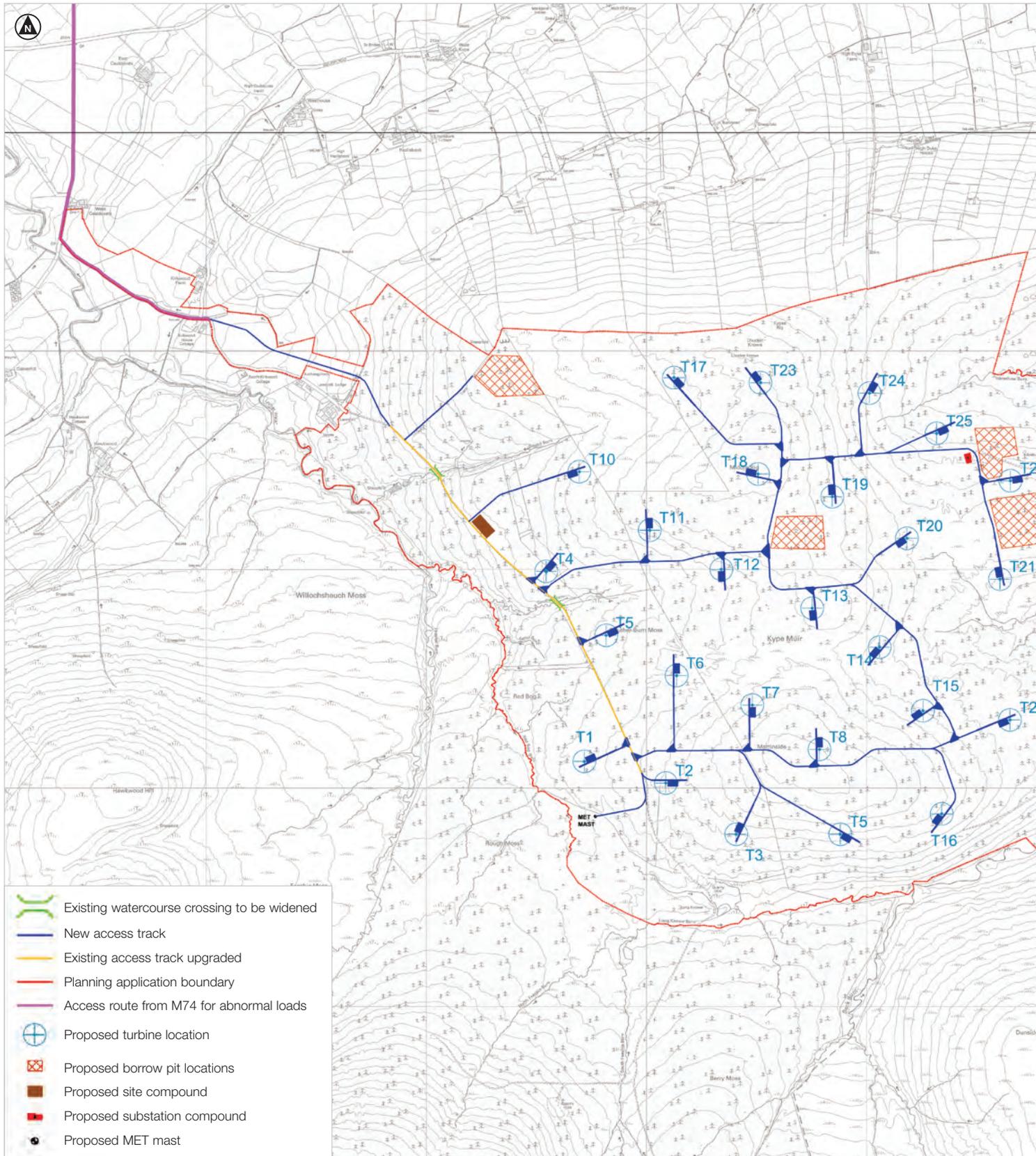


The wire frames below demonstrate the reduction in visual impact as a result of the design process.



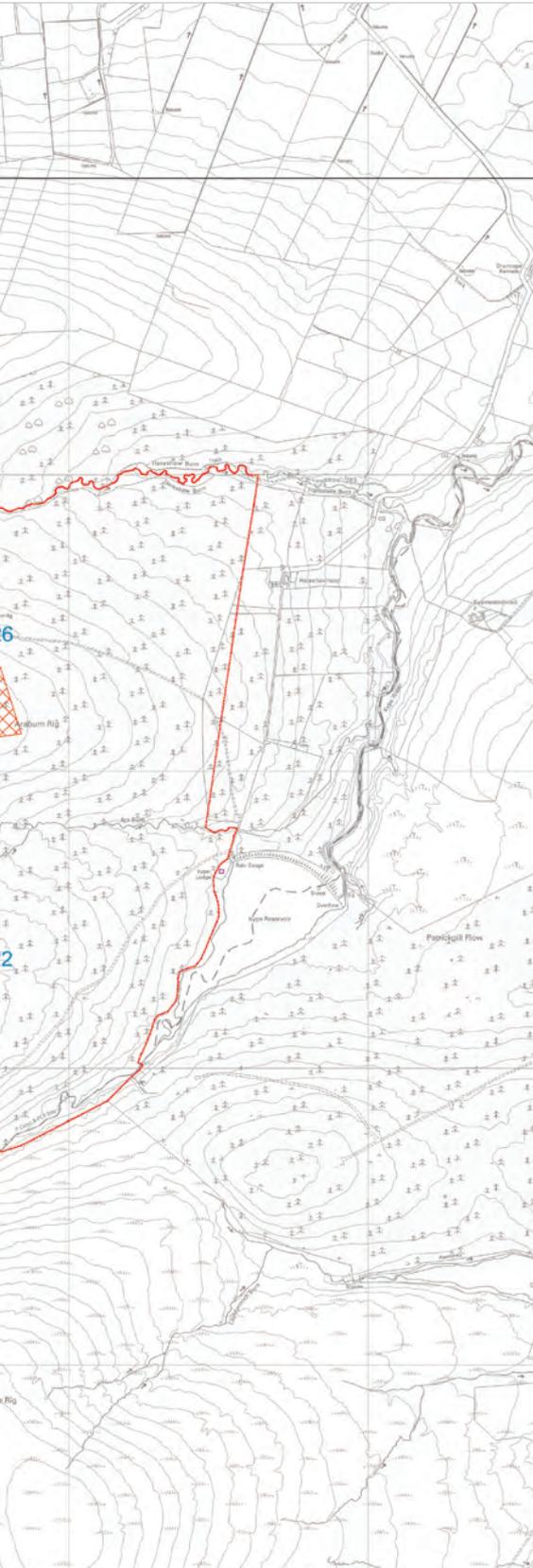


# Site layout



Site layout plan

# Main elements



## Woodland removal

To allow development of the wind farm the majority of the existing commercial forestry on the site will be felled in advance of wind farm construction. Post construction Banks Renewables are seeking to create a balance between the replacement of woodland planting; protection and enhancement of priority species; and the creation and connectivity of priority habitats.

## Turbines

All the turbines will be of the same height and specification. They will be of modern design with three bladed rotors. Each turbine will begin generating power at wind speeds of around 3 – 4 meters per second (m/s) and would shut down at wind speeds of approximately 25m/s. They will generate power approximately 85% of the time.

## Foundations

The turbine base would typically be a 15 metre x 15 metre square of concrete, around 4 metres deep. Following construction, surface vegetation will be re-established.

## Wind monitoring mast

A permanent anemometer mast is required to monitor the performance of the wind turbines by gathering data on wind speeds and direction. The mast will be a free standing steel lattice design and will be a maximum of 80 meters in height. The two temporary masts that are currently erected on the site will be removed prior to operation of the wind farm.

## Access tracks

To access and service the wind turbines, approximately 15km of permanent access tracks will be required. 2km of the existing forest tracks will be upgraded, while 13km of new tracks will require to be constructed. The tracks will typically be 5.5 metres wide, widening at bends where appropriate. The tracks will link the turbines to the public road network from the B743 via the unnamed road that leads to Lambhill.

## Compound and traffic

A temporary compound will be required during the construction phase for the storage of plant and materials, and to provide site workers with welfare facilities. Traffic travelling to and from the site will use an agreed route. The preferred access route for turbine delivery is from the M74, along the A71 and then the B743 until the Lambhill junction. Some road improvement measures will be required at Browns Bridge on the B743 to ensure large turbine components can be delivered to the site safely.

## Cabling and grid connection

Underground cables linking the turbines will generally be laid alongside the access tracks. A control building and on-site substation will be built in a compound area from which the electricity generated by the turbines will be fed into the grid. The electrical output of the proposal is such that the grid connection will require to be taken to Coalburn, approximately 8km to the south east of the site. The route from the site to this grid connection point will be assessed under a separate application, although initial assessments have not indicated any significant constraints. If the connection is above ground it will be on wooden poles.

# Visual assessment

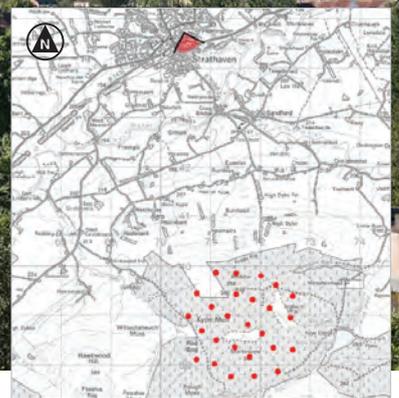
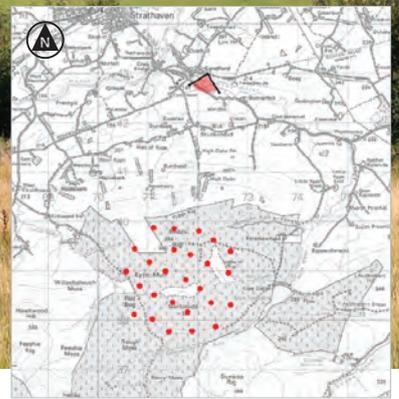
The following pages show what the Kype Muir Wind Farm would look like from a selection of viewpoints within the immediate locality. These viewpoints have been selected and agreed with South Lanarkshire Council and Scottish Natural Heritage. They have been produced by a professional landscape architect from Stephenson Halliday in accordance with the Landscape Institute and other guidelines.

Viewpoint from: **Sandford**



Viewpoint from: **Strathaven War Memorial**





# Visual assessment continued

Viewpoint from: **Strathaven, Lethame Road**



Viewpoint from: **Gilmourton**





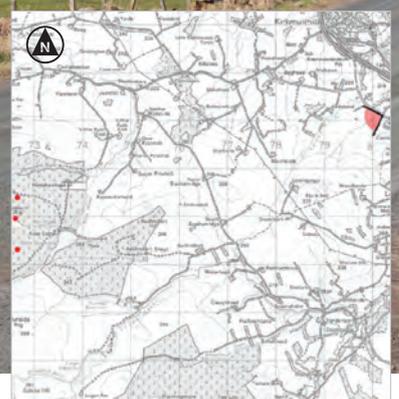
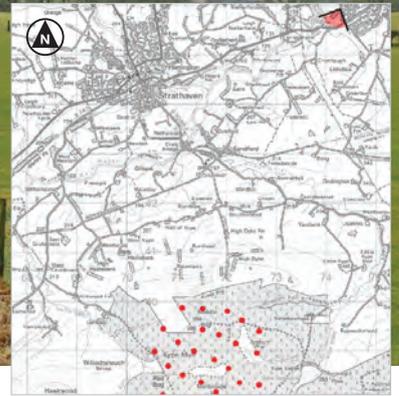
# Visual assessment continued

Viewpoint from: **Stonehouse**



Viewpoint from: **Lesmahagow**





# Environmental impacts

## Landscape and visual impacts

One inevitable consequence of constructing wind turbines is that they will be visible over a relatively large area. Their scale and man-made appearance mean that they will not naturally “fit in” with the rural landscape. It is however recognised that certain types of landscape are more capable of accommodating wind turbines than others.

The local landscape has already been selected as having some potential for wind turbine development by South Lanarkshire Council. The site is not in or adjacent to an area designated for its landscape value. The wind farm has been designed to relate well with the local landscape character and respect its scale.

The impact of the proposal on both the character and appearance of the local landscape has been assessed. The proposed development will have no significant effect on any designated landscape.

As would be expected with a wind farm development there would be significant effects on the landscape character within close proximity of the proposed turbines, however the removal of the commercial forestry and replacement with more organic forest patterns present an opportunity for landscape enhancement.

Within 3-4km of the proposed development the presence of turbines would have a significant effect on the landscape character; however the resulting landscape character is acceptable when compared to the criteria in South Lanarkshire Councils Supplementary Planning Guidance and Spatial Framework. Beyond this, changes to the landscape character would not be significant.

The visual assessment has found that significant visual effects as a result of the proposed development would be limited to a number of views from settlements at distances of between 5km and 7km as well as some individual properties within 3km. These views tend to be from the edges of the settlements. The significant effects associated with road users would only apply to parts of the B7086 and B743. There would be no significant visual effects upon the main visitor attractions within 15km of the site, although walkers using the local path network out to 6km and walking up Loudon Hill may experience significant effects.

The proposed development has been assessed in the context of other wind farms within the local area, especially Dungavel. Significant cumulative landscape and visual effects would be localised in extent and within the acceptable limits set out in South Lanarkshire Planning Policy.

It should be remembered that the significant effects of the proposed development are reversible. Upon decommissioning the wind farm the turbines would be dismantled and removed and the site restored.

The landscape and visual impact assessment concluded that in landscape and visual terms, the proposed development should be considered acceptable in this location.

## Ecology and ornithology

A number of specialist ecological and ornithological surveys have taken place on the site in order to gain a full understanding of the ecology of the application site and the sensitivity of the species in the area. The application site lies outwith any international or national designated areas for nature conservation. The Muirkirk and North Lowther Uplands Special Protection Area and Muirkirk Uplands Site of Special Scientific Interest, located to the south of the site have been taken into account in the design iteration and assessment process. The ornithological assessment concluded that the development will not compromise the conservation objectives of the designated area.

The layout of the proposed wind farm has been designed to minimise disturbance on sensitive habitats and species. Sensitive habitats of high ecological value have been avoided, while buffers have been placed around relevant protected species and watercourses. A standoff from the designated area to the south of the site was identified as a site constraint.

The effect of the proposals on habitats and species would therefore not be significant, and the ornithological assessment has concluded that the potential effects on all bird species would not be significant.

A habitat management plan (HMP) is proposed for the site. The felling of coniferous forestry offers a significant opportunity to enhance the biodiversity value of the site. The HMP has therefore aimed to create a balance between replacement woodland planting; protection and enhancement of priority species; and the creation and connectivity of priority habitats. The habitats created would also be beneficial to birds on the site.

## Archaeology and cultural heritage

An archaeological and cultural heritage assessment has been carried out. The assessment looked at the potential for direct effects (physical) and indirect effects (setting) on known features of historic importance.

There are no scheduled ancient monuments, listed buildings, conservation areas or other nationally designated features within the application site. There are two scheduled ancient monuments and one listed building within the vicinity of the site which will not be affected by the proposals.

The proposed wind farm will not have any significant direct or indirect effects on archaeological or cultural heritage features.

# Noise

## Construction

The potential for noise impacts associated with construction of the wind farm have been assessed.

The assessment concluded that at one property during the first two phases of the construction period when the access road is being constructed adjacent to the property the noise will be significant. This impact is however short term and temporary in nature. It will only occur when work is taking place 100m either side of the property. It will not cause long term impacts.

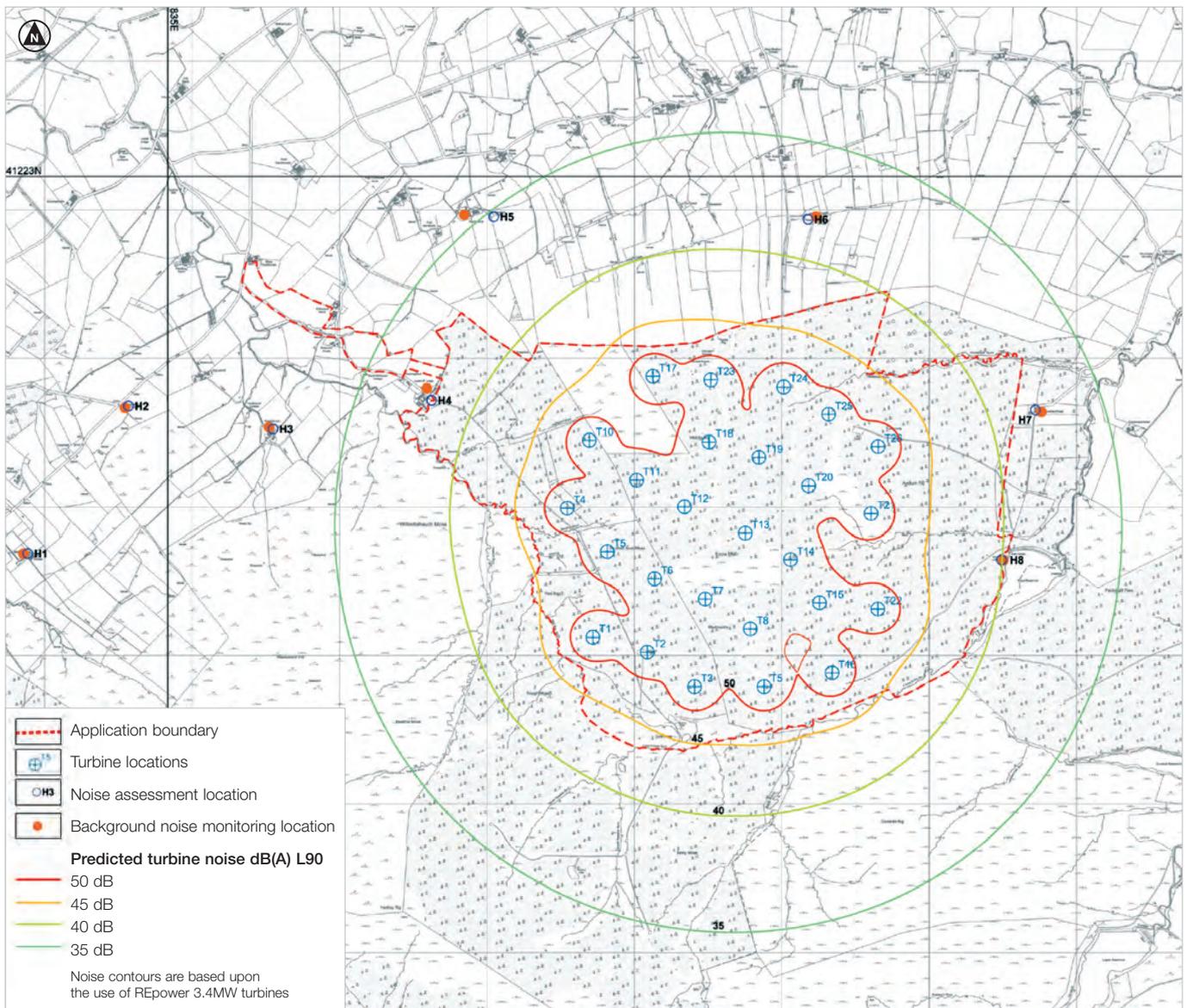
## Operation

The types of wind turbines proposed for the application site are designed for use in quiet rural areas. An assessment of predicted noise levels from the proposed wind turbines has been carried out in accordance with the UK Government's guidance on the Calculation and Assessment of Noise from Wind Farms (ETSU-R-97: The Assessment and Rating of Noise from Wind Farms).

Eight properties around the site were selected in consultation with South Lanarkshire Council Environmental

Health Officers and these have been used to represent properties in the area.

The predicted noise levels at the representative properties are less than the day time and night time specified in the guidance for all of the wind speeds considered. As a result it is not anticipated that there will be any significant disturbance to local residents caused by noise from the Kype Muir turbines. This is also the case when considering the potential cumulative impacts together with Dungavel Wind Farm.



Noise monitoring location plan

# Other potential effects

## **Traffic**

The transport assessment concluded that there will be a short term, insignificant increase in traffic levels during the construction of the proposed development (and during decommissioning) and that the surrounding road network has sufficient capacity to accommodate the temporary increase in traffic.

It is recommended that this is controlled by a Traffic Management Plan agreed with South Lanarkshire Council. The proposed route for abnormal (large) loads has been assessed as being suitable for delivery of turbines subject to a small number of minor improvements. Abnormal loads will be escorted and arrive at times agreed with the police and Transport Scotland.

The small amount of maintenance traffic generated during the operation of the wind farm will not be significant.

## **Aviation**

The impact of the proposed development on aviation interest in the area including Glasgow International Airport, NATS EN-Route Limited and the Ministry of Defence has been assessed. The assessment concluded that the proposed development could have a significant but not insurmountable effect on aviation interest in the area.

Given the open dialogue between Banks Renewables and the affected parties it is hopeful that suitable mitigation measures can be agreed and implemented. Theoretical assessments have shown positive results indicating that such a scheme can be designed and agreed with the affected parties.

## **Geology and ground conditions**

The proposed site layout has been informed by initial geological assessments to ensure that the location of turbines and other site infrastructure will not have a significant effect on the condition of the geology in the area.

## **Surface and groundwater**

The small footprint of the proposed development together with careful management of construction and operation works in line with an Environmental Management Plan and Construction Management Statement mean that the proposed development will not have a significant effect on watercourse, flood risk or ground water including local private water supplies.

## **Peat stability**

Preliminary assessments have established that there is a low peat landslide hazard across the site. In addition, careful siting of turbines, access tracks and other site infrastructure has ensured that areas of deeper peat have been avoided as far as possible. Where this has not been possible, special construction techniques will be employed. The proposed development will therefore not have a significant impact upon peat stability.

## **Woodland removal and future habitat management**

Development of the proposed wind farm at Kype Muir will require the felling of the majority of the existing commercial forestry on the site. Post construction a Habitat Management Plan will be put in place which aims to improve the ecological value and public benefit that can be associated with the site.

The Habitat Management Plan will aim to create a balance between replacement of woodland; protection and enhancement of priority species; and the creation and connectivity of priority habitats. A network of paths, that can be used for a range of recreational purposes will be also be provided utilising the on-site access tracks created for construction of the wind farm.

## **Shadow flicker**

The potential for the blades of the proposed turbines to cause flickering inside properties around the site has been considered and the amount of time it could theoretically occur calculated. The figures that are calculated are worst case as they assume the sun is always shining and that the turbines are facing the property giving the widest shadow range. Furthermore, the predictions do not take into account obstacles such as trees which would reduce impact further.

The turbines can be programmed to switch off during periods when it is theoretically possible that flickering may occur and so there would not be a significant impact. The results of the shadow flicker assessment concluded that no routine mitigation is proposed at this stage in relation to shadow flicker. This will be kept under review during the operation of the wind farm.

## **Television, telecommunications and radar**

It is possible for wind turbine to cause interference to local TV reception and telecommunication links. Liaison with the BBC and telecommunication operators has formed the basis of the assessment of possible impacts. It concluded that there are currently no links within or across the site.

Any impact on TV reception can be overcome by realignment or upgrading of the viewers TV aerial or by installing a new aerial. Banks Renewables will carry out these works if television reception is affected by the proposed development. Mitigating any impact on telecommunication links can also be done by realigning the link or installing a new mast.

### **Carbon balance**

The proposed development will result in carbon savings by displacing fossil fuel generated electricity. The wind farm will save 163,287 tCO<sub>2</sub>e per year. Within 14 months of construction the wind farm is expected to have paid back the carbon that was used in its construction. After this initial period all electricity generated by the wind farm will be carbon neutral.

### **Socio-economic considerations**

The proposed development will have a positive effect on the local economy in terms of providing opportunities for local employment during the construction phase and support for local businesses, including accommodation and services. In the long term, benefits will also be derived from operational and maintenance support work.

A community development fund will be established to provide tangible benefits to the local communities nearest the site. This will enable local initiatives to be funded through the proposed wind farm.

### **Safety**

Wind turbines have an excellent safety record. Experience indicates that properly designed and maintained turbines are a safe technology. There are no records of a member of the public being injured by an operational wind turbine in the UK.

### **Public access**

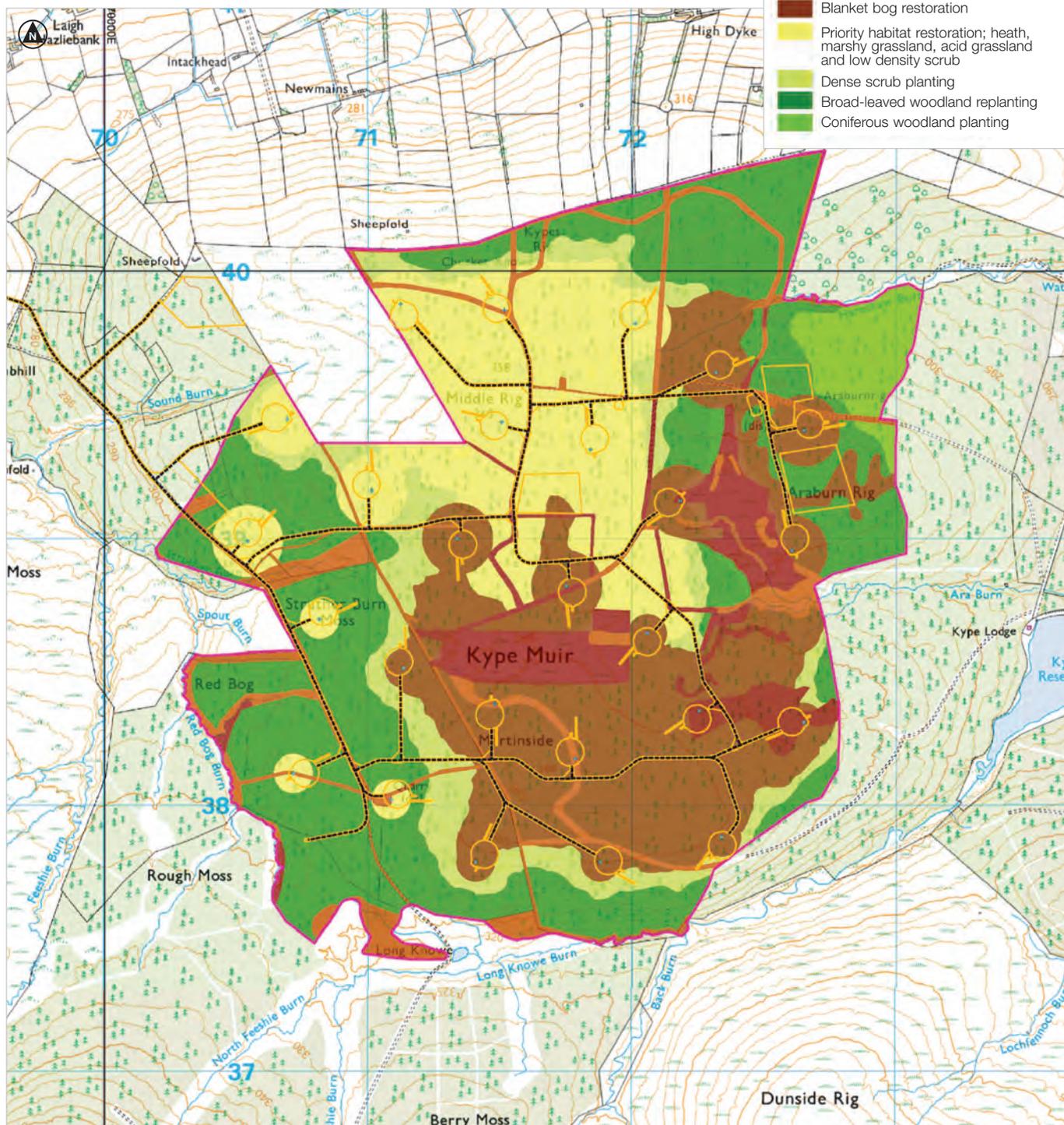
Although there may be some temporary diversions put in place during the construction and decommissioning phases, it is considered that the proposed development will have a positive effect on the public accessibility of Kype Muir. The existing core path will be upgraded and a new network of access tracks throughout the site will create new access opportunities that can be utilised for a range of recreational activities.



100m (to tip) turbines at Tow Law, County Durham

# Habitat management plan

The felling of the existing coniferous forestry on the site offers a significant opportunity to enhance the biodiversity value of the site, while the network of new access tracks throughout the site will create new access opportunities. The habitat management plan seeks to create a balance between replacement woodland planting; protection and enhancement of priority species; and the creation and connectivity of priority habitats.



Proposed habitat management plan

# Conclusions

The proposals for a wind farm at Kype Muir have been subject to an extensive site identification and design process involving consultation with statutory consultees, local interest groups and the local community.

The environmental impact assessment report in the environmental statement, along with a detailed description of the proposal has examined the potential significant environmental effects of the proposal.

The development of commercial scale wind turbines has similar effects wherever they are located because of the inherent nature of the technology and the sites that are suitable for their operation. The detailed design and assessment process has ensured that any adverse effects will be minimised.

Where appropriate, mitigation measures have been proposed to ensure adverse impacts are minimised. However, there are a small number of significant predicted impacts remaining:

- Landscape and visual effects due to the nature of wind turbines. These are localised and limited to a relatively small area surrounding the site.
- Construction noise due to the requirement to construct an access track in close proximity to residential properties. The predicted impact will be short term and once the construction plant is operating at a distance of greater than 100m either side of the property the impact will no longer be significant.

The Kype Muir site is considered to be an optimal location for accommodating a commercially viable wind farm that would contribute to meeting the Scottish Government's 2020 target for renewable energy generation.

# **BANKS**Renewables

development with care

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