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development with care

Middle Muir Wind Farm

Environmental Statement

Non Technical Summary • January 2012

BANKS



Introduction

This non technical summary summarises the environmental statement which accompanies an application to the Scottish Government for consent under Section 36 of the Electricity Act 1989, and deemed planning permission under the Town and Country Planning (Scotland) Act 1997, Section 57 (2) for the construction and operation of a wind farm at Middle Muir.

Under the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2000 (the EIA Regulations), development that is likely to have significant effects on the environment must be subject to an Environmental Impact Assessment (EIA) and an Environmental Statement must be provided with the Section 36 application.

Middle Muir

Banks Renewables is proposing to develop a 19 turbine wind farm at Middle Muir which is located in South Lanarkshire, north west of Crawfordjohn. If approved, the development would utilise the area's natural wind resource to provide renewable energy to the national grid.

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

Banks Renewables

Banks Renewables is part of the Banks Group, which has successfully developed a wide range of projects for over 35 years and employs around 380 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. These are at various stages of the development process ranging from just being identified as suitable sites, to being fully operational.

The Banks Group's success at delivering large projects has largely been attributed to its development with care approach, which is central to the aims and objectives of the business. This ensures that sites are developed in close consultation with the community, as well as carrying out extensive environmental assessments.

This approach ensures that developments have a positive long term effect on the environment and local communities within which they 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 693 hectares, of which only around 8.5 ha (1.2%) will be occupied by the wind turbines and their associated infrastructure, including access tracks.

Number of turbines: 19

Rated output of turbines:

Maximum 4 MW per turbine

Dimensions of turbines:

The turbines will all be the same height with a hub height of around 84m and a maximum height to blade tip of 136m.

Length of access tracks:

Approximately 12km of on-site access tracks. The majority will be required for both the construction and operation of the development.

Life span:

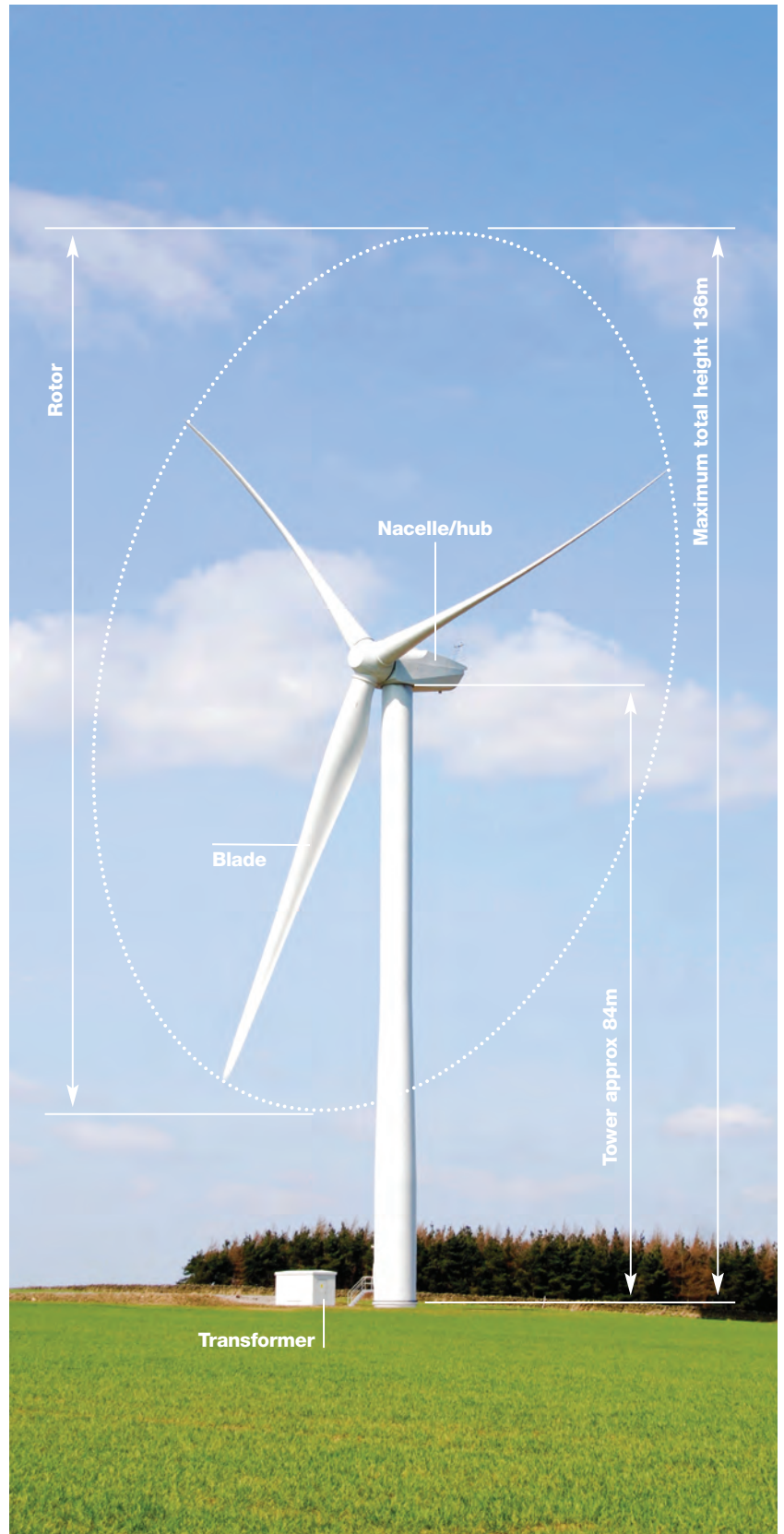
The turbines will be in place for 25 years plus around two years for construction and two years for decommissioning.

Employment:

Around 25 to 50 people will be employed on-site during the construction and decommissioning phases. In addition to this, there will be indirect economic benefits to local businesses. During operation, there will be two people employed for regular servicing and maintenance of the wind farm although it is not thought that these positions would be full-time on this site alone.

Vehicle movements:

A maximum of 68 vehicle movements per day during the construction period are anticipated. The number of daily loads will vary considerably over the construction period.



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 development will contribute significant benefits at both a local and national level. The wind farm will:

- Establish a community benefits package which will be based on £2,500 per installed MW per annum over the life time of the wind farm. The fund will be used to finance projects identified by local communities.
- Reduce greenhouse gas emissions by harnessing power from the wind to generate electricity equivalent to the requirements of approximately 29,000 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 during the construction period. Where possible contracts will be granted to locally based companies supporting the local construction industry.
- Create an opportunity for indirect economic benefits through local sourcing of materials and increased trade from construction workforce.
- Revenue from the Development will be provided to Douglas and Angus Estate and through this reinvested into the local area.

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



Employment and investment through renewable energy



Supporting local communities



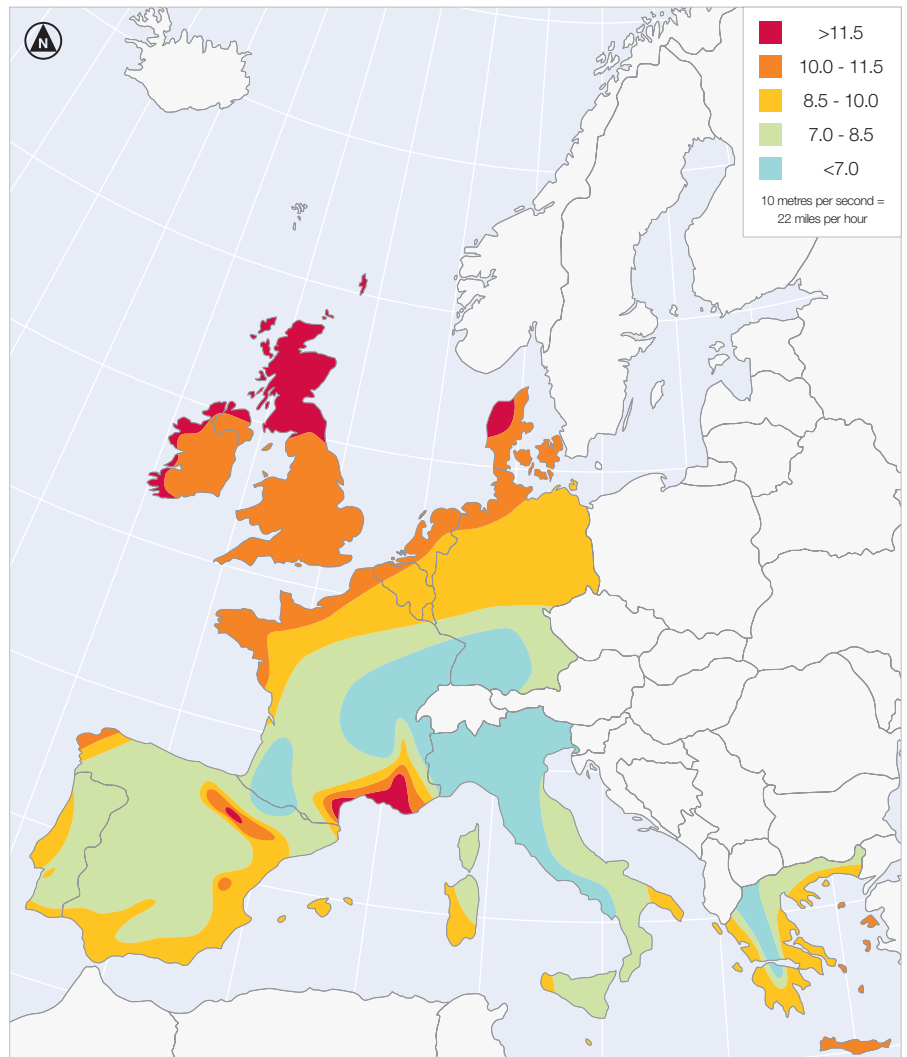
Delivering community benefits

Why wind energy?

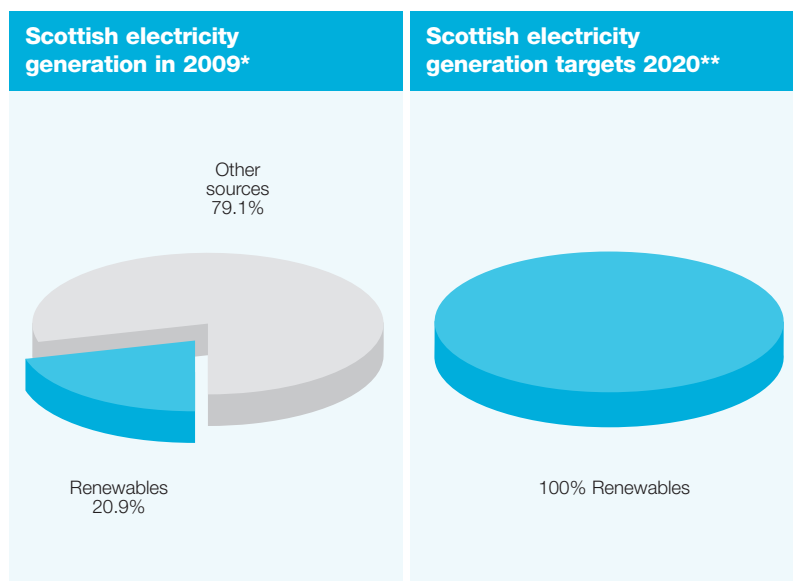
Climate change is a global issue that needs to be addressed. The need to reduce CO₂ (carbon dioxide) emissions is widely accepted due to the increasing changes to our climate and the impact it is already having on wildlife species, ecosystems, the weather and sea levels.

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 has recently increased the target for the amount of Scotland's electricity consumption produced by renewable energy in 2020 to 100%.

Capturing the natural energy of the wind is the most proven form of renewable electricity generation in the UK. It therefore provides the opportunity for the most immediate way of reducing CO₂ emissions from our electricity use and assisting in meeting the international and national targets that have been set. Within around two years it is anticipated the wind farm will have paid back the carbon used. For the remainder of its 25 year operational life all electricity generated by Middle 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.

Middle Muir Wind Farm will provide, on average, enough electricity to meet the domestic needs equivalent to the requirements of approximately 29,000 homes (based on an installed capacity of 76MW).

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 Middle Muir?

Wind farms can only be developed in areas where the wind resource can be converted into sufficient electrical output. Wind monitoring at Middle Muir has proven that there is a sufficient resource at the site.

The Middle Muir site is not subject to any international or national landscape, ecological or cultural heritage designations. The environmental statement has demonstrated that the site has suitable highway access and is a sufficient distance from residential properties to protect residents from noise and shadow flicker effects.

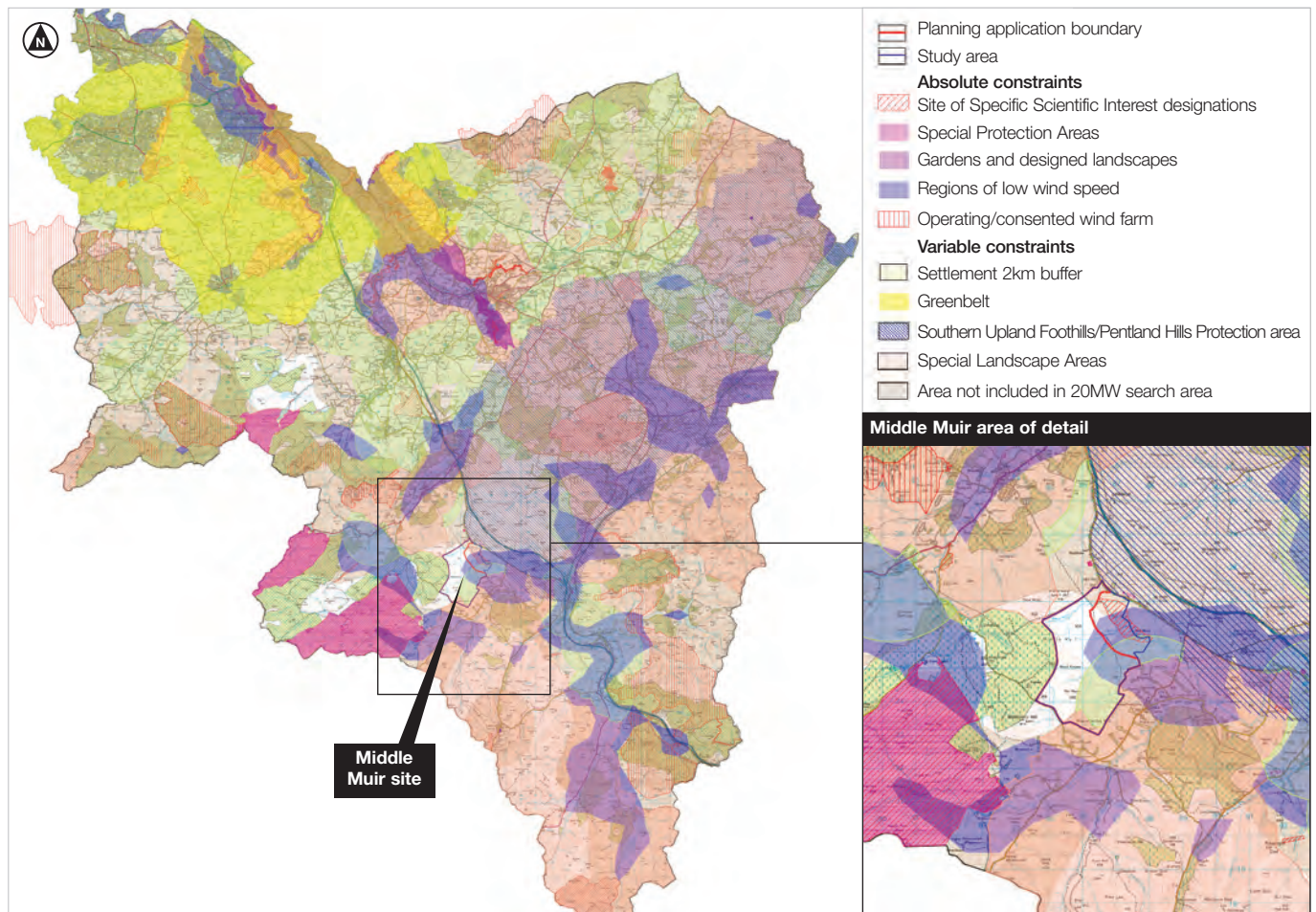
A detailed mapping exercise undertaken by the Developer highlighted that there are few suitable sites for commercial wind energy development in South Lanarkshire. Once the various constraints to development were combined into one map, only three areas within the Local Authority area were identified as being suitable for the proposed scale of the wind farm development.

South Lanarkshire Council has recently published new Supplementary Planning Guidance on Renewable Energy development. The guidance and accompanying Spatial Framework undertook a review of South Lanarkshire's capacity to accommodate wind farms and resulted in the identification of three broad areas of search, which are the preferred areas for wind farm development. Middle Muir is within one of these search areas.

Legislative and policy framework

Although consent for the development is sought through a Section 36 application made under the Electricity Act 1989 it is still appropriate to consider planning policy considerations as part of the application process.

The development has been considered against key national, regional and local planning policies (including supplementary guidance) and it is the Developer's assessment that the proposed wind farm at Middle Muir will comply with planning policy which promotes renewable energy developments where environmental effects can be minimised. Middle Muir is located within one of the Broad Areas of Search identified by South Lanarkshire Council as being preferred for wind farm development.



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

Design changes

Having identified the suitability of the site, the proposed layout has been developed and refined. This process has been informed by feedback from community and stakeholder consultation and the site assessments. It has also taken into account and responded to the site constraints. As a result, the Developer believes that the proposed site layout offers the best option for the development of the site.

When the Middle Muir site was first identified through the mapping process as being suitable for wind farm development, a large study area was identified. This area was then refined taking into consideration various constraints such as Red Moss (a nature conservation site of International and National importance close to the site), proximity to the village of Crawfordjohn and the presence of archaeological features (Auchensaugh Cairn).

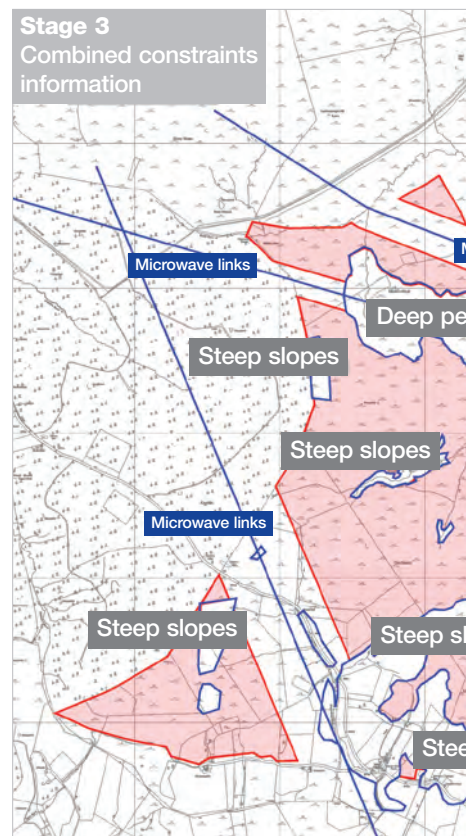
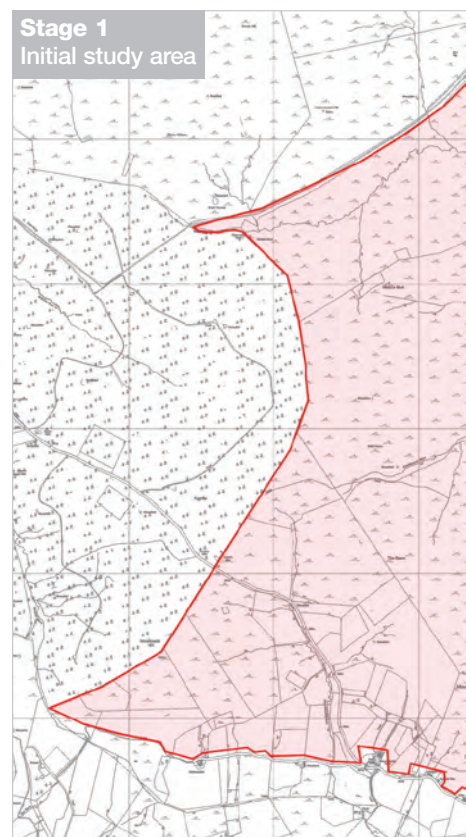
Initially, the study area showed a capacity for up to 24 turbines with an optimum turbine height of between 136m and 140m to blade tip. The final layout comprises 19 turbines with a maximum height to blade tip of 136m. The reduction in the number of turbines proposed was for a number of reasons.

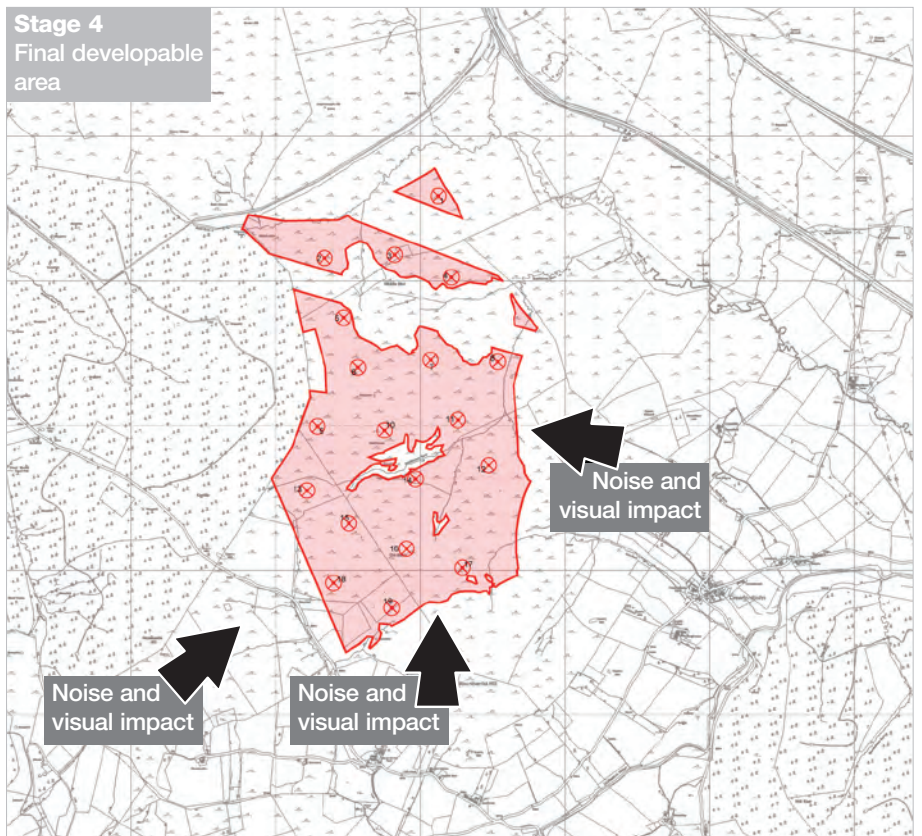
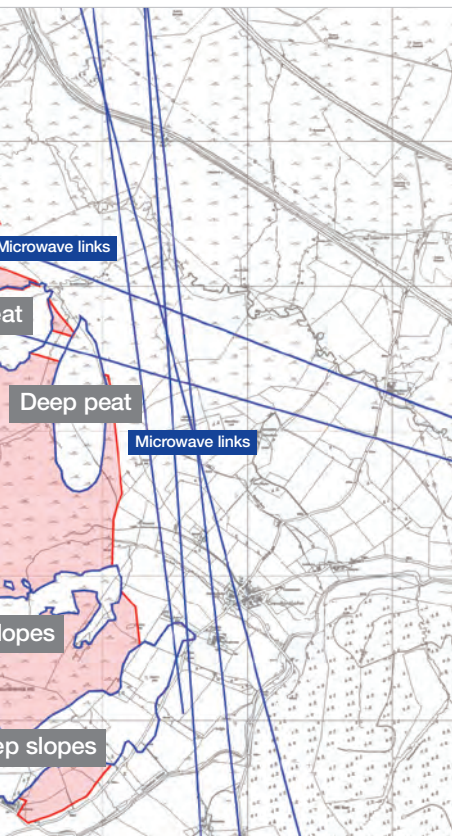
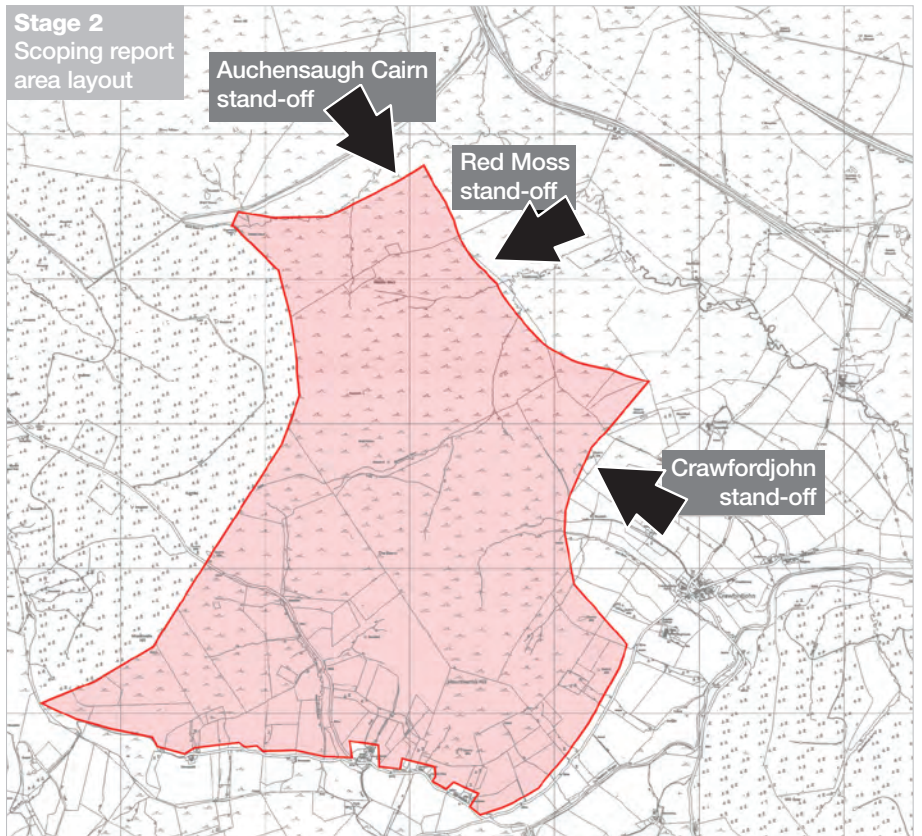
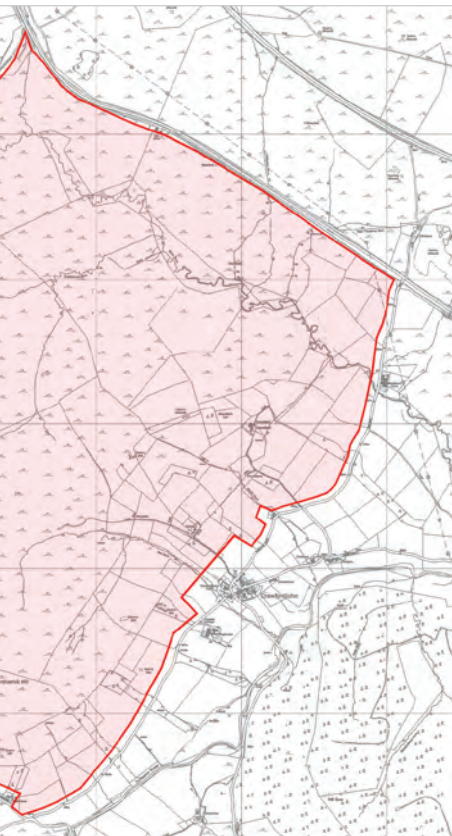
Turbines were removed from areas of deep peat on the site and removed from steeply sloped areas to reduce the risk of peat landslide. Turbines were also re-positioned in order to ensure that noise levels at the nearest residential properties would be within acceptable limits and to ensure that the turbines did not have an impact on microwave links crossing the site. Finally, the position of the turbines was amended in order to make most efficient use of the wind resource.

The design process also involved refining the layout to minimise potential adverse landscape and visual effects on local residents and users of routeways and outdoor spaces especially from nearby key viewpoints, including villages, recreational areas, popular hilltops and transportation routes.

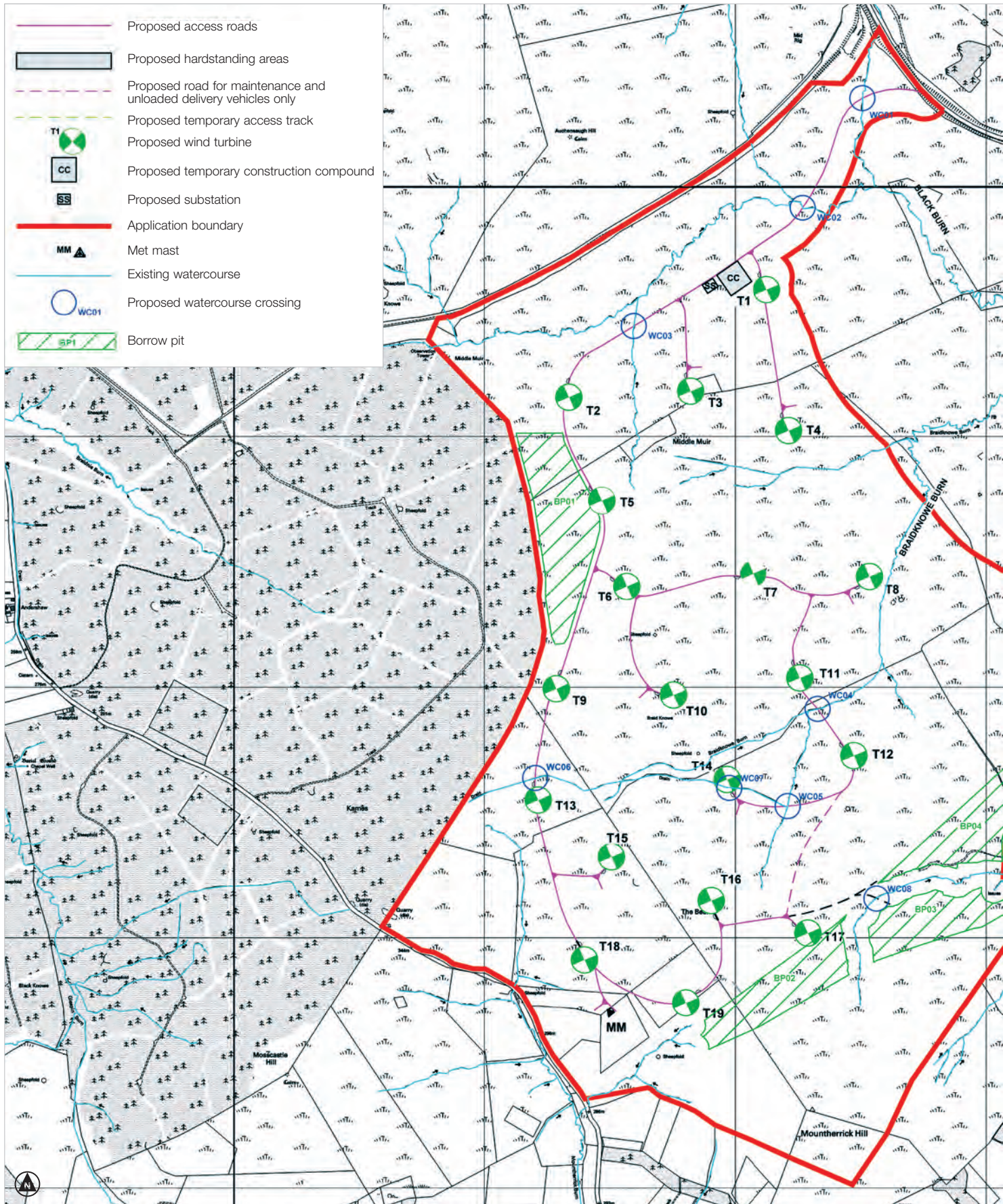
As a result of this process it was decided that another turbine would be removed, leaving a total of 19. It was also decided that the 19 turbines will all be of the same height and specification, maximum height to blade tip of 136m.

In addition to the location of turbines, careful consideration was also given to the layout of other infrastructure needed for both the construction and operation of the wind farm. In particular, care was taken to design the layout so that access roads could be kept to a minimum, and watercourse crossings where needed were designed to minimise the risk of pollution and avoid sensitive parts of the site.



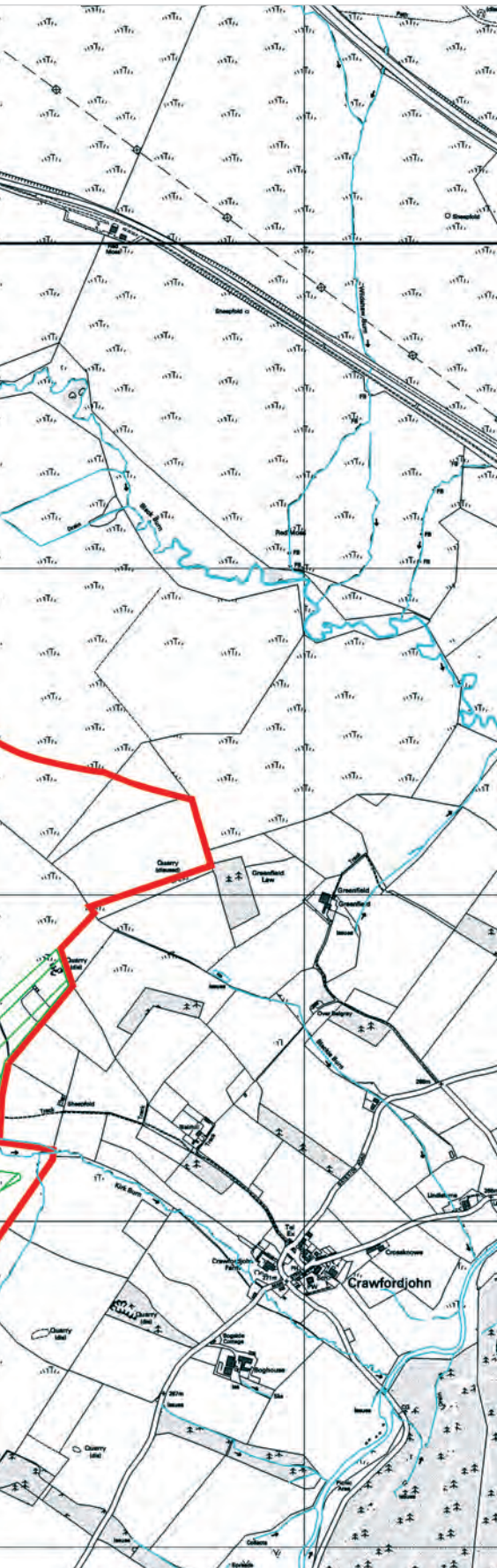


Site layout



Operational site layout plan

Main elements



Turbines

All turbines will all be of the same height and specification, with a hub height of approximately 84m and a maximum height to blade tip of 136m. They will be of modern design with three bladed rotors.

Each wind turbine will begin generating power at wind speeds of around 3 – 4 metres per second (m/s) and would shut down at wind speeds of approximately 25m/s. It is anticipated that they will generate power approximately 70-85% of the time.

Foundations

The turbine foundations are likely to consist of reinforced concrete pads. Disturbance to the ground will be minimised and following construction, surface vegetation will be re-established.

Wind monitoring mast

The wind farm's performance will be remotely monitored using an onsite meteorological (wind monitoring) mast. This will be a tall, slim lattice structure up to 80m in height.

Access tracks

An estimated 12km of gravel track will be required for construction purposes and for servicing the operational turbines. The tracks will typically be five metres wide, widening at bends where appropriate.

Traffic

Traffic travelling to and from the site will use an agreed route, avoiding settlements in proximity to the site. The preferred access route for turbine delivery is via Junction 13 of the M74 at Abington and B7078. Some minor improvements will be required at the roundabout from Junction 13 to ensure large turbine components can be delivered to the site safely.

Compound

A temporary construction compound will be required during the construction phase for the storage of plant and materials, and to provide site workers with welfare facilities.

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 electricity generated by the turbines will be fed into the grid. The electrical output from the development will require to be connected to the grid. It is proposed that the grid connection will be taken to Coalburn, approximately 10km north from the site. If connection is above ground it will be on wooden poles.

Visual assessment

The following pages show what Middle Muir Wind Farm would look like from a selection of viewpoints, which have been agreed with Scottish Natural Heritage and South Lanarkshire Council. They have been produced by professional landscape architects from ASH design + assessment Ltd in accordance with Landscape Institute and other guidelines.

Viewpoint from: **Crawfordjohn**



Viewpoint from: **Glespin**



Further visualisations can be seen in the full planning application, please see the back page for details of where this can be viewed.

A photomontage from Douglas has not been shown as there will be no view of the proposed development from the settlement.



Visual assessment continued

Viewpoint from: **Red Moss**



Viewpoint from: **Tinto Hill**





Visual assessment continued

Viewpoint from: **Brocketsbrae**



Viewpoint from: **B740 at Spango**





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 been identified as having some capacity for wind farm development, and has been included within a Broad Area of Search by South Lanarkshire Council. The site is not within an area designated for its landscape value. The wind farm has been designed to relate well to the local landscape character and respect its scale.

Potential significant visual impacts have been identified for a number of properties and roads in the study area. In the majority of cases, this relates to the introduction of turbines into views where they do not currently exist. However, it is also considered because there are other existing and consented wind farms within the area the scale of this impact would be reduced as Middle Muir wind farm will not be alone.

A pattern of development focussing the largest wind farms in the north and south of South Lanarkshire with smaller developments on the rolling moorland areas between the Clyde tributary valleys has been identified. As such, it is considered that this development, when considered alongside others in the area, would present a logical addition to the current pattern of wind farm development.

It should be remembered that the significant effects of the 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 development is considered acceptable in this location.

Ecology and ornithology

A number of specialist ecological and ornithological surveys have taken place on-site in order to gain a full understanding of the ecology of the site and the sensitivity of species in the area. The site does not have any international or nationally designated areas for nature conservation. Red Moss Special Area of Conservation and site of Special Scientific Interest is located directly east of the site and this has been taken into account in the design iteration and assessment process. North Lowther Uplands Site of Special Scientific Interest (SSSI) and Muirkirk and North Lowther Uplands Special Protection Area (SPA) are within 2km of the site boundary. Both of these sites are considered to be far enough from the site that the development will not affect the interests of the designated sites.

As the site is situated close to these designated areas which are of international importance for nature conservation, detailed information and assessments have been undertaken to ensure that the development will not harm the integrity of these designated areas. These assessments include detailed measures to ensure that there is effective management of potential environmental impacts, both during construction and operation of the wind farm.

The layout of the development 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 watercourses to ensure that turbines and other development are kept outside these areas as far as possible.

The ecological and ornithological assessments concluded that with suitable protective measures, the effect of the development on habitats and species would not be significant.

A Habitat Management Plan (HMP) has been developed for the site. The HMP proposes measures for replanting of native broadleaved woodland, grazing management and drainage and bog management, which would lead to beneficial effects for the site.

Implementation of proposals in the Habitat Management Plan will provide net benefits for the site within 10 years and these can be expected to continue through the 25 year minimum lifespan of the development.

Archaeology and cultural heritage

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

There are no scheduled monuments, listed buildings, conservation areas or known archaeological sites which will be directly affected by the development; however, there is the potential for impacts to the setting of the structures due to the highly visual nature of the turbines.

The development is considered to have an indirect effect on the setting of the Category B listed Parish Church of Crawfordjohn however it will not affect the function of the building as a focus for the local community. In addition, there will be moderate adverse effects to Netherton Cairn (east of the site, 380m NNW of Black Hill summit), Auchensaugh Hill Cairn (approximately 500m east of the site) and Thirstone stone circle (around 400m north of the site).

Noise

The development is located within a rural location where existing background noise levels are relatively low. The predominant noise sources in the area are wind induced noise (wind passing through vegetation and around buildings), distant and local road traffic noise, agricultural noise and birdsong.

Construction

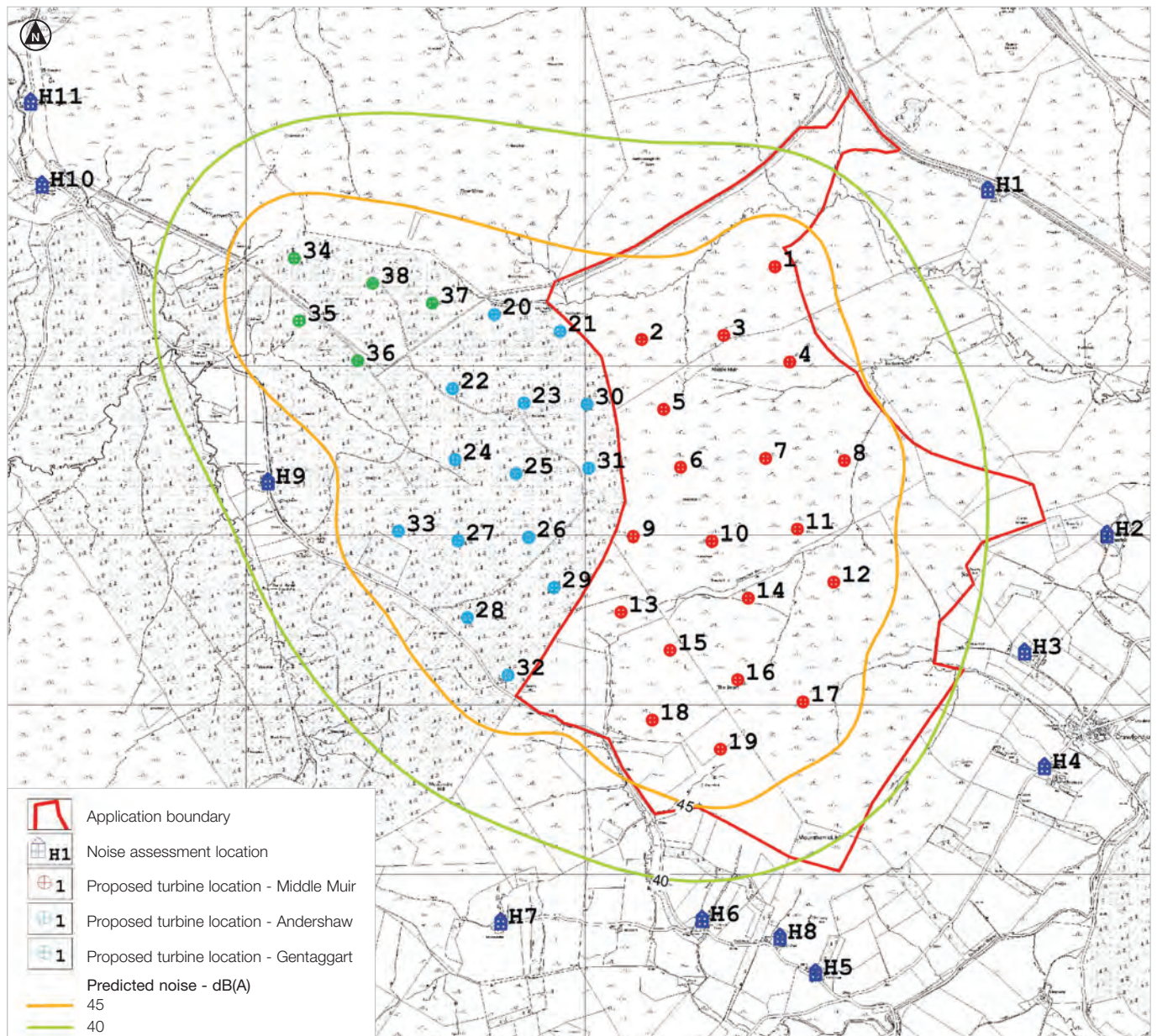
The construction noise assessment

concluded that construction noise levels are below acceptable guidelines and there will be no significant effects.

Operation

Consultation was undertaken with the Environmental Health Department at South Lanarkshire Council in order to agree the approach to the noise assessment and the noise monitoring locations. Nine

properties were identified as locations to measure background noise levels. Predicted operational noise levels and measured background noise levels indicate that for properties neighbouring the development, wind turbine noise will be within noise limits therefore the operational noise impact is deemed not significant. The noise assessment has taken into account other wind farms in the area (Andershaw and Glentaggart)



Noise monitoring and assessment locations

Other considerations

Traffic

The route for traffic to and from the site has been subject to assessment using a worst case scenario which provides a robust assessment to identify areas of constraint. The route avoids settlements in proximity to the site and will run from the M74 Junction 13 to the site via the B7078.

There will be no significant impacts associated with traffic movement. The main temporary traffic impacts would be associated with the increase in vehicle movements along the B7078 during construction of the development. The traffic flows will vary over time as different elements of the site are developed and constructed. Existing traffic on the B7078 may be delayed when the turbine components and abnormal loads are being delivered to site using an escort convoy. It should be noted however that there is a low existing traffic flow on the B7078.

A traffic management plan will be prepared by the contractor once the construction schedule, plant requirements, and the turbines have been defined. This will ensure impacts to the delivery route are minimised where possible.

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

Geology and ground conditions

The 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 development will have some minor, non-significant, short-term impacts on the watercourses, groundwater, raised bog and the Red Moss however these are reversible. No significant hydrological or hydrogeological effects have been identified during this assessment.

Careful management of construction and operation works in line with an environmental management plan and a construction method statement means that the development will result in no significant effects on watercourses or ground water (including private water supplies).

Peat stability

Preliminary assessments have established that there is a low peat landslide hazard risk 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. Careful management during construction will ensure that the development will not have a significant impact upon peat stability.

Aviation

The aviation assessment has considered the potential impacts on the interests of National Air Traffic Services En-Route Ltd (NATS) and the Ministry of Defence (MoD). It has been assessed that the development would be situated beneath a portion of the Scottish Terminal Control Area (TMA). The Scottish TMA is established for the protection of commercial flights into and out of Edinburgh, Glasgow and Prestwick Airports. The development would also be located in areas considered by the MoD to be areas of key, strategic importance for both day and night low flying training.

It has been concluded that although there is potential for significant effect, it is considered that this can be avoided through technical solutions to be agreed with NATS and the MoD. A solution has been identified as part of the consent for a neighbouring wind farm at Andershaw Forest, and it is considered that this could also apply for Middle Muir.

The Developer is continuing to hold discussions with the aviation bodies to reach an agreement.

Eskdalemuir

It is uncertain whether the development might affect Eskdalemuir Seismological Recording Station as it lies on the edge of the 50km safeguarding zone around Eskdalemuir that has been established by the MoD.

However, should it be decided that there is an impact, the Developer is confident that there are technical engineering or design solutions which would be acceptable to manage the impact.

Carbon balance

The development will result in carbon savings by displacing fossil fuel generated electricity. The wind farm is anticipated to save 84,000 tCO₂ per year. Within two years of operation, the development 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.

Telecommunications

It is possible for wind turbines to cause interference to local TV reception, microwave and telecommunication links. Television reception will not be significantly affected but the Developer will agree to carry out mitigation measures as required if any impacts arise.

The 35m offset specified by BT for the microwave link which runs across the development has been adhered to in the final turbine layout.

A Scottish Power overhead cable will require diversion to an underground cable or incorporated into the grid connection works whilst a BT cable adjacent to the new junction will be located and diverted and/or protected prior to the works.

Following mitigation, it is considered that the development would have no significant impact on telecommunications.

Socio-economic conditions

Overall it is expected that the development will have a positive effect on social and economic conditions. The development would constitute a large development in the area and as such provides the opportunity for positive economic investment. Where possible contracts will be granted to locally based companies which will support local construction jobs and training opportunities. Local businesses should also benefit through increased spend by the construction workforce during the construction period.

Enhancements to the Public Rights of Way could result in benefits to its users, dependant on the level of use following modifications. These modifications may include surface improvements, water crossings and regular maintenance of access points.

A community development fund of £2,500 MW per annum will be established to provide tangible benefits to local communities nearest the site. This will enable local initiatives to be funded through the development.

Shadow flicker

Shadow flicker relates to the potential for the blades of the turbines to cause flickering inside properties. No properties were found in the assessment area, and, as such, no significant effects are predicted.

Safety

Wind turbines have an excellent safety record with no recorded evidence of injury to the public. The turbines erected at Middle Muir will be designed and manufactured to meet the international engineering design and manufacturing safety standards.

The risk of ice throw (ice building up on turbine blades and falling to the ground) resulting in damage or injury is considered to be low. The maximum theoretical distance calculated for ice throw at the development is 282m. Appropriate measures are proposed in order to safeguard the safety of operations staff and the public.



100m (to tip) turbines at Hazlehead Wind Farm, Yorkshire

Conclusions

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

Environmental constraints and considerations have been taken into account in the site layout and design process. This has enabled most potentially significant effects to be avoided. Further measures to prevent or reduce any remaining significant environmental effects are described within the Environmental Statement.

Commercial scale wind turbines have similar effects wherever they are located because of the inherent nature of the technology and the type of sites which are suitable for their operation. Mitigation measures have been put forward where appropriate for construction, operational and decommissioning phases to ensure that any adverse effects are minimised.

The Environmental Impact Assessment has demonstrated that the development would have a localised significant impact on the landscape character and visual amenity, as would be expected from this type of development. However, it has also been shown that these impacts will already occur within the area due to existing and consented wind farms, and the development will not make a significant difference.

Some significant residual effects (moderate) have been identified for cultural heritage aspects within the vicinity of the site at the Category B listed Parish Church of Crawfordjohn, on Netherton Cairn (4513) on Auchensaugh Hill cairn (4234) and on Thirstone stone circle (5094).

With mitigation in place, there will be no other significant environmental effects resulting from the development.

The proposed development would represent an important environmental benefit in the generation of electricity from a renewable energy source that will reduce or avoid the use of fossil fuels through the displacement of electricity generated from renewable energy. The proposed development has a carbon payback time of two years, which is substantially shorter time than the 25 year operation period.

The proposed development will also lead to some beneficial effects in relation to its employment creation during construction and positive effects in relation to enhanced Public Rights of Way access during its operation. The communities of Crawfordjohn, Douglas and Glespin are expected to benefit from the community benefits package set up by the Developer that will provide grants for community based projects.



The full planning application, which includes the environmental statement, can be viewed at the following venues:

- South Lanarkshire Council Offices, Montrose House, 154 Montrose Crescent, Hamilton ML3 6LB
- South Lanarkshire Council Offices, South Vennel, Lanark ML11 7JT
- Crawfordjohn Village Hall, Manse Road, Crawfordjohn ML12 6SR

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Charged at local rate from a BT landline. Charges from mobile phones and other providers may vary.

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Alternative number for calls from mobile phones.

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