



Non - Technical Summary  
January 2008

# Earlsburn North Wind Farm



## INTRODUCTION

RDC Scotland Ltd proposes to develop a wind farm at Earlsburn North, in the Gargunnoch Hills, southeast of Kippen, Stirling. The proposal occurs to the immediate north west of the existing Earlsburn wind farm and is to be known as 'Earlsburn North'.

A planning application for the Earlsburn North wind farm has been submitted to Stirling Council for consent under the Town and Country Planning (Scotland) Act 1997. As required by the Environmental Impact Assessment (Scotland) Regulations 1999, this planning application is accompanied by an Environmental Statement (ES).

The planning application seeks consent for the installation of 9 wind turbine generators and associated ancillary equipment. The layout of the wind farm is illustrated in Figure 2.

The total maximum generating capacity will be 22.5MW. Each wind turbine will have an individual capacity to generate electricity up to 2.5MW.

The scope of the ES was agreed with Stirling Council, Scottish Natural Heritage (SNH) and other statutory and non-statutory agencies. The ES contains the environmental information required for the determination of the wind farm application using the following structure:

- Volume 1 - Environmental Statement
- Volume 2 - Technical Appendices
- Volume 3 - Figures

## WIND – CLEAN ENERGY FOR A SUSTAINABLE FUTURE

It is now widely accepted that global warming and climate change are a reality and have the potential to cause

major adverse effects on sea levels, water supply and agriculture in the coming decades.

Within the UK, climate change may have the following impacts:

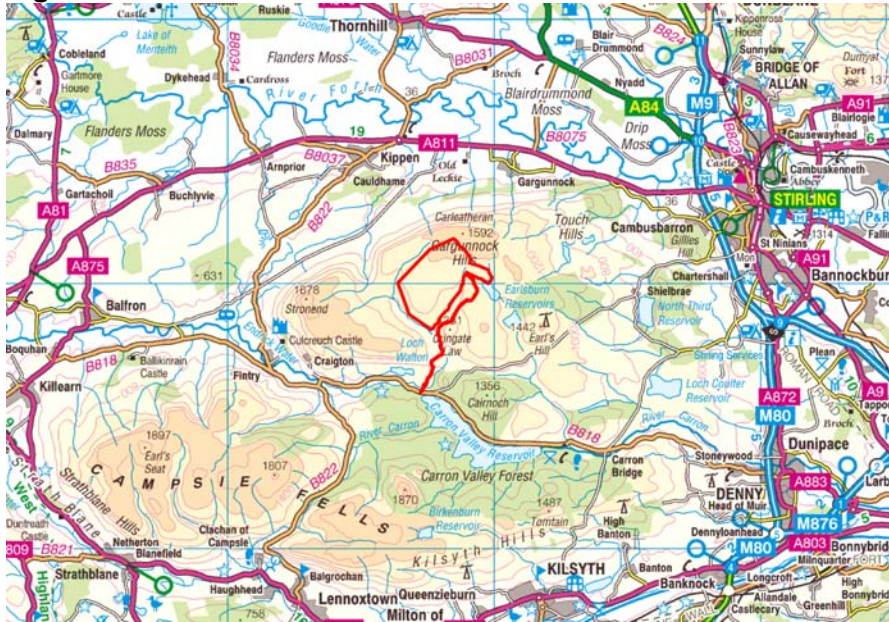
- Extremes in weather, with dry areas becoming drier and wet areas wetter;
- Increased bouts of flooding to communities;
- Increased erosion to coastal land and defences, leading to greater flooding threat to coastal townships and loss of rare habitats;
- Significant alteration of the species composition of about half of the statutory protected areas in the UK within 50 years, due to habitat changes; and
- A decline in populations of wading birds and wildfowl which depend upon estuaries in Northwest Europe, due to rising sea levels.

One of the major causes of global warming is the emission of carbon dioxide from power stations burning fossil fuels (coal, oil, gas) to generate electricity.

In order to combat the threat of global warming, there is a need to obtain clean, diverse and sustainable supplies of energy from renewable sources such as wind.



**Figure 1 – Site Location**



## **WIND ENERGY IN EUROPE**

Within Europe, virtually all member states are seeking to generate electricity from wind energy. Germany, Spain and Denmark lead the way with respective installed capacities of 20,622MW, 11,615MW and 3,136MW.

Whilst the UK, and Scotland in particular, has the biggest wind resource in Europe, statistics show the UK currently lagging significantly behind many of the other EU members in its rate of installing new renewable energy capacity (currently just under 2,300MW).

## **WIND ENERGY IN THE UK – SUSTAINABLE POWER**

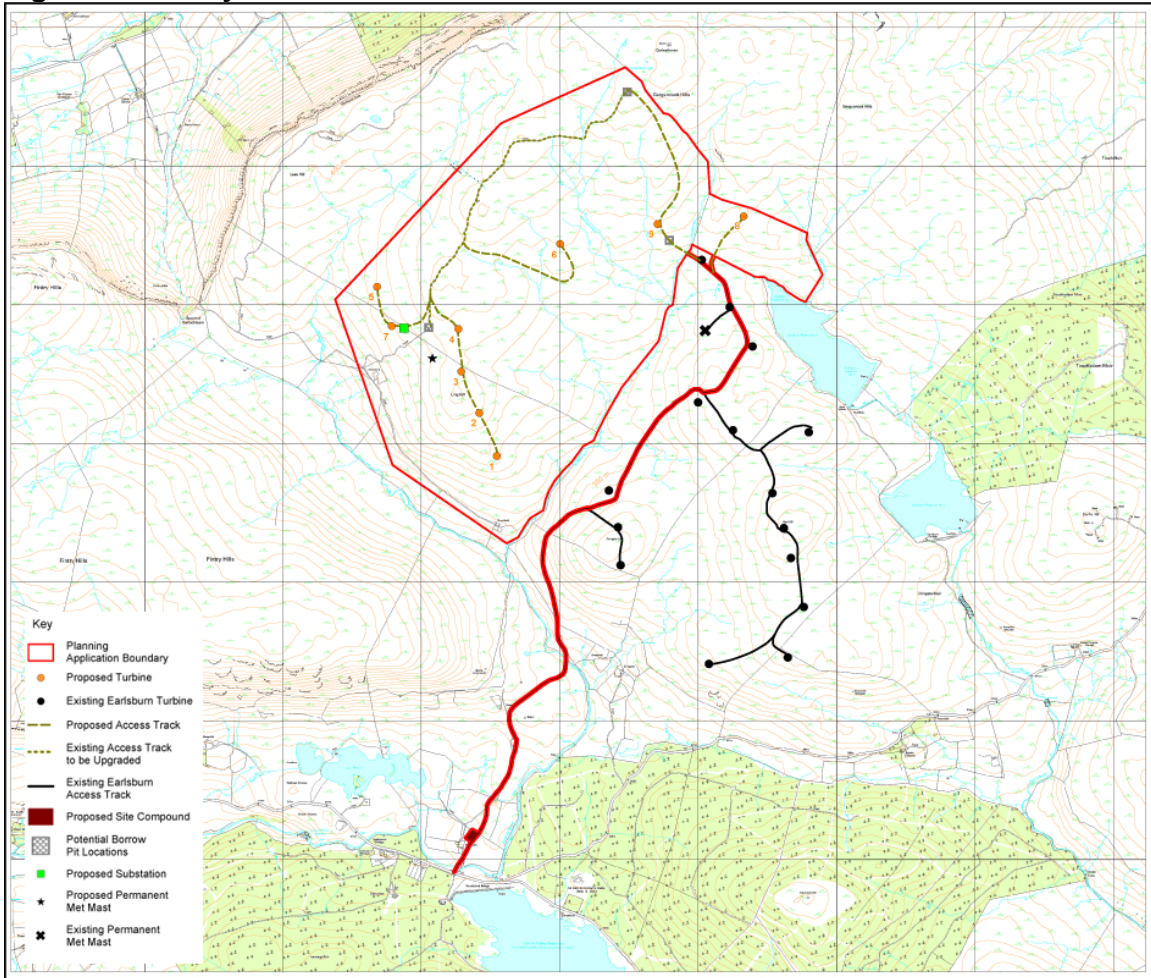
The Scottish Executive, Welsh Assembly and the UK Government are all strongly committed to developing wind power and other renewable technologies.

A market-based support mechanism for renewable energy has been introduced

and this places an obligation on electricity suppliers to buy an increasing proportion of electricity from renewable energy sources. In Scotland, this mechanism is called the Renewables Obligation Scotland and in England and Wales, it is called the Renewables Obligation.

Renewable energy has a key role to play in the UK government's Climate Change Programme. Renewable energy sources generally produce low or negligible levels of pollutants such as carbon dioxide and other 'greenhouse gases' and so by displacing conventional sources of energy, they can help the UK meet its climate change targets.

**Figure 2 Site Layout**



## WIND ENERGY IN SCOTLAND – GOVERNMENT TARGETS

In November 2007 the Scottish Executive set a new target to generate 31% of electricity from renewable sources by 2011 and to generate 50% by 2050.

This target was established after it was announced that Scotland had met its previous objective of generating 18% of electricity from renewable means by 2010. In announcing the new target the Energy Minister Mr Jim Mather stated:

*“Scotland is already a world leader in the energy and engineering sectors and is known for its innovation and talent. Harnessing this talent to generate more*

*renewable energy will give us a vibrant energy sector that makes a significant contribution to Scotland's future prosperity and help build increased, sustainable economic growth”.*



## THE EARLSBURN NORTH WIND FARM

The Earlsburn North site consists of 591ha of rising and falling ridges crossing roughly from north to south in the Gargunnock Hills. The land is used as a grouse moor in the northern and central parts of the site and for sheep grazing in the south.

The components of the wind farm that will be on site for 25 years are:

**Table 1 – Earlsburn North Wind Farm Components**

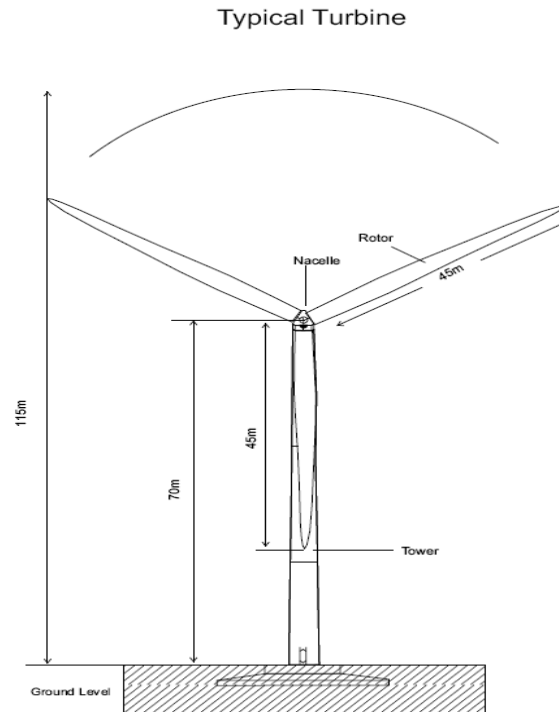
9 wind turbines
5.2km of new tracks
2.3km of upgraded tracks
Crane hard standing next to each turbine
3 borrow pits
Control Building
Underground cables to each turbine
Permanent anemometer mast
Temporary construction compound

Each turbine will be mounted on a tapered tubular steel tower with a nacelle mounted on top of the tower; this contains the gearbox, generator and associated equipment (e.g. transformer) to which are attached a hub and rotor assembly including three glass fibre-reinforced polyester blades.

The maximum height from the turbine base to the top of the blade will be 115m, with a hub height of 70m.

The estimated on site construction period for the wind farm is 9 months. Normal hours of operations for construction purposes will be between 07.00 – 19.00 over a Monday to Friday week.

**Figure 3 Typical Turbine**



The final design for the turbine foundations and the quantities of concrete needed will be determined by the ground and rock conditions at each location. However, it is expected that up to 300m<sup>3</sup> of concrete per turbine base will be required. The foundations would be approximately 15.7m square and up to 3.1m deep, in the form of an 'inverted T' design.



The design of the access route onto and within the site will meet the requirements of the Highway Authority, SNH and Stirling Council with regard to visibility, construction, materials, surface water drainage, gradient and safety of other road users. The main site access will be directly from the B818, as indicated on **Figure 1**.

Electricity generated by the individual turbines will be transmitted along underground cables to the on site control building (Figure 2), from where it will be exported from the site to the Kepculloch substation.

## **WIND FARM CONSTRUCTION AND OPERATION**

The construction period for the proposal is estimated to last approximately 6-9 months and this timescale makes allowances for restrictions during bird breeding seasons, the winter months and the rearing season. The construction phase will consist of the following operations:

- Construction of temporary site office and storage compounds;
- Surveying and setting out of roads, borrow pits and turbine locations;
- Protection of local watercourses and provision of pre-construction temporary works;
- Protection of any archaeological features using temporary fencing to restrict construction access;
- Establishment of spoil storage areas;
- Pre-construction environmental programme and final setting out;
- Extraction of road building material from borrow pits for on site tracks and crane hardstandings;
- Construction of new on-site tracks;
- Construction of culverts under roads to facilitate drainage and maintain existing hydrology;
- Construction of turbine foundations and transformer bases;
- Construction of site substation;
- Excavation of trenches and cable laying;
- Connection of distribution and signal cables;
- Improvements to local road networks and removal and erection of temporary street furniture for the transportation of turbine units, including passing bays on the local road network;
- Transportation and erection of wind turbine units;
- Commissioning of site equipment; and
- Site restoration and landscaping.

## CURRENT POLICY CLIMATE

Global warming and climate change, primarily caused by the burning of fossil fuels, is widely recognised as one of the most serious problems facing the world.

The latest renewable energy planning guidance published by the Scottish Executive, SPP6, commits to supporting a range of renewable generation technologies.

SPP6 recognises that onshore wind power is expected to make the most significant contribution towards meeting national energy targets.

The proposals to generate electricity from wind power at Earlsburn North arises as a direct response to the above UK Government's and Scotland's policies and targets. The benefits of this wind farm are:

**Table 2 – Benefits of Earlsburn North Wind Farm**

Displace over 1,250,000 tonnes of carbon dioxide and other polluting gases over the wind farms expected 25 year existence
Add over £15m to the local economy
Provide enough electricity to power over 12,580 households, the equivalent to over 33% of the households in the Scottish Borders Council area
Assist in the delivery of Scotland's climate change commitments and sustainable development strategy
Make a significant contribution towards the Scottish target of generating 31% of its electricity from renewable sources by 2011 and generating 50% by 2050.

## SOCIO-ECONOMICS

The total cost of the wind farm is expected to be around £27.5m and

would lead to significant investment in the Stirling area.

It is estimated that local companies will be able to bid for about £4.5 million worth of construction contracts. Additional indirect expenditure in local shops, service stations and accommodation is also expected.

During the construction phase there will be an average of 6 to 8 workers on site per day and one person will be employed as site security staff.

Throughout the 25-year lifetime of the wind farm, the establishment of a local service team will be promoted, depending on the wind turbine manufacturer's requirements. This would create 1 or 2 full time jobs.

The establishment of a community benefit fund and the provision of a community turbine will help fund a range of community projects throughout the local area. The revenue benefit of the proposal to the local community is likely to rise from about £50,000 to between £400,000 and £500,000 over the lifetime of the wind farm.

Public consultation is an integral part of the EIA process and helps to ensure that local views and priorities are incorporated at all stages of a proposals development.

During the development process a number of meetings were held with representatives of the local Community Councils of Gargunnoch, Carron Valley, Fintry, Kippen, Cambusbarron and Denny & District to explain the basis of the proposed community benefit package and specifically the community turbine and to understand their view on the potential wind farm development.

## ENVIRONMENTAL EFFECTS

### NATURE CONSERVATION

A total of seven Phase 1 habitat types were recorded within the study area. The most common were blanket bog, dry heath and semi-improved acid grassland. Several of the habitat types were considered to be of regional value.

None of the study area lies within a statutory designated site. However a number of watercourses within the study area drain into the Burnfoot and Backside Burns, which are tributaries of the downstream Endrick Water SAC. Due to the potential for indirect impacts on the downstream SAC the tributaries draining the site are considered to be of international value.



The primary reason for site selection of the SAC are lamprey (river and brook) and the qualifying interest is Atlantic salmon, which are both considered to be of international value. However the Endrick Water SAC designation ends at a waterfall some distance downstream of the study area. This feature acts an obstruction to any upstream migration of these species from the SAC into the study area. Therefore no direct impacts are predicted on primary or qualifying features of the Endrick Water SAC.

Desk and field studies identified the presence of otter signs on the Burnfoot Burn within the study area, no holts or resting places were found. Water shrew activity was identified by the Earlsburn 2 Reservoir outwith the study area.

Ecological constraints were taken into account in the wind farm design, and mitigation measures are proposed to avoid or minimise impacts. Best practice methods will be followed to ensure that any minor ecological impacts during the construction, operation or decommissioning phases of the proposed wind farm development are offset.

### HYDROLOGY

The majority of the southwest section of the Earlsburn North development site drains, via Burnfoot Burn, south in to Endrick Water SAC and SSSI, with the Northeast section of the site drained by the Earl's catchment.

Water from the Endrick Water is transferred into Carron Valley Reservoir, which is used for drinking water. Earlsburn Reservoir No 1 and No 2, immediately to the east of the site, are used for recreational fishing and to supply compensation flows into the River Carron.

The impacts and mitigation measures for hydrology, hydrogeology and soils can be summarised as falling into three main areas:

- Flow Alteration – install adequate drainage and maintenance programmes to minimise alterations to flow paths and runoff rates that could lead to channel erosion and downstream flood risk;

- Sediment discharges – implement buffer zones to minimise impacts to watercourses and water supplies from turbines, access tracks and borrow pits, undertake water monitoring and ensure that any culverts or bridging of watercourses are of sufficient size and spacing with appropriate erosion mitigation measures; and
- Contaminant discharges – follow pollution prevention guidance (PPGs), refuel and store oils and fuels in designated areas only, ensure vehicles are regularly cleaned and maintained to keep contaminant potential to a minimum, and implement an accident management plan.

The Earlsburn North wind farm has the potential to impact the water environment. However, providing the proposed mitigation measures above are adopted, the residual impacts relating to the construction, operation and decommissioning phases are considered to be minor.

## **ORNITHOLOGY**

Bird surveys completed between October 2006 and September 2007 indicate the presence of some important bird species.

Eight sensitive raptor species were observed on or over the site; red kite, osprey, hen harrier, merlin, peregrine, goshawk, honey and short-eared owl were considered breeding but no nest sites were identified.

Significant impacts on two raptors (red kite and osprey) are predicted. Red kite appear to occur more frequently when weather conditions are good, which may suggest that birds are more likely to avoid the turbines and are therefore less susceptible to collision. If red kite are

displaced from the immediate area around the turbines, the potential collision risk could be significantly reduced. A similar situation exists in the case of ospreys.

There are two sensitive species identified as breeding in the development area. The short-eared owl is considered at risk of slight adverse displacement impacts from the proposed development. Curlew was the only wader species considered sensitive to the development, and would be susceptible during the breeding season to a temporary displacement. After construction it is probable curlew levels will return to pre-construction levels

Black grouse could potentially be affected by slight adverse impacts during construction and operation of the wind farm, specifically during the spring lekking period. If operations are minimised or restricted in the areas closest to the leks this impact can be minimised.

## **LANDSCAPE AND VISUAL IMPACT ASSESSMENT (LVIA)**

The landscape assessment found that the proposal would not detract from or give rise to any significant effects within the 35km study area, or to any area designated for special protection due to their inherent landscape qualities i.e. The Loch Lomond and the Trossachs National Park, National Scenic Areas, Areas of Great Landscape Value and Historic Gardens and Designed Landscapes. Figure 3 shows the blade tip visibility of the Earlsburn North wind farm within a 35km radius of the site.

The turbines would be predominantly visible in the context of and seen in combination with the existing Earlsburn turbines, and may be perceived to be an extension to and part of the existing Earlsburn wind farm. By locating the

turbines in such close proximity to, and following a similar pattern, layout, height and type of turbine as the existing Earlsburn wind farm, the effects of the proposed development are reduced and mitigated on the landscape and visual resource.

Landscape resources will be affected most significantly near to the site (within 5km). Beyond this distance, there are likely to be only moderate or minor impacts on landscape character as a result of the inter-visibility between landscape character areas and the development site. The only potentially significant impacts on landscape resource are the footpath west and south of the site and Sir John De Graham's Castle (both within 3km of site).

The following page illustrates the predicted views of the wind farm from:

- Stirling Castle
- B822 on Campsie Muir

## **CULTURAL HERITAGE**

Eight sites of cultural heritage interest were identified within the proposed development area, using a range of desk-based sources, consultations and field study.

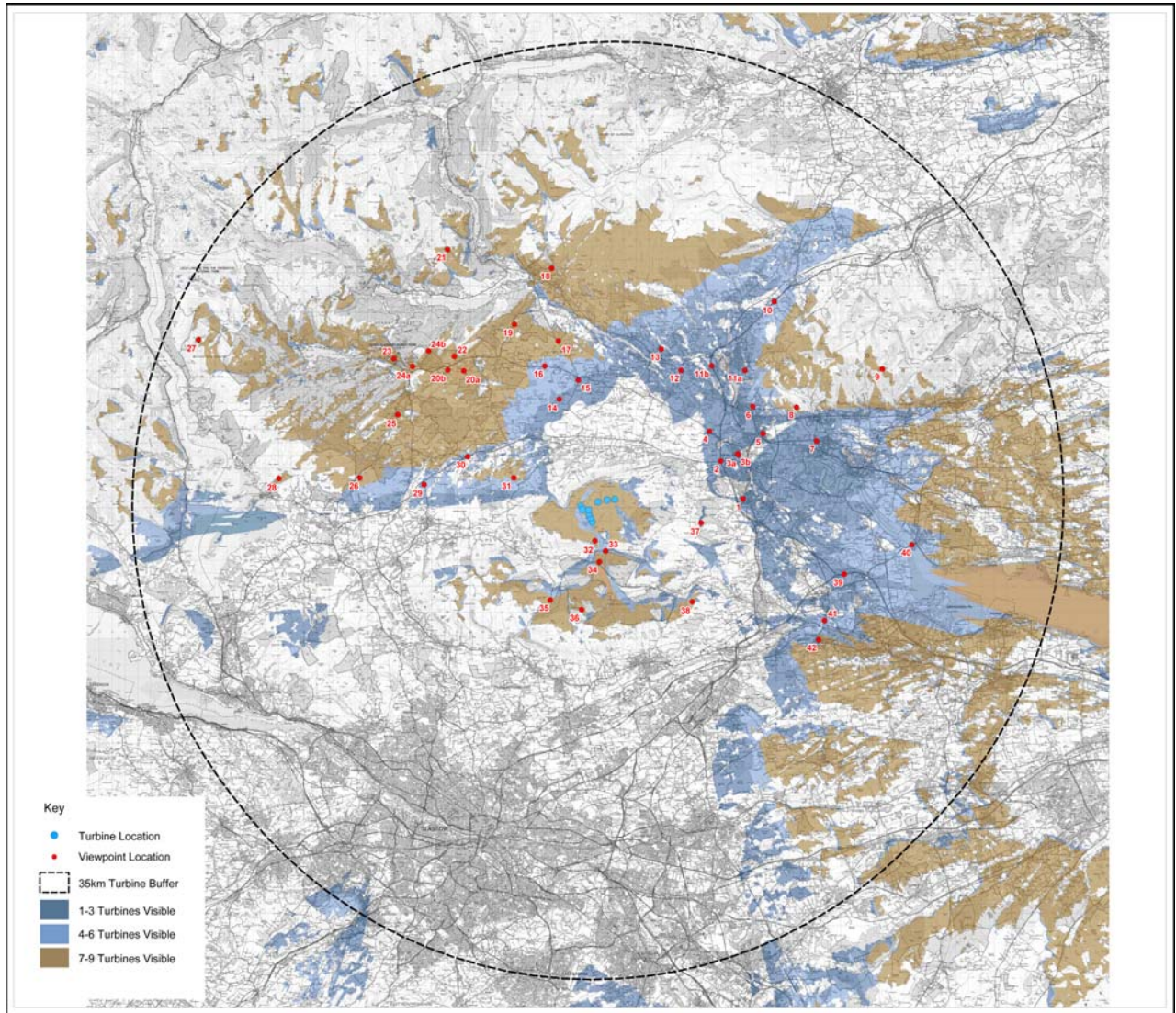
The identified sites are all considered to be of local or lesser importance and no

significant effects are predicted on any of the sites. These include two farmsteads, a small building, three groups of stone piles, a linear bank, a stone grouse butt and a possible shieling. The possibility that additional, buried and unrecorded remains of archaeological significance survive across the application area is considered to be low.

Mitigation measures have been proposed to offset the predicted possible direct effects through an appropriate mitigation strategy to be agreed with the Stirling Council Archaeologist in advance of construction.

Scheduled Ancient Monuments (SAMs) in the wider landscape are predicted to receive a potentially adverse indirect visual effect on their settings from the proposed wind farm. None of these adverse effects is considered to be significant. Twelve other SAMs, two category A and six category B listed buildings, and one Conservation Area in the wider landscape are predicted to receive an indirect visual effect on their settings that are considered to be neutral and not significant.

Figure 3 ZTV with Viewpoint Locations



Predicted View



**Viewpoint Data**  
 Grid Reference: E278900, N694200  
 Elevation: 67m AOD

**Wireframe / Photograph**  
 Height above ground: 2m  
 Camera & Lens: Digital SLR with 50mm Lens equivalent  
 Horizontal View Angle: 60 Degrees per A3 sheet  
 Viewing Distance: 600mm  
 Number of Frames: 1.22 Frames per A3 sheet

**Proposed Turbine Information**  
 Hub Height: 70m  
 Blade Tip Height: 115m

**Predicted Turbine Visibility**  
 Number of Turbine Hubs Visible: 2  
 Number of Turbine Tips Visible: 0  
 Nearest Turbine: 10213m



Predicted View

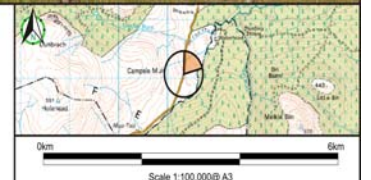


**Viewpoint Data**  
 Grid Reference: E264330, N683060  
 Elevation: 302m AOD

**Wireframe / Photograph**  
 Height above ground: 2m  
 Camera & Lens: Digital SLR with 50mm Lens equivalent  
 Horizontal View Angle: 60 Degrees per A3 sheet  
 Viewing Distance: 500mm  
 Number of Frames: 1.22 Frames per A3 sheet

**Proposed Turbine Information**  
 Hub Height: 70m  
 Blade Tip Height: 115m

**Predicted Turbine Visibility**  
 Number of Turbine Hubs Visible: 0  
 Number of Turbine Tips Visible: 0  
 Nearest Turbine: 6673m



## **NOISE**

The noise assessment considered the scenario of both the operational Earlsburn Wind Farm and the proposed nine turbine extension, operating simultaneously under normal circumstances.

The current practice on controlling wind farm noise is by the application of noise limits and these have been defined by the planning condition for the existing Earlsburn Wind Farm.

The same noise sensitive receptors (Cairnoch Lodge and Earlsburn Cottage) identified for the original 15 Earlsburn turbines were used. This approach was agreed with the Environmental Health Department of Stirling Council.

The noise assessment found that the cumulative noise impact from the operational wind farm at Earlsburn and the proposed extension would not exceed any of the target criteria defined in the planning condition, issued by Stirling Council.

Predicted levels from the operation of the existing 15 and proposed nine turbines at both noise receptors are below the planning limits during both the day and night-time periods, ensuring an acceptable level of protection to the amenity of local residents.

As a result, it is not anticipated that there will be any significant disturbance from noise at properties within the vicinity of the proposed extension. The assessment has also shown that noise levels at properties located further away from the wind farm will not be affected once the wind farm is operational.

## **INTERFERENCE WITH TELEVISION, RADIO AND MICROWAVE PATHS**

Organisations with an interest in telecommunications, television, aviation safety, defence and infrastructure in the vicinity of the site were consulted to ascertain potential interference from the proposed wind farm.

It was established that the proposed wind farm will not interfere with any EMI links and is not expected to interfere with aviation interests. There is no predicted impact on local television reception, nor any infrastructure.

As there are no properties within 800 metres of the proposed Earlsburn North turbines, there is no predicted shadow flicker.

## **PUBLIC SAFETY**

There is no recorded incident of a member of the public being injured by a wind turbine. The government has deemed wind energy as a 'safe' technology, requiring no special safety provisions. Experience has shown that livestock are undisturbed by the movement of the blades and will graze underneath them as well as using the towers for shelter in bad weather.

The proposed wind turbines are designed and manufactured to withstand weather conditions at least as extreme as those which arise in the United Kingdom, in terms of wind speed, turbulence and temperature. The wind turbines are equipped with safety systems, which will automatically shut down the machine on the occurrence of such events as loss of electrical connection or excessive blade speed. Shadow flicker effects will not occur as a result of the turbines given there are no properties within 900m of the proposed turbines.

## CONCLUSION

The Earlsburn North Wind Farm will contribute to national renewable energy targets by providing enough electricity to supply up to 12,580 homes with electricity.

It is anticipated that over the wind farms operational life of 25 years, up to 1,289,000 tonnes of carbon dioxide and other harmful gases that would otherwise have been produced by traditional fossil fuel burning plants will be displaced by electricity generated by the Earlsburn North Wind Farm.

The Scottish Executive is committed to generating 31% of Scotland's electricity from renewable sources by 2011 and 50% by 2020. The Earlsburn North Wind Farm will make a significant contribution on behalf of Stirling Council to achieving this target.

Earlsburn North will contribute to the local economy with opportunities for local contractors during the construction phase and through the use of local services both prior to, during and after construction of the site.

The establishment of a community benefit fund and the provision of a community turbine will help fund a range of community projects throughout the local area.

The proposal is in compliance with national and local planning guidance for renewable energy:

- No statutory environmental designations on site;
- The landscape and visual assessment found that the impact of the Earlsburn North proposal is not significant. The new turbines would be viewed as an extension to or part of the existing Earlsburn site which

is a key characteristic of the local landscape.

- Turbine noise is within planning limits;
- Ecological effects are not expected to be significant;
- No significant hydrological impacts following implementation of best practice guidelines;
- The impact on the cultural heritage resource is low;

The environmental assessment undertaken on the site of the potential Earlsburn North wind farm, has concluded that the proposal is acceptable in both planning and environmental terms and will help promote the objectives for sustainable development in the Stirling area.



## Further Information

Hard copies of the Non-Technical Summary are available free of charge on request while stocks last. The NTS can also be downloaded from [www.westcoastenergy.co.uk](http://www.westcoastenergy.co.uk).

Copies of the full application documentation can be purchased for £150 and CD copies of the ES will be charged at £20.

If you would like any further information on the Earlsburn North Wind Farm please contact:

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