INSTALLATION OF WIND PUMP AT RSPB OLD MOOR

3. Description of the Proposal

Please describe the proposed development, including any change of use:

Summary

- RSPB Old Moor is managed as a nature reserve and has a complex series of wetland habitats, each with the option to control water levels independently through the use of pipes and sluices.
- The site also acts as an Environment Agency (EA) Active Washland, providing flood alleviation to the surrounding area.
- Water can be brought onto the site from the River Dearne under an existing extraction licence. This is either via a gravity feed or via an electric pump.
- We wish to install a 7m high wind pump to replace the electric pump as the method by which we bring water on to the site.
- This will bring a number of benefits to the site in terms of efficiency, cost effectiveness, carbon savings, maintenance and management of the site.
- It will not involve changes to the operation of the washland or the extraction licence.
- The pump will be close to a footpath and on a well visited visitor site (nearly 100,000 visitors).
- However, it will be placed halfway down the flood bank and will be well screened by trees and bushes so that the visual impact on the landscape will be minimal.
- The proposals do not involve a change of use.

Summary of Benefits

- Environmentally friendly power supply – saving at least 1,400kg in carbon emissions per year.
- Cost effective means of generation – zero cost (saving at least 2,500 units of electricity per year).
- Far easier and cheaper to maintain and service.
- More suited to the style of management we need to manage the reserve – a smaller, more constant flow when compared to an electric pump which suits short bursts of greater volume.

Proposed Development

The Royal Society for the Protection of Birds (RSPB) would like to install a 7 metre high mast with turbine to power a wind pump, designed to move water from the River Dearne into a storage reservoir at RSPB Old Moor Nature Reserve (see figures 1 to 3).

Water can be brought onto site from the River Dearne under an Environment Agency (EA) extraction licence (No. 2/27/08/119) either by gravity feed or electric pump and is returned to the River Dearne via an environment agency pump at the other end of the reserve. Both can be turned on or off / opened or closed, as required.

The RSPB would like to replace an existing electric pump with a wind powered pump. This would be far more cost effective and environmentally friendly. A wind pump will also allow us to manage water levels in a more appropriate and sensitive manner.

The site is low lying with higher ground in the South Western corner where the Visitor Centre and other buildings are located. The site is embanked on all sides. It is an operational washland and a reinforced spillway at 20.07m AOD on the Eastern edge of the site allows water to flow into the site from the River Dearne during flood. There are four flap valve pipe inverts that help to drain the site after a flood incident. Water above 17.6m AOD can exit the site into Knollbeck via a 120cm pipe fitted with a flap valve. Three additional flap valves to the River Dearne activate at 18.5m AOD.

Other than the Spillway, Old Moor is isolated from inputs, and in order to manage it as a wetland habitat, water can be abstracted under licence from the River Dearne. This can be done either through gravity feed when river levels are higher than 18.5m AOD, or by pump. The gravity feed drops water directly into the reedbeds where it can then be distributed around the site. If levels in the river are low, water can be pumped from the River Dearne in to the reservoir. A head of 20m AOD is required within the reservoir before water can be moved from here, around site.

The outfall is located at the eastern most point of the site. A drop board sluice manages the main outfall, thus giving overall control of water levels on site (up to 17.3m AOD). The Old Moor pumping station returns water to the River Dearne. It is an EA Mercury switch, which becomes operational at 16.8m AOD and turns off at 16.4m AOD.

Structure Elevations		
Old Moor Spillway	20.07m AOD	
Gravity Feed	18.5m AOD	
Pipe Inverts to R. Dearne	18.5m AOD	
Pipe Invert to Knoll Beck	17.48 m AOD	
EA Pump Activation	16.8m AOD	
EA Pump Switch Off	16.4m AOD	AOD = Above Ordnance Datum)

The extraction licence allows up to 1.1 million m^3 of water to be extracted every year and for the site to still operate as an active Washland.

The proposed wind pump at Old Moor would simply switch the means of pumping water onto site from an electric powered pump to a wind turbine powered pump. Existing extraction levels would not be exceeded (see flood risk assessment).

Using the electric pump costs us several hundred pounds per year and more importantly, its high carbon footprint is something that the RSPB is keen to reduce. As a charity at the forefront of environmental issues, we have set a target of reducing the RSPB's carbon footprint by 3% per head per year and each reserve is set similar targets accordingly.

Old Moor already uses a wood fuel boiler, recycles rain water and generates electricity for the Visitor Centre through solar power and a wind turbine. Using the Wind Pump will save at least 2,500 units of electricity and more importantly, save a minimum of 1,400 kg in CO_2 emissions every year.

On top of this, our current pump is now reaching a stage where it is becoming increasingly unreliable and hard to maintain. It recently spent several months out of action, requiring costly repairs. And, due to the fact that the pump is sunk into the ground, even routine maintenance requires the whole system to be raised out of the ground on a complex pulley system. A simple wind pump will allow easy and cost efficient maintenance and repairs.

Management of the site in the Spring and Summer is a sensitive thing. Whilst we want to move water across the site, we need to do it in such a way that water levels don't rise to the detriment of nesting birds. A wind pump, which can achieve a small but constant flow is better than a higher capacity pump which has to be constantly checked to ensure that levels are not rising too quickly so as to flood any nests.

In addition, the RSPB recently worked with the Environment Agency and Rivers Trust to introduce 50,000 elvers into the Old Moor system in 2010. Eeels have undergone a 95% decline in the UK and

this is an important project for local biodiversity. The eels will stay in Old Moor for several years before leaving for the River Dearne, then Don, The North Sea, Atlantic Ocean and on to the Sargasso Sea. Eel passes have been built by the Environment Agency on the Rivers Dearne and Don and also at Old Moor. However, because Old Moor is a closed system (i.e not directly connected to the River Dearne), the water pass here will need a constant, if small, flow of water at the right time of year to enable the eels to pass across it. We again, feel that a wind pump will be better suited to providing these conditions, when compared to an electric pump.

Technical Details and Plans

Current Extraction Licence

Licence number	2/27/08/119
Period of abstraction:	Year Round
Extraction rate:	360 cubic meters per hour (At an instantaneous rate not exceeding 100 litres/second)
	3024 cubic meters per day
	1,103,760 cubic meters per year

Water Abstraction licence address:
RSPB Dearne Valley, c/o Warden, Old Moor Lane, Wombwell, South Yorkshire S73 0YF

Current Water pump type

Pump Type	Electric. Loff FLYGT submersible pump - model CP 3127
Pump capacity	360 cubic metres per hour
Electricity Demand:	15 units per hour
Carbon Footprint:	8 kg of CO_2 per hour

Proposed Wind Pump
We have funding from Natural England and Scottish Power's renewable energy fund to install a Boasman modular wind pump. The pump consists of a modular concrete sump unit and a mast with rotary turbine. The sump is sunk into the ground and the turbine mast sits on top to a height of 7.36m.

Pump Type	Bosman 7m Modular Wind Pump
Windmill Module	Height 7.36m, Weight 510 kg
Concrete Module	Height 2530mm, Weight 4400 kg (this is the sump unit sunk into the ground)
Pump capacity	Variable with wind speed – above 4m per second
Electricity Demand:	0 units per hour
Cost per hour:	£0
Carbon footprint:	0kg

The wind pump would be installed by Aquatic Control Engineering (ACE), a specialist company with a history of similar projects on RSPB and other nature conservation sites. Full diagrammatical details of the pump are shown in Figure 4.

The pump will be installed on the flood bank at OS grid reference SE 42650285, half way up on the reservoir side. An inlet pipe will run from the river to the sump and the turbine will then lift the water up and into the reservoir. The sump is a one way system so water will not be able to run back from the reservoir to the river. The pump can be turned off so that no water is pumped at all.

The inlet pipe will need to be laid into the flood bank, via a trench, to a depth of 3 metres. This will be filled in and we will work with the Environment Agency to ensure that this work does not risk the integrity of the flood bank or the river.

Full details of these plans are attached in Figure 5.

The land where the pump will be located is owned by the Environment Agency but leased to the RSPB on a 125 year lease.

Visual Impact

The river bank where the pump will be installed does not have public access, nor is it in sight of any dwelling or building.

Old Moor does however have public access and the busy A6195 runs past the site (see figures 1 and 2.) A public footpath from Bolton Ings to Wombwell runs past the other side of the river.

However, the location and presence of established hedges and trees means that the turbine and mast would not be easily visible from any of these points. We have attached photos at figures 6, 7, 8 & 9 and would be happy to conduct a site visit.

No trees will be affected by the installation but some scrub has been cleared already to make a space for the turbine.

Other Permissions / Links to other Partners

The project relates to the **Barnsley Local Biodiversity Action Plan** by creating and maintaining habitats, in particular floodplain grazing marsh and reedbed. It also relates to the **Environment Agency's** strategy of achieving good ecological status on the River Dearne by managing associated wetlands. The project also relates to the **Barnsley Local Development Framework**, which addresses renewable energy and encourages the use of wind power.

Other Permissions

It is worth noting that the RSPB has a planning application for a wind pump at nearby Edderthorpe Flash Nature Reserve that has been submitted at the same time as this one. The pump in this application is a seven metre high turbine when compared to the four meter high pump proposed for Edderthorpe. This is due to the fact that the water will need to be lifted a greater height and over a longer distance than at Edderthorpe – hence the requirement for a slightly larger pump.

14. Existing Use

Please describe the current use of the site

The RSPB manage a suite of Wetland Nature Reserves in the Dearne Valley. At its heart is Old Moor, a significant community resource. For many centuries Old Moor was a farm and more recently it was a coal depot and following re-landscaping of the local area, a local authority wetland centre managed by Barnsley Council. It is now one of the RSPB's most outstanding reserves, boasting nearly 100,000 visits annually, a cafe, visitor centre, community meeting rooms and an award-winning lifelong learning programme. The reserve also won the prestigious National Lottery Award for best environment project in 2009.

The Network of reserves covers around 260 hectares across seven sites. Habitats include several national and local biodiversity priorities such as lowland wet grassland, reedbeds and fen swamp. Species that rely on the site include significant populations of breeding and migrating wading birds, water voles, farmland birds such as Tree Sparrow and wetland specialists such as Bittern and Water Rail.

The Dearne Valley is prone to floods and it was particularly badly affected in 2007. Our management of the Dearne Valley reserves involves working with the Environment Agency to create Washlands to hold water in times of high river levels - which helps to mitigate against the dangers and effects of flooding.

Old Moor as a nature reserve was created in the 1990s following the closure of the Wath Manvers Colliery. Wath Ings already existed as a local nature reserve and with the need to cap off the brown field colliery site and railway sidings, earth was excavated from Old Moor for this purpose and a purpose designed wetland habitat created. The RSPB and Wildfowl and Wetlands Trust both contributed to the design.

Barnsley Metropolitan Borough Council ran the site for a few years until 2003 when the RSPB were awarded a long term lease to take on the site and its management. The site is around 90 hectares in size with half leased from the Environment Agency and half from Barnsley Council.

There is a year round wildlife spectacle – from the raucous noise of a Black Headed Gull colony in Spring, to dragonflies and orchids in the summer, passage wading birds in the Autumn and flocks of Golden Plover and Lapwing taking to the skies in the Winter as a Peregrine Falcon dashes through looking for a meal. If you haven't been, you should do!

Old Moor is primarily a wetland reserve and requires constant management to get the water levels right in each habitat at each time of year. Water can be brought onto site from the River Dearne under an extraction licence (No. 2/27/08/119) either by gravity feed or electric pump and is returned to the River Dearne via an environment agency pump at the other end of the reserve (see figure 2).

A series of pipes and sluices allow us to move the water across the site and manage the water levels in each part of the reserve individually.

The site is well designed in that the pump feeds directly into a storage reservoir, allowing us to hold water for when we need it elsewhere on site. This is especially important given recent dry Springs when we need water for breeding Wading Birds and climate change predictions also mean this facility is going to become increasingly important.

The ability to manage our water in as cost effective and environmentally sensitive manner as possible is very important to the Society.

The use of the site will not change as a result of the proposed work, simply the method by which we extract water from the River Dearne.

Flood Risk Assessment – Wind Pump at RSPB Old Moor

Old Moor lies between the A6195, A633 and the River Dearne at OS grid reference SE 4270 0240. It is managed by the RSPB and leased partly from the Environment Agency and partly from Barnsley Metropolitan Borough Council. It is managed as a Nature Reserve but also as an Environment Agency Washland for the Dearne Valley.

In times of high water in the River, it is the fourth of the Washlands in the Valley to activate and helps to protect the area from flooding. Other Barnsley area Washlands along the Dearne are:

Environment Agency Washland in the Dearne Valley – Barnsley Area	Capacity (m^3)
Edderthorpe Flash. Owned and Managed by RSPB	334,000
Houghton Environment Agency (EA) Owned with tenant farmers	758,000
Wombwell. EA Owned. Leased to and managed by RSPB	396,000
Old Moor. EA and Barnsley Council owned. Leased to and managed by RSPB	991,000
Bolton Ings. EA Owned. Leased to and managed by RSPB	934,000
Adwick. EA Owned. Leased to and managed by RSPB	1,302,000
Total Washland Capacity	**4,715,000**

The River Dearne at this point receives water from a largely urban and post industrial area having towns and new industrial developments in the catchment. This is tends to make the river 'flashy' with rapid run-off causing short duration flood flows. Old Moor, with a capacity of 991,000 m^3 is the second largest washland in the area and represents 20% of the 4.7 million m^3 flood storage capacity that helps to mitigate against the threat of flooding.

The reserve is managed for both wildlife and flood mitigation and an extraction licence allows for the extraction of up to 1.1 million m^3 of water annually. Most of this water flows through the site and is pumped back into the River Dearne via an Environment Agency pump at the far end of the site.

By changing the means of extracting the water, we will not be interfering with this management regime, and will not exceed the extraction licence.

The pump will only be used for part of the year when the gravity feed is not operational. It will only be able to lift the water once the wind speed exceeds 4 metres per second and for it to reach the extraction limit, would need to operate for 365 days constantly at a wind speed above 20 metres per second. Given that we will only use it for part of the year and the historical average wind speed over the course of a year for the Barnsley area is only 10 metres per second, this would simply not be possible.

The proposed work will therefore have no impact on flood risk or management on the site or local area.