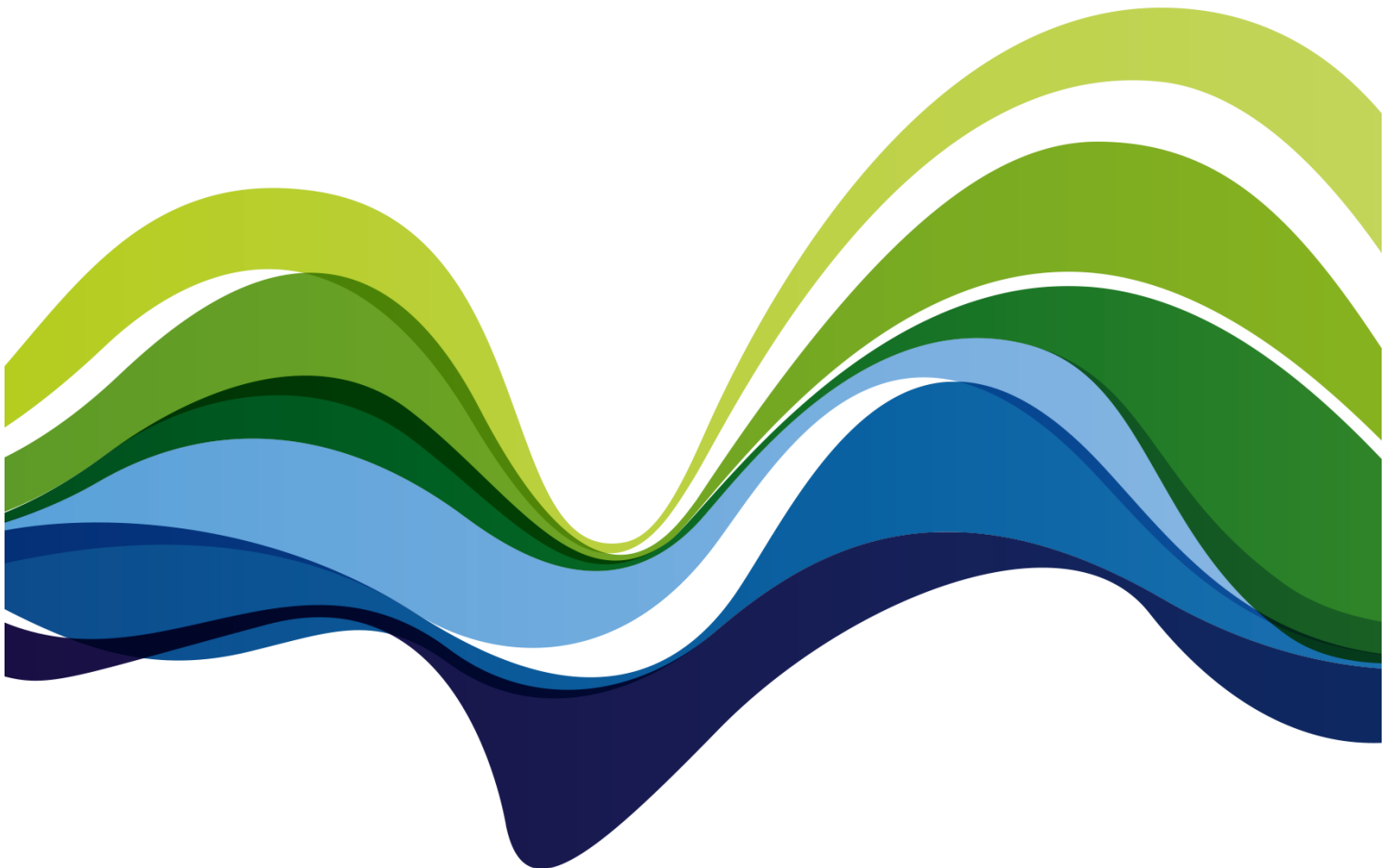




SSE 4, Penner Road Havant Vertical Axis Wind Turbine Proposals

Environment Impact Statement

Version 2 May 2016



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Project Summary

This statement outlines the Environment impact of three proposed vertical axis wind turbines (VAWT) at SSE's customer services centre at 4, Penner Road, Havant, PO9 1QH.

This statement has been prepared in conjunction with the site specific mapping, turbine drawings and all supporting documents submitted with this planning application.

The statement explains and justifies the proposed development in the context of the application site.

This proposal has been drawn up having regard to the need for good design, and the following general design principals have been taken into account in respect of the proposed small scale vertical wind axis turbine s proposed:

- The scale, massing and height of the proposed wind turbine have been considered in relation to that of nearby properties, the topography, views and landmarks.
- A proper assessment of the character of the surrounding area.
- The changing need for clean, renewable sources of energy production in a sustainable manner.

Application Proposals

The planning application proposes the erection of four 18m high small scale free standing columns mounted vertical axis wind turbine.

SSE wishes to erect the small scale vertical axis wind turbines turbine to provide a clean, renewable and sustainable form of electricity production. SSE is keen to reduce their carbon footprint and the installation of renewable energy systems is a component of an overall energy saving strategy across SSE's assets and operational buildings.

The electricity generated by the wind turbine would be used on-site to power existing operations at the Havant site and any additional electricity generated will be fed back into the National Grid therefore reducing there carbon footprint of the main SSE building adjacent the wind turbine proposed location.

Electricity generated by the turbines will feed back into the SSE office main electrical distribution. Designated switch rooms have been reviewed as feasible at the site.

The electricity generated will be metered to measure the benefits of the installation. The metering will be compliant with OFGEM metering guidance for the purposes of feed in tariff and also reporting of renewable emissions as mandatory requirements of the Carbon Reduction Commitment (CRC).

SSE Customer Services Centre and Office – Penner Road, Havant



The use of renewable generation technologies by SSE across assets and properties forms part of a strategy of increasing use of low or zero carbon technologies as part of SSE's commitments to reduce energy use in its buildings.

SSE's internal target has been to commit to an absolute reduction in energy use of 15% across its call centers, depots and office buildings against a 2012 baseline. The vertical axis wind turbine technology has been selected as part of this reduction strategy at the Havant site.

The small scale wind turbines selected have been chosen due to their safer environment credentials when compared to the usual blades. The vertical axis wind turbines proposed have the following characteristics that can be viewed as advantageous when compared to standard bladed turbines in a semi-urban environment:

- Elegant aesthetically pleasing swept blade design
- Compact and easy to integrate
- Revolutionary blade tip designed to shed noise
- Unique aero-elastic blade design captures turbulent wind and absorbs vibration
- Power regulation
- In built safety mechanisms – auto emergency shutdown
- Operating wind speeds: start up 4.5 m/s – safety cut-out > 25 m/s
- Design life of over 30 years

The rating of the VAWT's proposed is a maximum 7.5kW per turbine.

The Quiet Revolution Vertical Axis Wind Turbine was designed as the next generation of helical VAWT offering improved power generation, increased swept area whilst retaining the intrinsic beauty of the original design.

The blades, spokes and torque tube are made of advanced composite materials including carbon fibre for weight, reduction, stiffness and longevity. The brakes are modified with enhanced anti – corrosive properties, increased power despite decreased energy consumption.

The turbine blades are military grade marine rating for aggressive environments. The model proposed for the semi urban environment at Penner Road, Havant has been successfully utilised in a similar environment with some examples of installations in car parks and close to office buildings providing a good level of reassurance. The VAWT turbines have also been utilised in areas close to where large volumes of pedestrians can be expected to be in close proximity to the columns.



The turbines proposed at Penner Road, Havant will be the same model as the system installed at an office near Bridgewater. Some images of this model are noted below:

VAWT Located in Car Park – Proposals at Penner Road will the same model



Unique base provides for a safer and organised installation



VAWT – located close to building due to quiet noise levels

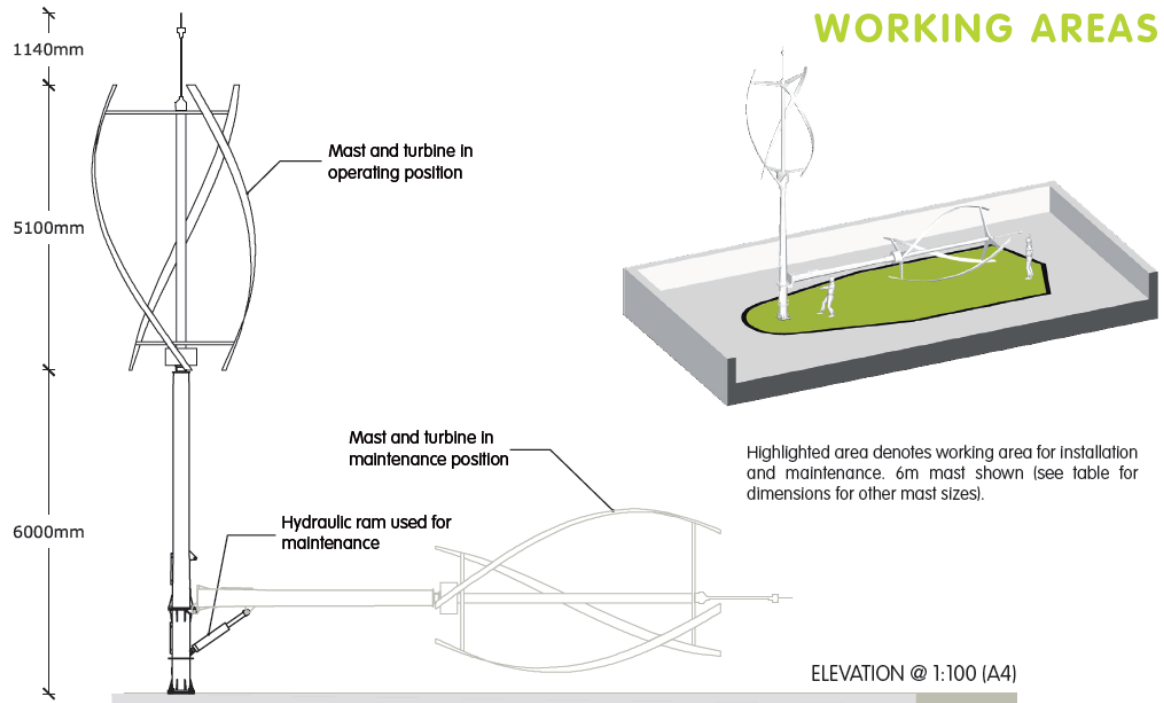


Inverter and controls systems require preferred indoor location



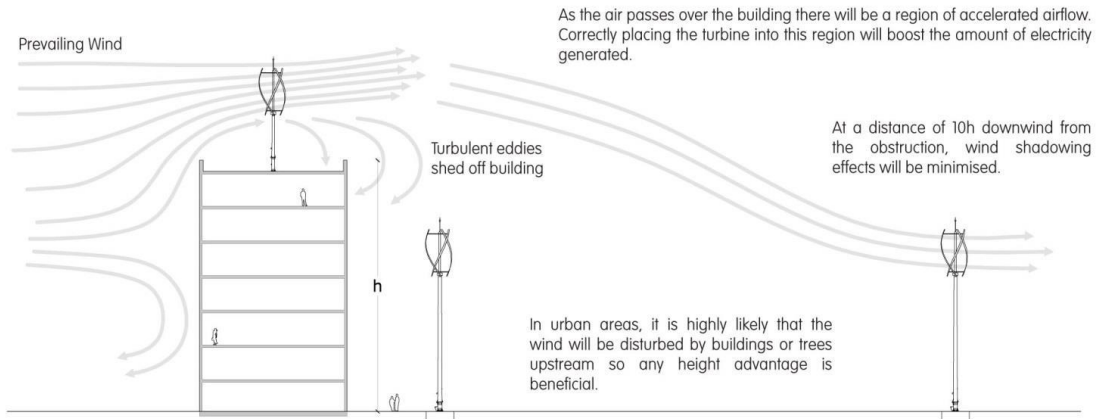
Wind Turbine Details

The wind turbines have been selected to be small and compact and have been split into three separate loads therefore allowing size and flexibility for installation.

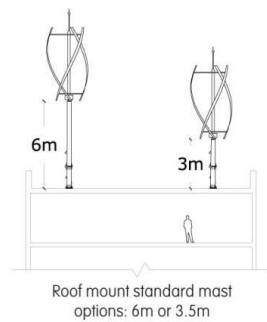
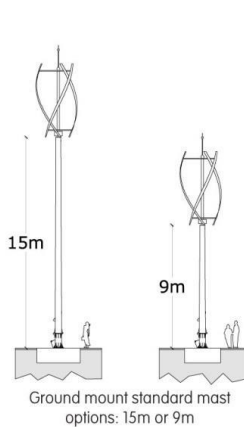


Wind Turbine Installation Options

Optimising Wind Energy in the Urban Environment

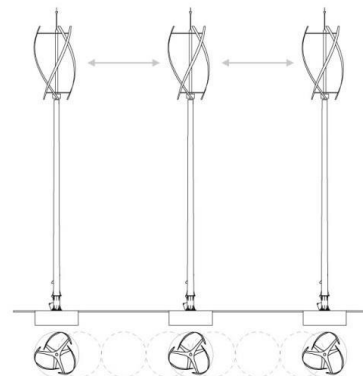


Installation Options



Note: masts come galvanised, other finishes are available on application.

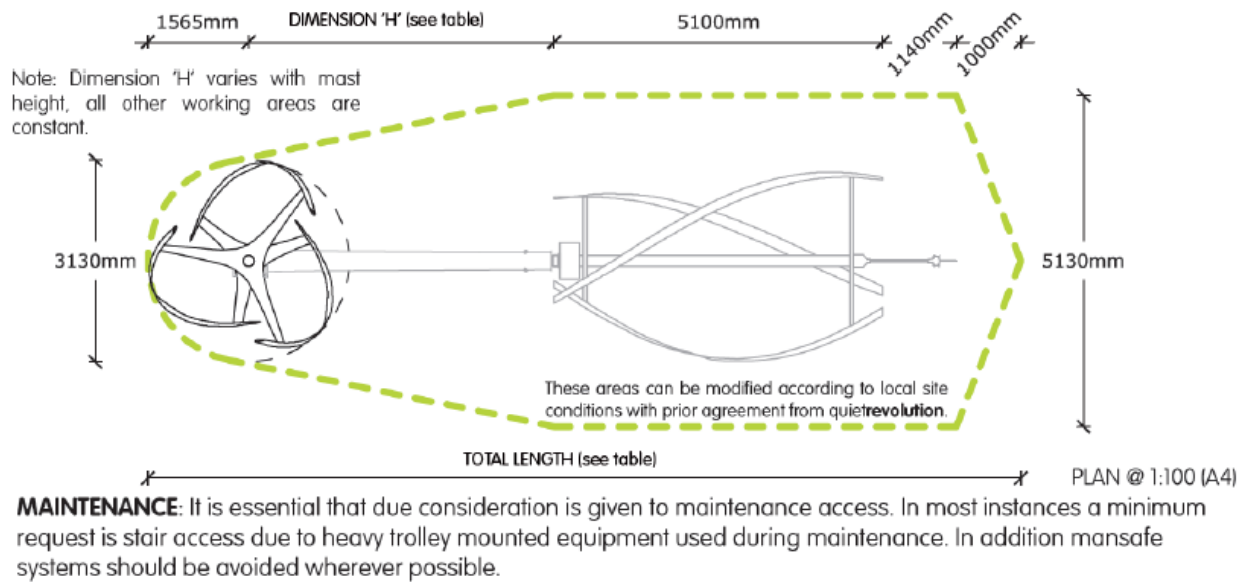
Turbine Spacing



Multiple turbines should be placed at least 3 rotor diameters (9.3m) apart to minimise interference.

Maintenance Requirements

Maintenance Requirements



The length of the column is proposed to be 18m.

Environment Impact Statement

In accordance with the town and Country Planning (Environment Impact Assessment) (England and Wales) Regulations 1999 (as amended) wind turbines fall within the Schedule 2 development and can require an Environment Impact Assessment where they exceed one of the two application thresholds and criteria set out below:

The development involves the installation of more than 2 turbines.

The hub height of any turbine or height of any other structures exceeds 15m.

However, DETR (Circular 02/99, Environment Impact Assessment (EIA)), makes it clear that EIA is more likely to be required for commercial developments of five or more turbines or more than 5MW of new generating capacity given that there is likely to be significant effects on the environment.

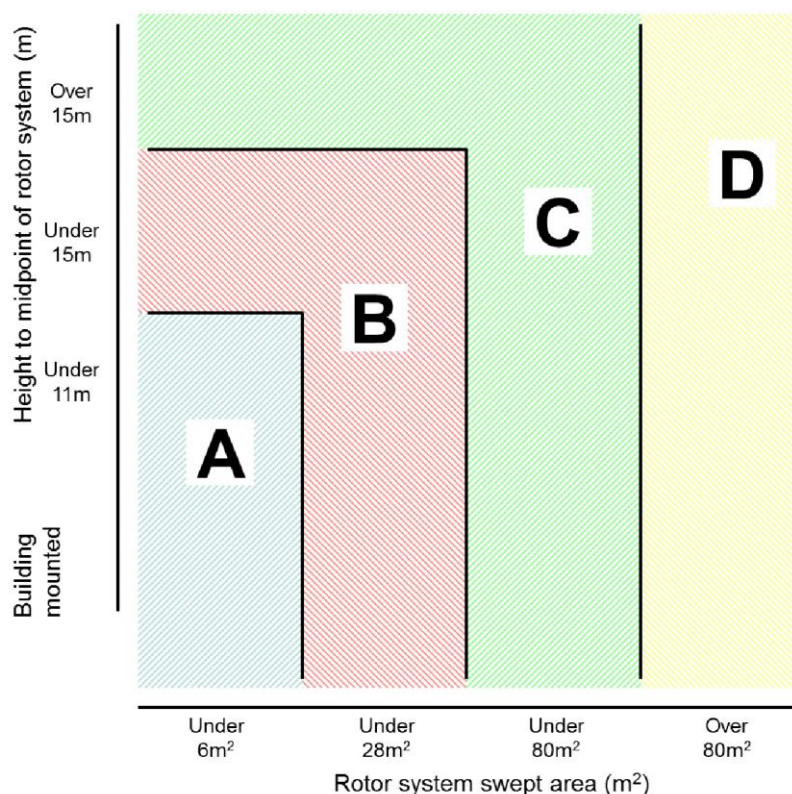
Taking this into account we are of the opinion that a full EIA is not required in this case and also taking into account the above, the proposed small scale wind turbine installation can be carried out without having any adverse impact on existing Environment or ecological features.

The various impacts have therefore been reviewed as recommended by the Renewable Energy UK document Planning Guidance: Small Scale Wind - A good practice guide dated November 2011.

The systems proposed are also Microgeneration Certificate Scheme Certified. This not only allows a feed in tariff application but also ensures a level of quality for the final installation and product.

The system has also been categorized using the categories in figure 1. The Quiet Revolution columns proposed are a flexible 15m or 18m. 18 m is proposed and the VAWT have been categorized as "C". The three systems proposed therefore fall within the control of the MCS product accreditation, and as such are covered MCS accreditation minimum quality requirements expected.

Figure 1



Category A: comprises systems up to 6m² swept areas and under 11m height to rotor midpoint.

Category B: comprises systems up to 28m² swept areas and under 15m height to rotor midpoint.

Category C: comprises systems up to 80m² swept areas and under 25m height to the blade tip.

Category D: comprises systems up to 200m² swept areas and under 45m height to the blade tip.

Noise

Quiet Revolution turbines are designed specifically to send what little noise they do generate vertically upwards.

A site visit has conducted a basic noise test was carried out reading a standing noise level of **47dB**. This was contributed to by the background noise consisting mostly of vehicular traffic. The selected position provides adequate exposure to the prevailing wind and minimises the risk of turbulence. The site has been specified, designed and located to allow sufficient distance between the wind generator and any existing noise-sensitive development so the noise from the wind generator will not be a nuisance or a material consideration in deciding the planning application. In practice turbine noise is often masked by background noise such as wind and traffic. It should be noted that due to its constant and medium rotational speed, the Quiet Revolution turbine is amongst the quietest in its class.

The ETSY-R-97 is a noise assessment and rating advice note for Wind Turbine Developments. This guidance Note recommends that in most the fixed noise limit for night time is 43dB (A) is acceptable. This limit is derived from 35dB (A) sleep disturbance criteria referred to in Planning Policy Guidance Note 24. An allowance of 10dB (A) is made for attenuation through an open window (free-field to internal) and 2dB subtracted to account for the use of LA90 and 10 min rather than LAeq 10 min. They also recommend noise emission of the wind turbine in relation to a neighbour's outdoor sitting area in open countryside should be no higher than 43-45dB (A) at any noise sensitive properties.

It must be noted that ETSY-R-97 advocates that considerations should be given to increasing the permissible margin above background where the occupier of the site has some financial involvement in the wind turbines meaning that it can be acceptable to have higher noise readings where the applicant's property is the primary residence. This can be viewed to be a consideration of acceptance by SSE with regards to the site proximity to the main office building. With regards to the closest other office buildings, it is considered that all buildings will not be impacted by noise and are within the acceptable limits of the Renewable Energy UK Small Scale Wind Turbine Planning Guidance at all locations adjacent the SSE Penner Road site.

Penner Road Site



The manufacturer's noise emission report for the QR6 is displayed in **Figure 2**. The table displays noise measurements for the turbine in order to determine the sound level of the turbine.

The conditions of ETSU-R-97 vary depend on whether a proposed turbine is considered 'large' or 'small'. In the standard, the definition of a 'small turbine' is as follows:

"A wind turbine having a rotor swept area 200m² or less. In a horizontal axis wind turbine this equates to a rotor diameter of 16m."

The VAWT wind turbines proposed have a threshold below levels in figure 1 that class the turbines as small scale class C

Clause 25 of ETSU-R-97 provides the following guidance when assessing the noise impact on non-financially involved properties:

"The noise emissions from the wind turbine/s shall not exceed a sound pressure level LAeq, T of 35dB at the curtilage of any dwelling lawfully existing at the time of this consent at wind speeds up to and including 8 ms⁻¹ at rotor centre height. Any measurement shall be made at a height of 1.2m and at a minimum distance of 3.5m from any façade or acoustically reflective surface".

Financially involved properties Clause 24 of ETSU-R-97 advises that the above limit may be increased to 45 dB (A) Where the occupier of the property has some financial involvement.

In determining any planning application for a wind system, consideration must be given to potential noise impact on neighboring residential properties. A threshold of acceptance is suggested by the Renewable Energy UK Guidance if any property would be exposed to noise emission levels less than 45dB (as measured) 1m from any window of an occupied room for 90% of the time.

The **Figure 2** table shows the declared noise emission levels as well as calculated noise emission (that is received by the hearer) at different distances from the turbine and at different wind speeds. The Sound Power box states that for this particular turbine the noise emitted (that is transmitted from the turbine) has a sound power of 86.5 dB LWd at a wind speed of 8m/s.

This wind speed is used as on a typical inland UK site, the wind speed is less than 8m/s for 90% of the year. The 'd' subscript is a declared level in accordance with IEC 61400-14:2003 which applies the uncertainty on the measurement and presents a 'worst case' scenario.

For a neighboring window to receive a sound pressure level (Lp) above the suggested threshold it would need to be within a close proximity of the turbine heads. From site measurements the closest residential area is over 100m away from the site. The locations of the wind turbines proposed are further than this. The proposed

locations are indicated on the 1:1250 plans submitted as part of the information submitted in support of this application.

Figure 2

Test Site Data

Derived Noise Emission and Noise Immission for a wind speed of 8 m/s at rotor centre height

PARAMETER	SYMBOL	VALUE
Apparent Emission Sound Power Level (dB(A) re 10^{-12} W)	$L_{Wd, 8m/s}$	86.5
Combined Uncertainty (68% confidence level) (dB)	σ	1.9
95% Confidence Limit (dB)	1.645σ	3.1
Noise Slope at 8 m/s (dB/m/s)	S_{dB}	2.38
Declared Apparent Emission Sound Power Level, (dB(A) re 10^{-12} W)	$L_{Wd, 8m/s}$	90
Immission Sound Pressure Level at 60 m at 8 m/s (dB(A) re 20 μ Pa)	$L_{p, 60m}$	47
Immission Sound Pressure Level at 25 m at 8 m/s (dB(A) re 20 μ Pa)	$L_{p, 25m}$	54

The location of the three vertical axis wind turbines is not a risk to acceptable noise criteria noted in the Renewable Energy UK Small Scale Wind planning guidance and is well below acceptable sleep and openable window thresholds recommended by the same guidance and the documents and guidance it refers.

Construction and Infrastructure Impacts

Construction of the turbines will be undertaken off-site. The installation will be at ground level and the turbines will be raised into their working position by manual hydraulics. The anchoring of the turbines is intended to utilise ground-breaking new technology – instead of the more usual large reinforced concrete cube on which the turbine column would reside, our cutting-edge installation uses a network of pins driven into the ground to a depth of up to six meters. This network requires no disturbance of the soil and is completely reversible at end of life, meaning the installation may be removed & the ground made good to pre-existing conditions.

The installation is also greater than 50m away from overhead cable routes and associated pylons therefore this is not considered a risk in this assessment.

Landscape and Visual Impacts

The building will form the backdrop to the turbines. A raised bank to the south end of the site will fulfil a similar role. There will be no views available from the residential areas.

The vertical axis wind turbines have also been selected due to their visual appearance and the innovative design is anticipated to actually enhance the building façade and appearance of the local landscape.

Ecological and Ornithological Impacts

Quiet Revolution QR6 turbines of the type proposed have undergone extensive independent testing and there have been no cases of bird strikes. Bird strike concerns have reduced in the past few years, such to the extent that the RSPB have begun construction on a turbine at their Sandy Lodge HQ, which will begin generation within the next couple of months.

The Penner Road site is not known as a bird nesting site. The installation will not be carried out during the nesting season if bird nests are encountered. There are no known instances of regular bird nesting in the locality of the four wind turbines proposed locations. Within the industrial estate it is known for gulls to nest on flat roof areas. The roof areas frequented by the gulls have been those associated with data centres i.e. where there is high heat generation that can cause a roof to be warmer. This has not been encountered at the Penner Road site

There are no known bat nests or nesting grounds within 50m protected by law. In order to protect Bat populations from the effects of large scale wind turbines Natural England produced a Technical Information Note TIN051 and TIN059 which relates to single turbines. It is only necessary to follow the guidelines of the TIN051 if evidence exists that Bat populations are present or if the habitat feature is likely to support the presence of Bats of the site location. These factors are not a feature of the turbines proposed or their immediate vicinity and the location chosen for the turbines will also not overhang trees or bushes.

The land immediately surrounding the application site to the north for the proposed turbines has been developed into a series of office buildings and units. No features of wildlife interest have been identified in the immediate vicinity of the site of the turbines proposed. To the south of the site there is an area of tidal margins that is in a flood zone and is also likely to attract wildlife. This area is designated as a Site of Special Scientific Interest (SSSI). Habitats and associated wildlife in this area have been considered in a risk and impact assessment included in **Table 1** of the Appendices of this statement.

The choice of wind turbine also has been considered to be suitable for the location as the design of the blades has no track record of bird strikes.

An evaluation of the bird and wildlife risks was conducted prior to selection of the turbine design and sizes. A risk assessment is attached to this report in the appendices together with mapping data. Further mapping data is available from local organisations that includes publically available information on bird locations.

The Hampshire and Isle of Wight Wildlife Trust describe Southmoor as “flower rich grassland with very good numbers of southern marsh orchid and ragged robin plants. A high tide roost and area for breeding birds such as skylark, blackcap and whitethroat.”

The area is also known as a grazing area for wintering wildfowl. A risk and impact assessment has considered this area (**Table 1** included in the Appendices).

The Solent Birds project maps bird sighting in the area. Data is publically available and tallies with the DEFRA mapping data set.

The British Wind Energy Association Website (<http://www.bwea.com>) States “Experience and careful monitoring by independent experts shows that birds are unlikely to be damaged by the moving blades of micro wind generators. More information about this can be found from BWEA Best Practice Guidelines and the Royal Society for the Protection of Birds, whose view is that “Climate change is the most significant, long-term threat to biodiversity worldwide. To help meet this threat, the RSPB also strongly supports moves to increase energy efficiency, reduce energy demand and supply more of our energy needs from renewable sources, including wind power, provided they do not harm birds or their habitats.” Studies of birds increasingly show that the risk from wind turbines to most species is very low, far greater risk exists from overhead cables and moving cars. The RSPB have installed a small wind turbine at their visitor centre at Rainham Marshes and are reported to be considering turbines for other sites including a wind turbine for a site near to Carlisle. The RSPB position on wind turbine installations is illustrated here: <http://www.rspb.org.uk/news/details.asp?id=tcm:9-213213>.

Many nature conservation bodies now support the use of small scale Renewables installation including domestic turbines, for example the National Trust believe there is great potential in developing renewable energy, for both electricity and heat, at a more local and small scale, in households, businesses and communities.” http://www.nationaltrust.org.uk/main/wmicrogen-policy_from_practice.pdf and English Nature also “support the development of renewable energy schemes.”

Sustainability

The European Commission published the 20 20 by 2020 package in January 2008 and the EU Climate and Energy package was formally agreed in April 2009. This package commits the European Union (EU) to the 20% reduction in its carbon emissions and to achieving a target of deriving 20% of the EU’s final energy consumption from renewable sources, both by 2020.

The renewable target is outlined in the Commission’s Directive on the promotion of the use of energy from renewable sources. In order to achieve the overall EU renewable energy target of 20% the proposal includes individual targets for each Member State. The UK’s legally binding obligation is 15% of energy coming from renewable sources by 2020 as set out in the 2009 Renewable Energy Directive. In planning terms the “need” for development is fundamentally determined by Government policy and this declaration was a clear statement of the urgent need for rapidly increasing development of renewable energy projects.

In consideration of renewable energy policies and policies and recommendations to consider the impact of large structures, SSE has proposed that as part of this development the turbines are smaller units that will have the least visual and environmental impact and are a better option than a larger more visible structure. The 7.5 kW turbines will provide enough generation to offset the energy use of the Penner Road offices by approximately 45 tonnes or about 2% of the energy requirements of a call centre with over 600 staff. The

installation will therefore contribute considerably to SSE responsibilities in meeting internal and external energy reduction targets. The site forms a large component of SSE's buildings carbon footprint. The Penner Road site is responsible for approximately 10% of the office building emissions in the entire UK.

Public Access, Safety, Recreation and Rights of Way

There will be no requirement for any new roads as the site has good road access. The site where the wind turbines are to be sited will have access via SSE car park and the site is suitable for large vehicle access. A contractor can supply and install the turbine over a 3-5 day period. The turbines will be delivered to site with all necessary installation equipment.

Post construction, access to the wind turbines should only be required for routine maintenance. Access will be via the current standard entrance.

The wind turbines are to be sited in the proposed location noted in the planning application submissions, it is thought unlikely to require access from any of the emergency services.

The land is currently used for no other purpose than car parking for offices and no car parking spaces are to be lost under the scope of this project. The land will remain useable right up to the edge of the turbine column foundations after installation.

Rights of Way

Rights of pedestrian way exist within the local area but there are no rights of way across the application site. All components and turbine blades will be located as to not over hand or impact public rights of way.

Hydrological impacts, groundwater protection

Due to the unique anchoring solution, meaning there is no reinforced concrete required for the unique QR anchoring points, there will be any hydrological impact from the proposed installation

Archaeological Impacts

All proposed installations are within boundaries of existing building.

The surrounding area has been subject to much commercial development recently and it is not anticipated that site earthworks will encounter or cause any archaeological impacts.

Shadow Flicker

Due to the asymmetric design of the blades, the possibilities of flicker are vastly reduced and the vertical axis design practically eliminates these risks to the surrounding environment.

Electromagnetic Interference and Air Safeguarding

Quiet Revolution already produce other technological parts for the Ministry of Defence & their main suppliers, including radar & housings, towed array sonar units, & many other components. They have access to all manner of testing facilities for those parts and the wind turbines have been tested using similar means in the same facilities.

The design of the vertical axis wind turbine removes the risks of electromagnetic interference which is why these systems have proven to be a good choice of renewable wind generation at many urban or semi urban sites.



APPENDICES

Table 1 – Birds and Wildlife Impact and Risk Assessment

See attached table

DEFRA Mapping

A set of local DEFRA habitat and wild life maps are attached. These have been reviewed to evaluate environment impacts prior to the selection of the turbines.

Table 1 - Birds and Wildlife Impact and Risk Assessment

Item	Area/Locality	Description	Impact and Actions
Birds and wildlife	Penner Road	Assessment of collisions	Due to the design principle of the vertical axis wind turbines (VAWT's) with the incorporation of external stator blades the turbines will be perceived as solid obstacle/objects, even at the highest operating velocity (which keeps the risk of collisions low). This consideration was a main driver in the turbine selections. Both visually hunting birds and acoustically hunting bats (via ultrasonic reflections) can perceive the turbines as obstacles and, accordingly, avoid them. The risk of collisions is also reduced by the relatively small surface area and size of the turbines proposed. The smaller surface areas of the VAWT's make them a much safer option than a rotor turbine design. The design of the selected turbines proposed is very different to that of larger rotor blade turbines. The rotor turbine creates an unforeseen obstacle to birds in particular over a much larger swept volume area. It is simply the case that birds cannot see or judge the rotor blade as it approaches. This type of turbine is considered suitable in high level areas with low woodland density and was not considered as suitable at the Penner Road site. They are also not considered suitable close to habitat areas and reserves identified in the Site of Special Scientific Interest (SSSI) located to the south of SSE's Penner Road site.
Birds - Gulls	Penner Road	Gulls nest on industrial estate rooves. Within the industrial estate it is known for gulls to nest on flat roof areas. The roof areas identified have been known to be data centres where heat generation creates a warm roof. The gulls are attracted to these warm roof areas for nesting.	The Penner Road roof area is not known as a locality for seasonal gull nesting. If nesting gulls or other nesting bird species are ever encountered on the Penner Road roof then the turbines use will be reduced or switched off during the nesting period.
Birds (Woodland Species)	Penner Road	Bird habitats are located surrounding the site including lower flying small birds in the woodland areas.	A map of the significant woodland areas has been reviewed. The main woodland areas are located to the east of the Penner Road site car park. Birds occupying this habitat do not fly across the Penner Road site. The turbines selected will be quieter than background and vehicular noise in this woodland location. Small turbine selections have assured that turbine noise will not be an issue in the woodland habitats

Birds (Grasslands)	South Moor	Bird habitats are located surrounding the site including lower flying small birds in the grassland areas and coastal marshes.	Maps of the coastal marshes and grassland areas have been reviewed. The area to the south provides a winter habitat for important species such as waders. The choice of turbines is small and quiet and this has been considered as a main parameter in the selections. The SSSI area to the south of the Penner Road site extends over the tidal flood zone area. An area of coastal marsh is included in the SSSI. This area will provide a habitat to wild fowl. The area between the marsh and the Penner Road site contains a habitat of mixed hedges and small trees. This area provides a buffer between the grassland and marsh included in the SSSI areas and the industrial estate and also therefore flight paths. Flight paths are predominantly from east to west. Flight paths from north to south tend to be from the sea/mud flat areas and to the South Moor marshes and grassland. The small scale turbine selections have been made to assure that they will not impact the important bird areas and coastal marsh to the south that provides an important bird and wild life habitat.
Birds (Seabirds, Waders and Wild Fowl)	Langstone and South Moor	Important bird areas are located extensively between Hayling Island and Portsmouth. The areas are predominantly mud flat areas with areas known for significant wader populations to the south of Bakers Island and South Binness Island	Areas of significant populations of seabirds, waders and wild fowl exist between Portsmouth and Hayling Island. There is significant data on these locations and the RSPB have designated reserves and there are other designated Local Nature Reserves to the west and east. These reserves are located a few miles away from the Penner Road site. However large turbines along the coast have not been considered appropriate in close proximity to these areas. Flight paths have been observed and are recorded as mainly west to east across the mud flats and tidal areas. These flight paths appear to be across the mudflats/tidal zone due to birds flying to suitable habitats designated by the reserve status. These areas will not be impacted by the small scale turbines selected at the Penner Road site.

European Protected Species	Havant, Hayling Island and Langstone	An impact assessment on wild life has considered all types of wild life including protected species types including Bats, Cetacean, Invertebrate, Other Mammal, Plant, and Reptile.	DEFRA's data base of protected species includes a Bat colony at Northney, Hayling Island and mammals to the north of Bedhampton. Both these localities are a significant distance from the Penner Road site. Both populations will not be impacted by the small scale turbines planned at Penner Road. The turbine selections have also been made to ensure no electromagnetic interference in the site location and the surrounding areas.
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