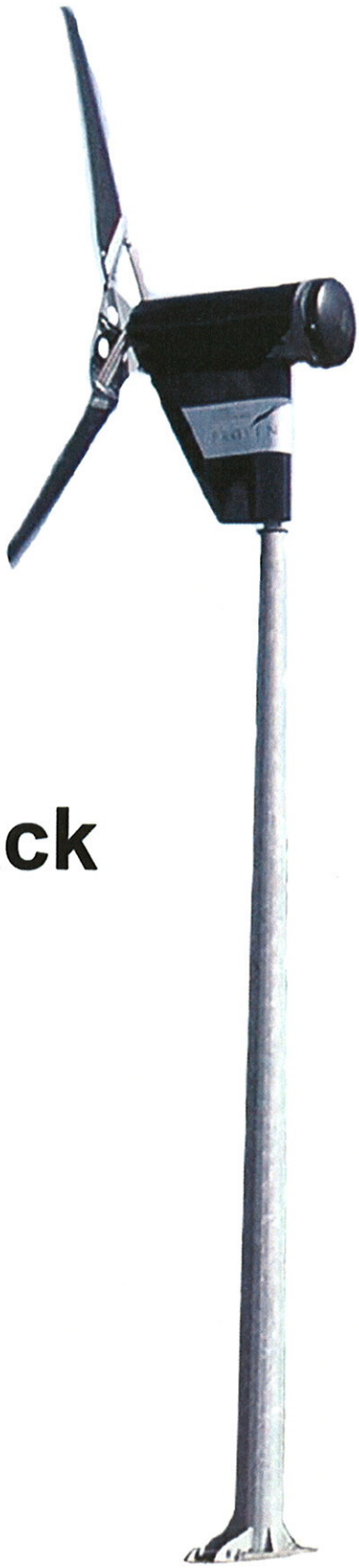
WT15000
on TM1500

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Planning Pack

SCOTTISH renewables

Energy Saving Trust

THE BRITISH WIND ENERGY ASSOCIATION

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INSTALLER ACCREDITION NUMBER:
2118497

Proven Planning Pack

The 'Proven Planning Pack' is designed to give you information relevant to the planning process for the small wind turbine systems manufactured by Proven Energy Ltd. Please feel free to pass this information on to planning officers and encourage them to contact us direct should they have any further questions.

General

Proven Energy Ltd. has now installed over 500 wind turbine systems world-wide with roughly over 300 installations in the UK supplying a diverse range of applications from hilltop telecommunications sites and commercial applications to domestic householder and community electricity generation schemes.

Planning officers and committees have typically had little first-hand information or experience on which to base their decisions for small wind turbines (3 metre rotor diameter). The majority of applications that have been dealt with have typically been for larger-scale commercial wind turbines (45 metre rotor diameter) and planning officers and committees are wary of issues such as visual intrusion and noise, which are associated more with this type of turbine rather than our small-scale ones.

This document offers information that should help to give you a clearer idea as to the scale of our technology and it's (minimal) affect on the local area. Previous forms of this document have supported applications of turbines to be installed in sensitive areas such as National Parks, nature reserves, AONB's (Areas of Outstanding Natural Beauty), SSSI's (Site of Special Scientific Interest) and other protected sites. **See attached list for details.*

Please feel free to contact any of the people on our Reference Site List attached or to visit our factory in Ayrshire, Southwest Scotland where we have a number of turbines on display – including the new 15kW turbine! If any of the sites listed overleaf or our own factory is located a considerable distance from your site please contact our office where we can point you to a site that may be a bit closer to home for you.

The Planning Process

In most areas of Britain local government has two layers: county councils and district or borough councils, with the district/borough council making planning decisions. Most district councils are then divided into parish or town councils.

These bodies don't have any direct influence on planning decisions but may be consulted during the process. In Scotland, Wales and some metropolitan areas of England a single-tier system exists, sometimes called unitary authorities. Northern Ireland has a different system again with the Northern Ireland Assembly administering planning decisions through 6 divisional offices.

Applications are made to a council's planning office and dealt with by a planning officer. The planning officer will consider an application and make a recommendation to a planning committee with whom the final decision rests. A planning committee is made up to 30 local councillors.

PPS 22 – Planning Policy Statement 22

Planning Policy Statement 22 (PPS22) replaces Planning Policy Guidance Note 22 (PPG22) issued in 1993, the annexes issued in 1994 and the photovoltaics annex issued in 2002. Its scope is specific to the consideration of planning issues relating to renewable energy projects rather than broader issues.

The objective of PPS22 is to provide a clear, up to date Statement of national Planning Policy for renewable energy in England; to ensure that the planning system plays its part in delivering Government policy on energy as set out in the Energy White Paper.

Under Planning Policy Statement 22 (PPS22):

- The financial viability of the project should not form part of the decision.
- Regional Planning Bodies and local planning authorities should recognise the full range of renewable energy sources, their differing characteristics, locational requirements and the potential for exploiting them subject to appropriate environmental safeguards.
- The wider environmental and economic benefits of all proposals for renewable energy projects, whatever their scale, are material considerations that should be given significant weight in determining whether proposals should be granted planning permission.
- Regional planning bodies and local planning authorities should not make assumptions about the technical feasibility of renewable energy projects.
- Local planning authorities, regional stakeholders and Local Strategic Partnerships should foster community involvement in renewable energy projects and seek to promote knowledge of and greater acceptance by the public of prospective renewable energy developments that are appropriately located.
- Small-scale developments should be permitted within areas such as National Parks, Areas of Outstanding Natural Beauty and Heritage Coasts provided that there is no serious environmental detriment to the area concerned.

Further information and guidance can be received through the Office of the Deputy Prime Minister (Planning Policies Division A)

Scottish Natural Heritage (SNH)

Scottish Natural Heritage has released specific guidance on location of wind farms in Scotland. This is contained in their policy statement "Strategic Locational Guidance for onshore wind farms in respect of the natural heritage" to be read in conjunction with the National Planning Policy Guidelines on renewable energy (NPPG6).

Paragraph 7 deals specifically with smaller wind turbines such as those manufactured by Proven and states that the special rules required for wind farms do not apply to small-scale wind turbines:

"The guidance only applies to the consideration of onshore wind farms, and it excludes small wind developments of a domestic or small business scale, typically single turbines of under 50kW capacity, which may be accommodated satisfactorily in most landscapes and in relation to which strategic guidance of this sort is unnecessary."

Paragraph 4 indicates that:

"[SNH] supports the Government's policy to increase the generation of electricity from renewable sources in Scotland."

Visual impact

Proven Energy Ltd's small-scale wind turbines are all sited so that visual impact is kept at a minimum without compromise to power output. Our technology requires a location that offers good exposure such as the highest point on the land. This is ideal, however may not be practical in terms of either distance or visual impact – we therefore site our turbines to accommodate both.

The ability to paint our turbines (both the head and the tower) also allows us to further increase its camouflage into the background – making it almost invisible to the human eye at a distance in some cases.

Noise

Proven Energy Ltd. recognises that noise can be a nuisance not only to the householder that purchases a wind turbine but also to their neighbours also. This is why our turbines have been developed as one of the quietest on the market.

Most of the noise associated with larger-scale wind turbines comes from the gearbox located inside the nacelle (head), our small-scale turbines are produced without a gearbox for this reason! No gearbox – no gearbox noise!

A common misconception with our equipment is that it interferes with telecommunications equipment and TV signals. This is nonsense and is totally disproved by a number of our installations at high profile sites across the world.

We have:

- A small wind turbine at one side of a large-scale wind farm to provide power to a TV repeater station that boosts the signal coming through the wind farm for a small village.
- A number of wind turbines at remote, off-grid telecommunications sites across the world. One in Italy with four 15kW wind turbines!
- Continued interest in our equipment from large telecoms companies such as O2, Vodafone, Vodacom and T-Mobile.

"I'm not aware of us having any power outages at the site since the site was integrated into the network, this is more than can be said for some of the grid connected sites!"
Jim Porter, Orange Ltd.

Ornithological Issues

The Royal Society for the Protection of Birds (RSPB) supports the sustainable development of renewable energy such as wind power because it helps mitigate climate change, which they believe "poses the most significant long-term threat to the environment – this was also echoed in a recent report in *Nature*. It concluded that over the next 50 years climate change is expected to drive a quarter of land animals and plants into extinction and that under the higher estimates of climate change a quarter of the birds could become extinct. The RSPB described the report as 'a deeply depressing paper'. The RSPB further agree that developed alongside other forms of renewable energy and energy efficiency, wind energy has a key role to play in averting the worst of these impacts.

Across the country as a whole, studies carried out at the UK's existing wind farm installations shows hit rates of less than one per turbine per year; for example, the 9 turbines on the harbour wall at Blyth are in a busy bird area and of bird flights through the wind farm, only 1 in 10,000 resulted in a collision. This translates to 1-2 collisions per year per turbine. To put this in perspective, cars in the UK kill more than 10 million birds – every year.

When scaling this type of statistic down to our small-scale type of equipment the rate drops even more dramatically to an almost non-existent figure! This fact coupled with the careful siting of our systems means that we can further protect our feathered friends and help to ensure their long-term future.

Quite simply, birds are in far more danger from colliding with overhead power lines, or being eaten by domestic cats, or hit by vehicles than they are from wind turbines.

Further Information & Assistance

Hopefully this document should help you through the planning process and help to give information to planning officers and councils on small-scale wind turbines to make their decision easier. However, if further information is required please do not hesitate to contact the office where we may be of further assistance.

N.B. Overleaf is a selection of reference sites, photographs and drawings with comments to help visualise our scale of turbines.

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Stewarton,
Ayrshire
KA3 5LH

T: 01560 48 55 70
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National Park Reference Sites

Exmoor National Park

- WT2500 with 6.5m mast powering remote holiday home and cottage.
  Mr Roger Fox
  Combe Ridge, Ham Hill Road, Higher Odcombe, Yeovil, Somerset, BA22 8XE
  Tel: 01935 862 041

- WT6000 with 9m mast powering remote field study centre.
  Pinkery Outdoor Education Centre, Simonsbath, Minehead, Somerset
  Tel: 01398 323 665

Dartmoor National Park

- WT2500 with 6.5m mast for domestic power system.
  Rundlestone, Yelverton, Devon

- WT2500 with 6.5m mast for domestic power system.
  Mr Greg Miller
  Moorgate, Okehampton, Devon

North York Moors

- WT2500 with 6.5m mast for domestic system at remote farm.
  Mr. Chris Chapman
  Standing Stones Rigg, Cloughton, Scarborough, North Yorkshire, YO13 0DX
  Tel: 01723 870 984

Pennine National Park

- WT2500 with 6.5m mast on working farm and visitor centre.
  Mr Chris McCarty, English Nature
  Widdybank Farm, Forest in Teesdale, Barnet Castle, Co Durham DL12 0HQ
  Tel: 01833 622 378

- WT2500 with 13m guyed mast at off-grid farmhouse.
  Mrs R. Sawyer
  Intake Farm, Slaggyford, Carlisle, Cumbria CA6 7NH
  Tel: 01434 382 055

- WT2500 domestic battery charging system with 9m mast.
  Mr M. Muter
  Spring House, Allenheads, Northumberland NE47 9HJ
  Tel: 01434 685 301

Northumberland National Park

- WT2500 with 11m mast powering domestic house/farm.
  Mr Roger Wilson
  Gibshiel, Targett, Hexham, Northumberland NE48 1RR.
  Tel: 01434 240 435

- WT2500 on 6.5m mast installed on boundary of Torridon National Scenic Area.
  Hugh Tollemache
  Balgy Lodge, Shieldaig, Ross & Cromarty, IV54 8XP.
  Tel: 01684 854 444

Other AONB, SSSI and other special areas

- WT2500 on 6.5m tower providing electricity for remote youth hostel.
  The Warden, Glen Affric Youth Hostel, Wester Ross, Scotland.

- WT2500 on 6.5m mast providing electricity for remote mountain hut at 2400ft under north face of Ben Nevis.
  CIC Hut, Alt-a-mhuilin, Ben Nevis, Lochaber, Scotland.

- WT2500 on 6.5m mast powering water pumping system on grounds of Nature Reserve.
  Dawlish Warren Nature Reserve, Dawlish, Devon.
  Tel: 01626 863980

UK Public Access Sites

- WT2500 with 6.5m mast providing electricity for community garden project, exterior lighting & other miscellaneous electrical appliances. Excess power diverts to heating.
  Springfield Community Garden, Stirling Crescent, Holmewood, Bradford BD4 0DA
  Tel: 01274 688 359

- WT2500 with 6.5m mast on working renewable energy demonstration site.
  Earthbalance Ltd, West Sleekburn Farm, Bomarsund, Bedlington, Northumberland
  Tel: 01670 821 000

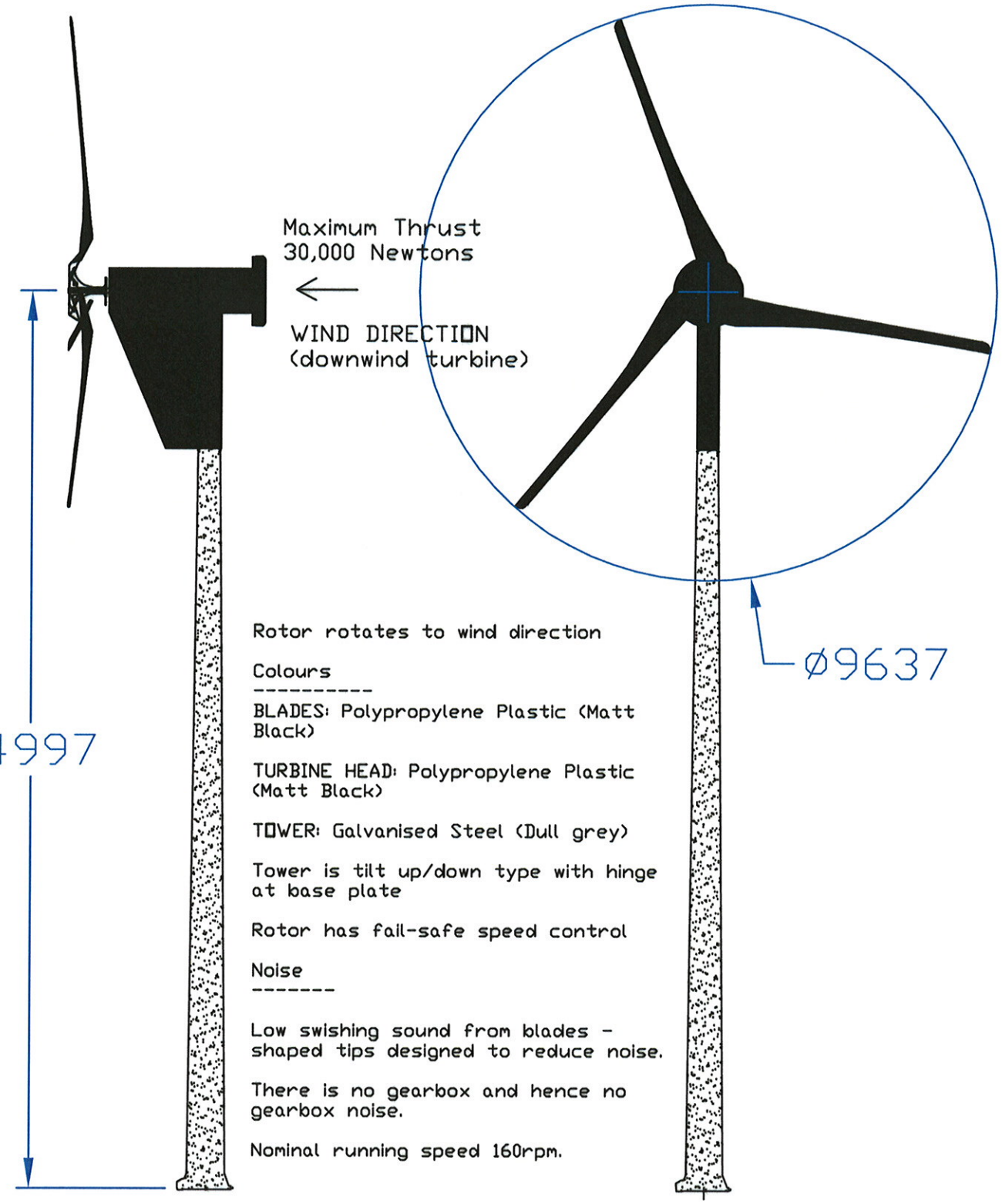
- WT2500 battery inverter system with 9m mast working with grid to supply electricity for flagship environmental visitor centre.
  Millenium Centre (Dagenham) , The Chase, Rush Green, Romford, Essex RM7 0SS
  Tel: 0181 595 4155

- WT2500 on 6.5m mast powering remote youth hostel.
  Loch Ossian Youth Hostel, Corrour, by Fort William
  Tel: 01397 732 207

- WT2500 on 6.5m mast providing power for remote station approx 1 mile from Loch Ossian Youth Hostel. Station lights switched on by timer before trains arrive.
  Corrour Railway Station, by Fort William

- 2 WT2500 Proven wind turbines providing power for Sainsbury's Superstore.
  J. Sainsbury's Ltd, 55 Bugsby's Way, Greenwich, London, SE10 9LU
  Tel: 020 7695 8447

- 2 WT6000 Proven wind turbines on 9m masts powering BP service station.
  Hornchurch, Essex, RM12 6RJ



Rotor rotates to wind direction

Colours

BLADES: Polypropylene Plastic (Matt Black)

TURBINE HEAD: Polypropylene Plastic (Matt Black)

TOWER: Galvanised Steel (Dull grey)

Tower is tilt up/down type with hinge at base plate

Rotor has fail-safe speed control

Noise

Low swishing sound from blades - shaped tips designed to reduce noise.

There is no gearbox and hence no gearbox noise.

Nominal running speed 160rpm.

ZONE	REV	DESCRIPTION REVISIONS	DATE	APPROVED
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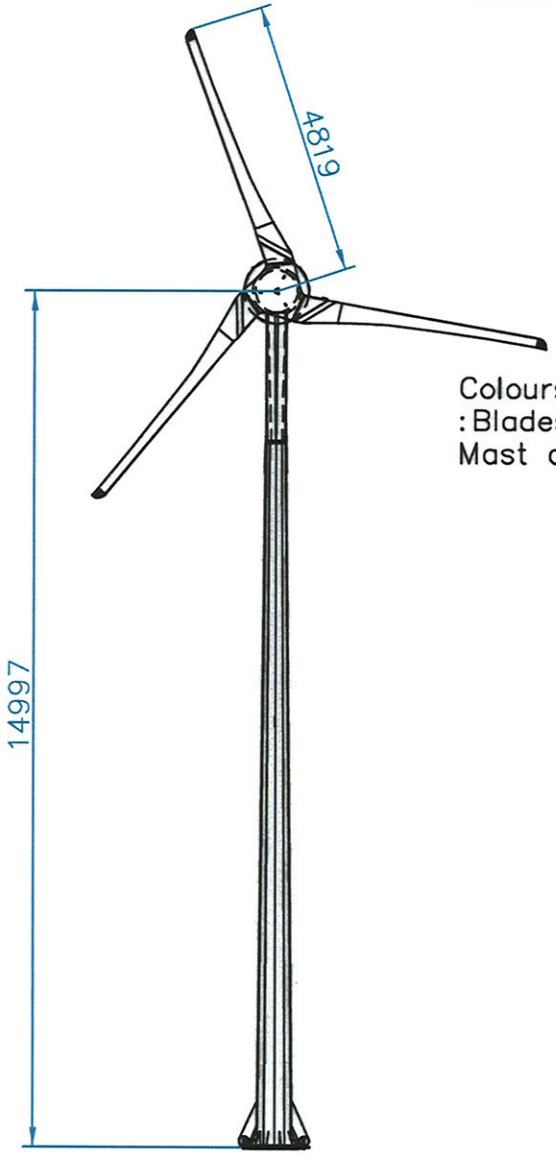
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Proven WT15000 Wind Turbine with TM15000 15m Tower

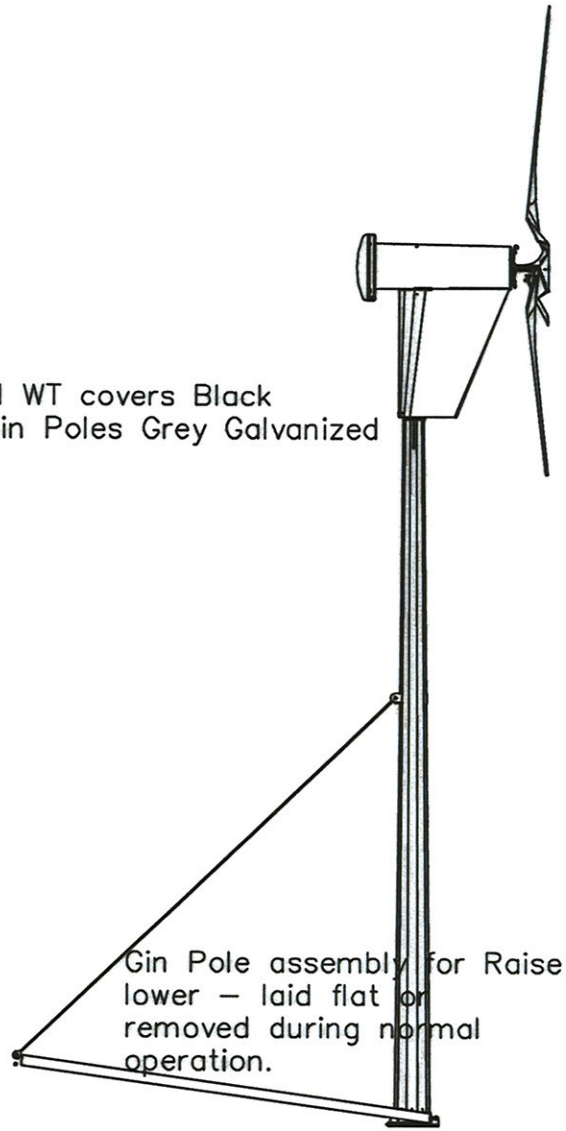
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SCALE	Date	SHEET
	5/6/2003	



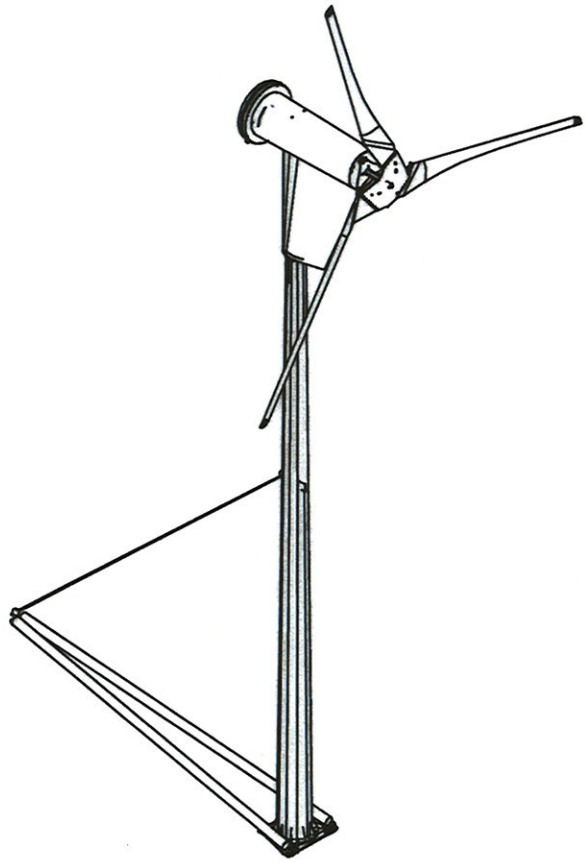
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Colours: –
: Blades and WT covers Black
Mast and Gin Poles Grey Galvanized



Gin Pole assembly for Raise lower – laid flat or removed during normal operation.

1:100



ZONE	REV	DESCRIPTION REVISIONS	DATE	APPROVED
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PREPARED BY GP | CHECKED BY

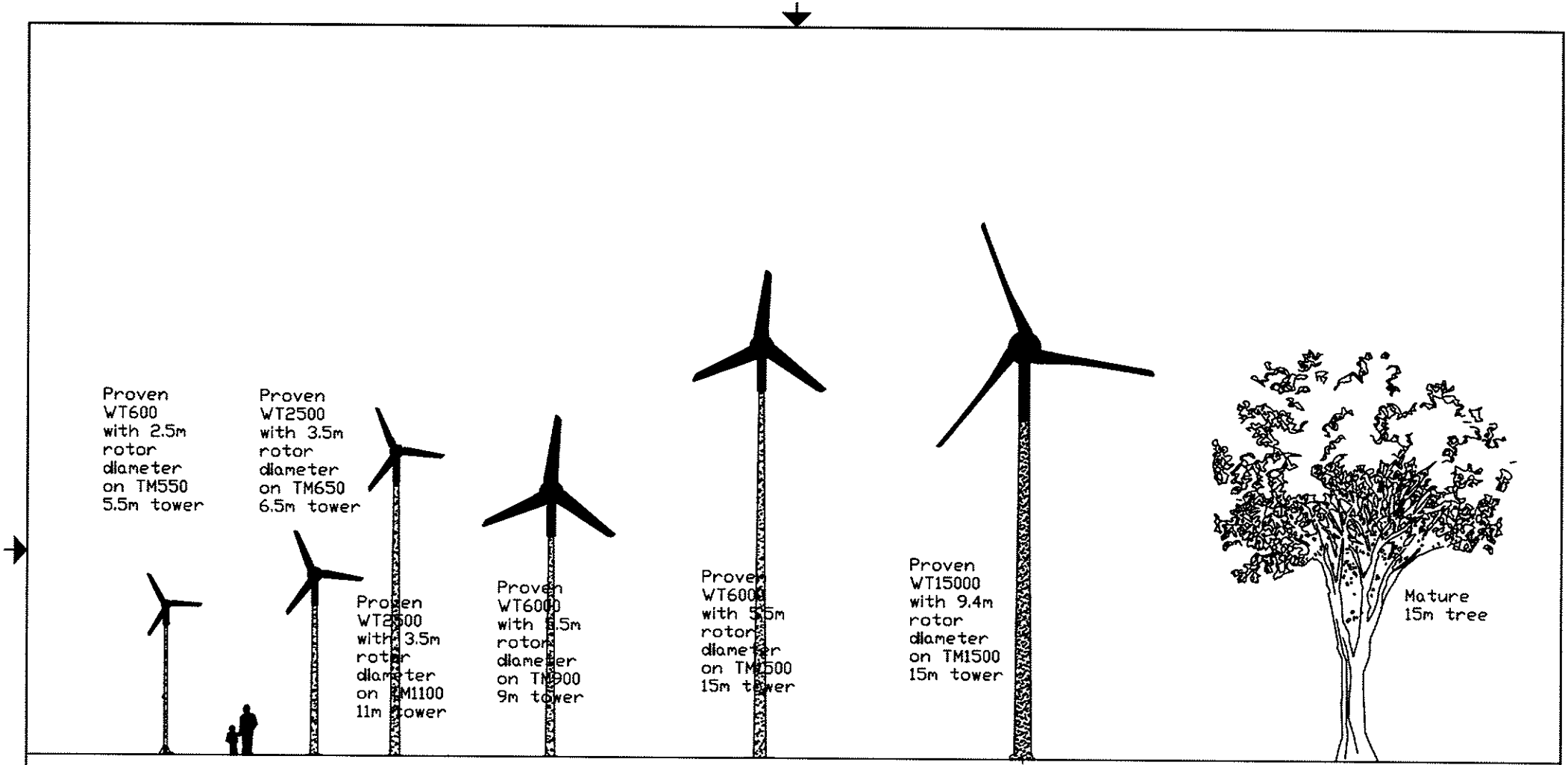
FSCM NO. | DWG NO. 15000 PL 002 | REV 1

SCALE 1:100 | DATE 01/09/2003 | SHEET sheet

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Proven WT15000 Wind Turbine with TM15000 15m Tower – 3D view



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PREPARED BY AJP | CHECKED BY

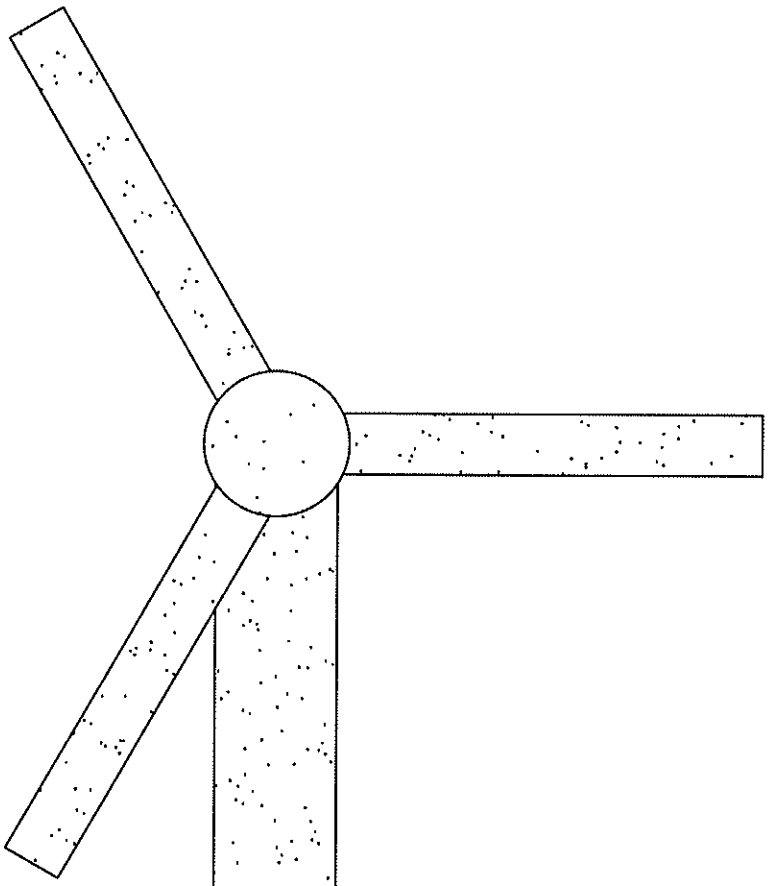
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SCALE | DATE 15/03/2005 | SHEET sheet

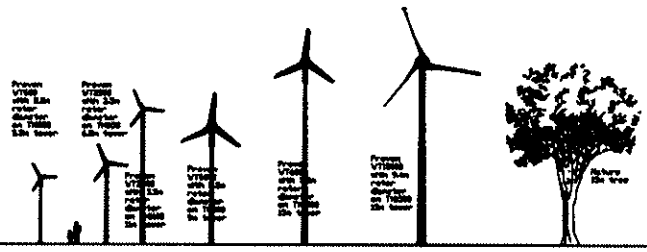
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Comparison of Proven WTs and Self Supporting Masts
G PL 001



Modern wind farm machine with
80m diameter and 100m tower eg
Vestas V80 or Nordex N80



ZONE	REV	DESCRIPTION REVISIONS	DATE	APPROVED
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	-	-	-	-
	-	-	-	-

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Comparison of Proven WTs to typical Wind Farm Wind Turbine

G PL 002

	FSCM NO.	DWG NO.	REV
		G PL 001_002 rev8.dwg	8
SCALE	Date 15/03/05	SHEET	



Proven WT15000 Wind Turbine

Mounted on TM1500 15m self supporting tower

Noise Emission Report

GENERAL

The dB (A) scale is the most common measure used to quantify noise. It covers sound intensity over the entire audible scale *and* takes account of the sensitivity of the human ear to give an overall measure of "loudness".

TYPICAL DB(A) LEVELS

Sound Level	dB (A)
Threshold of hearing	0
Whisper	30
Talking	60
City Traffic	90
Rock Concert	120
Jet Engine (10m away)	150

CURRENT BEST PRACTICE

In assessing the noise from a proposed wind turbine installation we are often interested in what noise levels will be at various distances from the wind turbine. It is accepted practice to *calculate* noise contributions from the wind turbine. This is because it is only practical to *measure* the wind turbine contribution accurately when it is 10 dBA above background noise. For example, background noise in a "quiet" environment is typically 30-40 dBA making it impossible to *measure* contributions less than 40-50 dB(A).

PROVEN WT15000 WIND TURBINE NOISE CALCULATIONS

Figure 1 shows how the noise emitted by a Proven WT15000 wind turbine on a 15m mast will disperse over the local environment. Maximum noise output at the base of the machine was recorded at 65dB(A) at a wind speed of 20 m/s. The noise output at the base of the mast in light winds 5m/s was 48 dB(A). The sound meter was held at a height of 1.5m from the ground. Background noise is louder than the turbine when more than 60m from the mast in both cases.

Figure 2 shows how the combined noise of wind turbine plus background; this is what will be detected by the human ear.

Figure 3 graphs the dBA difference between wind turbine and background plus common complaint classifications. *It can be generally taken that there will be no noise complaints where the turbine specific noise is 10dBA less than background.* This happens at a distance of 70-190m depending on wind speed.

Details of the calculations used in these graphs are given in Appendices B & C.

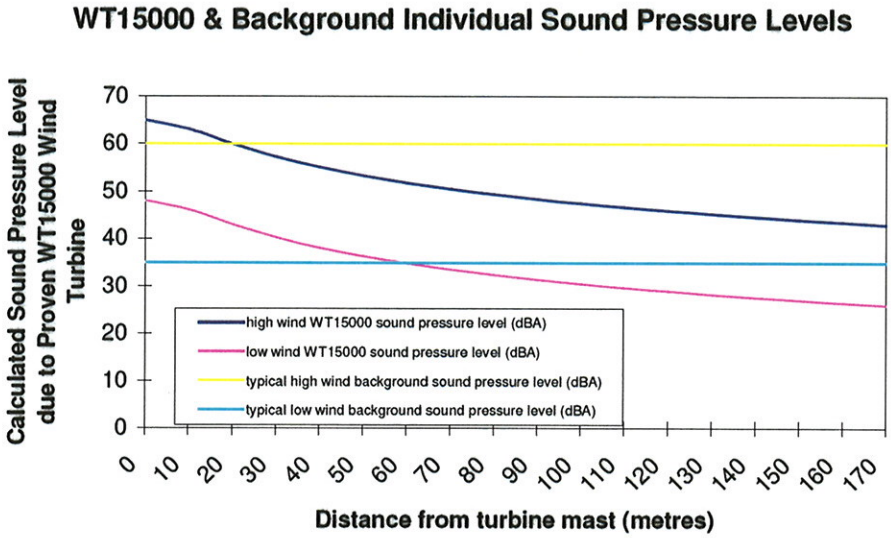


Figure 1

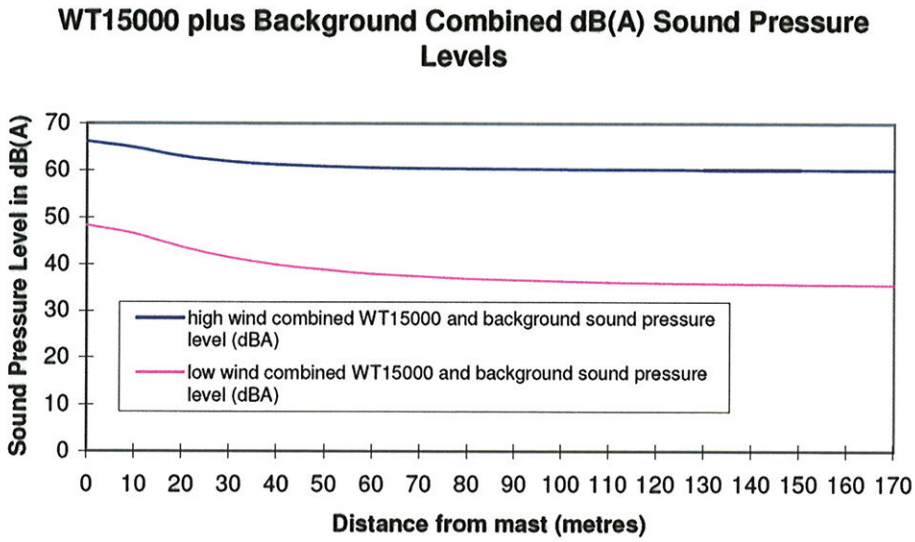


Figure 2

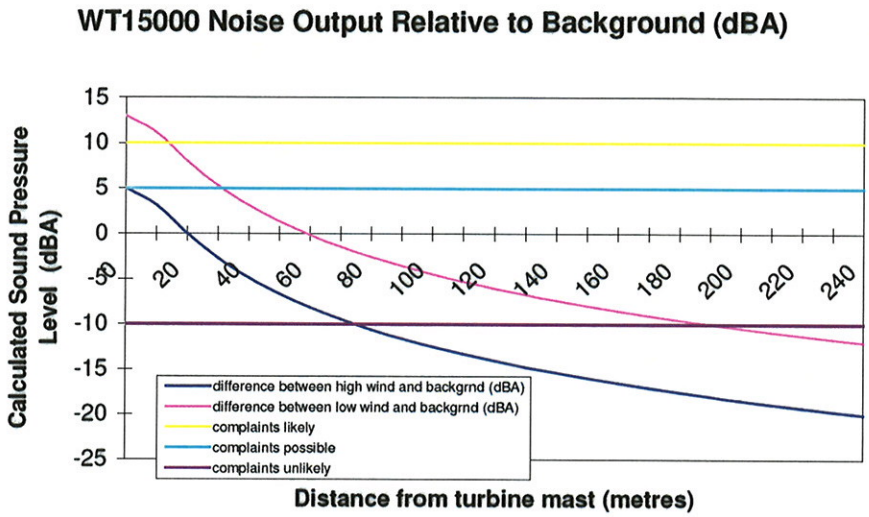


Figure 3

Note on Measurements Used in This Report

All measurements were taken on a portable SL-25 dBA sound meter at our demonstration wind turbine site in Kilmarnock. Proven Wind Turbines emit a swishing noise only - we do not believe full tonal analysis is needed for our small wind turbines (see also Appendix A).

COMMENT ON THE CALCULATIONS AND ASSUMPTIONS USED IN THIS REPORT

The above method does not take account of wind "streaming" noise to the downwind side of the turbine. In practice, turbine dBA levels will be shifted downwind by a variable amount depending on the individual site.

In both cases the dB(A) readings taken as coming from the wind turbine **certainly also included a contribution from background noise in a nearby tree.** Secondly, in the graphs shown, the typical background dBA readings have been chosen very conservatively (low).

For both of the above reasons, the results shown can be taken to be a "worst case scenario". A 1996 market survey of present Proven customers indicated that all would be happy to have the turbine closer to their houses than at present and that none had had complaints from neighbours about turbine noise after installation.

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Appendix A - Noise Reduction Features in Proven Wind Turbines

Feature	Benefit
Proven rotors are specially designed to operate at low rpm (typical max Tip Speed Ratio 6)	Blades and bearings rotate slowly keeping air noise to a minimum.
Direct Drive Permanent Magnet Generator	There is no gearbox as the rotor is coupled direct to the generator. This eliminates the gearbox hum which is the main source of noise in turbines with gearboxes. There are no touching parts.
Specially shaped blade tips	The rounded tips on Proven Wind Turbine blades are designed to reduce the vortices present at the end of any aerofoil. This keeps wind noise to a minimum.

Appendix B - Calculating Sound Pressure Levels

DEFINITIONS

1. Sound Pressure Level in dB(A) = 10 x $\log_{10}$ (sound power in W/m^2)

2. Sound Power in Watts/m^2 = $10^{0.1 \times (dB-120)}$

Given a sound power P_1 at distance d_1 from a noise source the sound power P_2 at distance d_2 may be calculated by the formula

3. $P_2 = P_1 x \left(\frac{d_1}{d_2}\right)^2$

ADDING DBA SOUND PRESSURE LEVELS FROM DIFFERENT SOURCES AT POINT X

First convert the dBA ratings at their initial distances to sound powers using equation 2.

Use the equation 3 to work out the sound powers at point X where you are interested in the total sound pressure level

Add all the sound powers together to find P_{total}

Convert back using equation 1 to find $dB(A)_{total}$

Appendix C - Calculations used in this report

height to hub	15		dBA high	65														
height meter	1.5		dBA low	48														
initial height	13.5																	
initial dist	0																	
db=10log(power in w/m2)+120																		
sound power=10^(0.1(db-120)																		
horizontal distance (m)	actual distance	sound high (w/m2)	sound low (W/m2)	high wind WT15000 sound pressure level (dBA)	low wind WT15000 sound pressure level (dBA)	typical high wind background sound pressure level (dBA)	typical low wind background sound pressure level (dBA)	combined WT15000 plus background sound high	combined WT15000 plus background sound low	high wind combined WT15000 and background sound pressure level (dBA)	low wind combined WT15000 and background sound pressure level (dBA)	difference between high wind and backgrnd (dBA)	difference between low wind and backgrnd (dBA)	complaints likely	complaints possible	complaints unlikely
0	13.5	3.16E-06	6.31E-08	65	48	60	35	4.16E-06	6.63E-08	66	48	5	13	10	5	-10
10	16.8	2.04E-06	4.07E-08	63	46	60	35	3.04E-06	4.39E-08	65	46	3	11	10	5	-10
20	24.1	9.9E-07	1.97E-08	60	43	60	35	1.99E-06	2.29E-08	63	44	0	8	10	5	-10
30	32.9	5.33E-07	1.06E-08	57	40	60	35	1.53E-06	1.38E-08	62	41	-3	5	10	5	-10
40	42.2	3.23E-07	6.45E-09	55	38	60	35	1.32E-06	9.61E-09	61	40	-5	3	10	5	-10
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60	61.5	1.52E-07	3.04E-09	52	35	60	35	1.15E-06	6.2E-09	61	38	-8	0	10	5	-10
70	71.3	1.13E-07	2.26E-09	51	34	60	35	1.11E-06	5.42E-09	60	37	-9	-1	10	5	-10
80	81.1	8.76E-08	1.75E-09	49	32	60	35	1.09E-06	4.91E-09	60	37	-11	-3	10	5	-10
90	91.0	6.96E-08	1.39E-09	48	31	60	35	1.07E-06	4.55E-09	60	37	-12	-4	10	5	-10
100	100.9	5.66E-08	1.13E-09	48	31	60	35	1.06E-06	4.29E-09	60	36	-12	-4	10	5	-10
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120	120.8	3.95E-08	7.89E-10	46	29	60	35	1.04E-06	3.95E-09	60	36	-14	-6	10	5	-10
130	130.7	3.37E-08	6.73E-10	45	28	60	35	1.03E-06	3.84E-09	60	36	-15	-7	10	5	-10
140	140.6	2.91E-08	5.81E-10	45	28	60	35	1.03E-06	3.74E-09	60	36	-15	-7	10	5	-10
150	150.6	2.54E-08	5.07E-10	44	27	60	35	1.03E-06	3.67E-09	60	36	-16	-8	10	5	-10
160	160.6	2.24E-08	4.46E-10	43	26	60	35	1.02E-06	3.61E-09	60	36	-17	-9	10	5	-10
170	170.5	1.98E-08	3.95E-10	43	26	60	35	1.02E-06	3.56E-09	60	36	-17	-9	10	5	-10
180	180.5	1.77E-08	3.53E-10	42	25	60	35	1.02E-06	3.52E-09	60	35	-18	-10	10	5	-10
190	190.5	1.59E-08	3.17E-10	42	25	60	35	1.02E-06	3.48E-09	60	35	-18	-10	10	5	-10
200	200.5	1.43E-08	2.86E-10	42	25	60	35	1.01E-06	3.45E-09	60	35	-18	-10	10	5	-10
210	210.4	1.3E-08	2.6E-10	41	24	60	35	1.01E-06	3.42E-09	60	35	-19	-11	10	5	-10
220	220.4	1.19E-08	2.37E-10	41	24	60	35	1.01E-06	3.4E-09	60	35	-19	-11	10	5	-10
230	230.4	1.09E-08	2.17E-10	40	23	60	35	1.01E-06	3.38E-09	60	35	-20	-12	10	5	-10
240	240.4	9.97E-09	1.99E-10	40	23	60	35	1.01E-06	3.36E-09	60	35	-20	-12	10	5	-10
						sound w/m	sound w/m2									
						0.0000011	3.16E-09									