

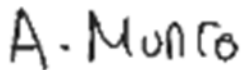
REPORT ID: 15156.01.T31.RP3

Adelaide Wind Energy Centre – Turbine T31 IEC 61400-11 Edition 2.1 Measurement Report

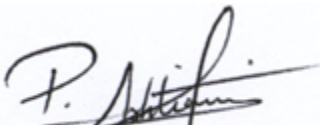
Prepared for:

Kerwood Wind LP
32185 Kerwood Road
Parkhill, ON
N0M 2K0

Prepared by:



Allan Munro, B.A.Sc., P.Eng.



Payam Ashtiani, B.A.Sc., P.Eng.

18 June 2019 – Revision 3



Revision History

Revision Number	Description	Date
1	Issued test report	December 17, 2015
2	Minor changes to body of the report only	December 23, 2015
3	Update to analysis to include Rotor distance to tower axis Update to Appendix F	June 18, 2019

This report in its entirety, including appendices contains 67 pages.

Statement Qualifications and Limitations

This report was prepared by Aercoustics Engineering Limited in accordance with International Standard IEC 61400-11 (Edition 2.0, released 2002 and amendment 1, released 2006-05), "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques". This report is specific only to the Wind Turbine identified in this report.

Aercoustics Engineering Limited shall not be responsible for any events or circumstances that may have occurred since the date on which the Wind Turbine was tested and/or this report was prepared, or for any inaccuracies contained in information that was provided to Aercoustics Engineering Limited. Further, Aercoustics Engineering Limited agrees that this report represents test data analysed as per the above described standard for the specific Wind Turbine described in this report, but Aercoustics Engineering Limited makes no other representations with respect to this report or any part thereof.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Aercoustics Engineering Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Any use of this report is subject to this Statement of Qualifications and Limitations. Any damages arising from improper use of this report or parts thereof shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of this report.

Table of Contents

Revision History	2
Statement Qualifications and Limitations	2
List of Appendices	5
1 Introduction	6
2 Wind Turbine Information	6
2.1 Wind turbine equipment specific information.....	6
2.2 Wind Turbine Location.....	7
3 Measurement Details	8
3.1 Measurement Equipment.....	8
3.1.1 Acoustic Measurement Equipment.....	8
3.1.2 Meteorological Equipment.....	8
3.2 Measurement Setup.....	8
3.2.1 Microphone Placement.....	8
3.2.2 Double Windscreen Setup.....	9
3.3 Measurement Schedule.....	9
3.4 Meteorological Conditions.....	9
3.5 Turbine operational information.....	9
4 Measurement Results	10
4.1 Deviations from IEC-61400-11 Edition 2.1.....	10
4.2 Special Notes & Considerations.....	10
4.3 Analysis Details.....	10
4.3.1 Double Windscreen Adjustment.....	10
4.3.2 Wind Speed Correction.....	10
4.4 Type B uncertainties.....	11
4.5 Sound Pressure Level Measurements.....	11
4.6 Sound Power Level of Turbine.....	12
4.7 Tonality Analysis.....	12
5 Closure	12
6 References	12

List of Figures

Figure A.01 – Site plan.....	Appendix A
Figure A.02 – Site photos	Appendix A
Figure B.01 – Power Curve.....	Appendix B
Figure B.02 – Rotor RPM vs. Wind Speed.....	Appendix B
Figure C.01 – Plot of sound power level at each integer wind speed.....	Appendix C
Figure C.02 – Plot of overall measurement data pairs at Position 1 (Turbine ON & Background)	Appendix C
Figure C.03 – Plot of sound pressure spectrum in 1/3 Octave at 6 m/s.....	Appendix C
Figure C.04 – Plot of sound pressure spectrum in 1/3 Octave at 7 m/s.....	Appendix C
Figure C.05 – Plot of sound pressure spectrum in 1/3 Octave at 8 m/s.....	Appendix C
Figure C.06 – Plot of sound pressure spectrum in 1/3 Octave at 9 m/s.....	Appendix C
Figure C.07 – Plot of sound pressure spectrum in 1/3 Octave at 10 m/s.....	Appendix C
Figure D.01 – Plot of narrow band spectra – Turbine ON vs. Background at 6 m/s.....	Appendix D
Figure D.02 – Plot of narrow band spectra – Turbine ON vs. Background at 7 m/s.....	Appendix D
Figure D.03 – Plot of narrow band spectra – Turbine ON vs. Background at 8 m/s.....	Appendix D
Figure D.04 – Plot of narrow band spectra – Turbine ON vs. Background at 9 m/s.....	Appendix D
Figure D.05 – Plot of narrow band spectra – Turbine ON vs. Background at 10 m/s.....	Appendix D

List of Tables

Table 1 - Wind Turbine Details	6
Table 2 - Operating Details.....	6
Table 3 - Rotor Details.....	7
Table 4 - Gearbox Details.....	7
Table 5 - Generator Details	7
Table 6 - Acoustic Measurement Equipment.....	8
Table 7 – Meteorological Measurement Equipment.....	8
Table 8 - Measurement Schedule Summary	9
Table 9 - Summary of Type B uncertainties	11
Table 10 - Summary of Sound Pressure Level Measurements.....	11
Table 11 - LWA _{10m, K} at each integer wind speed	12
Table 12 - Tonality Assessment Summary.....	12
Table C.01 – Sound Pressure Spectrum in 1/3 Octave band 6-10m/s.....	Appendix C
Table C.02 – 1/3 Octave Band measurement uncertainties – Turbine ON.....	Appendix C
Table C.03 – 1/3 Octave Band measurement uncertainties – Background.....	Appendix C
Table D.01 – Tonality assessment table – 6 m/s.....	Appendix D
Table D.02 – Tonality assessment table – 7 m/s.....	Appendix D
Table D.03 – Tonality assessment table – 8 m/s.....	Appendix D
Table D.04 – Tonality assessment table – 9 m/s.....	Appendix D
Table D.05 – Tonality assessment table – 10 m/s.....	Appendix D
Table E.01 – Measurement data –Turbine ON.....	Appendix E
Table E.02 – Measurement data – Background.....	Appendix E

List of Appendices

Appendix A – Site Details

- Figure A.01 – Site plan
- Figure A.02 – Site photos

Appendix B – Turbine Information

- Figure B.01 – Power Curve
- Figure B.02 – Rotor RPM vs. Wind Speed

Appendix C – Apparent Sound Power Level

- Figure C.01 – Plot of sound power level at each integer wind speed
- Figure C.02 – Plot of overall measurement data pairs at Position 1 (Turbine ON & Background)
- Figure C.03 – Plot of sound pressure spectrum in 1/3 Octave at 6 m/s
- Figure C.04 – Plot of sound pressure spectrum in 1/3 Octave at 7 m/s
- Figure C.05 – Plot of sound pressure spectrum in 1/3 Octave at 8 m/s
- Figure C.06 – Plot of sound pressure spectrum in 1/3 Octave at 9 m/s
- Figure C.07 – Plot of sound pressure spectrum in 1/3 Octave at 10 m/s
- Table C.01 – Sound Pressure Spectrum in 1/3 Octave band 6-10m/s
- Table C.02 – 1/3 Octave Band measurement uncertainties – Turbine ON
- Table C.03 – 1/3 Octave Band measurement uncertainties – Background

Appendix D – Tonality Assessment

- Figure D.01 – Plot of narrow band spectra – Turbine ON vs. Background at 6 m/s
- Figure D.02 – Plot of narrow band spectra – Turbine ON vs. Background at 7 m/s
- Figure D.03 – Plot of narrow band spectra – Turbine ON vs. Background at 8 m/s
- Figure D.04 – Plot of narrow band spectra – Turbine ON vs. Background at 9 m/s
- Figure D.05 – Plot of narrow band spectra – Turbine ON vs. Background at 10 m/s
- Table D.01 – Tonality assessment table – 6 m/s
- Table D.02 – Tonality assessment table – 7 m/s
- Table D.03 – Tonality assessment table – 8 m/s
- Table D.04 – Tonality assessment table – 9 m/s
- Table D.05 – Tonality assessment table – 10 m/s

Appendix E – Measurement Data

- Table E.01 – Measurement data – Turbine ON
- Table E.02 – Measurement data – Background

Appendix F – Supplementary Information for the Regulator

- Appendix F.01 – Calibration Certificates
- Appendix F.02 – Compliance Statement
- Appendix F.03 – E-audit Checklist
- Appendix F.04 – Sample Calculation – Standardized Wind Speed

1 Introduction

Aercoustics Engineering Limited (Aercoustics) was retained by Kerwood Wind LP to conduct an acoustic measurement of turbine T31 at the Adelaide Wind Energy Centre. The purpose of the measurement was to provide verification of the maximum noise emission of the turbine. The measurement was carried out in accordance with International Standard IEC 61400-11 (Edition 2.0, released 2002 and amendment 1, released 2006-05), “Wind turbine generator systems – Part 11: Acoustic noise measurement techniques”. This report is specific only to Turbine T31.

2 Wind Turbine Information

2.1 Wind turbine equipment specific information

Wind turbine specific equipment information for turbine T31 was provided by Kerwood Wind LP and is summarized in Tables 1 – 5.

Table 1 - Wind Turbine Details

Wind Turbine Details	
Manufacturer	GE
Model Number	1.6-100
Turbine ID	WAD-031 (Adelaide)

Table 2 - Operating Details

Operating Details	
Vertical or Horizontal axis wind turbine	Horizontal
Upwind or downwind rotor	Upwind
Hub height	80 m
Horizontal distance from rotor centre to tower axis	4.1 m
Diameter of rotor	100 m
Tower type (lattice or tube)	Tube
Passive stall, active stall, or pitch controlled turbine	Pitch Controlled
Constant or variable speed	Variable
Power curve	See Figure B.01
Rotational speed at each integer standardised wind speed	See Figure B.02
Rated power output	1.62 MW
Control software version	V04.07.02C

Table 3 - Rotor Details

Rotor Details	
Rotor control devices	Electric Motor
Presence of vortex generators, serrated trailing edges	Serrated edges, no VGs
Blade type	GE 48.7 Glass- TPI
Serial number	S/N:30122 GE ID # D21907-101-02961-W860 S/N: 20128 GEID # D21907-101-02960-W860 S/N: 10137 GEID # D21907-101-02959-W860
Number of blades	3

Table 4 - Gearbox Details

Gearbox Details	
Manufacturer	Winergy
Model number	PEAB4431
Serial number	4851646-110-8

Table 5 - Generator Details

Generator Details	
Manufacturer	Hitachi
Model number	HIG- 3669J00 GE ID Tag # 1-6-HEAD-31457-P
Serial number	530437-9

2.2 Wind Turbine Location

Turbine T31 is located in the township of Adelaide Metcalfe, approximately 620m South of Mullifarry Drive, and 1120m West of Kerwood Road. The area surrounding T31 is flat and consists primarily of farmland.

A general layout of the area in which the turbine is located is provided in the site plan (Figure A.01).

3 Measurement Details

3.1 Measurement Equipment

3.1.1 Acoustic Measurement Equipment

A summary of acoustic equipment utilized by Aercoustics for the measurement of turbine T31 is summarized in Table 6.

Table 6 - Acoustic Measurement Equipment

Equipment	Manufacturer Name & Model	Serial Number
Acoustic Data acquisition system	LMS SCADA Mobile	53103922
Microphone	B&K 4189	2625197
Pre-amplifier	B&K 2671	2614901
Acoustic calibrator	B&K 4231	2513184

Calibration of the measurement setup was carried out before and after Aercoustics set of measurements.

3.1.2 Meteorological Equipment

Wind speed for Turbine ON was derived from the power curve (as per procedures outlined in IEC 61400-11). Wind direction for turbine ON measurements was utilized from the nacelle anemometer located at hub height (82m high) from turbine T31. Data for background measurements was obtained from a 10m high anemometer, which was placed as per guidelines outlined in IEC-61400-11.

The meteorological equipment is summarized in Table 7

Table 7 – Meteorological Measurement Equipment

Equipment	Manufacturer Name & Model	Serial Number
Anemometer	VAISALA WXT520	K425007
Serial to Analog Converter	NOKEVAL 7470	A165164

3.2 Measurement Setup

3.2.1 Microphone Placement

The measurement microphone was setup 130m from the base of the turbine in 'Position 1', (i.e. downwind of the turbine, as per IEC 61400-11) at an elevation of 0m relative to the base of T31. The microphone was placed in the centre of a circular, acoustically reflective board.

During the measurement period only data points for which the microphone was within 15 degrees of downwind from the turbine were used. The microphone position relative to downwind of the turbine was monitoring via the yaw angle output provided from the turbine

system (discussed further in Section 3.5). During placement of the microphone the turbine was parked and the reference yaw angle for that measurement logged.

When measurements of T31 were taken, the surrounding land was cleared farmland. There were no nearby reflecting surfaces (houses, barns etc.); as such the influence from reflecting surfaces was considered to be negligible.

Photos of the measurement setup are provided in Figure A.02, Appendix A.

3.2.2 Double Windscreen Setup

A double windscreen setup was not utilized.

3.3 Measurement Schedule

Table 8 provides a summary of the test date and times. Data was logged in 1 minute intervals for post-processing (as per the measurement standard).

Table 8 - Measurement Schedule Summary

Date	Test Type	Start Time	Finish time
December 10, 2015	Background	10:34am	11:37am
	Turbine ON	11:46am	12:17pm
	Background	12:23pm	1:28pm
	Turbine ON	1:40pm	2:40pm
	Turbine ON	2:46pm	3:22pm
	Turbine ON	3:36pm	4:06pm
	Turbine ON	4:13pm	5:53pm
	Turbine ON	6:12pm	7:04pm
	Background	7:07pm	7:25pm
	Turbine ON	7:36pm	8:36pm

3.4 Meteorological Conditions

Detailed meteorological data relevant to the measurement is provided in Appendix E.

As previously mentioned, wind speed for Turbine ON was derived from T31’s power curve (as per the standard), while wind direction was provided by T31’s nacelle anemometer (located at hub height). Background data was obtained from an anemometer located 10m above ground level near T31.

Temperature and pressure readings during the measurement period were provided by the 10m anemometer, located near turbine T31 for the duration of Aercoustics measurements.

3.5 Turbine operational information

Output data from the turbine (Power, yaw, RPM, pitch angle, and nacelle wind speed) were obtained as analog output signals that were simultaneously acquired with the acoustic and anemometer measurement data using Aercoustics data acquisition system.

4 Measurement Results

4.1 Deviations from IEC-61400-11 Edition 2.1

The anemometer was placed in the Edition 3.0 location due to site specific constraints. This deviation is expected to have little influence on the measurement.

4.2 Special Notes & Considerations

Turbine T32 is in the vicinity of T31. Turbine T32 was parked for the duration of the measurements.

4.3 Analysis Details

The following section outlines analysis of the measurement data acquired for T31. The data presented is exclusive of transient events such as vehicle traffic, wildlife, air traffic etc. The site has been assessed to have a roughness length of 0.05m, representative of farmland with some vegetation.

4.3.1 Double Windscreen Adjustment

As previously mentioned, no double wind screen was used, as such the measurement data did not require adjustment.

4.3.2 Wind Speed Correction

Method 1: “determination of the wind speed from the electric output and power curve” (as per IEC 61400-11) was used to adjust the measured turbine power output (provided by GE) to standardized wind speed data (10m above grade) for Turbine ON.

For data points between 5% and 95% of the rated power, Aercoustics applied a linear regression using the nacelle wind speed and corrected wind speed at hub height determined from electrical power output (for points beyond 95% of rated power).

Background wind speed was derived utilizing data acquired with the 10m anemometer.

4.4 Type B uncertainties

Type B uncertainties were obtained through interpretation of information provided in Annex D of IEC-61400-11. A summary of Type B uncertainties is provided in Table 9, while detailed information (including data in 1/3 octave) is provided in Appendix C.

Table 9 - Summary of Type B uncertainties

Component	Turbine ON Uncertainty (dB)	Background Uncertainty (dB)	Apparent Sound Power Level Uncertainty (dB)
Calibration	0.2	0.2	0.2
Instrument	0.2	0.2	0.2
Board	0.3	0.3	0.3
Distance	0.1	-	0.1
Impedance	0.1	0.1	0.1
Turbulence	0.4	-	0.4
Wind speed measured	0.9	0.9	0.9
Wind speed derived	0.2	-	0.2
Direction	0.3	-	0.3
Background	-	-	(Turbine ON – Background)

4.5 Sound Pressure Level Measurements

Sound pressure level measurements are summarized in Table 10. Detailed 1/3 Octave band spectrum data, respective uncertainties, and analysis plots are provided in Appendix C. A copy of the unprocessed measurement data used for analysis is provided in Appendix E and includes meteorological and turbine operational data.

As the purpose of this measurement was to verify turbine noise emission, testing was conducted in conformity with IEC 61400-11 section 5, paragraph 5 and a minimum of three integer wind speed values and 8m/s have been reported.

Table 10 - Summary of Sound Pressure Level Measurements

	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s
Turbine ON					
L_{eq} , (dBA)	54.0	54.4	54.4	55.0	55.4
# of data points	28	65	87	72	13
Uncertainty (dB)	0.9	1.2	1.2	1.2	1.2
Background					
L_{eq} , (dBA)	38.4	40.3	40.6	39.1	38.4
# of data points	20	5	25	29	11
Uncertainty (dB)	1.8	2.6	2.5	2.7	2.2
Resultant Levels					
Signal to Noise (dB)	15.6	14.2	13.8	15.8	17.0
Turbine ON, Background adjusted L_{eq} , (dBA)	53.9	54.3	54.2	54.9	55.3

4.6 Sound Power Level of Turbine

The calculated sound power level of the turbine T31 (as per IEC 61400-11) is summarized in Table 11. Detailed analysis results are provided in Appendix C.

Table 11 - LWA_{10m, K} at each integer wind speed

	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s
Apparent LWA, (dBA)	102.8	103.1	103.1	103.7	104.1
Uncertainty (dB)	0.9	1.2	1.2	1.2	1.2

4.7 Tonality Analysis

The tonality analysis for Turbine T31 is summarized in Table 12, while plots of narrow band spectra at each wind speed are provided in Appendix D.

Table 12 - Tonality Assessment Summary

Wind Speed (m/s)	Frequency (Hz)	Tonality, ΔL_{tn} (dB)	Tonal audibility, ΔL_a (dB)	FFT's with tones	Total # of FFT's	Presence (%)
6	129	-4.0	-2.0	11	12	92%
	557	0.2	2.6	6	12	50%
7	130	-0.4	1.6	12	12	100%
	261	-4.3	-2.3	11	12	92%
	558	3.5	5.8	11	12	92%
8	130	-3.6	-1.6	12	12	100%
	558	3.4	5.7	11	12	92%
9	555	2.9	5.2	12	12	100%
10	559	1.2	3.6	12	12	100%

5 Closure

Measurements and analysis were carried on Turbine T31 of the Adelaide Wind Energy Centre, located in the township of Adelaide Metcalfe as per International Standard IEC 61400-11 (Edition 2.0, released 2002 and amendment 1, released 2006-05), "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques".

Should you have any questions or comments please do not hesitate to contact the authors of this report.

6 References

1. International Standard IEC 61400-11 (Edition 2.0, released 2002 and amendment 1, released 2006-05), "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques".

Appendix A Site Details





Legend	
Project Components	Other Components
▲ Turbine (38)	● 1 Storey Receptor
⚡ Proposed Transmission 115 kV Line	● 2 Storey Receptor
⚡ Collector System	● 3 Storey Receptor
⚡ Access Road	● Vacant Lot Receptor
■ Substation	— Existing 500 kV Line
□ Laydown Area	— Existing Transmission Line
■ Project Location	— Railway
□ 120m Boundary	— Freeway
□ 300m Boundary	— Arterial Road
● Closest Point to Waterbodies	— Local Road / Street
Significant Natural Features	— Race Track
■ Wetland	— Pipeline
■ Valleyland	— Permanent Watercourse
■ Carey's Sedge	— Intermittent Watercourse
■ Yellow Stargrass	— Runway
■ Amphibian Breeding Habitat	■ Transformer Station
■ Bat Maternity Area	■ Park / Sports Field
■ Raptor Wintering Area	■ Residential Area
Cultural Heritage	■ Cemetery
■ Structure Locations A	■ Pit or Quarry
■ Structure Locations B	■ Waterbody
	■ Wetland
	▲ Napier Turbine

15156.01.T31.RP3
 Scale: NTS
 Drawn by: AM
 Reviewed by: PA
 Date: Dec15 2015
 Revision: 1

Project Name
 Adelaide Wind Energy Centre - Turbine T31 - IEC61400-11 Edition 2.1

Figure Title
 Site Plan

Figure A.01





15156.01.T31.RP3

Scale: NTS
Drawn by: AM
Reviewed by: PA
Date: Dec 15, 2015
Revision: 1

Project Name

Adelaide Wind Energy Centre - Turbine T31 - IEC61400-11 Edition 2.1

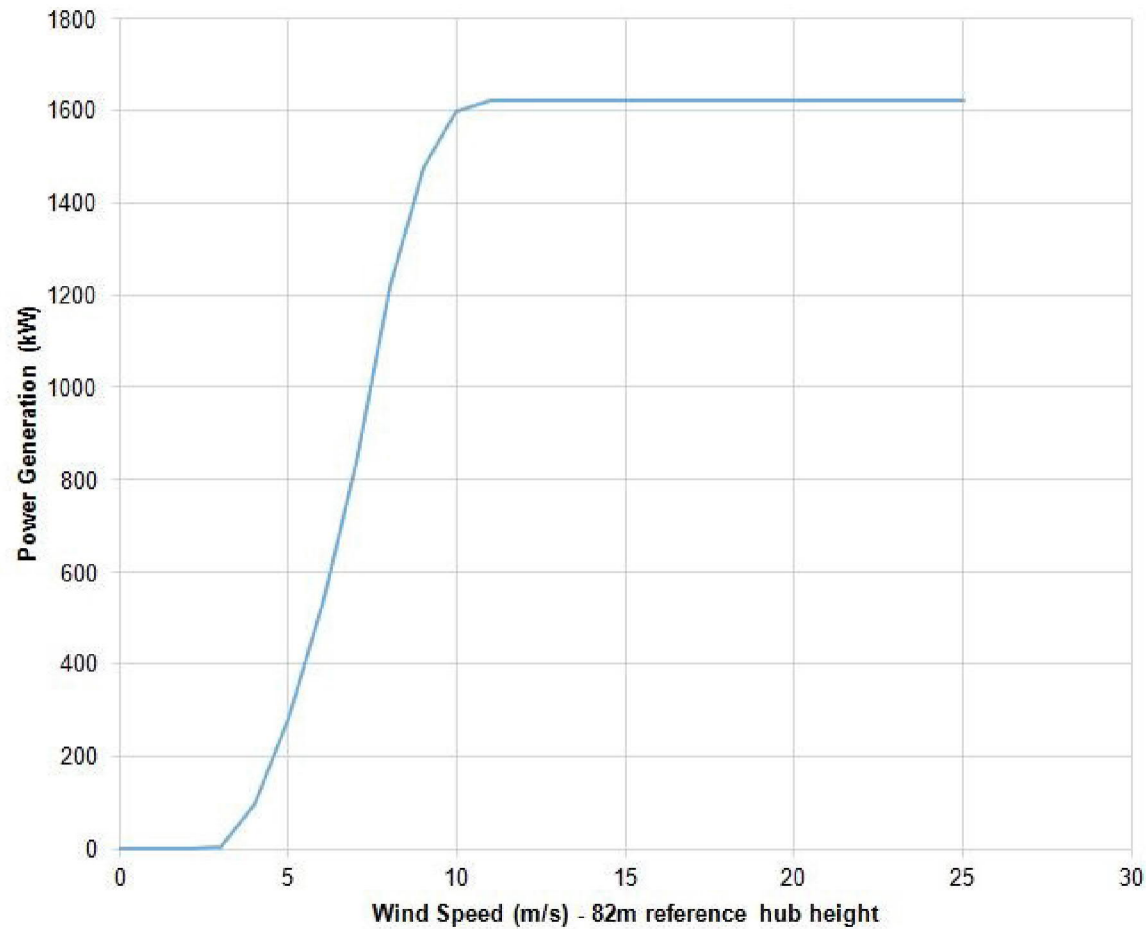
Figure Title

Site photos

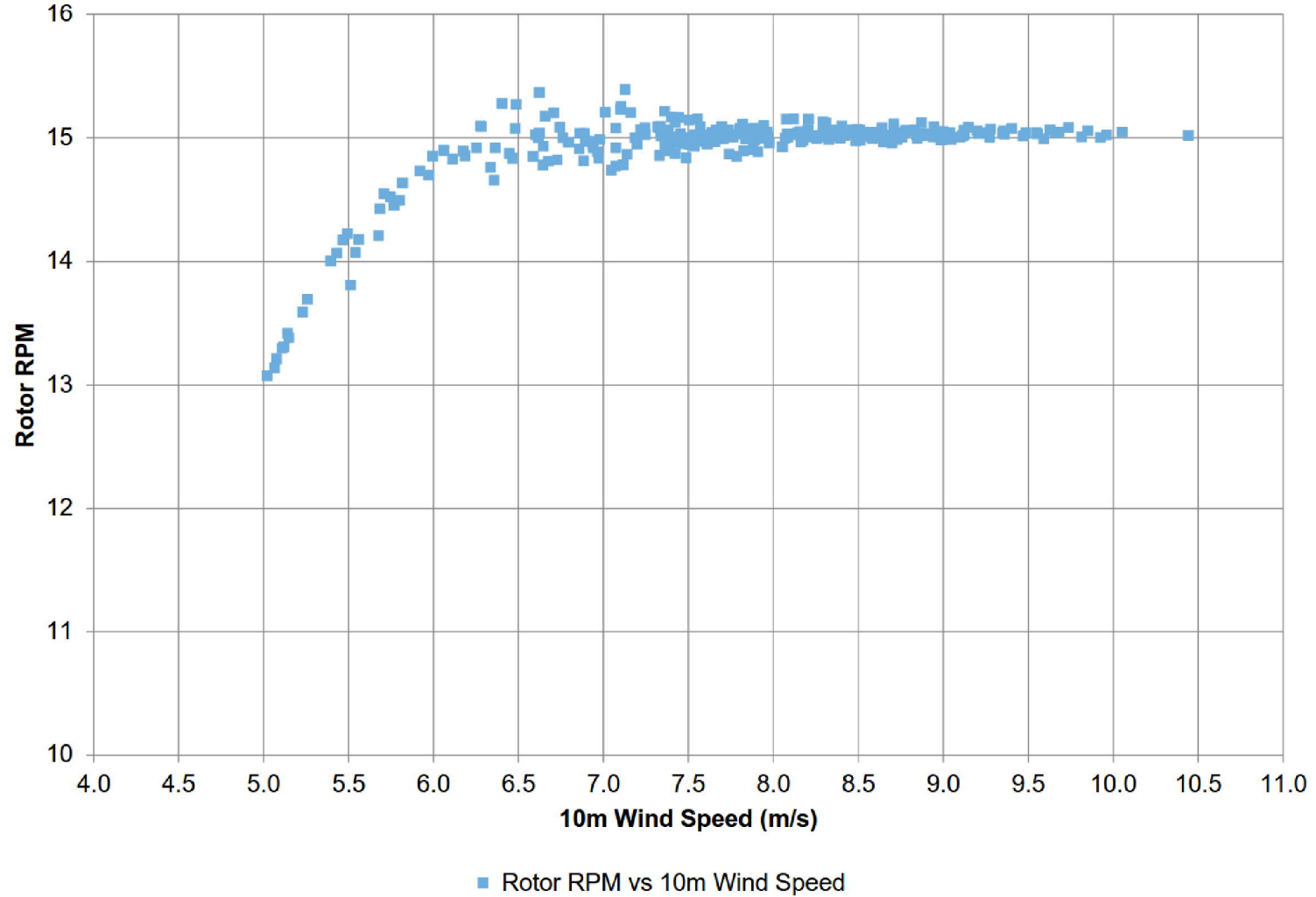
Figure A.02

Appendix B Turbine Information



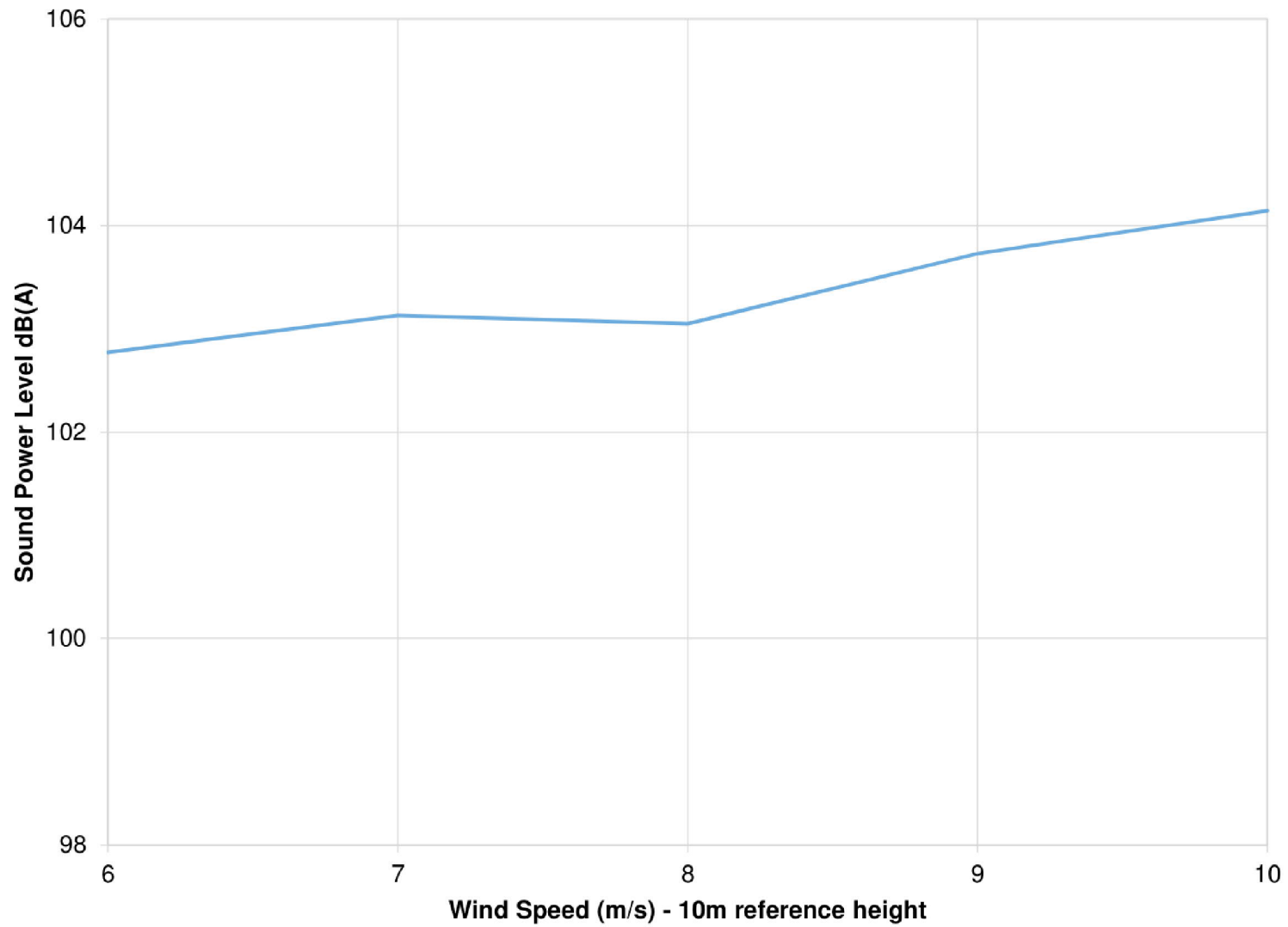


Power Curve	
Hub Wind Speed (m/s)	Power [kW]
0	0
1	0
2	0
3	4
4	97
5	281
6	528
7	838
8	1219
9	1478
10	1597
11	1620
12	1620
13	1620
14	1620
15	1620
16	1620
17	1620
18	1620
19	1620
20	1620
21	1620
22	1620
23	1620
24	1620
25	1620



Appendix C Apparent Sound Power Level





14331.00.T31.RP3

Scale: NTS
 Drawn by: AM
 Reviewed by: PA
 Date: June 12, 2019
 Revision: 2

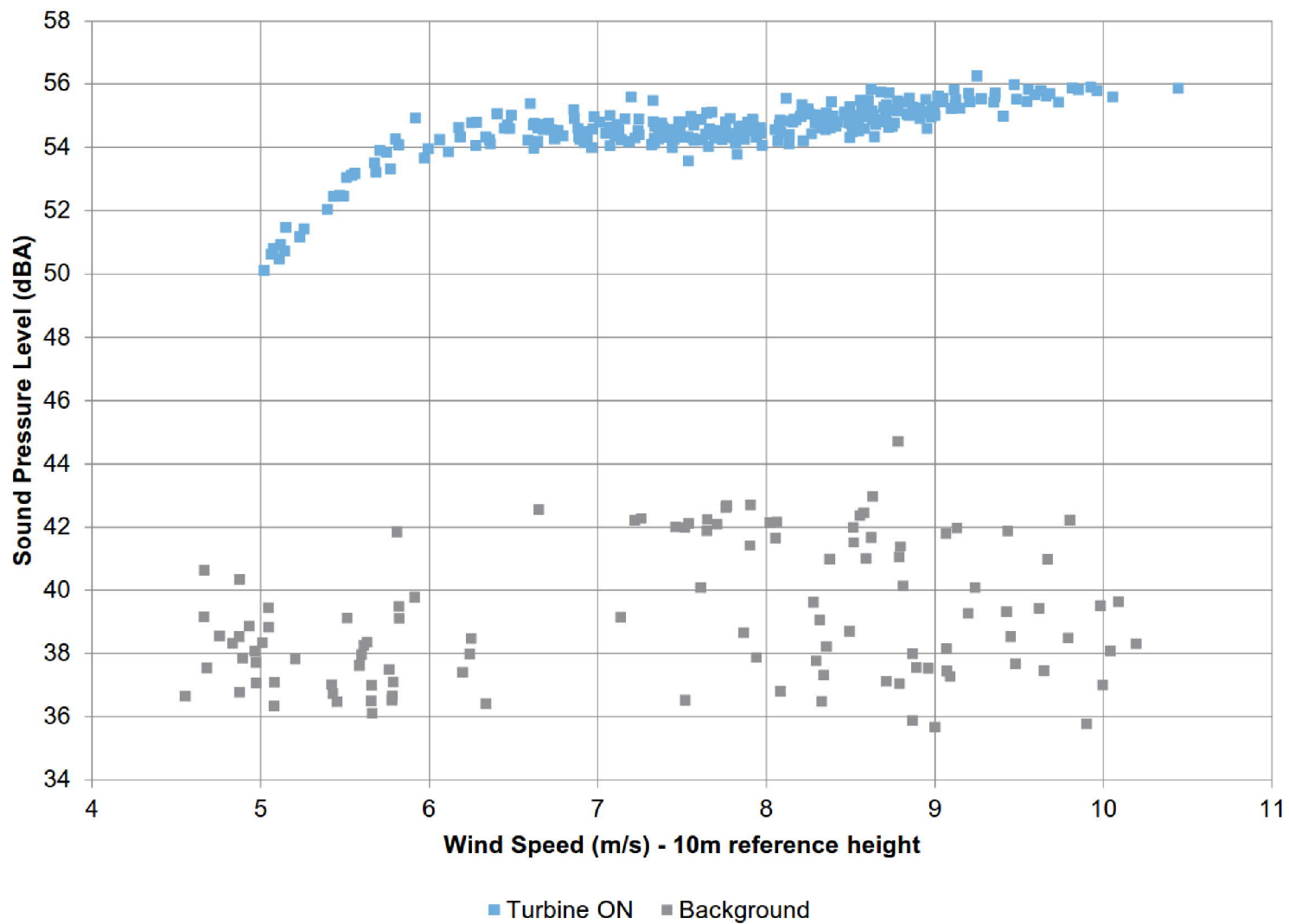
Project Name

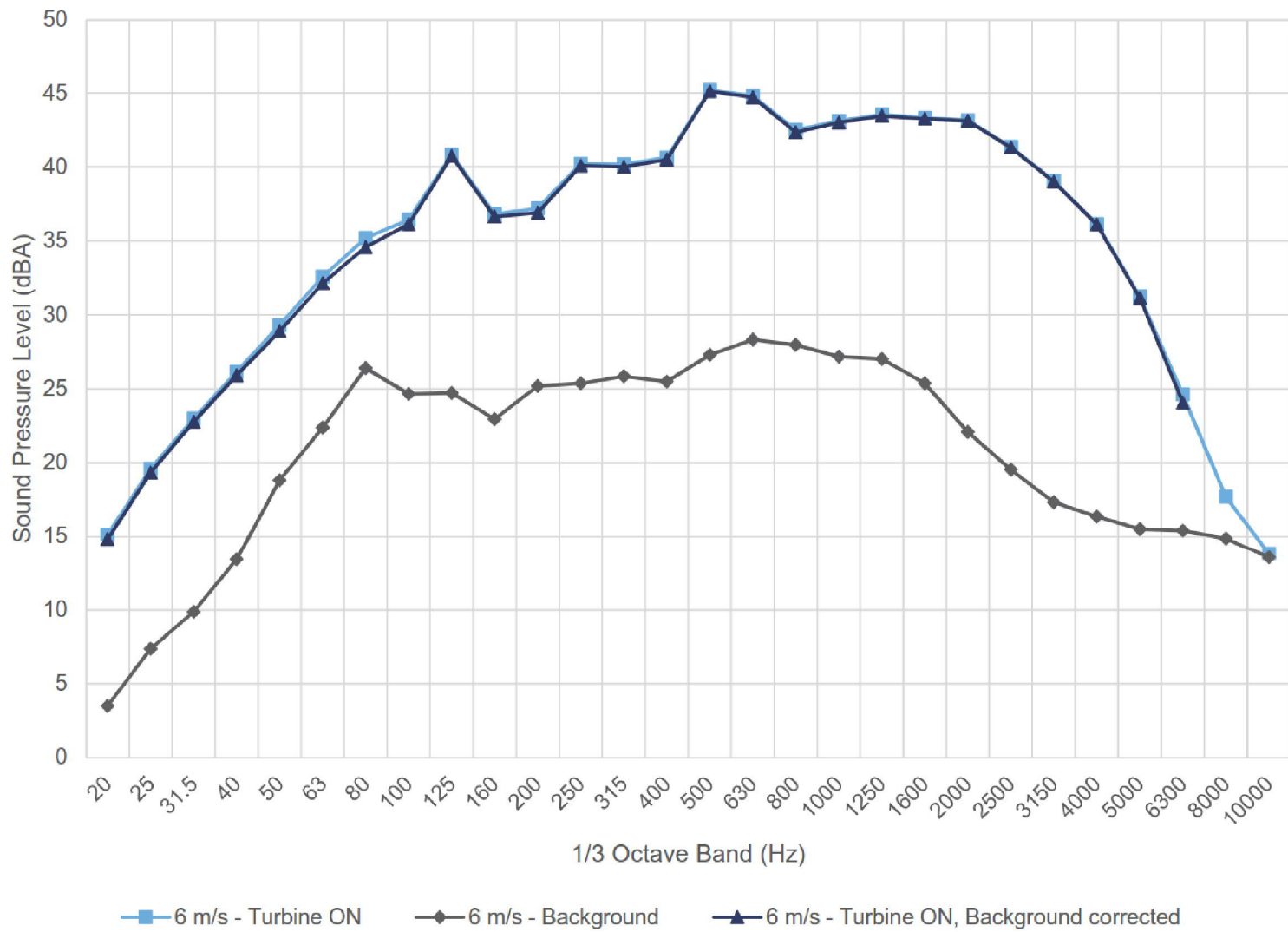
Adelaide Wind Energy Centre - Turbine T31 - IEC61400-11 Edition 2.1

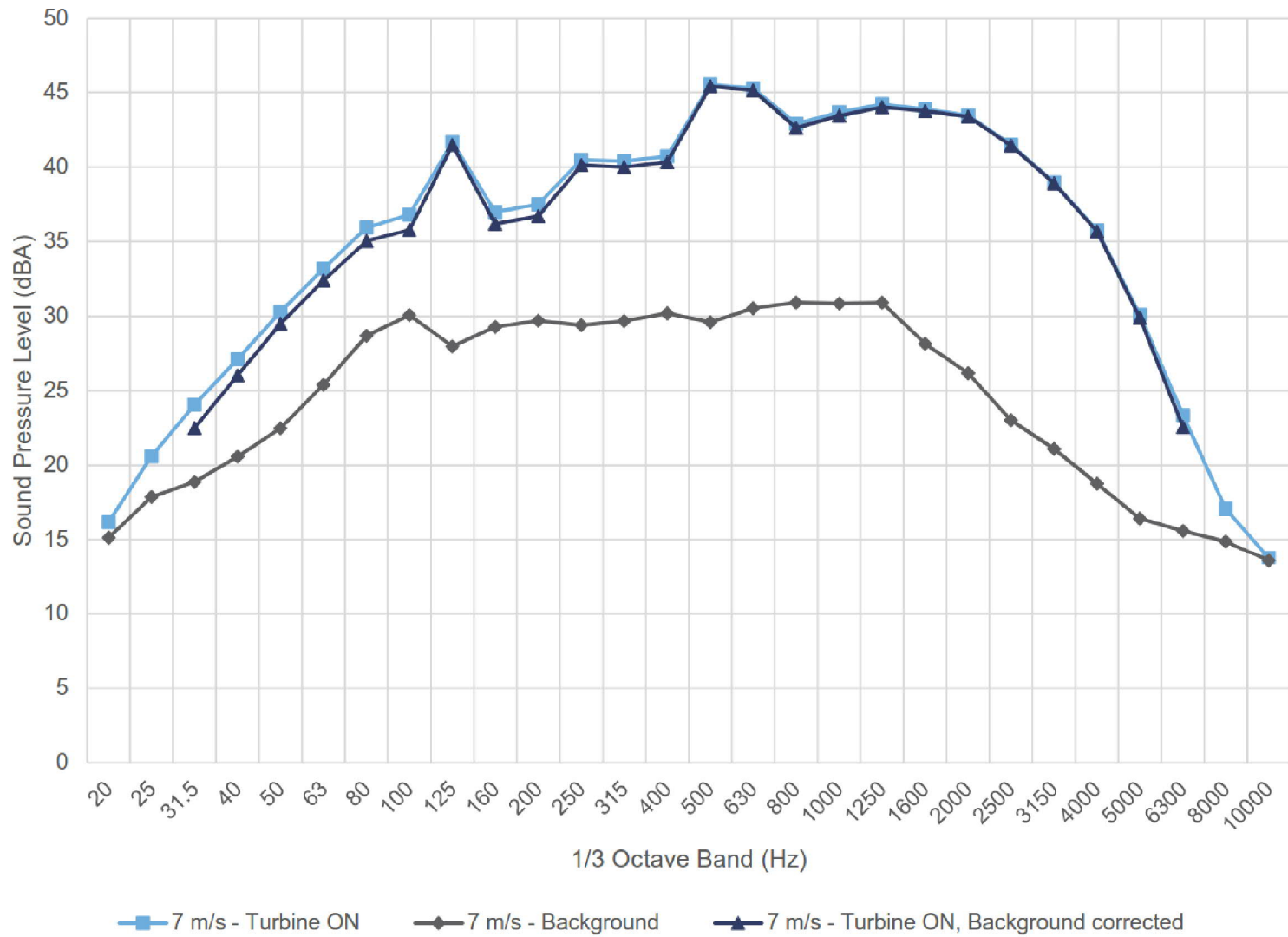
Figure Title

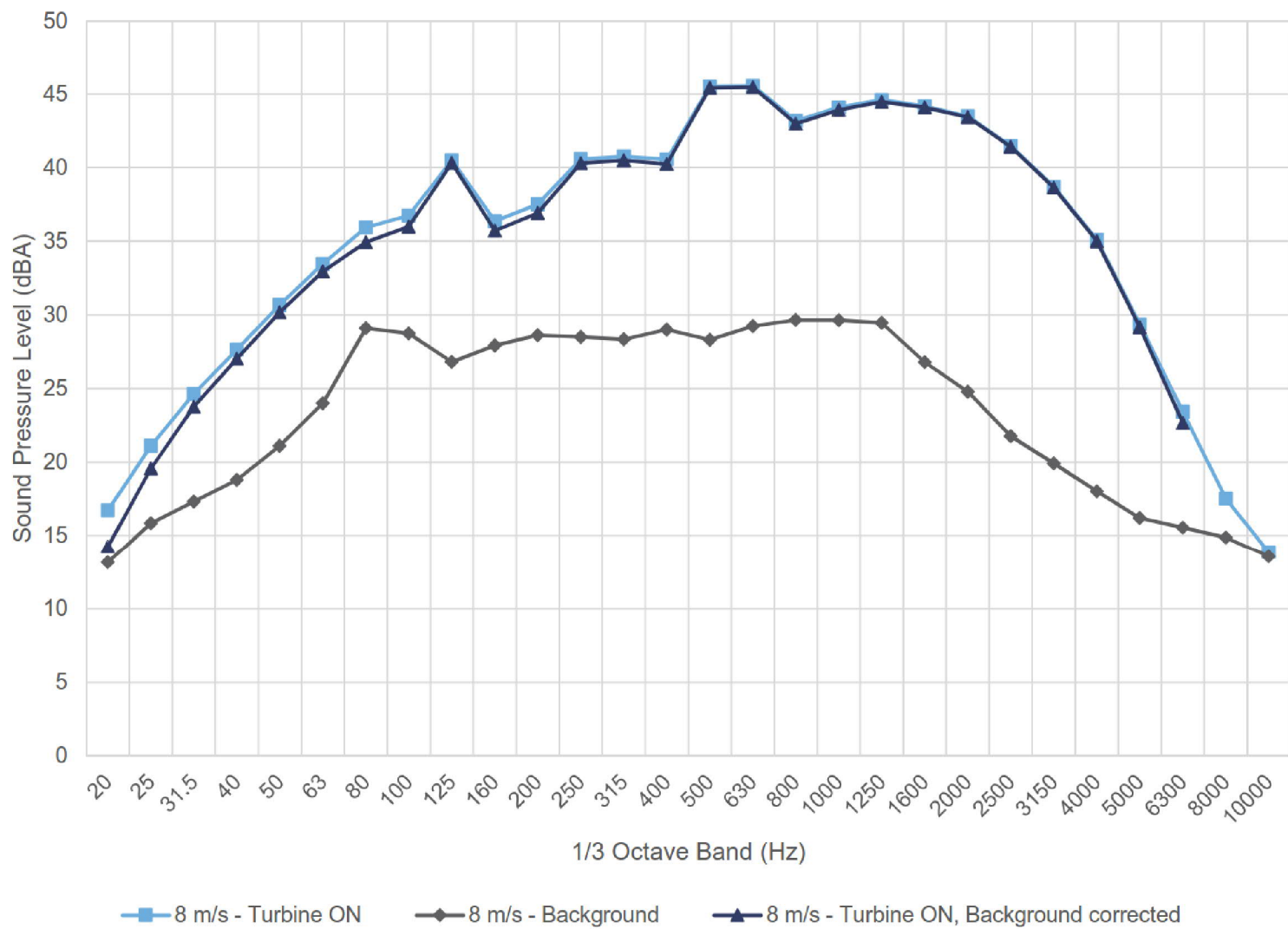
Plot of sound power level at each integer wind speed

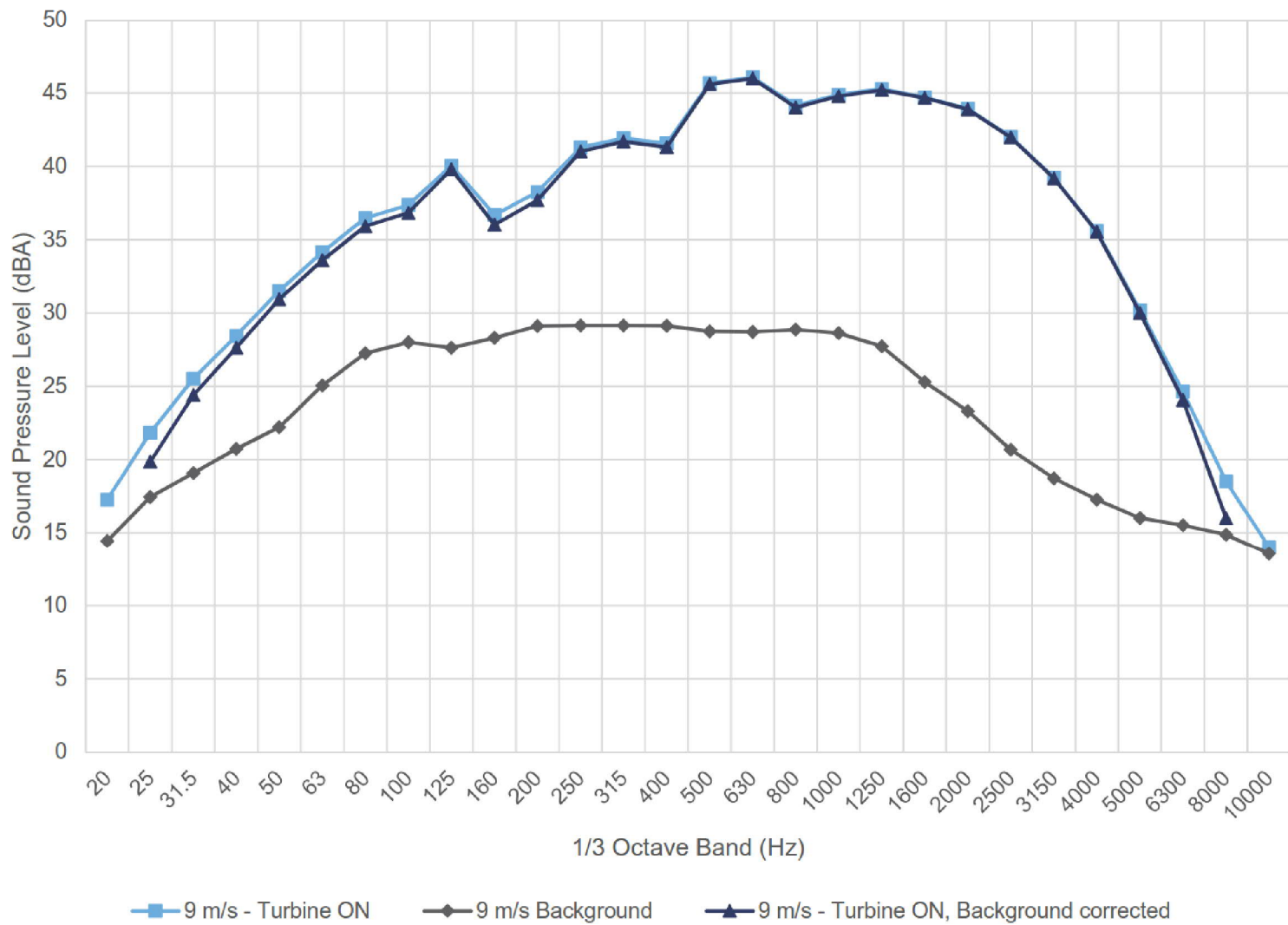
Figure C.01

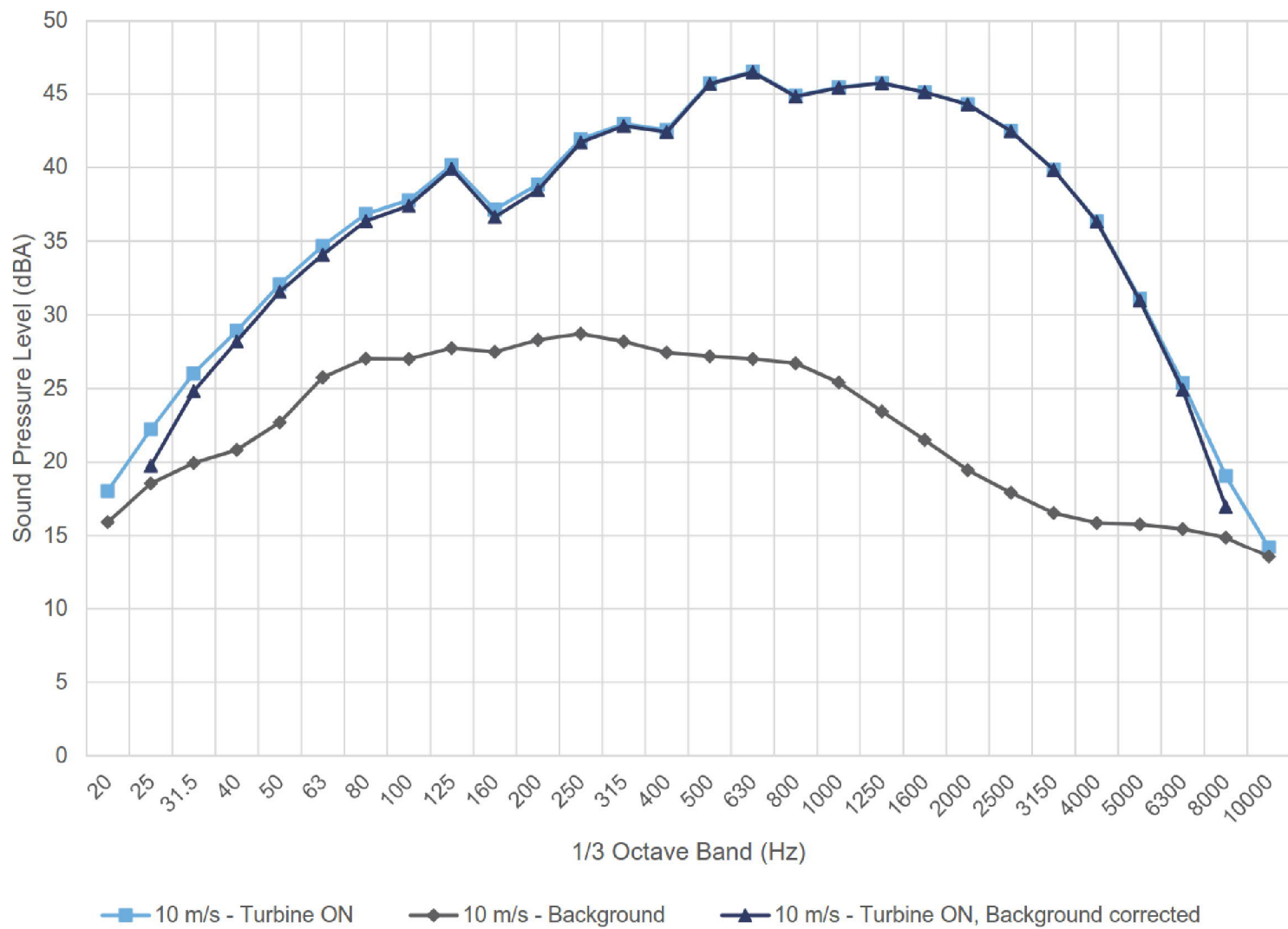












15156.01.T31.RP3

Scale: NTS
 Drawn by: AM
 Reviewed by: PA
 Date: Dec 15, 2015
 Revision: 1

Project Name

Adelaide Wind Energy Centre - Turbine T31 - IEC61400-11 Edition 2.1

Figure Title

Plot of sound pressure spectrum in 1/3 Octave at 10 m/s

Figure C.07

Table C.01 Sound Pressure Spectrum in 1/3 Octave Band 6-10m/s

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 1 of 1
 Created on: 12/15/2015

Wind Speed	Description	Sound Pressure Level per 1/3 Octave Band (Hz), dBA																											
		20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
6 m/s	Turbine on	15	20	23	26	29	33	35	36	41	37	37	40	40	41	45	45	43	43	44	43	43	41	39	36	31	25	18	14
	Background	4	7	10	13	19	22	26	25	25	23	25	25	26	26	27	28	28	27	27	25	22	20	17	16	16	15	15	14
	Turbine ON (background corrected)	15	19	23	26	29	32	35	36	41	37	37	40	40	41	45	45	42	43	43	43	43	41	39	36	31	24	**	**
7 m/s	Turbine on	16	21	24	27	30	33	36	37	42	37	37	40	40	41	46	45	43	44	44	44	43	41	39	36	30	23	17	14
	Background	15	18	19	21	22	25	29	30	28	29	30	29	30	30	30	31	31	31	31	28	26	23	21	19	16	16	15	14
	Turbine ON (background corrected)	**	**	23*	26	30	32	35	36	41	36	37	40	40	40	45	45	43	43	44	44	43	41	39	36	30	23	**	**
8 m/s	Turbine on	17	21	25	28	31	33	36	37	41	36	38	41	41	41	46	46	43	44	45	44	43	41	39	35	29	23	18	14
	Background	13	16	17	19	21	24	29	29	27	28	29	29	28	29	28	29	30	30	29	27	25	22	20	18	16	16	15	14
	Turbine ON (background corrected)	14*	20*	24	27	30	33	35	36	40	36	37	40	41	40	45	45	43	44	44	44	43	41	39	35	29	23	**	**
9 m/s	Turbine on	17	22	26	28	31	34	36	37	40	37	38	41	42	42	46	46	44	45	45	45	44	42	39	36	30	25	19	14
	Background	14	17	19	21	22	25	27	28	28	28	29	29	29	29	29	29	29	29	28	25	23	21	19	17	16	16	15	14
	Turbine ON (background corrected)	**	20*	24	28	31	34	36	37	40	36	38	41	42	41	46	46	44	45	45	45	44	42	39	36	30	24	16*	**
10 m/s	Turbine on	18	22	26	29	32	35	37	38	40	37	39	42	43	43	46	47	45	45	46	45	44	42	40	36	31	25	19	14
	Background	16	19	20	21	23	26	27	27	28	27	28	29	28	27	27	27	27	25	23	21	19	18	17	16	16	15	15	14
	Turbine ON (background corrected)	**	20*	25	28	32	34	36	37	40	37	38	42	43	42	46	46	45	45	46	45	44	42	40	36	31	25	17*	**

Values with * denote background is greater than 3 dB, but less than 6 dB from Turbine ON.
 Values with ** denote background was less than 3 dB from Turbine ON.

Table C.02 1/3 Octave Band measurement uncertainties - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Standard Measurement Uncertainty(Type A Uncertainty)

Wind Speed	Description	1/3 Octave Band (Hz), dB																												
		20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
6m/s	Type A uncertainties	2.0	2.0	1.9	1.6	1.4	1.4	1.1	1.0	1.1	1.0	0.8	1.2	0.8	0.7	1.3	0.9	0.6	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.0
7m/s	Type A uncertainties	1.6	1.1	1.1	0.9	0.9	0.8	0.9	0.8	1.5	1.1	0.6	0.6	0.9	0.9	1.1	0.5	0.5	0.3	0.3	0.3	0.3	0.4	0.5	0.6	0.8	0.6	0.3	0.0	
8m/s	Type A uncertainties	1.8	1.3	1.1	0.9	0.8	0.8	0.7	0.7	1.4	1.0	0.6	0.6	0.7	0.6	0.9	0.6	0.5	0.4	0.4	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.5	0.1	
9m/s	Type A uncertainties	1.6	1.2	1.0	0.9	0.8	0.7	0.6	0.6	0.6	0.7	0.5	0.5	0.7	0.6	0.7	0.5	0.5	0.4	0.4	0.3	0.3	0.4	0.4	0.5	0.6	0.6	0.5	0.1	
10m/s	Type A uncertainties	1.0	0.7	0.7	0.6	0.6	0.6	0.5	0.4	0.2	0.4	0.4	0.5	0.5	0.4	0.6	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.6	0.3	0.1	

Type B measurement uncertainty

calibration	0.2 dB
instrument	0.2 dB
board	0.3 dB
distance	0.1 dB
impedance	0.1 dB
turbulence	0.4 dB
wind speed measured	0.9 dB
wind speed derived	0.2 dB
direction	0.3 dB
Total - Wind speed measured	1.1 dB
Total - Wind speed derived	0.7 dB

Overall Uncertainty (Type A & B Uncertainties combined)

Wind Speed	Description	1/3 Octave Band (Hz), dB																											
		20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
6m/s	Type A & B uncertainties combined	2.2	2.2	2.0	1.7	1.5	1.5	1.3	1.2	1.3	1.2	1.1	1.4	1.0	1.0	1.5	1.1	0.9	0.8	0.9	0.8	0.9	0.9	0.8	0.8	0.9	0.9	0.8	0.7
7m/s	Type A & B uncertainties combined	2.0	1.6	1.6	1.4	1.4	1.4	1.4	1.4	1.9	1.5	1.3	1.3	1.4	1.4	1.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.4	1.3	1.2	1.1
8m/s	Type A & B uncertainties combined	2.1	1.7	1.5	1.4	1.4	1.4	1.3	1.3	1.8	1.5	1.3	1.2	1.3	1.3	1.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.2	1.1	
9m/s	Type A & B uncertainties combined	1.9	1.7	1.5	1.4	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.2	1.1	
10m/s	Type A & B uncertainties combined	1.5	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.3	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.1	1.1

Table C.03 1/3 Octave Band measurement uncertainties - Background

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Standard Measurement Uncertainty (Type A Uncertainty)

Wind Speed	Description	1/3 Octave Band (Hz), dB																											
		20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
6 m/s	Type A uncertainties	3.7	3.4	2.2	1.4	1.5	2.7	3.4	1.9	1.7	2.6	1.8	2.1	2.1	2.0	1.7	1.8	1.8	1.8	2.8	3.3	3.8	3.4	2.3	1.6	0.3	0.1	0.0	0.0
7 m/s	Type A uncertainties	1.5	1.4	1.5	1.3	0.7	0.4	1.0	1.4	0.5	1.2	1.0	0.8	0.5	1.6	1.4	1.7	2.5	2.9	3.9	3.1	3.8	3.2	2.9	1.8	0.5	0.1	0.0	0.0
8 m/s	Type A uncertainties	3.0	2.8	2.5	1.8	1.3	1.2	2.6	2.6	1.8	2.2	2.2	2.1	2.1	2.9	2.6	2.9	3.1	3.8	5.0	4.5	4.5	3.7	3.2	2.0	0.6	0.1	0.0	0.0
9 m/s	Type A uncertainties	4.2	4.1	4.0	3.5	2.5	1.9	2.1	3.0	2.8	3.3	2.9	2.9	2.7	3.3	2.6	2.3	2.5	3.0	3.7	3.4	3.4	2.7	2.4	1.7	0.5	0.1	0.1	0.0
10 m/s	Type A uncertainties	5.4	4.8	4.2	3.1	2.2	1.8	2.2	2.7	3.1	3.3	3.0	2.6	2.3	2.3	1.7	1.4	1.4	1.1	1.1	0.8	0.6	0.7	0.3	0.2	0.2	0.0	0.0	0.0

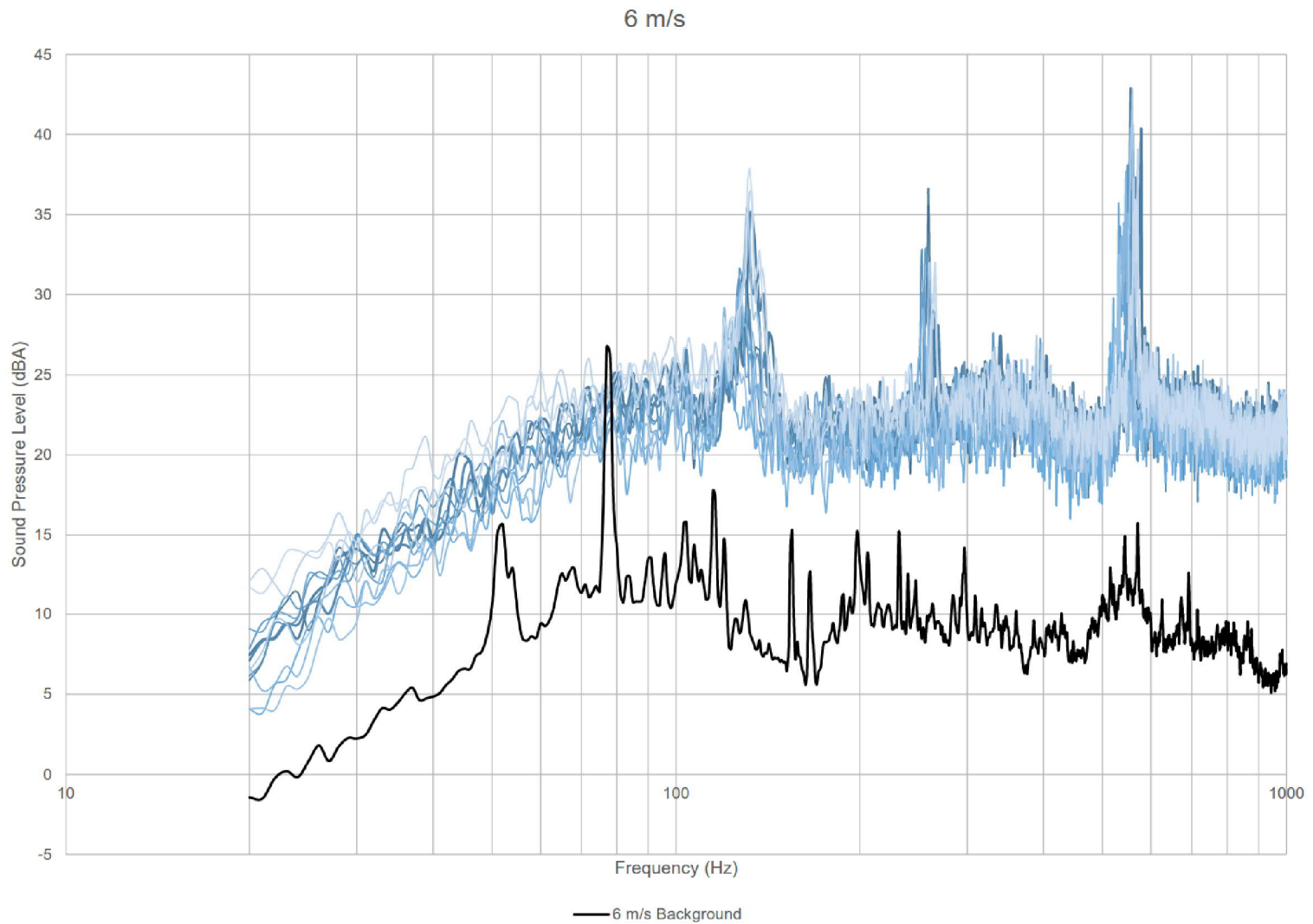
Type B measurement uncertainty	
calibration	0.2 dB
instrument	0.2 dB
board	0.3 dB
impedance	0.1 dB
wind speed measured	0.9 dB
Total	1.0 dB

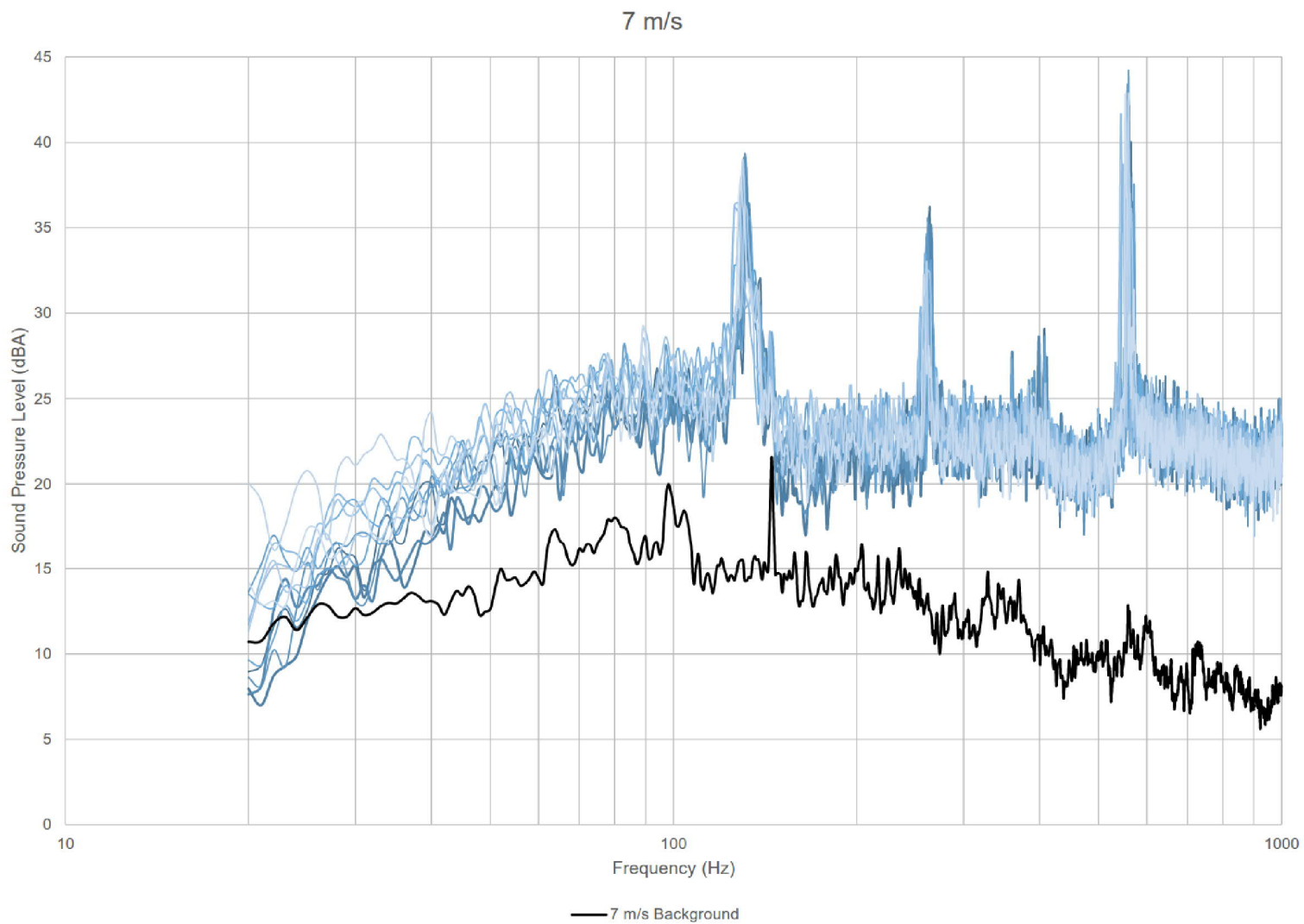
Overall Uncertainty (Type A & B Uncertainties combined)

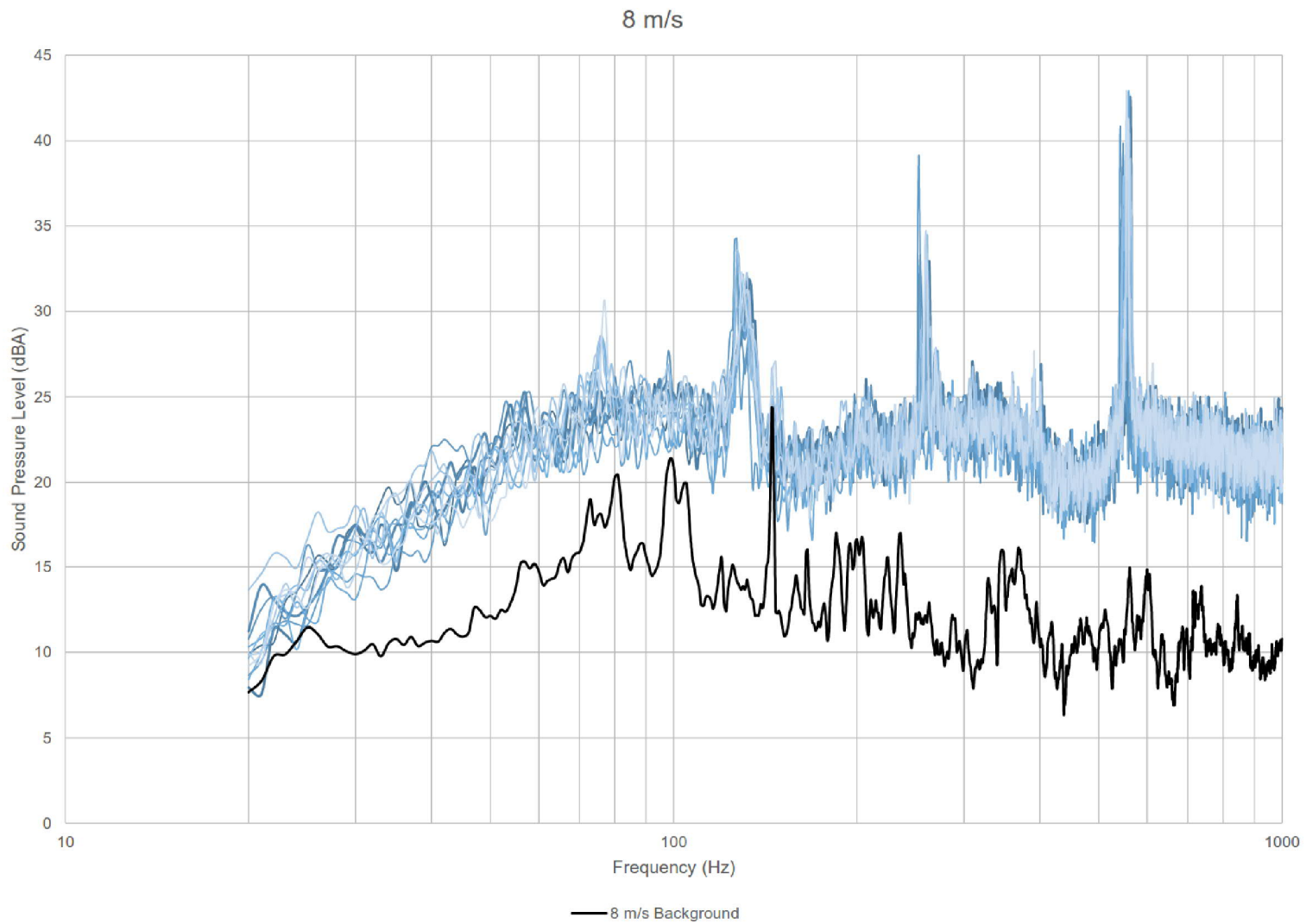
Wind Speed	Description	1/3 Octave Band (Hz), dB																											
		20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
6 m/s	Type A & B uncertainties combined	3.9	3.5	2.4	1.7	1.8	2.8	3.5	2.2	2.0	2.8	2.0	2.3	2.3	1.9	2.0	2.0	2.1	3.0	3.4	3.9	3.5	2.5	1.9	1.0	1.0	1.0	1.0	1.0
7 m/s	Type A & B uncertainties combined	1.8	1.7	1.8	1.6	1.2	1.1	1.4	1.8	1.1	1.6	1.4	1.3	1.1	1.9	1.7	2.0	2.7	3.1	4.1	3.3	3.9	3.4	3.0	2.0	1.1	1.0	1.0	1.0
8 m/s	Type A & B uncertainties combined	3.1	2.9	2.7	2.1	1.6	1.5	2.7	2.7	2.0	2.4	2.4	2.3	2.3	3.0	2.7	3.1	3.3	3.9	5.1	4.6	4.6	3.8	3.4	2.3	1.1	1.0	1.0	1.0
9 m/s	Type A & B uncertainties combined	4.4	4.3	4.2	3.7	2.7	2.1	2.3	3.1	3.0	3.4	3.1	3.1	2.8	3.4	2.8	2.5	2.7	3.1	3.8	3.5	3.6	2.9	2.6	2.0	1.1	1.0	1.0	1.0
10 m/s	Type A & B uncertainties combined	5.5	4.9	4.3	3.3	2.4	2.1	2.4	2.8	3.3	3.4	3.2	2.8	2.5	2.5	2.0	1.7	1.7	1.5	1.4	1.3	1.2	1.2	1.1	1.0	1.0	1.0	1.0	1.0

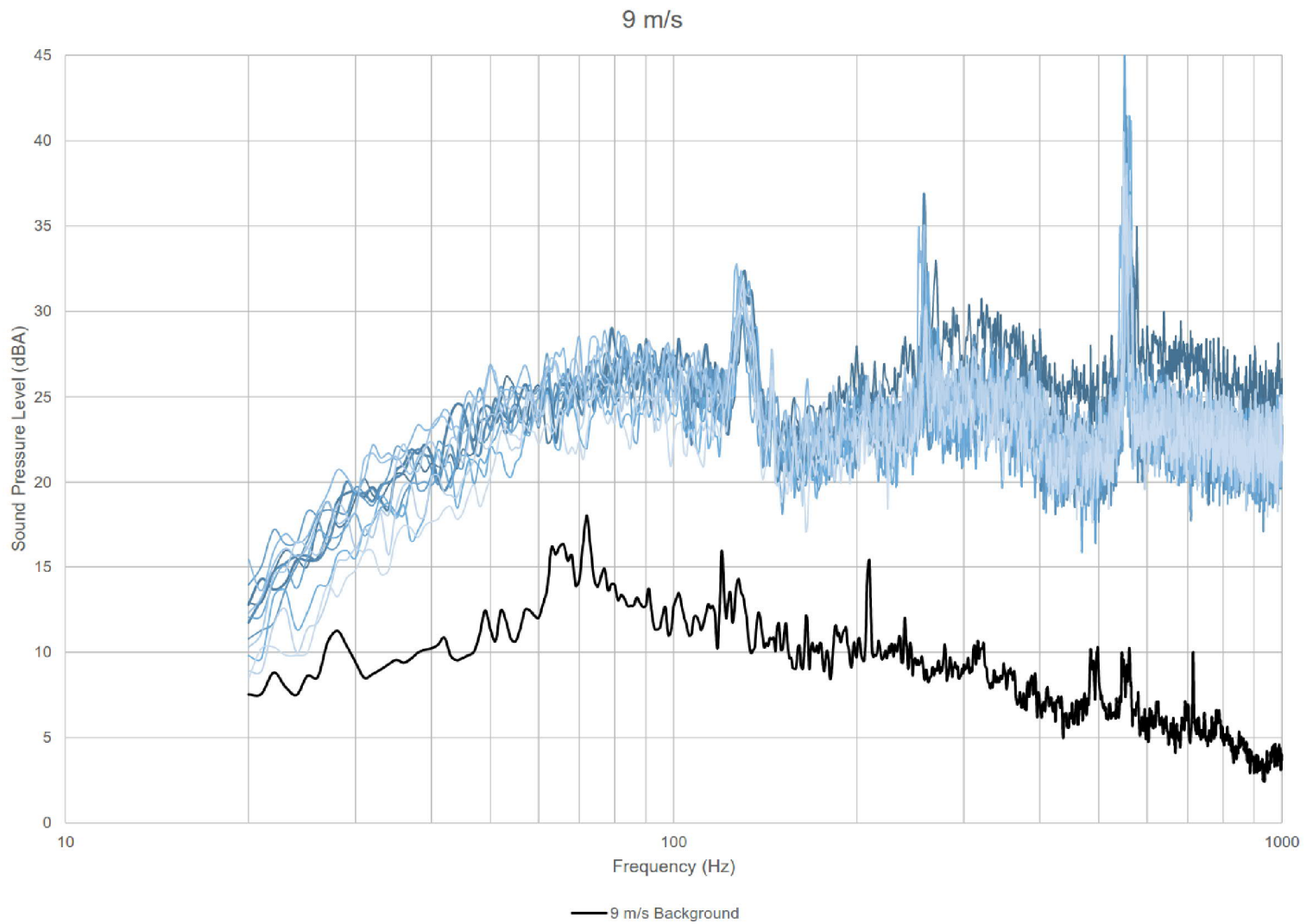
Appendix D Tonality Assessment











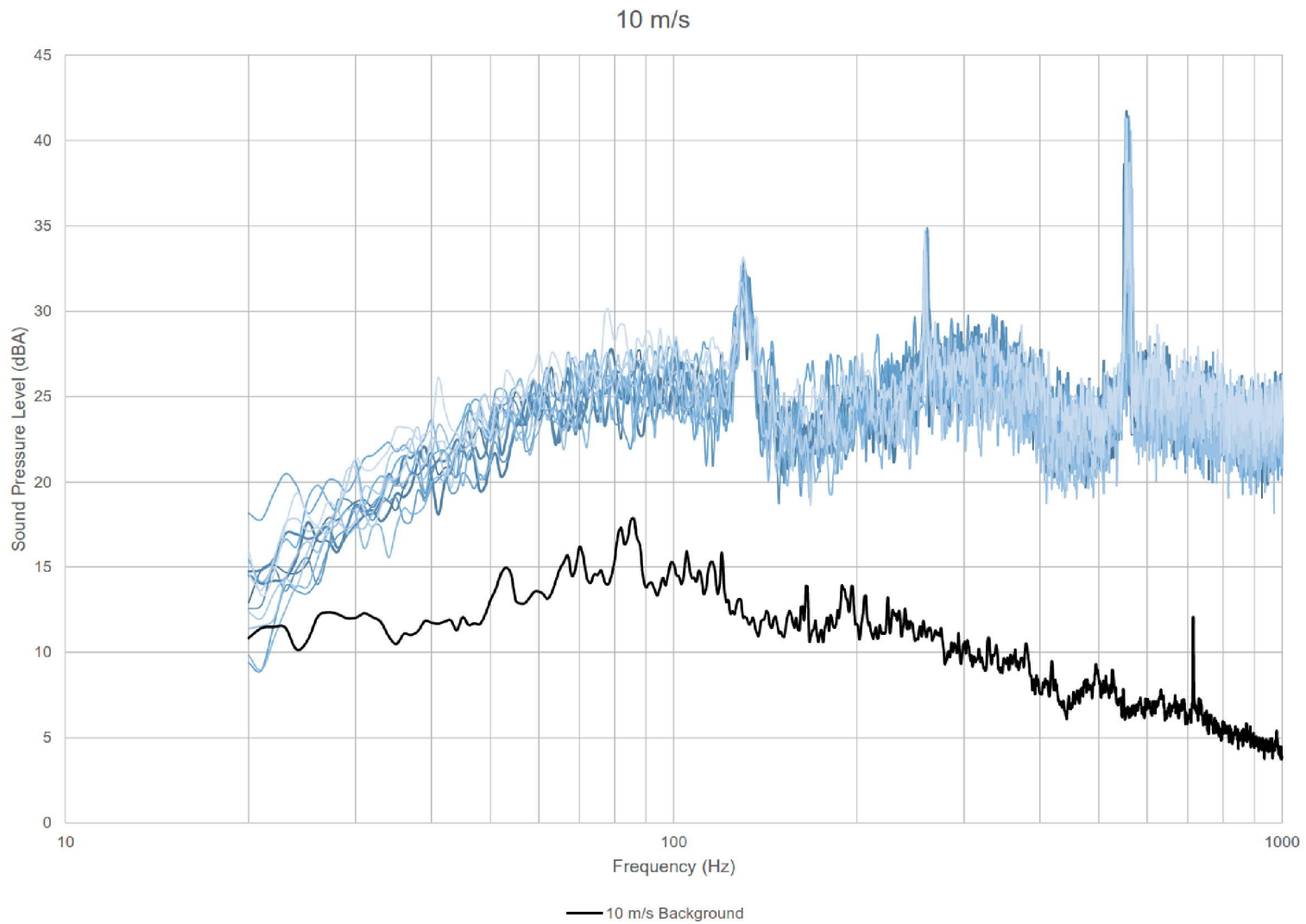


Table D.01 Tonality Assessment Table - 6 m/s

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 1 of 1
 Created on: 12/15/2015

Description	Data Points												Average
	1	2	3	4	5	6	7	8	9	10	11	12	
Centre frequency (Hz)	123	126	127	127	128	129	131	131	132	133	133		129
Energy average of all masking lines (dB)	22.0	22.4	23.5	22.7	22.2	23.2	23.2	24.2	24.8	23.8	24.8		
Background (dB)	13.4	13.4	13.4	13.4	13.3	12.2	10.9	10.9	10.9	10.8	10.8		12.3
Background adjusted criterion level (dB)	21.3	21.8	23.0	22.1	21.6	22.9	22.9	24.0	24.6	23.6	24.6		
Masking level (dB)	39.6	40.1	41.3	40.4	39.9	41.2	41.2	42.3	42.9	41.9	42.9		
Tone level (dB)	31.0	34.2	31.8	35.3	36.2	35.1	40.0	38.6	42.2	39.8	41.0		
Determination of tonality (dB)	-8.6	-6.0	-9.5	-5.1	-3.7	-6.0	-1.2	-3.8	-0.6	-2.1	-1.8	-18.3	-4.0
Frequency dependent audibility criterion (dB)													-2.0
Tonal Audibility (dB)													-2.0

Description	Data Points												Average
	1	2	3	4	5	6	7	8	9	10	11	12	
Centre frequency (Hz)	546	554	556	559	559	565							557
Energy average of all masking lines (dB)	23.4	23.3	23.0	24.0	23.9	24.3							
Background (dB)	11.2	11.1	11.1	11.0	11.0	11.0							11.1
Background adjusted criterion level (dB)	23.2	23.1	22.7	23.8	23.6	24.1							
Masking level (dB)	42.2	42.1	41.8	42.8	42.7	43.2							
Tone level (dB)	44.9	44.7	46.3	47.0	46.6	43.4							
Determination of tonality (dB)	2.7	2.6	4.4	4.1	3.9	0.2	-19.1	-19.1	-19.1	-19.1	-19.1	-19.1	0.2
Frequency dependent audibility criterion (dB)													-2.4
Tonal Audibility (dB)													2.6

Table D.02 Tonality Assessment Table - 7 m/s

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 1 of 2
 Created on: 12/15/2015

Description	Data Points												Average
	1	2	3	4	5	6	7	8	9	10	11	12	
Centre frequency (Hz)	126	127	129	129	130	131	131	131	131	132	133	133	130
Energy average of all masking lines (dB)	25.8	26.3	25.6	24.4	24.8	25.2	22.8	23.5	24.4	24.6	24.4	23.7	
Background (dB)	15.9	15.8	15.8	15.8	15.8	15.7	15.7	15.7	15.7	15.7	15.6	15.6	15.7
Background adjusted criterion level (dB)	25.3	25.9	25.1	23.7	24.2	24.6	21.8	22.7	23.8	24.0	23.8	23.0	
Masking level (dB)	43.6	44.2	43.4	42.0	42.5	42.9	40.1	41.0	42.1	42.3	42.1	41.3	
Tone level (dB)	40.5	41.4	42.4	42.1	42.5	42.4	41.7	42.4	41.6	41.3	40.7	41.3	
Determination of tonality (dB)	-3.1	-2.9	-1.1	0.1	0.0	-0.5	1.6	1.4	-0.5	-1.0	-1.4	0.1	-0.4
Frequency dependent audibility criterion (dB)													-2.0
Tonal Audibility (dB)													1.6

Description	Data Points												Average
	1	2	3	4	5	6	7	8	9	10	11	12	
Centre frequency (Hz)	255	258	259	261	261	261	262	262	264	265	265		261
Energy average of all masking lines (dB)	23.0	22.8	23.5	23.0	21.6	23.4	22.8	22.0	22.9	23.0	22.8		
Background (dB)	13.2	13.1	13.1	13.0	13.0	13.0	13.0	13.0	12.9	12.9	12.9		13.0
Background adjusted criterion level (dB)	22.5	22.3	23.1	22.5	20.9	22.9	22.3	21.4	22.4	22.6	22.4		
Masking level (dB)	41.0	40.7	41.5	41.0	39.3	41.4	40.7	39.9	40.9	41.0	40.8		
Tone level (dB)	31.4	34.3	36.8	35.0	36.5	38.1	36.9	37.6	37.8	38.8	36.6		
Determination of tonality (dB)	-9.6	-6.4	-4.7	-6.0	-2.8	-3.2	-3.8	-2.2	-3.0	-2.2	-4.3	-18.4	-4.3
Frequency dependent audibility criterion (dB)													-2.1
Tonal Audibility (dB)													-2.3

Table D.02 Tonality Assessment Table - 7 m/s

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 2 of 2
 Created on: 12/15/2015

Description	Data Points												Average
	1	2	3	4	5	6	7	8	9	10	11	12	
Centre frequency (Hz)	544	547	553	558	559	559	560	561	563	565	565		558
Energy average of all masking lines (dB)	23.2	22.9	23.6	23.8	22.9	23.4	24.1	23.3	23.6	24.1	24.1		
Background (dB)	10.2	10.2	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3		10.3
Background adjusted criterion level (dB)	23.0	22.7	23.4	23.6	22.6	23.1	24.0	23.0	23.4	23.9	23.9		
Masking level (dB)	42.0	41.7	42.5	42.6	41.7	42.2	43.0	42.1	42.5	43.0	43.0		
Tone level (dB)	49.1	44.0	46.1	48.4	44.9	46.4	49.5	43.7	43.8	42.2	43.7		
Determination of tonality (dB)	7.0	2.3	3.5	5.8	3.2	4.1	6.4	1.6	1.3	-0.8	0.7	-19.1	3.5
Frequency dependent audibility criterion (dB)													-2.4
Tonal Audibility (dB)													5.8

Table D.03 Tonality Assessment Table - 8 m/s

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 1 of 1
 Created on: 12/15/2015

Description	Data Points												Average
	1	2	3	4	5	6	7	8	9	10	11	12	
Centre frequency (Hz)	127	127	127	129	130	130	130	132	132	133	133	133	130
Energy average of all masking lines (dB)	24.8	22.1	24.4	22.8	22.7	23.2	24.0	23.3	23.1	21.9	23.6	23.6	
Background (dB)	15.9	15.9	15.9	15.8	15.8	15.8	15.8	15.6	15.6	15.5	15.5	15.5	15.7
Background adjusted criterion level (dB)	24.2	20.9	23.7	21.9	21.7	22.4	23.3	22.5	22.2	20.8	22.9	22.9	
Masking level (dB)	42.4	39.2	42.0	40.2	40.0	40.7	41.6	40.8	40.5	39.1	41.2	41.2	
Tone level (dB)	35.6	37.8	34.3	37.8	37.5	37.5	36.7	36.3	37.4	37.3	34.9	37.4	
Determination of tonality (dB)	-6.8	-1.4	-7.8	-2.4	-2.5	-3.2	-4.9	-4.4	-3.1	-1.7	-6.3	-3.8	-3.6
Frequency dependent audibility criterion (dB)													-2.0
Tonal Audibility (dB)													-1.6

Description	Data Points												Average
	1	2	3	4	5	6	7	8	9	10	11	12	
Centre frequency (Hz)	548	555	556	556	556	559	560	560	561	563	563		558
Energy average of all masking lines (dB)	22.2	23.5	23.5	23.5	22.9	23.4	23.0	23.2	23.5	23.1	23.8		
Background (dB)	11.7	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.8	11.7	11.7		11.8
Background adjusted criterion level (dB)	21.8	23.2	23.2	23.2	22.5	23.0	22.6	22.9	23.2	22.8	23.6		
Masking level (dB)	40.9	42.3	42.2	42.3	41.6	42.1	41.7	41.9	42.3	41.9	42.6		
Tone level (dB)	45.1	47.0	43.9	46.5	46.4	43.9	47.5	43.2	46.9	43.8	46.0		
Determination of tonality (dB)	4.2	4.7	1.7	4.2	4.9	1.8	5.8	1.2	4.5	1.9	3.4	-19.1	3.4
Frequency dependent audibility criterion (dB)													-2.4
Tonal Audibility (dB)													5.7

Table D.04 Tonality Assessment Table - 9 m/s

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement

Report ID: 15156.01.T31.RP3

Page 1 of 1

Created on: 12/15/2015

Description	Data Points												Average
	1	2	3	4	5	6	7	8	9	10	11	12	
Centre frequency (Hz)	547	549	551	552	554	554	555	555	555	560	561	561	555
Energy average of all masking lines (dB)	23.6	22.8	22.2	22.8	23.4	23.6	24.5	23.6	24.8	24.3	24.3	27.8	
Background (dB)	7.4	7.3	7.3	7.2	7.2	7.2	7.2	7.2	7.2	7.0	7.0	7.0	7.2
Background adjusted criterion level (dB)	23.5	22.6	22.0	22.7	23.3	23.5	24.4	23.5	24.8	24.2	24.2	27.7	
Masking level (dB)	42.5	41.7	41.1	41.7	42.3	42.6	43.4	42.5	43.8	43.3	43.3	46.8	
Tone level (dB)	44.6	45.3	44.0	48.8	46.3	44.4	43.9	44.9	43.9	46.0	46.7	40.9	
Determination of tonality (dB)	2.0	3.6	2.9	7.1	4.0	1.8	0.5	2.4	0.1	2.7	3.4	-5.9	2.9
Frequency dependent audibility criterion (dB)													-2.4
Tonal Audibility (dB)													5.2

Table D.05 Tonality Assessment Table - 10 m/s

Project: Adelaide Wind Energy Project - Turbine T31 - IEC 61400-11 Measurement

Report ID: 15156.01.T31.RP3

Page 1 of 1

Created on: 12/15/2015

Description	Data Points												Average
	1	2	3	4	5	6	7	8	9	10	11	12	
Centre frequency (Hz)	553	553	555	555	555	560	560	560	561	564	564	567	559
Energy average of all masking lines (dB)	22.9	24.4	25.6	24.6	24.6	24.8	25.2	25.1	25.2	26.2	24.5	26.4	
Background (dB)	7.3	7.3	7.3	7.3	7.3	7.2	7.2	7.2	7.2	7.1	7.1	7.1	7.2
Background adjusted criterion level (dB)	22.8	24.3	25.5	24.5	24.5	24.8	25.1	25.1	25.2	26.2	24.4	26.4	
Masking level (dB)	41.9	43.4	44.6	43.6	43.6	43.8	44.2	44.1	44.2	45.2	43.5	45.5	
Tone level (dB)	44.9	46.1	44.1	46.5	44.9	44.2	46.4	47.0	43.8	42.4	44.2	42.6	
Determination of tonality (dB)	3.0	2.7	-0.5	2.9	1.3	0.3	2.1	2.8	-0.4	-2.8	0.7	-2.9	
Frequency dependent audibility criterion (dB)													1.2
Tonal Audibility (dB)													-2.4
													3.6

Appendix E Measurement Data



Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 2 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)	Wind Shear
1		967	219	210	0.8	12.6	7.4	6.0	8	1.0	88	0.10
2	5.1	883	219	210	1.1	13.3	6.9	6.9	8	1.0	89	0.01
3	5.4	1034	219	210	1.2	14.0	7.5	6.9	8	1.0	88	0.04
4	5.0	836	219	210	1.2	13.1	6.9	6.5	8	1.0	88	0.04
5	5.1	858	219	210	1.3	13.1	6.9	6.8	8	1.0	87	0.02
6	5.1	899	219	210	1.2	13.4	7.3	6.2	8	1.0	88	0.07
7	5.5	1085	219	210	1.3	14.2	7.7	6.4	8	1.0	87	0.09
8	5.2	947	219	210	1.3	13.6	7.2	6.5	8	1.0	87	0.06
9	6.0	1301	219	210	1.2	14.7	8.4	6.0	8	1.0	87	0.16
10	5.9	1282	219	210	1.1	14.7	7.9	6.5	8	1.0	88	0.11
11	5.4	1053	219	210	1.2	14.1	7.4	6.8	8	1.0	88	0.05
12	5.1	865	219	210	1.2	13.2	7.0	7.0	8	1.0	87	0.01
13	5.1	903	219	210	1.3	13.4	7.0	6.9	8	1.0	87	0.02
14	5.5	1095	219	210	1.0	13.8	7.9	7.1	8	1.0	86	0.04
15	5.8	1239	219	210	1.2	14.5	8.1	6.4	9	1.0	87	0.11
16	5.5	1111	219	210	1.1	14.1	7.6	6.1	9	1.0	88	0.11
17	5.3	961	219	210	1.2	13.7	7.4	7.2	9	1.0	86	0.01
18	5.5	1072	219	210	1.3	14.2	7.8	6.5	9	1.0	86	0.08
19	5.1	887	219	210	1.2	13.3	7.0	6.3	9	1.0	87	0.06
20	6.1	1352	219	210	1.0	14.8	8.0	6.1	9	1.0	87	0.16
21	5.6	1121	219	210	1.2	14.2	7.2	6.4	9	1.0	87	0.09
22	5.8	1228	219	210	1.1	14.5	7.6	7.2	9	1.0	86	0.05
23	6.0	1309	219	210	1.2	14.9	7.7	7.9	9	1.0	86	0.03
24	6.4	1442	219	210	1.9	14.9	8.4	7.4	9	1.0	85	0.08
25	5.7	1187	219	210	1.2	14.4	7.7	7.5	9	1.0	85	0.02
26	5.7	1200	219	210	1.3	14.5	7.7	8.0	9	1.0	86	0.00
27	5.7	1220	219	210	1.1	14.5	7.8	7.6	9	1.0	85	0.03
28	6.2	1378	219	210	1.1	14.9	8.0	7.4	9	1.0	85	0.07
29	6.3	1403	219	210	1.0	14.9	8.0	7.6	9	1.0	85	0.06
30	5.7	1183	219	210	1.5	14.2	7.6	6.8	9	1.0	85	0.07
31	6.4	1549	219	210	2.5	14.7	8.5	8.0	10	1.0	78	0.05
32	6.7	1617	219	210	3.2	15.2	8.9	7.0	10	1.0	78	0.14
33	7.6	1621	219	210	6.9	15.2	9.9	7.1	10	1.0	79	0.19
34	6.9	1627	219	210	4.7	14.9	9.2	7.1	10	1.0	79	0.15
35	6.3	1566	219	210	4.2	14.8	8.5	7.9	10	1.0	79	0.06
36	6.3	1413	219	210	1.7	15.1	8.5	8.3	10	1.0	78	0.02
37	6.7	1606	219	209	3.8	14.8	8.9	8.4	10	1.0	78	0.05
38	6.3	1411	219	204	1.8	15.1	7.8	8.8	10	1.0	78	0.00
39	7.1	1618	219	204	5.3	15.2	9.4	7.7	10	1.0	79	0.12
40	7.2	1618	219	204	7.2	15.0	9.6	9.4	10	1.0	78	0.03
41	7.3	1626	219	204	6.5	15.0	9.7	9.6	10	1.0	77	0.03
42	7.7	1622	219	204	8.3	15.1	10.2	9.6	10	1.0	77	0.06
43	8.1	1621	219	204	7.3	14.9	10.6	8.8	10	1.0	78	0.12
44	7.4	1626	219	204	6.4	15.1	9.7	7.4	10	1.0	79	0.16
45	7.4	1612	219	204	6.4	14.9	9.8	8.6	10	1.0	79	0.09
46	7.2	1615	219	204	3.9	15.2	9.5	9.1	10	1.0	78	0.04

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Sound Pressure Level per 1/3 Octave Band (Hz), dBA																	Total (dBA)												
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800		1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
47	7.5	16	20	24	27	30	34	36	37	42	37	37	40	39	40	46	45	43	44	44	44	43	41	38	35	29	23	17	14	54.5	
48	6.5	14	19	23	26	29	33	36	37	42	37	37	40	40	41	47	45	43	44	44	44	44	42	39	36	31	25	18	14	54.7	
49	6.5	18	23	25	28	31	35	37	38	41	38	38	41	41	41	43	45	43	44	44	44	44	42	39	36	31	24	17	14	54.6	
50	6.4	17	22	24	28	31	34	36	38	42	38	38	41	41	41	46	45	43	43	44	43	43	42	39	36	31	25	18	14	54.6	
51	6.6	16	20	24	27	30	34	36	37	41	38	38	40	40	41	43	46	43	44	45	44	44	42	40	37	31	24	17	14	54.7	
52	6.7	15	19	23	27	30	34	36	37	43	37	37	40	40	40	47	45	42	43	44	43	43	41	39	36	31	24	17	14	54.5	
53	6.5	19	23	26	28	31	34	36	38	42	38	39	41	41	41	45	46	43	44	45	44	44	42	40	37	32	25	18	14	55.0	
54	7.4	17	21	25	28	31	34	36	37	42	38	37	40	40	41	44	45	43	44	45	44	44	42	39	36	30	23	17	14	54.6	
55	6.8	17	21	25	28	31	34	36	37	42	38	38	40	40	40	45	45	43	44	44	44	43	41	39	36	30	23	17	14	54.4	
56	7.6	22	24	27	30	32	35	37	38	43	39	39	40	40	41	44	45	43	44	44	44	44	41	39	35	29	23	17	14	54.7	
57	7.1	19	23	25	27	30	33	35	36	43	37	37	40	39	40	45	44	42	43	44	43	43	41	38	35	29	23	17	14	54.0	
58	6.2	16	21	24	27	30	33	36	37	43	37	37	40	40	41	47	45	43	43	44	44	43	41	39	36	31	24	17	14	54.6	
59	7.1	19	23	26	28	30	34	36	37	41	38	38	40	40	41	42	46	43	44	45	44	44	42	39	36	30	24	17	14	54.5	
60	7.6	19	24	26	28	31	34	36	38	43	38	38	41	40	41	46	46	43	44	44	44	43	41	39	36	30	23	17	14	54.9	
61	7.5	18	22	26	28	31	34	37	38	43	38	38	40	40	41	46	46	43	44	44	44	44	41	39	36	30	23	17	14	54.8	
62	8.6	21	25	29	30	32	35	38	38	43	39	39	41	41	41	46	46	44	44	45	44	44	42	39	35	30	24	18	14	55.2	
63	8.3	19	23	26	28	31	34	37	37	43	38	38	40	40	41	44	46	44	45	45	44	44	42	39	35	30	24	18	14	54.8	
64	8.5	19	22	24	26	30	32	36	36	43	37	37	40	39	40	46	46	43	44	45	44	44	41	39	35	29	24	18	14	54.8	
65	7.9	20	22	26	28	30	33	36	37	43	38	37	40	39	40	45	45	43	44	44	44	43	41	38	35	29	23	17	14	54.3	
66	7.9	21	24	27	29	31	34	36	38	43	38	38	40	40	40	45	46	43	44	45	44	44	42	39	35	29	23	17	14	54.9	
67	7.0	19	22	26	29	31	34	37	38	43	38	38	40	40	41	46	46	43	44	44	44	44	42	39	36	30	23	17	14	55.0	
68	8.9	16	20	24	26	30	32	36	37	43	37	38	40	40	41	44	46	44	45	46	45	44	43	40	36	30	25	18	14	55.2	
69	7.9	15	19	23	26	30	33	36	37	43	37	37	40	39	40	45	45	43	44	45	44	43	42	39	35	29	23	17	14	54.5	
70	7.0	15	19	23	26	30	33	36	37	42	37	37	40	40	41	47	45	43	43	44	44	43	42	39	36	31	24	17	14	54.6	
71	7.6	17	21	25	28	31	34	37	38	43	38	38	40	40	41	46	46	44	44	45	45	44	42	40	36	30	24	18	14	55.1	
72	6.9	17	22	25	28	31	33	36	37	43	38	38	40	40	40	45	44	42	43	44	43	43	42	39	36	30	23	17	14	54.3	
73	7.4	19	23	26	29	31	33	36	37	42	38	38	40	40	41	44	45	43	44	45	44	44	41	39	36	30	23	17	14	54.6	
74	7.7	16	20	24	27	30	33	37	38	44	38	38	41	40	41	46	46	43	44	45	44	44	42	40	36	30	23	17	14	55.1	
75	7.3	17	21	24	27	31	33	38	39	44	38	39	42	41	43	46	46	45	44	45	44	44	42	39	36	30	23	17	14	55.5	
76	8.2	18	23	25	27	30	33	36	38	43	38	38	41	41	42	45	46	44	44	45	44	43	41	39	36	30	24	18	14	55.0	
77	7.1	17	21	24	27	30	33	36	37	43	37	38	40	41	41	45	45	43	44	44	44	43	42	39	36	30	23	17	14	54.7	
78	8.1	19	23	25	28	31	34	38	38	43	39	40	42	42	42	46	47	44	45	45	45	44	42	40	36	30	23	17	14	55.5	
79	7.2	16	21	25	28	31	34	38	38	43	39	39	42	42	42	47	46	44	45	45	45	44	42	40	36	30	23	17	14	55.6	
80	6.6	15	20	24	27	30	33	37	38	43	38	38	40	40	41	45	45	43	44	44	44	44	42	40	36	30	23	17	14	54.6	
81	8.3	15	20	24	27	30	33	38	37	42	38	38	41	40	41	45	46	44	45	45	45	44	42	39	36	30	24	18	14	55.0	
82	6.9	18	21	25	28	30	33	36	37	43	37	37	41	40	41	47	45	43	43	44	43	43	41	39	36	30	24	17	14	54.6	
83	6.8	16	20	24	27	30	33	36	37	43	38	37	40	40	41	45	45	43	44	44	44	44	42	39	36	30	23	17	14	54.5	
84	6.9	16	21	25	28	31	34	37	38	43	38	38	41	41	41	46	45	43	44	44	44	44	42	40	37	32	25	18	14	54.9	
85	8.2	19	23	26	28	31	33	36	37	42	38	38	40	40	41	44	46	44	45	45	45	44	43	40	36	30	24	18	14	55.0	
86	7.4	19	23	26	28	31	33	36	38	43	38	38	41	40	40	46	45	43	44	44	44	43	41	39	35	29	23	17	14	54.6	
87	8.1	17	22	25	29	32	34	37	38	43	38	38	41	40	41	43	45	43	44	45	44	44	42	39	36	30	24	17	14	54.7	
88	7.3	18	22	24	27	30	33	35	37	43	37	37	40	40	40	46	45	43	44	44	44	44	42	40	36	30	23	17	14	54.8	
89	6.9	14	20	23	27	30	33	36	37	43	37	38	41	40	41	47	46	43	44	45	44	44	42	40	37	31	24	17	14	55.2	
90	7.5	16	21	24	28	30	34	36	37	42	38	38	41	40	41	45	46	43	44	45	44	44	42	40	37	31	24	17	14	54.8	
91																															
92																															

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 4 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)	Wind Shear
47	7.5	1615	219	204	5.6	14.8	9.9	9.1	10	1.0	78	0.06
48	6.5	1478	219	204	1.9	14.8	8.5	9.7	10	1.0	78	-0.03
49	6.5	1481	219	204	2.8	15.1	8.7	8.2	10	1.0	77	0.04
50	6.4	1472	219	204	1.3	14.9	8.3	9.3	10	1.0	78	-0.02
51	6.6	1620	219	204	4.7	15.4	8.8	9.0	10	1.0	78	0.01
52	6.7	1616	219	204	3.3	14.8	8.9	9.3	10	1.0	78	0.00
53	6.5	1610	219	204	2.7	15.3	8.6	8.8	10	1.0	77	0.01
54	7.4	1613	219	204	6.3	15.1	9.8	8.3	10	1.0	77	0.10
55	6.8	1623	219	204	5.5	15.0	9.0	8.4	10	1.0	78	0.06
56	7.6	1624	219	204	7.3	15.1	10.0	8.6	10	1.0	78	0.10
57	7.1	1618	219	204	5.9	14.8	9.4	8.4	10	1.0	79	0.08
58	6.2	1622	219	204	3.4	14.9	8.3	8.5	10	1.0	78	0.01
59	7.1	1631	219	204	6.7	15.4	9.4	7.7	10	1.0	78	0.12
60	7.6	1623	219	204	7.0	14.9	10.0	9.0	10	1.0	78	0.08
61	7.5	1623	219	204	6.7	15.0	9.9	9.7	10	1.0	77	0.04
62	8.6	1622	219	204	8.1	15.0	11.2	9.3	10	1.0	77	0.12
63	8.3	1623	219	204	9.0	15.1	10.9	10.0	10	1.0	77	0.07
64	8.5	1623	219	204	9.7	15.0	11.1	9.8	10	1.0	76	0.09
65	7.9	1622	219	204	8.2	15.0	10.4	9.4	10	1.0	77	0.08
66	7.9	1624	219	204	7.7	15.0	10.4	8.1	10	1.0	77	0.15
67	7.0	1624	219	204	6.7	15.0	9.2	10.4	10	1.0	77	-0.03
68	8.9	1622	219	204	10.5	15.1	11.6	8.7	10	1.0	77	0.17
69	7.9	1621	219	204	8.1	14.9	10.4	8.8	10	1.0	78	0.11
70	7.0	1605	219	204	3.7	14.8	9.2	9.4	10	1.0	78	0.02
71	7.6	1608	219	204	7.3	15.0	10.1	8.5	10	1.0	77	0.11
72	6.9	1628	219	204	4.6	14.9	9.2	8.5	10	1.0	77	0.06
73	7.4	1624	219	204	7.4	15.2	9.8	8.7	10	1.0	77	0.08
74	7.7	1624	219	204	7.0	15.0	10.1	9.3	10	1.0	77	0.07
75	7.3	1624	219	204	7.2	15.1	9.7	8.0	10	1.0	77	0.12
76	8.2	1623	219	204	8.5	15.1	10.7	7.5	10	1.0	77	0.21
77	7.1	1623	219	204	5.6	14.8	9.4	8.1	10	1.0	77	0.10
78	8.1	1621	219	204	8.3	15.2	10.6	8.1	10	1.0	76	0.16
79	7.2	1624	219	204	6.7	14.9	9.5	8.1	10	1.0	77	0.10
80	6.6	1624	219	204	5.6	14.9	8.8	8.0	10	1.0	77	0.07
81	8.3	1620	219	204	8.4	15.1	10.9	9.0	10	1.0	77	0.12
82	6.9	1628	219	204	4.6	14.8	9.1	9.8	10	1.0	77	-0.01
83	6.8	1617	219	204	5.1	15.0	9.0	10.2	10	1.0	76	-0.04
84	6.9	1622	219	204	2.6	15.0	9.1	9.0	10	1.0	76	0.03
85	8.2	1615	219	204	8.7	15.2	10.8	8.8	10	1.0	77	0.13
86	7.4	1624	219	204	6.2	14.9	9.7	9.2	10	1.0	77	0.05
87	8.1	1626	219	204	7.2	15.2	10.6	10.8	10	1.0	76	0.02
88	7.3	1621	219	204	7.1	14.9	9.7	10.8	10	1.0	76	-0.03
89	6.9	1627	219	204	4.0	14.9	9.1	9.9	10	1.0	76	-0.02
90	7.5	1623	219	204	4.8	15.1	9.9	8.9	10	1.0	76	0.07
91		1410	219	204	5.6	14.7	8.6	8.2	10	1.0	77	0.03
92		1244	219	204	5.8	14.5	9.0	9.6	10	1.0	77	-0.08

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 6 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)	Wind Shear
93		1031	219	204	7.5	14.5	8.6	9.2	10	1.0	77	-0.10
94		921	219	204	8.7	14.1	9.3	8.4	10	1.0	77	-0.07
95		881	219	204	7.4	13.9	8.1	7.9	10	1.0	77	-0.05
96		1075	219	204	8.5	14.4	9.4	8.3	10	1.0	77	-0.04
97		1278	219	204	6.0	14.3	9.0	6.8	10	1.0	77	0.09
98		1441	219	204	7.0	15.0	10.1	7.5	10	1.0	78	0.08
99	7.0	1604	219	204	4.9	14.7	9.3	7.1	10	1.0	77	0.15
100	7.0	1628	219	204	5.4	15.2	9.3	7.1	10	1.0	77	0.15
101	7.4	1619	219	204	5.3	14.9	9.7	7.3	10	1.0	78	0.17
102	7.1	1623	219	204	5.1	15.1	9.4	9.2	10	1.0	78	0.03
103	7.2	1629	219	204	5.1	15.1	9.6	8.4	10	1.0	77	0.09
104	7.1	1617	219	204	5.0	14.9	9.4	8.5	10	1.0	77	0.07
105	7.1	1627	219	204	2.3	14.9	9.4	7.3	10	1.0	77	0.15
106	5.8	1246	219	204	1.1	14.6	7.9	8.0	10	1.0	78	0.01
107	6.1	1333	219	204	1.1	14.9	8.2	8.2	10	1.0	77	0.01
108	6.6	1501	219	204	1.3	15.0	8.9	7.9	10	1.0	78	0.07
109	6.4	1573	219	204	3.1	15.3	8.5	8.3	10	1.0	78	0.03
110	6.6	1508	219	204	2.8	14.8	8.3	7.5	10	1.0	78	0.10
111	6.7	1510	219	204	1.2	15.2	8.9	7.9	10	1.0	79	0.08
112	7.1	1620	219	204	4.0	15.3	9.4	8.8	9	1.0	79	0.06
113	6.6	1618	219	204	4.4	15.0	8.8	8.3	9	1.0	78	0.05
114		1626	219	199	5.5	15.1	9.5	8.7	9	1.0	79	0.07
115		1625	219	198	6.4	15.1	9.9	7.9	9	1.0	78	0.14
116		1618	219	198	8.0	15.0	10.7	8.5	9	1.0	79	0.14
117		1627	219	198	7.4	15.1	9.2	7.8	9	1.0	78	0.10
118		1623	219	198	7.5	15.0	9.5	7.5	9	1.0	79	0.14
119		1626	219	198	6.0	14.9	9.1	7.8	9	1.0	79	0.10
120		1623	219	198	7.7	15.0	9.7	8.4	9	1.0	79	0.09
121		1622	219	198	7.4	15.0	9.7	7.5	9	1.0	79	0.15
122		1623	219	198	5.6	14.9	9.0	8.2	9	1.0	79	0.07
123		1627	219	198	5.2	15.0	8.8	8.1	9	1.0	79	0.06
124		1616	219	198	7.6	15.0	10.1	7.9	9	1.0	80	0.14
125		1625	219	198	6.7	15.0	9.7	8.5	9	1.0	79	0.09
126		1626	219	198	7.6	15.1	10.2	7.4	9	1.0	80	0.18
127		1623	198	198	8.2	15.1	10.2	9.3	9	1.0	79	0.07
128		1623	198	198	7.9	15.0	10.3	8.1	9	1.0	79	0.14
129	7.6	1623	198	198	7.1	15.0	10.0	9.5	9	1.0	79	0.05
130	8.0	1619	198	198	8.0	15.0	10.5	9.1	9	1.0	79	0.09
131	6.6	1635	198	198	5.2	15.0	8.8	8.9	9	1.0	79	0.02
132	8.1	1617	198	198	7.9	15.0	10.7	8.3	9	1.0	79	0.15
133	7.0	1626	198	198	4.7	14.9	9.2	8.6	9	1.0	79	0.06
134	7.4	1625	198	198	5.9	15.2	9.8	8.0	9	1.0	79	0.12
135	7.8	1623	198	198	6.6	15.1	10.3	9.0	9	1.0	79	0.10
136	8.6	1620	198	201	8.4	15.0	11.2	8.3	9	1.0	78	0.18
137	7.8	1626	198	204	8.3	15.1	10.3	9.1	9	1.0	79	0.09
138	8.9	1624	198	204	10.0	15.0	11.6	8.4	9	1.0	78	0.19

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 7 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Sound Pressure Level per 1/3 Octave Band (Hz), dBA																				Total (dBA)										
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600		2000	2500	3150	4000	5000	6300	8000	10000		
139	8.8	15	20	25	28	31	34	36	37	40	36	38	41	42	41	45	46	44	45	45	45	44	42	39	35	30	24	18	14	55.0		
140	8.2	15	20	25	28	31	33	36	37	39	36	37	40	41	40	45	45	43	44	44	44	43	41	38	35	29	23	17	14	54.2		
141	7.8	20	23	26	29	32	35	37	38	40	37	38	41	42	41	45	45	44	44	45	44	44	42	39	36	30	24	18	14	54.9		
142	7.9	15	20	24	27	31	34	36	36	39	36	37	40	41	40	45	45	43	44	45	44	44	42	39	35	30	23	17	14	54.4		
143	7.5	16	21	25	28	32	35	37	38	40	36	38	41	41	40	45	45	43	44	44	44	43	42	39	35	30	23	17	14	54.5		
144	7.7	16	21	25	28	31	34	36	37	39	36	37	41	41	40	44	45	43	44	44	44	44	41	39	35	29	23	17	14	54.3		
145	7.5	17	22	25	28	31	34	36	36	40	36	37	40	40	40	46	45	43	43	44	44	43	41	38	35	29	23	17	14	54.3		
146	7.9	15	21	25	28	31	34	36	37	39	36	37	40	41	40	45	46	43	44	44	44	43	41	39	35	29	23	17	14	54.3		
147	7.5	16	21	24	28	31	34	36	37	40	35	37	40	40	40	46	45	43	44	44	44	43	41	38	35	29	23	17	14	54.3		
148	7.3	16	22	24	28	31	34	36	37	39	36	37	40	41	40	44	45	43	44	44	44	43	41	39	35	29	23	17	14	54.3		
149	8.1	15	20	24	28	31	34	36	37	40	36	37	41	41	40	45	45	43	44	44	44	43	42	39	35	29	23	17	14	54.4		
150	7.4	15	21	24	28	31	34	36	37	40	35	37	40	40	40	47	46	42	44	44	44	43	41	39	35	29	23	17	14	54.5		
151	7.8	15	20	24	27	29	33	35	36	39	35	36	41	40	40	44	44	42	43	44	44	43	41	38	34	28	22	17	14	53.8		
152																																
153																																
154																																
155	7.7	14	20	24	27	31	34	35	36	40	35	37	40	40	40	46	45	43	43	44	44	43	41	39	35	30	23	17	14	54.2		
156																																
157																																
158																																
159																																
160																																
161																																
162																																
163																																
164																																
165																																
166																																
167																																
168																																
169																																
170																																
171																																
172																																
173																																
174																																
175																																
176																																
177																																
178																																
179																																
180																																
181																																
182																																
183																																
184																																

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 8 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)	Wind Shear
139	8.8	1623	198	204	9.7	15.0	11.5	8.8	9	1.0	79	0.16
140	8.2	1626	198	204	8.4	15.0	10.8	9.5	9	1.0	78	0.09
141	7.8	1618	198	204	7.9	14.9	10.2	9.7	9	1.0	78	0.05
142	7.9	1625	198	204	7.8	15.1	10.4	8.0	9	1.0	78	0.15
143	7.5	1624	198	204	6.5	15.0	9.8	8.3	9	1.0	78	0.11
144	7.7	1623	198	204	7.1	15.1	10.1	8.2	9	1.0	78	0.13
145	7.5	1623	198	204	7.4	14.9	9.9	8.8	9	1.0	78	0.08
146	7.9	1623	198	204	7.7	15.1	10.3	8.8	9	1.0	78	0.11
147	7.5	1619	198	204	7.6	14.9	9.9	9.3	9	1.0	78	0.06
148	7.3	1627	198	204	7.4	15.1	9.7	9.5	9	1.0	78	0.04
149	8.1	1624	198	204	8.0	15.0	10.7	9.3	9	1.0	78	0.10
150	7.4	1624	198	204	6.8	15.0	9.8	9.0	9	1.0	78	0.07
151	7.8	1542	198	204	7.6	14.9	10.3	7.9	9	1.0	78	0.15
152		1371	198	204	7.8	14.7	9.9	8.9	9	1.0	78	-0.02
153		1201	198	204	9.2	14.5	9.7	7.2	9	1.0	78	0.05
154		1234	198	204	10.2	14.3	10.6	7.9	9	1.0	79	0.01
155	7.7	1604	198	204	7.2	14.9	10.2	8.5	9	1.0	78	0.11
156		1436	198	204	7.6	14.8	9.7	8.9	9	1.0	78	0.00
157		168	198	204	18.2	10.1	9.5	9.7	9	1.0	78	-0.38
158		100	198	204	18.4	10.2	8.8	9.1	9	1.0	78	-0.39
159		186	198	204	17.8	10.1	9.0	8.2	9	1.0	78	-0.29
160		400	198	204	14.0	10.7	9.0	8.1	9	1.0	79	-0.19
161		628	198	204	11.9	12.5	9.2	7.8	9	1.0	78	-0.10
162		831	198	204	9.6	13.7	8.8	8.7	9	1.0	79	-0.11
163		1071	198	204	8.8	14.2	9.2	8.3	9	1.0	78	-0.04
164		1229	198	204	7.9	14.5	8.2	7.3	9	1.0	79	0.04
165		1300	198	204	7.6	14.6	8.7	8.3	9	1.0	79	0.00
166		1320	198	204	8.3	14.7	9.8	8.7	9	1.0	79	-0.02
167		1474	198	204	6.8	14.7	9.2	8.5	9	1.0	79	0.03
168		1601	198	204	6.6	14.9	9.7	8.7	9	1.0	79	0.08
169		1612	198	204	6.6	15.1	9.9	7.6	9	1.0	79	0.15
170		1442	198	204	8.5	14.8	10.3	8.5	9	1.0	79	0.02
171		1268	198	204	9.7	14.6	9.9	8.1	9	1.0	79	0.01
172		1077	198	204	9.6	14.3	9.0	7.3	9	1.0	79	0.02
173		915	198	204	9.8	14.1	9.0	8.2	9	1.0	79	-0.06
174		711	198	204	10.7	13.6	8.9	9.1	9	1.0	79	-0.16
175		578	198	204	12.9	12.6	9.5	9.4	9	1.0	79	-0.20
176		405	198	204	16.3	11.3	10.1	8.4	9	1.0	79	-0.21
177		238	198	204	17.1	10.2	8.5	8.4	9	1.0	79	-0.27
178		108	198	204	19.0	10.2	9.7	8.1	9	1.0	79	-0.33
179		168	198	204	18.0	10.1	9.7	8.0	9	1.0	79	-0.29
180		357	198	204	15.0	10.5	8.6	7.7	9	1.0	79	-0.18
181		549	198	204	12.7	12.0	8.7	8.1	9	1.0	79	-0.14
182		725	198	204	11.2	13.2	8.9	7.2	9	1.0	80	-0.04
183		939	198	204	9.4	14.0	8.6	8.0	9	1.0	80	-0.05
184		1158	198	204	8.8	14.4	9.5	7.6	9	1.0	80	0.02

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 9 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Sound Pressure Level per 1/3 Octave Band (Hz), dBA																		Total (dBA)										
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000		1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
185																														
186																														
187																														
188																														
189	7.2	16	21	24	28	31	33	37	38	40	38	38	41	41	40	45	45	42	43	44	44	43	41	39	35	29	22	17	14	54.2
190	7.2	15	19	24	27	32	34	36	37	40	35	37	40	40	40	45	45	43	44	44	44	43	42	39	35	29	23	17	14	54.3
191	7.7	14	20	24	27	32	36	36	37	40	35	37	40	40	40	46	46	43	43	44	44	43	41	39	35	29	23	17	14	54.4
192	6.9	16	21	24	27	31	33	35	36	39	35	37	40	40	40	46	45	42	43	44	44	43	41	39	35	29	23	17	14	54.1
193	6.7	14	19	23	27	30	33	35	36	39	35	37	40	40	40	45	45	43	43	44	44	44	42	39	36	31	24	17	14	54.3
194	7.3	16	20	25	28	31	34	36	37	40	35	37	40	40	40	44	45	43	44	44	44	43	41	39	35	29	23	17	14	54.1
195	7.5	14	18	23	26	29	32	34	35	39	34	36	39	40	39	43	44	42	43	44	44	43	41	38	35	29	22	17	14	53.6
196	7.6	14	19	23	27	30	33	35	36	39	35	36	40	40	40	45	45	43	44	44	44	43	42	39	35	29	23	17	14	54.2
197	6.6	14	20	24	27	30	33	35	37	40	35	37	41	41	40	46	44	42	43	44	44	43	41	39	36	30	23	17	14	54.2
198	7.4	14	20	23	27	30	33	35	36	39	35	37	41	41	40	43	45	43	44	45	44	44	42	39	36	30	23	17	14	54.3
199	7.5	16	21	25	28	31	34	36	37	40	36	37	40	40	40	46	45	43	44	44	44	43	41	38	35	29	23	17	14	54.4
200	7.4	17	22	25	28	32	35	37	37	40	37	38	40	41	40	47	46	43	44	44	44	44	42	39	35	29	23	17	14	54.8
201	7.2	14	20	24	27	31	33	36	37	39	36	37	41	41	40	46	46	43	44	44	44	43	41	39	35	29	23	17	14	54.5
202	6.9	16	21	24	27	30	33	35	36	39	36	37	41	40	40	46	45	43	44	44	44	43	41	39	35	29	23	17	14	54.3
203	7.8	16	20	24	27	30	33	35	36	40	36	37	40	41	40	45	45	43	44	45	44	44	42	39	35	29	23	17	14	54.5
204	7.4	16	19	23	27	30	32	35	36	39	35	38	41	41	42	46	45	43	43	44	43	43	41	38	35	29	22	17	14	54.3
205	6.9	14	19	23	27	30	33	35	36	40	36	38	41	41	41	45	45	43	43	44	44	43	41	38	35	29	23	17	14	54.3
206	7.3	15	19	24	27	30	33	35	36	39	35	37	40	40	40	44	45	43	44	44	44	43	41	38	35	29	23	17	14	54.1
207	7.9	14	19	23	26	29	32	35	36	40	35	36	40	40	40	45	45	43	44	45	44	43	41	38	35	29	23	17	14	54.3
208	7.6	14	19	22	26	29	32	34	35	39	34	36	40	40	40	47	45	43	43	44	44	43	41	38	35	29	22	17	14	54.3
209	7.4	15	20	23	26	30	33	35	36	40	35	37	41	40	40	47	46	42	43	44	44	43	41	39	35	29	22	17	14	54.4
210	7.7	16	20	23	26	29	32	35	36	39	35	37	41	41	40	47	46	43	44	44	44	43	41	38	35	29	23	17	14	54.5
211	7.7	14	19	22	26	29	32	35	35	40	35	37	40	40	40	45	46	43	44	44	44	43	41	38	35	29	22	17	14	54.3
212	7.5	14	19	22	25	29	32	35	35	40	35	37	40	41	40	45	46	43	44	44	44	43	41	38	35	29	23	17	14	54.3
213	8.7	17	21	24	26	29	32	35	36	39	35	37	41	41	41	47	47	43	44	45	44	44	41	39	35	29	23	18	14	54.9
214	8.4	17	21	25	27	30	34	36	37	40	36	38	40	41	41	46	46	43	44	45	44	44	41	39	35	29	24	18	14	54.8
215	8.3	18	21	25	28	31	33	35	36	39	36	37	40	40	41	47	47	43	44	45	44	43	41	38	34	29	23	17	14	54.9
216	7.8	16	20	24	26	30	32	35	36	39	35	37	40	40	40	46	46	43	44	44	44	43	41	38	34	28	23	17	14	54.4
217	8.3	15	20	23	27	30	32	35	36	40	35	37	41	41	40	46	45	43	44	44	44	43	41	38	34	29	23	17	14	54.4
218	8.2	14	19	23	26	30	32	35	36	40	35	37	40	41	40	46	46	43	44	45	44	44	41	39	35	29	23	17	14	54.8
219	8.5	16	20	24	27	30	33	36	36	39	36	37	41	41	41	45	46	44	44	45	44	44	42	39	35	30	24	18	14	54.7
220	8.5	17	21	25	27	30	33	36	36	40	36	37	40	41	40	46	45	43	44	45	44	43	41	38	34	29	23	17	14	54.5
221	7.9	15	20	23	26	29	32	35	36	40	36	38	41	41	41	46	46	43	44	45	44	43	41	39	35	29	23	17	14	54.8
222	8.2	16	21	24	27	30	33	35	36	40	36	38	41	41	41	48	46	43	44	44	44	43	41	38	34	28	23	17	14	54.9
223	7.9	16	21	24	28	31	33	36	37	40	36	38	41	41	41	46	47	43	44	45	44	43	41	39	35	29	23	17	14	54.9
224	7.8	15	20	24	27	30	33	36	36	39	35	37	41	40	40	48	46	43	44	44	44	43	41	38	35	29	23	17	14	54.8
225	7.8	15	19	24	27	30	33	35	36	39	35	37	40	40	40	46	45	43	44	44	44	43	41	38	35	29	23	17	14	54.3
226	7.8	14	19	23	26	30	32	35	36	39	35	37	40	41	40	44	46	43	44	45	44	43	41	38	35	29	23	17	14	54.3
227	8.5	15	19	23	26	30	32	35	36	39	37	37	40	41	41	46	46	44	44	45	44	43	41	38	34	29	24	18	14	54.7
228	8.1	17	21	24	27	30	33	36	36	39	35	37	40	41	40	46	46	43	44	44	44	43	41	38	34	29	23	17	14	54.5
229	8.3	14	19	23	27	30	33	35	36	40	35	37	41	41	41	45	46	43	44	45	44	44	42	39	35	29	24	18	14	54.8
230	8.0	16	20	24	27	30	33	36	36	40	36	37	41	40	40	46	46	43	44	44	44	43	41	38	35	29	23	17	14	54.4

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 10 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)	Wind Shear
185		1249	198	204	8.6	14.4	10.0	7.1	9	1.0	80	0.06
186		1310	198	204	6.7	14.5	9.0	8.2	9	1.0	80	0.01
187		1469	198	204	7.2	14.8	9.6	9.0	9	1.0	80	0.00
188		1610	198	204	6.8	15.0	10.1	7.4	9	1.0	80	0.17
189	7.2	1625	198	204	6.0	15.0	9.5	8.8	9	1.0	80	0.06
190	7.2	1623	198	204	6.9	15.1	9.5	7.9	9	1.0	79	0.12
191	7.7	1623	198	204	6.8	15.0	10.1	8.4	9	1.0	79	0.12
192	6.9	1621	198	204	6.3	15.0	9.2	7.7	9	1.0	79	0.11
193	6.7	1630	198	204	5.7	15.1	9.0	7.6	9	1.0	80	0.10
194	7.3	1620	198	204	7.2	15.0	9.7	8.7	9	1.0	80	0.08
195	7.5	1622	198	204	7.7	15.0	9.9	8.0	9	1.0	80	0.13
196	7.6	1622	198	204	7.7	15.0	10.0	8.6	9	1.0	80	0.10
197	6.6	1625	198	204	4.7	14.9	8.8	8.2	9	1.0	80	0.05
198	7.4	1623	198	204	7.3	15.2	9.7	10.2	9	1.0	79	0.00
199	7.5	1623	198	204	7.7	15.0	9.8	9.1	9	1.0	79	0.06
200	7.4	1620	198	204	7.6	15.0	9.7	9.6	9	1.0	79	0.03
201	7.2	1625	198	204	7.2	15.1	9.6	7.9	9	1.0	79	0.11
202	6.9	1628	198	204	7.1	15.0	9.1	7.6	9	1.0	79	0.11
203	7.8	1622	198	204	8.3	15.0	10.2	7.6	9	1.0	80	0.17
204	7.4	1625	198	204	7.0	15.0	9.8	8.6	9	1.0	80	0.09
205	6.9	1625	198	204	6.2	15.0	9.1	7.9	9	1.0	80	0.09
206	7.3	1620	198	204	7.4	15.1	9.7	8.1	9	1.0	80	0.11
207	7.9	1623	198	204	8.9	15.0	10.3	8.3	9	1.0	80	0.13
208	7.6	1622	198	204	7.4	15.0	10.0	7.8	9	1.0	80	0.15
209	7.4	1624	198	204	6.6	15.0	9.8	8.2	9	1.0	80	0.11
210	7.7	1624	198	204	7.8	15.0	10.2	8.2	9	1.0	80	0.13
211	7.7	1622	198	204	7.6	15.0	10.1	9.3	9	1.0	80	0.07
212	7.5	1621	198	204	8.3	15.0	9.8	8.4	9	1.0	80	0.10
213	8.7	1627	198	204	9.4	15.1	11.4	8.0	9	1.0	80	0.20
214	8.4	1623	198	204	9.8	15.0	11.0	7.9	9	1.0	80	0.19
215	8.3	1624	198	204	9.5	15.0	10.9	9.0	9	1.0	81	0.12
216	7.8	1624	198	204	8.6	15.0	10.2	8.0	9	1.0	81	0.14
217	8.3	1623	198	204	9.0	15.0	10.8	8.4	9	1.0	80	0.15
218	8.2	1624	198	204	9.2	15.0	10.7	8.4	9	1.0	81	0.15
219	8.5	1624	198	204	9.6	15.1	11.1	8.6	9	1.0	80	0.16
220	8.5	1622	198	204	9.2	15.0	11.1	9.0	9	1.0	80	0.13
221	7.9	1626	198	204	8.6	15.1	10.4	8.4	9	1.0	80	0.13
222	8.2	1622	198	204	8.5	15.0	10.7	8.4	9	1.0	80	0.14
223	7.9	1624	198	204	8.6	15.1	10.4	8.1	9	1.0	81	0.15
224	7.8	1626	198	204	8.4	15.0	10.2	7.9	9	1.0	81	0.15
225	7.8	1622	198	204	8.3	15.0	10.2	8.7	9	1.0	81	0.11
226	7.8	1624	198	204	8.8	15.1	10.3	8.2	9	1.0	81	0.14
227	8.5	1622	198	204	9.8	15.0	11.1	8.9	9	1.0	81	0.14
228	8.1	1624	198	204	8.9	15.0	10.6	7.8	9	1.0	81	0.18
229	8.3	1622	198	204	8.9	15.0	10.9	7.8	9	1.0	81	0.19
230	8.0	1623	198	204	8.6	15.0	10.5	8.1	9	1.0	81	0.15

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 11 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Sound Pressure Level per 1/3 Octave Band (Hz), dBA																		Total (dBA)											
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000		1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
231	8.4	16	21	25	28	31	34	36	37	39	36	37	41	41	41	45	46	43	44	45	44	43	41	39	35	29	23	18	14	54.7	
232	8.0	14	20	24	27	30	33	36	36	39	36	37	40	41	40	47	46	43	44	44	44	43	41	38	35	29	23	17	14	54.6	
233	8.1	15	20	24	27	30	33	35	36	39	36	37	40	41	40	45	45	43	44	44	44	43	41	38	34	28	23	17	14	54.2	
234	8.3	15	20	24	28	31	34	36	37	40	36	37	41	41	41	46	46	43	44	45	44	44	42	39	35	29	24	18	14	54.8	
235	8.6	15	20	24	27	30	33	36	36	39	35	37	41	41	41	45	46	43	44	45	44	43	42	39	35	29	24	18	14	54.6	
236	7.7	17	21	24	27	30	33	35	36	39	35	37	40	40	40	45	45	42	43	44	44	43	41	38	34	28	22	17	14	54.0	
237	8.4	16	21	25	28	32	34	36	37	40	36	38	41	41	41	45	45	43	44	45	44	44	41	39	35	29	24	18	14	54.6	
238	8.6	15	20	24	27	31	34	36	37	40	36	37	41	41	41	45	46	43	44	45	45	44	42	39	35	30	24	18	14	54.9	
239	8.5	15	21	24	27	30	33	35	36	39	35	37	41	41	41	45	45	43	44	44	44	43	41	38	35	29	23	17	14	54.3	
240	8.3	15	20	24	28	31	34	36	37	39	36	38	40	41	41	45	46	43	44	45	44	44	42	39	35	29	24	18	14	54.6	
241	8.7	16	22	26	29	32	35	37	38	40	37	38	42	42	41	47	46	44	45	45	44	44	42	39	35	30	24	18	14	55.3	
242	8.4	17	22	26	29	32	34	37	37	40	36	38	41	41	41	45	46	43	44	44	44	43	41	39	35	29	23	18	14	54.6	
243	7.6	16	20	24	28	31	34	36	37	40	36	37	40	41	40	45	45	43	44	44	44	43	41	39	35	29	23	17	14	54.4	
244	7.7	18	21	25	28	31	34	36	37	39	36	37	41	41	41	45	45	43	44	44	44	43	41	39	35	29	23	17	14	54.3	
245	8.8	15	20	24	27	30	33	37	37	39	36	38	41	41	41	45	46	44	45	45	45	44	42	39	35	30	24	18	14	55.0	
246	8.9	16	21	25	28	31	34	36	37	40	36	38	40	42	41	45	46	44	45	45	45	44	42	39	35	30	24	18	14	55.0	
247	7.8	18	22	25	28	31	34	36	37	39	36	38	41	41	41	46	45	43	44	45	44	44	41	39	35	29	24	18	14	54.6	
248	8.2	15	20	24	28	31	34	36	37	39	36	38	42	42	41	46	46	44	45	45	45	44	42	39	36	30	24	18	14	55.2	
249	7.7	17	21	25	28	31	33	36	37	39	36	38	41	41	41	45	46	43	44	45	44	43	41	39	35	29	24	18	14	54.6	
250	8.5	17	21	25	28	30	33	36	37	39	36	37	40	41	41	45	45	44	44	45	44	44	42	39	35	29	24	18	14	54.5	
251	7.9	15	21	25	27	30	34	36	37	39	36	37	41	41	41	45	45	44	44	45	44	44	42	39	35	30	24	18	14	54.7	
252	8.7	17	20	24	27	30	33	35	36	39	36	37	41	41	41	44	45	44	45	45	45	44	42	39	35	30	24	18	14	54.6	
253																															
254																															
255																															
256																															
257	8.7	16	20	24	27	30	34	36	37	39	36	38	41	42	41	46	46	44	45	45	44	44	42	39	35	30	24	18	14	55.0	
258	8.6	15	21	25	28	31	34	37	37	40	36	39	42	42	42	46	46	44	45	46	45	44	42	40	36	31	25	19	14	55.5	
259	9.2	17	21	25	28	31	34	36	37	40	37	39	42	43	42	46	46	45	46	46	45	45	43	40	36	31	25	19	14	55.7	
260	8.2	17	21	25	28	32	35	36	37	40	37	39	42	42	42	46	46	44	45	45	45	44	42	39	36	30	25	19	14	55.3	
261	9.0	16	21	25	28	32	34	36	37	40	37	39	42	42	42	45	46	45	45	46	45	44	42	40	36	31	25	19	14	55.4	
262	9.1	16	21	25	28	31	34	37	37	40	37	38	41	42	42	45	46	45	45	46	45	44	42	39	36	30	25	19	14	55.3	
263	8.7	19	23	26	29	32	34	37	38	40	38	39	42	43	43	46	46	45	46	46	45	44	42	40	36	31	25	19	14	55.7	
264	8.5	17	22	25	28	30	34	36	37	40	36	38	41	42	41	46	46	44	45	45	45	44	42	39	35	30	24	18	14	55.1	
265	8.6	18	23	26	29	31	34	36	37	40	37	38	41	42	41	47	47	44	45	45	45	44	42	39	35	30	24	18	14	55.5	
266	9.3	16	21	25	28	31	34	37	37	40	37	38	42	42	42	45	46	45	46	46	45	44	42	40	36	31	25	19	14	55.5	
267	9.9	20	22	26	29	32	35	37	38	40	38	39	43	43	43	46	46	45	46	46	45	44	42	40	36	31	25	19	14	55.9	
268	8.8	17	21	24	28	31	33	36	37	40	36	38	41	42	41	46	46	44	45	45	45	44	42	39	35	30	24	18	14	55.1	
269																															
270																															
271																															
272																															
273																															
274																															
275	9.3	17	21	25	28	31	34	36	37	40	36	38	41	42	42	46	46	44	45	46	45	44	42	39	36	30	25	19	14	55.4	
276	9.5	15	21	25	29	32	34	37	38	40	37	39	42	43	43	46	47	45	46	46	46	45	43	40	37	31	26	19	14	56.0	

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 12 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)	Wind Shear
231	8.4	1622	198	204	9.0	15.0	11.0	8.3	9	1.0	81	0.16
232	8.0	1626	198	204	8.5	15.0	10.5	8.5	9	1.0	81	0.13
233	8.1	1622	198	204	8.7	15.0	10.6	9.2	9	1.0	81	0.09
234	8.3	1624	198	204	8.8	15.0	10.9	8.2	9	1.0	81	0.16
235	8.6	1622	198	204	9.6	15.0	11.2	8.1	9	1.0	81	0.19
236	7.7	1624	198	204	8.1	15.0	10.1	8.0	9	1.0	82	0.14
237	8.4	1624	198	204	8.5	15.1	11.0	8.3	9	1.0	82	0.16
238	8.6	1621	198	204	9.3	15.0	11.3	8.9	8	1.0	82	0.14
239	8.5	1626	198	204	8.9	15.0	11.1	8.6	9	1.0	82	0.15
240	8.3	1622	198	204	9.1	15.1	10.9	9.4	8	1.0	82	0.10
241	8.7	1623	198	204	9.0	15.0	11.4	8.7	9	1.0	82	0.16
242	8.4	1623	198	204	8.4	15.0	10.9	8.2	9	1.0	82	0.17
243	7.6	1624	198	204	8.4	15.0	10.1	8.6	8	1.0	82	0.10
244	7.7	1625	198	204	7.8	15.0	10.2	9.5	8	1.0	82	0.06
245	8.8	1622	198	204	9.9	15.1	11.5	9.8	8	1.0	82	0.11
246	8.9	1623	198	204	10.4	15.0	11.5	9.1	9	1.0	82	0.15
247	7.8	1624	198	204	9.3	15.0	10.3	9.3	9	1.0	82	0.07
248	8.2	1621	198	204	8.9	15.0	10.8	9.3	9	1.0	82	0.10
249	7.7	1626	198	204	9.5	15.1	10.1	8.9	8	1.0	82	0.09
250	8.5	1624	198	204	9.9	15.0	11.2	8.8	8	1.0	82	0.15
251	7.9	1624	198	204	9.4	15.0	10.3	9.1	8	1.0	82	0.09
252	8.7	1623	198	204	10.6	15.0	11.4	9.0	8	1.0	82	0.15
253		1623	198	204	10.9	15.0	11.9	8.7	8	1.0	82	0.18
254		1626	198	204	8.9	15.0	10.1	9.4	8	1.0	82	0.06
255		1622	198	204	10.7	15.0	11.6	9.7	8	1.0	82	0.12
256		1625	198	204	10.4	15.0	11.9	10.6	8	1.0	82	0.09
257	8.7	1623	198	204	10.2	15.0	11.4	9.7	8	1.0	82	0.11
258	8.6	1624	198	204	10.6	15.0	11.2	9.4	8	1.0	82	0.11
259	9.2	1625	198	204	11.3	15.1	12.0	8.0	8	1.0	82	0.23
260	8.2	1623	198	204	10.7	15.0	10.8	9.4	8	1.0	82	0.10
261	9.0	1624	198	204	11.1	15.0	11.8	8.5	8	1.0	82	0.19
262	9.1	1625	198	204	11.2	15.1	11.9	9.2	8	1.0	82	0.16
263	8.7	1623	198	204	11.2	15.0	11.4	10.1	8	1.0	82	0.09
264	8.5	1624	198	204	10.7	15.0	11.1	9.9	8	1.0	82	0.08
265	8.6	1624	198	204	10.6	15.0	11.2	9.6	8	1.0	82	0.11
266	9.3	1624	198	204	11.5	15.1	12.1	9.6	8	1.0	82	0.14
267	9.9	1623	198	204	11.4	15.0	12.9	9.5	8	1.0	82	0.18
268	8.8	1624	198	204	10.4	15.0	11.4	9.5	8	1.0	82	0.12
269		1622	198	204	11.0	15.0	11.6	9.8	8	1.0	82	0.11
270		1517	198	204	11.2	14.9	11.1	9.9	8	1.0	82	-0.03
271		1348	198	204	11.0	14.7	11.2	9.4	8	1.0	82	-0.05
272		1182	198	204	11.9	14.5	11.2	9.9	8	1.0	82	-0.11
273		1056	198	204	12.9	14.3	11.5	9.1	8	1.0	82	-0.09
274		1604	198	204	11.3	14.9	12.0	9.0	8	1.0	82	0.17
275	9.3	1624	198	204	10.9	15.0	12.1	10.1	8	1.0	82	0.12
276	9.5	1623	198	204	11.0	15.0	12.3	9.3	8	1.0	82	0.17

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
Report ID: 15156.01.T31.RP3

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Sound Pressure Level per 1/3 Octave Band (Hz), dBA																	Total (dBA)											
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800		1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
277	8.6	17	21	25	28	31	33	36	37	40	36	38	41	42	41	46	46	44	45	45	45	44	42	39	35	30	24	18	14	55.0
278	8.1	19	23	26	28	31	34	36	37	40	37	38	41	41	41	46	46	43	44	45	44	43	41	38	35	29	24	18	14	54.8
279	8.6	18	23	26	29	32	35	37	38	40	38	39	42	43	43	46	47	45	46	46	45	44	42	40	36	31	25	19	14	55.8
280	9.2	16	20	24	27	30	33	36	37	40	36	38	41	42	42	46	47	45	45	46	45	44	42	39	36	30	25	19	14	55.4
281	8.6	15	20	25	28	30	33	36	37	40	36	38	41	42	41	46	46	44	45	45	45	44	42	39	35	30	25	19	14	55.1
282	10.6	16	21	25	29	32	34	37	38	40	37	39	43	44	43	46	47	46	46	46	46	45	43	40	37	31	26	20	14	56.3
283	9.6	17	22	25	28	31	34	36	37	40	36	38	42	42	42	47	47	45	46	46	45	44	42	39	36	30	25	19	14	55.7
284	8.9	20	23	27	29	32	34	37	37	40	37	39	42	42	42	46	46	44	45	45	45	44	42	39	35	30	25	18	14	55.3
285	9.0	18	22	25	28	30	33	35	36	40	36	38	41	41	41	45	46	43	44	45	44	43	41	38	34	29	23	18	14	54.6
286	9.7	17	21	25	28	31	34	36	37	40	37	38	41	42	42	47	47	45	45	46	45	44	42	39	35	30	25	19	14	55.7
287	9.1	17	21	24	27	31	34	36	37	40	36	38	42	43	42	47	47	45	45	46	45	44	42	40	36	31	25	19	14	55.8
288	8.6	16	21	25	28	31	33	36	37	40	36	38	41	42	41	45	46	44	45	45	45	44	42	39	35	30	24	18	14	55.0
289	9.2	16	21	25	28	31	34	36	38	40	37	39	42	43	43	48	48	45	46	46	45	45	43	40	36	31	26	19	14	56.2
290	9.1	17	21	25	28	32	34	37	37	40	37	38	42	42	42	46	47	44	45	46	45	44	42	39	35	30	25	18	14	55.5
291	8.9	18	23	26	29	32	34	37	37	40	37	38	42	42	42	47	46	44	45	45	44	44	42	39	35	30	24	18	14	55.2
292	8.4	16	21	25	28	31	35	37	37	40	37	38	41	42	42	46	47	44	45	45	45	44	42	39	35	30	25	19	14	55.4
293	9.7	18	21	25	28	32	34	37	37	40	37	39	42	43	42	46	47	45	45	46	45	44	42	40	36	31	25	19	14	55.6
294	7.9	18	22	25	29	31	34	37	37	40	36	38	41	41	41	46	46	43	44	44	44	43	41	38	35	29	24	18	14	54.8
295	8.4	15	20	24	28	31	33	36	37	40	37	38	41	41	41	45	46	44	45	45	45	44	42	39	35	30	24	18	14	55.1
296	8.7	17	21	25	28	30	33	36	37	40	36	37	41	41	41	45	45	43	44	45	44	43	42	39	35	29	24	18	14	54.6
297	8.4	15	21	24	28	31	34	36	37	40	36	38	42	42	41	46	46	44	45	45	45	44	42	39	35	30	25	18	14	55.0
298	8.6	17	21	25	28	31	34	36	37	40	37	38	41	42	41	45	46	44	45	45	45	44	42	39	35	30	25	19	14	55.0
299	8.6	15	20	24	28	31	34	36	37	39	36	37	40	41	40	44	45	43	44	45	44	43	41	39	35	29	23	18	14	54.3
300	8.7	17	21	26	29	32	35	37	38	40	37	39	42	43	43	46	46	45	46	46	45	44	43	40	36	31	26	19	14	55.7
301	8.3	16	21	25	29	32	35	37	37	40	37	38	41	42	41	46	46	44	45	45	45	44	42	39	36	30	25	18	14	55.0
302	8.5	15	20	24	28	31	34	36	37	40	36	38	41	42	41	46	46	44	45	45	45	44	42	39	36	30	25	19	14	55.0
303	9.1	19	23	26	30	32	35	37	38	40	37	39	41	42	42	45	46	44	45	45	45	44	42	39	36	30	25	19	14	55.2
304	8.7	15	22	26	29	32	35	37	38	40	37	38	41	42	41	46	46	44	45	45	45	44	42	39	36	30	25	19	14	55.2
305	8.8	15	21	25	28	31	34	37	37	40	36	38	41	42	41	44	45	44	45	45	45	44	42	39	35	30	25	19	14	54.8
306	8.6	15	21	25	28	32	34	37	38	40	37	39	41	42	42	46	46	44	44	45	44	44	42	39	35	30	24	18	14	55.1
307	8.5	15	21	25	29	32	35	37	37	40	37	38	42	42	42	45	46	44	45	45	45	44	42	40	36	31	26	19	14	55.3
308	8.7	17	22	26	29	32	35	37	38	40	37	38	42	42	42	45	46	45	45	45	45	44	42	40	36	31	25	19	14	55.3
309	8.9	19	22	26	29	32	34	36	37	40	37	38	41	42	41	45	46	44	45	45	45	44	42	39	36	30	25	19	14	55.1
310	7.9	17	21	24	28	31	34	36	37	40	36	37	41	41	40	45	45	43	44	45	44	43	42	39	35	30	24	18	14	54.5
311	8.4	17	22	26	29	32	34	36	37	40	36	38	41	41	41	45	45	43	44	45	44	44	42	39	36	30	24	18	14	54.7
312	8.8	16	22	25	28	32	34	36	37	40	37	38	42	42	42	45	46	45	45	46	45	44	43	40	36	31	25	19	14	55.5
313	8.3	19	23	26	29	31	34	36	37	40	37	38	41	41	41	46	45	43	44	44	44	43	41	38	34	29	23	18	14	54.6
314	8.2	15	21	25	28	32	34	36	37	40	36	38	41	41	41	46	45	43	44	45	44	44	42	39	35	30	24	18	14	54.9
315	8.7	15	21	25	28	31	34	36	37	40	36	38	41	41	41	45	45	44	45	45	45	44	42	39	35	30	24	18	14	54.8
316	9.0	16	21	25	29	32	34	37	38	40	37	39	42	43	42	46	46	45	45	46	45	44	42	40	36	31	26	19	14	55.6
317	8.1	17	22	25	28	31	34	36	37	40	36	38	41	41	41	46	46	44	44	45	44	44	42	39	35	29	24	18	14	54.8
318	8.7	17	21	25	29	32	35	37	38	40	37	38	41	41	41	46	46	44	45	45	44	44	42	39	35	30	24	18	14	54.9
319	9.6	17	22	26	29	32	35	37	38	40	37	39	42	43	43	45	46	45	46	46	45	45	43	40	37	31	26	19	14	55.8
320	9.5	19	23	27	30	33	35	37	38	41	38	39	42	43	42	45	46	45	45	46	45	44	43	40	36	31	26	19	14	55.5
321	8.9	18	22	25	28	32	34	36	37	40	37	38	41	42	41	45	46	44	45	45	45	44	42	39	35	30	25	19	14	55.1
322	8.8	15	21	25	28	32	34	36	38	40	36	38	41	42	42	46	47	44	45	45	45	44	42	39	36	31	25	19	14	55.4

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 14 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)	Wind Shear
277	8.6	1624	198	204	10.6	15.0	11.2	9.1	8	1.0	82	0.13
278	8.1	1625	198	204	10.3	15.0	10.7	9.4	8	1.0	82	0.09
279	8.6	1623	198	204	11.3	15.0	11.3	9.8	8	1.0	82	0.10
280	9.2	1624	198	204	11.4	15.0	12.0	9.6	8	1.0	82	0.14
281	8.6	1623	198	204	10.6	15.0	11.2	8.6	8	1.0	82	0.16
282	10.6	1624	198	204	12.0	15.1	13.7	9.7	8	1.0	82	0.20
283	9.6	1624	198	204	11.1	15.0	12.4	9.0	8	1.0	82	0.19
284	8.9	1624	198	204	11.1	15.0	11.6	9.2	8	1.0	82	0.14
285	9.0	1624	198	204	10.1	15.0	11.7	9.5	8	1.0	82	0.13
286	9.7	1622	198	204	11.5	15.0	12.6	9.6	8	1.0	82	0.16
287	9.1	1624	198	204	11.4	15.0	11.9	9.6	8	1.0	82	0.13
288	8.6	1624	198	204	10.9	15.0	11.3	10.6	8	1.0	82	0.06
289	9.2	1623	198	204	11.6	15.0	12.0	9.1	8	1.0	82	0.17
290	9.1	1625	198	204	11.0	15.0	11.9	8.3	8	1.0	82	0.20
291	8.9	1623	198	204	10.2	15.0	11.6	9.0	8	1.0	82	0.16
292	8.4	1622	198	204	11.1	15.0	11.0	9.5	8	1.0	82	0.10
293	9.7	1625	198	204	10.9	15.0	12.5	8.9	8	1.0	82	0.20
294	7.9	1624	198	204	9.3	15.0	10.4	9.7	8	1.0	82	0.06
295	8.4	1623	198	204	10.1	15.1	10.9	9.4	9	1.0	81	0.11
296	8.7	1624	198	204	10.3	15.0	11.4	8.8	9	1.0	81	0.15
297	8.4	1622	198	204	9.9	15.0	11.0	9.3	9	1.0	81	0.11
298	8.6	1624	198	204	10.4	15.0	11.3	9.8	9	1.0	81	0.10
299	8.6	1627	198	204	9.4	15.1	11.3	9.6	9	1.0	81	0.11
300	8.7	1622	198	204	11.1	15.0	11.3	6.4	-4	0.9	56	0.31
301	8.3	1625	198	204	9.2	15.0	10.8	0.1	-35	0.6	0	2.57
302	8.5	1621	198	204	9.8	15.0	11.1	0.1	-35	0.6	0	2.59
303	9.1	1626	198	204	10.2	15.1	11.9	0.1	-35	0.6	0	2.62
304	8.7	1624	198	204	10.0	15.0	11.4	0.1	-35	0.6	0	2.60
305	8.8	1623	198	204	9.6	15.0	11.4	0.1	-35	0.6	0	2.60
306	8.6	1625	198	204	9.2	15.0	11.3	0.1	-35	0.6	0	2.60
307	8.5	1624	198	204	9.9	15.1	11.1	0.1	-35	0.6	0	2.59
308	8.7	1621	198	204	10.3	15.0	11.4	0.1	-35	0.6	0	2.60
309	8.9	1626	198	204	10.3	15.1	11.7	0.1	-35	0.6	0	2.61
310	7.9	1621	198	204	8.5	14.9	10.4	0.1	-35	0.6	0	2.55
311	8.4	1628	198	204	8.7	15.1	11.0	0.1	-35	0.6	0	2.58
312	8.8	1623	198	204	11.3	15.1	11.4	0.1	-35	0.6	0	2.61
313	8.3	1625	198	204	9.4	15.0	10.9	0.1	-35	0.6	0	2.58
314	8.2	1622	198	204	8.8	15.0	10.7	0.1	-35	0.6	0	2.57
315	8.7	1626	198	204	10.1	15.1	11.4	0.1	-35	0.6	0	2.60
316	9.0	1623	198	204	10.7	15.0	11.7	0.1	-35	0.6	0	2.62
317	8.1	1624	198	204	9.9	15.0	10.6	0.1	-35	0.6	0	2.57
318	8.7	1623	198	204	9.1	15.0	11.3	0.1	-35	0.6	0	2.60
319	9.6	1624	198	204	10.9	15.1	12.5	0.1	-35	0.6	0	2.65
320	9.5	1625	198	204	10.3	15.0	12.3	0.1	-35	0.6	0	2.64
321	8.9	1623	198	204	10.0	15.0	11.7	0.1	-35	0.6	0	2.61
322	8.8	1625	198	204	9.7	15.1	11.5	0.1	-35	0.6	0	2.61

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 15 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Sound Pressure Level per 1/3 Octave Band (Hz), dBA																			Total (dBA)										
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250		1600	2000	2500	3150	4000	5000	6300	8000	10000	
323	9.0	17	21	26	29	33	35	37	38	40	37	38	42	42	42	45	45	44	45	45	45	44	42	39	36	30	25	19	14	55.1	
324	9.4	19	23	26	28	32	34	36	37	40	37	38	41	42	42	45	46	44	45	45	45	44	42	39	35	30	25	19	14	55.0	
325	10.0	19	23	26	29	32	34	36	38	40	38	39	43	44	43	46	46	45	45	46	45	44	42	40	36	31	25	19	14	55.8	
326	9.4	17	21	26	29	32	35	37	38	40	37	39	42	43	43	46	46	45	45	46	45	44	42	40	36	31	26	19	14	55.7	
327	8.8	19	23	26	29	32	35	37	38	40	37	39	42	43	42	46	46	45	45	46	45	44	42	40	36	31	25	19	14	55.6	
328	9.4	16	21	25	28	31	34	37	38	40	37	38	41	43	42	47	47	45	45	45	45	44	42	39	36	30	25	19	14	55.6	
329	8.3	20	23	26	29	31	34	36	37	40	37	38	41	41	41	46	46	43	44	45	44	43	41	38	35	29	24	18	14	54.7	
330	8.5	17	21	25	28	31	34	36	37	40	36	38	41	41	41	46	46	43	44	45	44	44	42	39	35	29	24	18	14	54.8	
331	9.0	20	25	27	29	32	35	37	38	40	37	38	41	42	41	46	46	44	44	45	44	44	42	39	35	29	24	18	14	55.0	
332																															
333																															
334	8.5	18	22	26	29	32	35	37	38	40	37	38	41	41	41	46	45	43	44	45	44	44	42	39	35	30	24	18	14	54.9	
335	8.9	18	23	27	30	33	35	38	38	41	38	39	42	43	42	45	46	44	45	45	45	44	42	40	36	31	25	19	14	55.5	
336	10.1	18	22	26	30	32	35	37	38	40	37	39	42	43	42	45	46	45	45	46	45	44	43	40	36	31	25	19	14	55.6	
337																															
338	8.6	20	23	27	29	32	34	37	38	40	36	38	41	41	41	46	46	43	44	45	44	43	41	39	35	30	24	18	14	54.7	
339	8.5	18	22	27	30	32	35	37	38	40	37	39	41	42	41	45	46	44	45	45	45	44	42	39	36	31	25	18	14	55.0	
340	9.5	17	22	26	28	32	34	37	37	40	37	39	41	43	42	45	46	45	45	45	45	44	42	40	36	31	25	19	14	55.4	
341	9.3	17	22	26	30	33	36	38	38	40	37	39	42	43	42	47	46	44	45	45	45	44	42	40	37	31	25	19	14	55.5	
342	9.9	17	22	26	29	33	35	37	38	40	37	39	42	43	43	45	47	45	46	46	45	44	43	40	37	32	26	19	14	55.8	
343	9.0	20	25	28	30	33	35	37	38	40	37	38	41	42	42	45	46	44	45	45	45	44	42	39	36	31	25	18	14	55.1	
344	9.0	17	22	26	29	32	35	37	38	40	36	38	41	42	41	46	46	44	44	45	44	44	42	39	36	31	24	18	14	55.0	
345	9.0	17	21	26	29	32	35	37	38	40	37	39	41	43	42	46	46	45	45	46	45	44	42	40	37	31	25	19	14	55.5	
346	9.0	18	23	26	29	33	35	37	38	40	37	39	42	42	42	46	46	44	45	45	45	44	42	40	36	31	25	18	14	55.3	
347	9.7	17	22	26	29	33	35	37	38	40	37	39	42	43	42	45	46	44	45	45	45	44	42	40	37	31	25	19	14	55.4	
348	10.4	19	23	27	29	32	35	37	38	40	37	39	42	43	43	45	46	45	46	46	45	45	43	40	37	32	26	19	14	55.9	
349	9.6	19	23	28	30	33	36	38	38	40	38	40	42	44	43	46	47	45	45	46	45	44	43	40	37	32	25	19	14	55.8	
350	10.7	19	22	26	29	33	35	37	39	41	38	40	43	44	43	46	47	45	46	46	45	45	43	40	37	32	26	19	14	56.2	
351	9.1	17	22	26	29	32	35	37	38	40	36	38	41	42	42	45	46	44	45	45	45	44	42	39	36	31	25	18	14	55.2	
352	9.0	17	22	26	29	32	35	37	38	40	37	38	41	42	41	45	46	44	44	45	45	44	42	39	36	31	25	18	14	54.9	
353	10.8	18	23	26	29	33	35	37	39	40	38	39	42	44	43	45	47	45	46	46	45	45	43	41	37	32	26	19	14	56.0	
354	9.8	19	23	26	29	32	35	37	38	40	37	39	42	43	43	46	47	45	45	46	45	44	43	40	37	32	26	19	14	55.9	

Table E.01 Measurement data - Turbine ON

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 16 of 16
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to yaw angle or an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)	Wind Shear
323	9.0	1623	198	204	9.4	15.0	11.7	0.1	-35	0.6	0	2.62
324	9.4	1626	198	204	10.7	15.1	12.2	0.1	-35	0.6	0	2.64
325	10.0	1623	198	204	11.4	15.0	12.9	0.1	-35	0.6	0	2.66
326	9.4	1625	198	204	11.0	15.0	12.2	0.1	-35	0.6	0	2.63
327	8.8	1624	198	204	10.6	15.0	11.5	0.1	-35	0.6	0	2.61
328	9.4	1625	198	204	10.8	15.1	12.2	0.1	-35	0.6	0	2.63
329	8.3	1624	198	204	10.1	15.0	10.9	0.1	-35	0.6	0	2.58
330	8.5	1624	198	204	9.7	15.0	11.1	0.1	-35	0.6	0	2.59
331	9.0	1622	198	204	9.7	15.0	11.7	0.1	-35	0.6	0	2.62
332		1627	198	204	10.8	15.1	12.0	0.1	-35	0.6	0	2.63
333		1624	198	204	11.7	15.0	13.4	0.1	-35	0.6	0	2.68
334	8.5	1626	198	204	8.8	15.0	11.2	0.1	-35	0.6	0	2.59
335	8.9	1623	198	204	9.7	15.0	11.7	0.1	-35	0.6	0	2.61
336	10.1	1623	198	204	10.8	15.0	13.0	0.1	-35	0.6	0	2.67
337		1624	198	204	11.0	15.0	13.0	0.1	-35	0.6	0	2.67
338	8.6	1623	198	204	9.5	15.0	11.3	0.1	-35	0.6	0	2.60
339	8.5	1625	198	204	9.8	15.1	11.1	0.1	-35	0.6	0	2.59
340	9.5	1625	198	204	10.7	15.0	12.4	0.1	-35	0.6	0	2.64
341	9.3	1625	198	204	9.9	15.0	12.1	0.1	-35	0.6	0	2.63
342	9.9	1622	198	204	11.0	15.1	12.8	0.1	-35	0.6	0	2.66
343	9.0	1625	198	204	9.3	15.0	11.7	0.1	-35	0.6	0	2.62
344	9.0	1627	198	204	9.4	15.1	11.7	0.1	-35	0.6	0	2.62
345	9.0	1621	198	204	10.2	15.0	11.8	0.1	-35	0.6	0	2.62
346	9.0	1624	198	204	9.4	15.0	11.7	0.1	-35	0.6	0	2.62
347	9.7	1624	198	204	10.3	15.1	12.6	0.1	-35	0.6	0	2.65
348	10.4	1623	198	204	11.3	15.0	13.5	0.1	-35	0.6	0	2.69
349	9.6	1625	198	204	10.6	15.0	12.4	0.1	-35	0.6	0	2.64
350	10.7	1625	198	204	11.8	15.0	13.8	0.1	-35	0.6	0	2.70
351	9.1	1624	198	204	10.4	15.0	11.8	0.1	-35	0.6	0	2.62
352	9.0	1624	198	204	10.1	15.0	11.7	0.1	-35	0.6	0	2.62
353	10.8	1623	198	204	11.9	15.0	13.9	0.1	-35	0.6	0	2.70
354	9.8	1624	198	204	11.2	15.0	12.7	0.1	-35	0.6	0	2.66

Table E.02 Measurement data - Background

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 2 of 8
 Created on: 12/15/2015

Data Point #	Standardized Wind Speed (m/s)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
1		0.0	5.2	5.3	6	1.0	90
2		0.0	5.3	5.0	6	1.0	90
3		0.0	5.1	5.2	6	1.0	91
4		0.0	5.2	4.9	6	1.0	90
5		0.0	5.3	4.8	6	1.0	90
6		0.0	5.1	5.6	6	1.0	90
7		0.0	5.4	5.3	6	1.0	90
8	4.7	0.0	5.1	4.7	6	1.0	90
9	4.4	0.0	5.4	4.4	7	1.0	90
10	4.5	0.0	5.3	4.5	7	1.0	90
11	4.9	0.0	5.6	4.9	7	1.0	90
12	4.8	0.0	5.4	4.8	7	1.0	90
13	4.5	0.0	5.1	4.5	7	1.0	90
14	5.2	0.0	5.4	5.2	7	1.0	90
15	4.2	0.0	5.0	4.2	7	1.0	90
16	4.4	0.0	5.1	4.4	7	1.0	90
17	5.0	0.0	5.3	5.0	7	1.0	90
18	5.0	0.0	5.4	5.0	7	1.0	90
19	4.7	0.0	5.2	4.7	7	1.0	90
20	5.0	0.0	5.3	5.0	7	1.0	90
21	4.9	0.0	5.4	4.9	7	1.0	90
22	5.1	0.0	5.1	5.1	7	1.0	90
23	5.0	0.0	5.4	5.0	7	1.0	90
24	4.6	0.0	5.2	4.6	7	1.0	90
25	4.4	0.0	5.5	4.4	7	1.0	90
26	5.1	0.0	5.3	5.1	7	1.0	90
27	5.0	0.0	5.0	5.0	7	1.0	90
28	4.7	0.0	4.9	4.7	7	1.0	90
29	4.8	0.0	4.6	4.8	7	1.0	90
30	4.9	0.0	5.4	4.9	7	1.0	90
31	5.6	0.0	5.0	5.6	7	1.0	90
32	5.5	0.0	5.4	5.5	7	1.0	90
33	5.4	0.0	5.6	5.4	7	1.0	89
34	4.9	0.0	5.5	4.9	7	1.0	89
35	5.4	0.0	5.1	5.4	7	1.0	90
36	6.2	0.0	5.5	6.2	7	1.0	89
37	5.6	0.0	5.7	5.6	7	1.0	89
38	5.7	0.0	5.6	5.7	7	1.0	89
39	5.7	0.0	5.6	5.7	7	1.0	89
40	5.0	0.0	5.6	5.0	7	1.0	90
41		0.0	5.6	5.2	7	1.0	90

Table E.02 Measurement data - Background

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 3 of 8
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Sound Pressure Level per 1/3 Octave Band (Hz), dBA																		Total (dBA)											
		20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000		
42																															
43																															
44																															
45																															
46																															
47																															
48																															
49	5.8	0	6	9	13	17	21	28	24	25	22	24	25	26	26	28	28	27	26	23	20	16	15	15	15	15	15	15	15	14	18.2
50	5.6	1	6	9	13	19	22	31	24	24	23	26	27	28	27	27	27	26	25	23	21	16	15	15	15	15	15	15	15	14	22.2
51	5.8	3	6	9	13	19	22	31	24	25	24	26	27	28	26	29	29	28	27	26	24	19	16	15	17	16	15	15	14	22.4	
52	6.2	2	5	9	13	17	21	31	24	25	26	25	27	26	25	27	28	28	26	25	24	20	17	15	15	15	15	15	14	19.2	
53	6.2	2	5	9	13	17	21	23	24	23	21	23	24	25	25	28	30	29	27	28	26	21	18	16	15	15	15	15	14	21.8	
54	5.8	1	4	8	13	17	19	23	23	22	19	22	23	23	23	27	29	27	27	27	25	20	18	16	15	15	15	15	14	17.7	
55	5.5	1	4	8	13	17	20	23	23	24	19	22	23	27	26	28	31	30	29	30	29	26	23	18	16	15	15	15	14	20.3	
56	4.9	2	6	9	13	18	20	23	24	24	19	24	23	28	27	28	29	29	28	29	29	26	23	18	16	15	15	15	14	20.2	
57	5.8	1	4	9	13	20	20	23	27	24	20	25	25	28	27	29	30	30	29	29	29	26	23	18	16	15	15	15	14	19.3	
58	5.9	5	7	10	13	20	20	23	25	23	21	26	25	27	27	29	30	30	29	30	30	27	24	19	16	15	15	15	14	22.7	
59	5.6	2	5	9	14	19	20	23	24	22	20	24	23	24	24	26	29	28	27	28	27	23	21	17	15	15	15	15	14	25.6	
60	5.7	0	4	9	13	18	20	26	22	22	22	25	24	24	24	25	25	26	25	23	21	18	17	15	15	15	15	15	14	24.0	
61	6.3	1	5	7	12	16	19	22	21	22	21	25	23	23	23	26	27	26	25	26	25	20	18	16	15	15	15	15	14	19.2	
62	5.8	0	4	8	12	18	20	22	23	25	20	23	22	22	22	25	27	27	26	27	25	22	20	17	16	15	15	15	14	20.1	
63	5.8	1	5	9	13	17	20	24	24	23	20	23	22	22	23	25	26	26	26	26	25	22	20	17	16	15	15	15	14	22.1	
64	7.9	9	12	14	16	20	23	28	29	26	28	28	27	28	30	29	31	31	32	32	29	27	24	22	20	17	16	15	14	21.5	
65	8.1	10	13	14	17	20	24	28	30	27	28	29	29	29	32	31	31	32	32	32	29	27	24	22	20	17	16	15	14	24.1	
66	7.5	13	17	17	19	22	26	29	30	28	29	30	29	30	31	30	31	32	32	32	29	27	24	22	19	17	16	15	14	21.8	
67	9.1	15	18	19	20	21	25	29	30	28	29	30	29	30	31	30	31	31	31	31	29	27	23	21	19	17	16	15	14	22.4	
68	7.7	13	15	17	18	21	24	28	29	27	29	30	31	31	30	30	31	31	32	32	29	27	24	22	19	17	16	15	14	18.7	
69	7.5	12	14	16	18	21	24	29	29	28	29	31	31	30	30	29	31	31	32	32	29	27	24	22	20	17	16	15	14	21.7	
70	7.7	15	19	20	21	22	26	30	30	29	30	31	30	30	31	30	31	31	31	31	29	27	23	22	19	17	16	15	14	19.8	
71	7.6	13	15	16	19	22	24	30	30	28	29	29	29	29	30	29	31	31	31	31	29	27	24	21	19	17	16	15	14	17.9	
72	7.8	15	17	18	20	22	25	30	30	28	29	30	30	30	31	31	32	32	32	32	29	27	24	22	20	17	16	15	14	18.6	
73																															
74																															
75																															
76																															
77																															
78																															
79																															
80																															
81	7.3	14	16	17	19	22	25	29	30	27	29	30	29	30	31	30	31	32	32	32	29	27	24	22	20	17	16	15	14	17.0	
82	8.5	9	12	14	17	20	24	28	30	26	29	29	29	31	30	29	31	32	32	32	29	27	24	22	20	17	16	15	14	17.1	

Table E.02 Measurement data - Background

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 4 of 8
 Created on: 12/15/2015

Data Point #	Standardized Wind Speed (m/s)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
42		0.0	5.7	5.7	7	1.0	90
43		0.0	5.4	5.4	7	1.0	90
44		0.0	5.3	5.8	7	1.0	89
45		0.0	5.7	5.7	7	1.0	89
46		0.0	5.8	5.6	7	1.0	89
47		0.0	5.2	5.8	7	1.0	89
48		0.0	5.4	5.3	8	1.0	89
49	5.8	0.0	6.1	5.8	8	1.0	90
50	5.6	0.0	5.3	5.6	8	1.0	89
51	5.8	0.0	5.3	5.8	8	1.0	89
52	6.2	0.0	5.5	6.2	8	1.0	89
53	6.2	0.0	5.7	6.2	8	1.0	89
54	5.8	0.0	5.8	5.8	8	1.0	89
55	5.5	0.0	5.8	5.5	8	1.0	89
56	4.9	0.0	5.7	4.9	8	1.0	89
57	5.8	0.0	5.9	5.8	8	1.0	89
58	5.9	0.0	5.4	5.9	8	1.0	88
59	5.6	0.0	5.4	5.6	8	1.0	89
60	5.7	0.0	5.4	5.7	8	1.0	89
61	6.3	0.0	5.4	6.3	8	1.0	89
62	5.8	0.0	5.3	5.8	8	1.0	88
63	5.8	0.0	5.5	5.8	8	1.0	89
64	7.9	0.4	6.3	7.9	9	1.0	84
65	8.1	0.0	6.7	8.1	9	1.0	83
66	7.5	0.0	6.6	7.5	9	1.0	84
67	9.1	0.0	6.4	9.1	9	1.0	84
68	7.7	0.0	6.9	7.7	9	1.0	83
69	7.5	0.0	6.8	7.5	9	1.0	83
70	7.7	0.0	6.3	7.7	9	1.0	83
71	7.6	0.0	6.8	7.6	9	1.0	83
72	7.8	0.0	6.9	7.8	9	1.0	83
73		0.0	7.2	7.3	9	1.0	83
74		0.0	6.9	8.3	9	1.0	83
75		0.0	7.8	7.5	9	1.0	83
76		0.0	7.6	8.1	9	1.0	84
77		0.0	7.3	7.4	9	1.0	83
78		0.0	6.8	6.8	9	1.0	83
79		0.0	7.3	8.1	9	1.0	83
80		0.0	6.9	9.0	9	1.0	82
81	7.3	0.0	6.6	7.3	9	1.0	82
82	8.5	0.0	6.4	8.5	9	1.0	82

Table E.02 Measurement data - Background

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 5 of 8
 Created on: 12/15/2015

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Sound Pressure Level per 1/3 Octave Band (Hz), dBA																				Total (dBA)										
		20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000			
83	7.5	9	12	13	17	21	24	28	30	26	28	28	28	30	31	30	31	32	32	32	30	27	24	22	20	17	16	15	14	16.6		
84	7.2	15	18	19	21	22	25	29	30	28	30	30	30	31	30	31	32	31	31	32	29	27	23	21	19	17	16	15	14	17.0		
85	5.8	13	17	17	19	21	25	28	30	28	30	29	29	29	30	29	31	31	32	32	29	27	24	22	19	17	16	15	14	18.6		
86	6.6	17	19	20	22	23	26	29	32	29	31	30	30	30	31	31	31	32	32	32	29	27	24	22	19	17	16	15	14	21.9		
87	8.0	11	14	15	18	21	26	28	29	26	28	29	28	30	30	31	33	32	32	32	29	27	24	22	20	17	16	15	14	17.9		
88	8.6	11	14	15	17	20	23	28	30	27	29	30	31	32	32	30	31	31	32	32	29	27	24	22	20	17	16	15	14	18.1		
89	8.6	13	15	17	18	20	24	29	31	29	30	31	32	31	31	29	31	31	32	32	29	27	24	22	19	17	16	15	14	19.4		
90	9.1	9	12	14	16	20	24	28	30	27	29	30	29	28	30	29	30	31	32	32	29	27	24	22	19	17	16	15	14	18.3		
91	8.6	8	12	13	16	19	23	29	29	26	29	29	28	28	30	29	30	31	32	32	29	28	24	22	20	17	16	15	14	17.5		
92	8.1	14	17	18	19	22	24	29	30	27	29	29	28	28	30	29	30	31	31	32	29	27	24	22	19	17	16	15	14	16.5		
93	7.9	17	19	21	22	23	26	29	31	29	30	31	30	30	31	30	32	32	32	32	29	27	24	22	20	17	16	15	14	18.2		
94	8.6	7	12	13	16	19	24	29	30	28	30	32	32	31	34	34	31	31	31	31	29	27	24	22	19	17	16	15	14	19.3		
95	7.8	5	9	12	16	20	24	30	30	29	30	31	31	31	31	30	31	32	32	32	29	27	24	22	20	17	16	15	14	19.1		
96	7.6	10	14	15	18	20	24	30	27	26	27	28	28	28	28	28	28	29	29	29	26	24	21	19	18	16	15	15	14	16.2		
97	8.4	14	16	19	20	21	23	29	26	27	26	27	28	27	26	25	25	25	24	23	21	18	16	15	15	16	15	15	14	18.5		
98	8.3	13	15	17	18	21	22	26	28	26	24	25	24	23	24	24	23	24	22	21	19	18	16	15	15	16	15	15	14	16.7		
99	7.9	14	17	18	19	21	24	29	25	26	26	27	26	27	26	25	25	25	24	22	21	19	17	16	15	16	15	15	14	17.8		
100	8.3	13	15	17	18	20	23	26	25	25	25	26	26	27	25	25	25	25	25	23	22	20	17	16	15	16	15	15	14	18.9		
101	7.1	16	19	19	21	23	25	27	28	28	28	28	28	29	27	27	27	26	25	23	22	19	17	16	15	15	15	15	14	16.9		
102	7.5	10	13	14	16	19	23	24	24	23	22	25	24	26	25	24	26	25	26	24	22	20	17	16	15	15	15	15	14	16.3		
103	8.1	13	15	17	18	21	22	25	25	25	24	25	25	25	24	24	25	25	25	23	21	19	17	16	15	16	15	15	14	17.2		
104	8.9	10	13	14	16	19	22	24	26	23	23	26	24	24	23	24	24	24	23	22	20	17	16	15	15	16	15	15	14	17.1		
105	8.3	12	13	15	16	19	22	32	33	23	28	29	30	26	26	26	25	25	23	20	18	16	16	15	15	15	15	14	14	21.6		
106	8.3	10	14	15	18	20	22	35	27	24	27	25	27	25	24	26	26	27	25	22	20	17	16	16	16	16	15	15	14	17.6		
107	7.9	15	17	18	20	22	24	30	27	27	26	26	26	26	26	26	26	27	28	25	22	19	17	16	16	16	16	15	15	14	38.7	
108	8.8	18	20	22	24	24	27	29	29	29	29	29	30	30	29	29	30	30	32	28	25	22	18	16	16	16	16	15	15	14	41.4	
109	8.8	13	15	17	18	20	23	26	25	25	24	25	24	26	25	24	25	25	23	22	19	17	16	16	16	16	15	15	14	37.0		
110	8.7	8	10	13	15	18	22	25	22	23	22	24	24	26	24	25	29	27	27	25	23	20	18	16	16	16	16	15	15	14	37.1	
111	9.0	12	15	16	18	19	23	25	24	24	24	26	25	26	25	26	27	27	26	25	23	20	18	16	16	16	16	15	15	14	37.5	
112	9.8	19	22	24	24	25	27	29	30	31	31	32	33	32	32	30	29	29	27	25	22	20	18	16	16	16	16	15	15	14	42.2	
113																																
114																																
115																																
116	9.6	16	19	21	22	23	25	27	27	28	28	28	28	27	28	28	28	29	26	24	23	19	17	16	16	16	15	15	14	39.4		
117	9.7	18	22	23	24	24	26	29	30	30	30	31	31	30	29	29	29	27	26	24	22	19	18	16	16	16	16	15	15	14	41.0	
118	10.1	18	21	21	22	24	27	28	28	29	28	29	28	28	28	28	27	26	25	22	20	18	17	16	16	16	16	15	15	14	39.6	
119	10.0	19	21	22	22	23	25	28	28	28	28	29	29	28	28	27	27	26	25	23	21	19	17	16	16	16	16	15	15	14	39.5	
120	8.8	16	19	21	22	23	27	29	28	28	29	29	28	28	29	28	28	28	27	26	24	22	19	17	16	16	16	15	15	14	40.1	
121	8.5	19	22	24	25	25	27	29	30	30	31	31	31	31	30	30	30	29	27	25	23	20	18	17	16	16	16	15	15	14	41.5	
122	9.2	15	17	18	19	21	25	26	27	26	28	28	28	29	31	30	29	29	29	27	25	23	19	17	16	16	16	16	15	15	14	40.1
123	8.4	18	21	23	23	24	26	29	30	30	30	31	30	30	29	29	29	28	26	24	22	20	18	17	16	16	16	16	15	14	41.0	

Table E.02 Measurement data - Background

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 6 of 8
 Created on: 12/15/2015

Data Point #	Standardized Wind Speed (m/s)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
83	7.5	0.0	7.1	7.5	9	1.0	82
84	7.2	0.0	6.9	7.2	9	1.0	83
85	5.8	0.0	5.7	5.8	9	1.0	83
86	6.6	0.0	7.4	6.6	9	1.0	84
87	8.0	0.0	6.3	8.0	9	1.0	83
88	8.6	0.0	6.2	8.6	9	1.0	82
89	8.6	0.0	6.1	8.6	9	1.0	82
90	9.1	0.0	6.8	9.1	9	1.0	81
91	8.6	0.0	6.2	8.6	9	1.0	80
92	8.1	0.0	6.3	8.1	9	1.0	81
93	7.9	0.0	5.8	7.9	9	1.0	81
94	8.6	0.0	6.2	8.6	9	1.0	81
95	7.8	0.0	6.2	7.8	9	1.0	81
96	7.6	0.0	6.8	7.6	9	1.0	82
97	8.4	0.0	7.0	8.4	9	1.0	81
98	8.3	0.0	6.9	8.3	10	1.0	80
99	7.9	0.0	6.7	7.9	10	1.0	81
100	8.3	0.0	6.4	8.3	10	1.0	81
101	7.1	0.0	6.6	7.1	10	1.0	81
102	7.5	0.0	6.7	7.5	10	1.0	81
103	8.1	0.0	7.5	8.1	10	1.0	81
104	8.9	0.0	6.2	8.9	10	1.0	80
105	8.3	0.0	5.5	8.3	10	1.0	80
106	8.3	0.0	6.6	8.3	10	1.0	80
107	7.9	0.0	7.0	7.9	10	1.0	80
108	8.8	0.0	6.9	8.8	10	1.0	79
109	8.8	0.0	7.4	8.8	10	1.0	80
110	8.7	0.0	7.4	8.7	10	1.0	80
111	9.0	0.0	7.1	9.0	10	1.0	79
112	9.8	0.0	7.7	9.8	10	1.0	79
113		0.0	7.2	8.3	10	1.0	79
114		0.0	7.5	8.5	10	1.0	80
115		0.0	6.6	8.9	10	1.0	80
116	9.6	0.0	6.8	9.6	10	1.0	79
117	9.7	0.0	7.3	9.7	9	1.0	79
118	10.1	0.0	7.9	10.1	9	1.0	79
119	10.0	0.0	7.2	10.0	9	1.0	78
120	8.8	0.0	7.1	8.8	9	1.0	79
121	8.5	0.0	7.5	8.5	9	1.0	79
122	9.2	0.0	7.7	9.2	9	1.0	79
123	8.4	0.0	7.3	8.4	9	1.0	79

Table E.02 Measurement data - Background

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed (m/s)	Sound Pressure Level per 1/3 Octave Band (Hz), dBA																				Total (dBA)								
		20	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
124	8.8	18	21	23	24	24	26	29	30	30	31	30	30	30	30	29	28	26	24	22	20	18	17	16	16	15	15	14	41.0	
125	10.2	16	18	20	21	23	25	27	27	28	27	27	27	26	25	25	25	24	22	21	19	18	17	16	16	15	15	14	38.3	
126	9.1	15	18	19	20	22	24	26	26	26	26	26	26	24	24	25	24	24	22	20	19	18	17	16	16	16	15	14	37.3	
127	8.8	21	24	26	28	29	30	31	33	34	34	34	34	34	33	32	32	30	28	26	25	23	20	18	17	16	15	14	44.7	
128	9.6	12	14	16	17	20	23	23	24	25	24	25	27	26	25	26	27	26	25	23	20	19	17	16	16	15	15	14	37.5	
129	9.5	13	16	17	19	21	24	24	25	25	25	26	27	26	25	25	26	26	25	23	21	19	17	16	16	15	15	13	37.7	
130	8.5	11	16	17	19	21	23	25	25	25	25	27	29	28	27	27	27	28	28	26	24	22	20	17	16	16	15	15	14	38.7
131	9.4	14	17	19	20	21	24	25	26	26	27	29	28	27	26	28	27	26	26	24	22	20	19	17	16	16	15	15	14	38.5
132	9.4	17	22	23	24	26	27	28	30	30	31	33	32	31	30	30	29	29	27	25	23	21	19	17	16	16	15	15	14	41.9
133	9.2	14	17	18	20	22	25	26	27	27	28	29	29	28	28	27	27	26	24	22	20	19	17	16	16	15	15	14	39.3	
134	8.3	12	15	17	18	22	24	25	25	25	26	26	27	26	25	26	26	27	26	24	22	20	19	17	16	16	15	15	14	37.8
135	9.1	12	14	16	18	20	23	24	24	24	24	25	26	25	25	26	28	27	25	23	21	19	17	16	16	15	15	14	37.4	
136	9.4	11	15	17	19	21	25	26	26	26	26	28	29	30	28	27	27	28	27	25	23	21	19	17	16	16	15	15	14	39.3
137	8.6	14	17	18	21	23	25	26	27	29	30	31	32	32	30	29	29	29	27	25	23	21	19	17	16	16	15	15	14	41.0
138	8.9	11	13	16	17	20	24	25	25	25	25	26	27	26	26	27	27	26	25	23	21	19	17	16	16	16	15	15	14	37.6
139	10.0	4	9	12	15	20	23	25	24	23	22	24	25	26	25	26	26	27	26	24	22	20	19	17	16	16	15	15	14	37.0
140	9.1	12	14	15	18	21	26	27	25	27	27	27	28	27	26	26	26	26	26	24	21	19	18	16	16	16	15	15	14	38.2
141	10.0	10	14	15	18	23	28	26	25	26	25	26	28	28	26	25	26	25	25	23	21	20	18	17	16	16	15	15	14	38.1
142	9.8	14	17	18	20	22	27	28	26	26	26	28	28	27	27	27	26	26	24	23	21	19	18	17	16	16	15	15	14	38.5
143	9.9	7	11	13	16	19	25	23	22	22	22	23	24	24	24	25	25	24	24	22	21	19	18	17	16	16	15	15	14	35.8
144	9.0	4	9	12	15	19	24	23	22	22	21	22	24	24	24	25	25	25	24	22	21	19	18	16	16	16	15	15	14	35.7
145	8.9	11	13	15	18	21	26	26	24	25	24	26	26	26	26	28	26	27	26	24	22	21	21	17	20	16	16	15	14	38.0

Table E.02 Measurement data - Background

Project: Adelaide Wind Energy Centre - Turbine T31 - IEC 61400-11 Measurement
 Report ID: 15156.01.T31.RP3

Page 8 of 8
 Created on: 12/15/2015

Data Point #	Standardized Wind Speed (m/s)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
124	8.8	0.0	7.7	8.8	9	1.0	80
125	10.2	0.0	7.6	10.2	9	1.0	79
126	9.1	0.0	9.1	9.1	9	1.0	78
127	8.8	0.0	8.4	8.8	9	1.0	79
128	9.6	0.4	10.2	9.6	9	1.0	82
129	9.5	0.0	9.0	9.5	9	1.0	81
130	8.5	0.0	9.9	8.5	9	1.0	81
131	9.4	0.0	9.3	9.4	9	1.0	81
132	9.4	0.0	9.4	9.4	9	1.0	81
133	9.2	0.0	9.4	9.2	9	1.0	81
134	8.3	0.0	9.8	8.3	9	1.0	81
135	9.1	0.0	8.9	9.1	9	1.0	81
136	9.4	0.0	8.4	9.4	9	1.0	82
137	8.6	0.0	8.4	8.6	9	1.0	82
138	8.9	0.0	7.6	8.9	9	1.0	82
139	10.0	0.0	9.1	10.0	9	1.0	82
140	9.1	0.0	8.2	9.1	9	1.0	82
141	10.0	0.0	8.8	10.0	9	1.0	82
142	9.8	0.0	8.8	9.8	9	1.0	81
143	9.9	0.0	8.4	9.9	9	1.0	81
144	9.0	0.0	9.1	9.0	9	1.0	81
145	8.9	0.6	8.3	8.9	9	1.0	81

Appendix F Supplementary Information for the Regulator

Appendix F.01 Calibration Certificates

ISO 17025**As Left RECALIBRATION CERTIFICATE**

Region: LMS NA
Account: Aercoustics Engineering

Instrument: LMS SCADAS
Manufacturer: LMS Instruments BV
Type: SCR05
Serial number(s): 53103922

Calibration method: Two calibrated external standards (DC voltage and frequency) are used to calibrate the internal LMS SCADAS references: time/frequency accuracy of the internal system clock and amplitude accuracy of the internal signal sources. All input channels are calibrated against the internal references.

Ambient conditions: The calibrations have been carried out in a controlled environment, at an ambient temperature of 22.8 °C and a relative humidity of 54 %.

Calibration date: 04 June,2014

Results: The calibration results, together with their associated uncertainties, are included in this calibration certificate.

Uncertainty: The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.
The standard uncertainty of measurement has been determined in accordance with publication EA-4/02

Traceability: The measurements have been executed using methods for which the traceability to international standards has been demonstrated towards the Raad voor Accreditatie.

Breda, 06 June, 2014

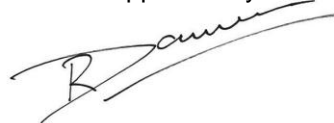
Calibration performed by:



A v Aalst

The Raad voor Accreditatie is one of the signatories of the Multilateral Agreement of the European Cooperation for Accreditation (EA) for the mutual recognition of calibration certificates

Certificate approved by:



M.C.A.G. Damen

Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced with written approval of the calibration laboratory

This certificate is issued provided that neither LMS Instruments nor the Raad voor Accreditatie assumes any liability

Certificate number: **53103922-20140604-0**

Page: 1 of 21

West Caldwell Calibration Laboratories Inc.

Certificate of Calibration

for

MICROPHONE UNIT

Manufactured by: **BRUEL & KJAER**
Model No: **4189-A-021**
Serial No: **2622169**
Calibration Recall No: **24274**

Submitted By:

Customer:
Company: **AERCOUSTICS ENGINEERING**
Address:

The subject instrument was calibrated to the indicated specification using standards traceable to the National Institute of Standards and Technology or to accepted values of natural physical constants. This document certifies that the instrument met the following specification upon its return to the submitter.

West Caldwell Calibration Laboratories Procedure No. **4189-A-021 BRUE**

Upon receipt for Calibration, the instrument was found to be:

Within (X) see attached Report of Calibration.

the tolerance of the indicated specification.

West Caldwell Calibration Laboratories' calibration control system meets the requirements, ISO 10012-1 MIL-STD-45662A, ANSI/NCSL Z540-1, IEC Guide 25, ISO 9001:2008 and ISO 17025.

Note: With this Certificate, Report of Calibration is included.

Approved by:

Calibration Date: **16-Jun-14**

FC

Certificate No: **24274 - 2**

Felix Christopher (QA Mgr.)
ISO/IEC 17025:2005

QA Doc. #1051 Rev. 2.0 10/1/01

Certificate Page 1 of 1

**West Caldwell
Calibration
Laboratories, Inc.**
uncompromised calibration
1575 State Route 96, Victor, NY 14564, U.S.A.



Calibration Lab. Cert. # 1533.01

West Caldwell Calibration Laboratories, Inc.
 uncompromised calibration
 1575 State Route 96, Victor NY 14564



Calibration Lab. Cert. # 1533.01

REPORT OF CALIBRATION

for
Brüel & Kjær Microphone Unit Model No.: 4189-A-021
Mic. Model: 4189
Preamp. Model No.: 2671
Company : Aercoustics Engineering

Serial No.: 2622169
Serial No.: 2625417
Serial No.: 2614900
I. D. No.: XXXX

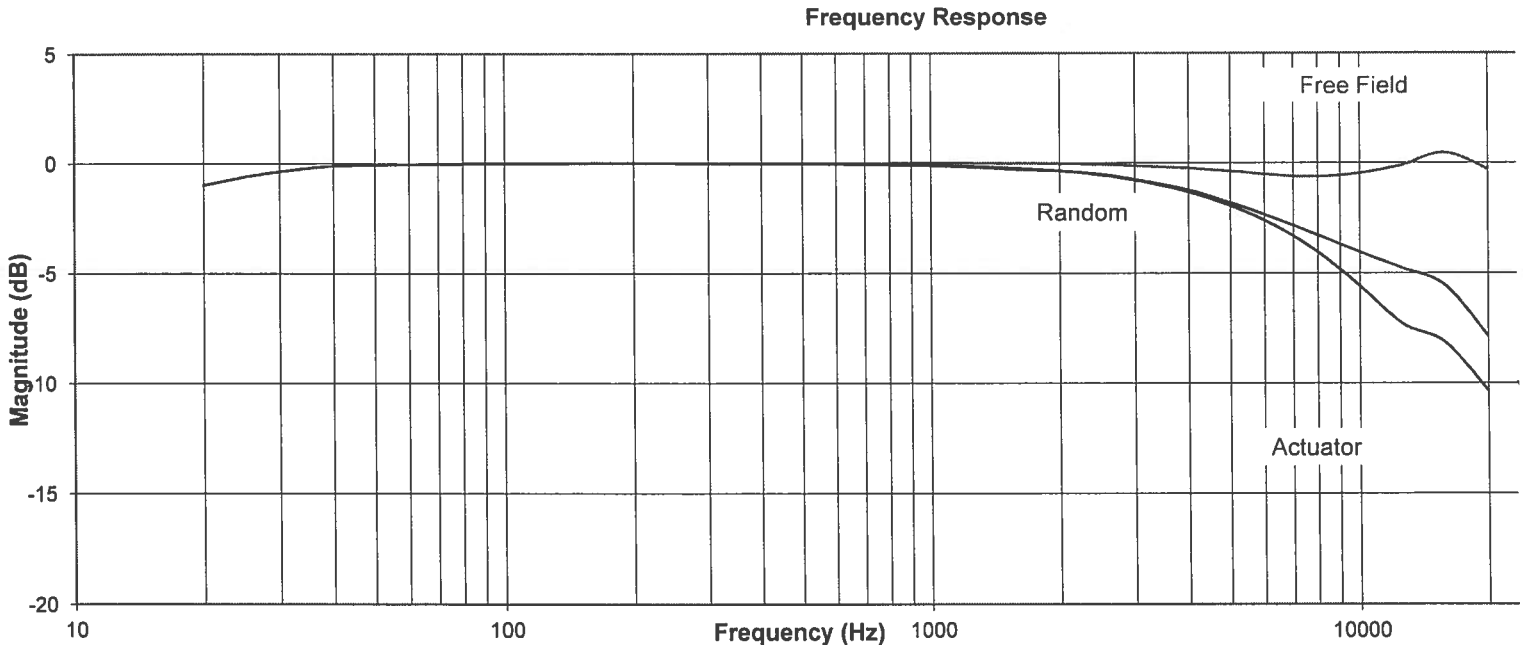
Calibration results:	Before data:	After data:
Combined Sensitivity @ 250 Hz and pressure of 99.622 kPa	Before & after data same: ...	
(Sensitivity with microphone and preamplifier.)	Ambient Temperature: 21 °C	
-26.71 dB re.1V/Pascal	Ambient Humidity: 51.8 % RH	
46.21 mV/Pascal	Ambient Pressure: 99.62 kPa	
0.71 Ko (- dB re 50 mV/Pascal)	Calibration Date: 16-Jun-2014	
Sensitivity: Pass	Re-calibration Due: 16-Jun-2015	
Freq. Response Pass	Report Number: 24274 -2	
All tests: Pass	Control Number: 24274	
Combined Sensitivity @ 1000 Hz	-26.80 dB re.1V/Pascal or	45.72 mV/Pascal

The above listed instrument meets or exceeds the tested manufacturer's specifications.

This Calibration is traceable through NIST test numbers: 683/281764-12

The expanded uncertainty of calibration: 0.18dB at 95% confidence level with a coverage factor of k=2.

The lower curve is the pressure response recorded with electrostatic actuator.




The above listed instrument was checked using calibration procedure documented in West Caldwell

Calibration Laboratories Inc. procedure :

Rev. 7.0 Jan. 24, 2014 Doc. # 1038 4189A021B&K

Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures

intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NCSS Z540-1, (MIL-STD-45662A) and ISO 9001:2008, ISO 17025

Measurements performed by: 

Felix Christopher

Calibrated on WCCL system type 9700

This document shall not be reproduced, except in full, without the written approval from West Caldwell Cal. Labs. Inc.

Rev. 7.0 Jan. 24, 2014 Doc. # 1038 4189A021B&K

West Caldwell Calibration Laboratories Inc.

1575 State Route 96, Victor NY 14564

Tel. (585) 586-3900 FAX (585) 586-4327

Calibration Data Record

for

Brüel & Kjær Microphone Unit Model No.: 4189-A-021

Serial No.: 2622169

I. D. No.: XXXX

Company : Aercoustics Engineering

Frequency Response (Reference = 0 dB @ 250Hz)

Frequency [Hz]	Actuator [dB]	Random (dB)	Free Field (dB)	Frequency [Hz]	Actuator [dB]	Random (dB)	Free Field (dB)
19.95	-0.99	-0.99	-0.99	631.0	-0.04	-0.04	-0.01
25.12	-0.58	-0.58	-0.58	794.3	-0.06	-0.06	0.00
31.62	-0.30	-0.30	-0.30	1000.0	-0.09	-0.11	0.00
39.81	-0.10	-0.10	-0.10	1258.9	-0.15	-0.18	0.00
50.12	-0.07	-0.07	-0.07	1584.9	-0.23	-0.29	-0.01
63.10	-0.03	-0.03	-0.03	1995.3	-0.35	-0.35	-0.03
79.43	-0.02	-0.02	-0.02	2511.9	-0.55	-0.51	-0.07
100.00	-0.01	-0.01	-0.01	3162.3	-0.86	-0.82	-0.15
125.89	-0.01	-0.01	-0.01	3981.1	-1.30	-1.21	-0.24
158.49	0.01	0.01	0.01	5011.9	-1.94	-1.80	-0.37
199.53	0.01	0.01	0.01	6309.6	-2.82	-2.50	-0.54
251.19	0.00	0.00	0.00	7943.3	-4.01	-3.26	-0.63
316.23	-0.01	-0.01	-0.01	10000.0	-5.58	-4.05	-0.46
398.11	-0.02	-0.02	-0.01	12589.3	-7.29	-4.78	-0.10
501.19	-0.03	-0.03	-0.01	15848.9	-8.12	-5.54	0.46
				19952.6	-10.33	-7.84	-0.28

Frequency Response: Expanded Uncertainty (dB) with coverage factor K = 2
 20 to 25 Hz 0.8dB, 25 to 160 Hz 0.5dB, 160 to 2kHz 0.3dB, 2k to 10kHz 0.5dB, 10k to 20kHz 1.3dB.

Instruments used for calibration:	Date of Cal.	Traceability No.	Re-cal. Due Date
Brüel & Kjær 4134 S/N 1942286	2-Oct-2013	683/281764-12	3-Oct-2014
HP 34401A S/N 36064102	8-Oct-2013	,287708	8-Oct-2014
HP 34401A S/N 36102471	8-Oct-2013	,287708	8-Oct-2014
HP 33120A S/N 36043716	8-Oct-2013	,287708	8-Oct-2014
Brüel & Kjær 2636 S/N 1324082	3-Oct-2013	683/281764-12	3-Oct-2014
Brüel & Kjær 2669 S/N 1835082	3-Oct-2013	683/281764-12	3-Oct-2014
Brüel & Kjær 4228 S/N 1742061	2-Oct-2013	683/281764-12	3-Oct-2014

Cal. Date: 16-Jun-2014

Tested by: Felix Christopher

Calibrated on WCCL system type 9700

This document shall not be reproduced except in full without the written approval from West Caldwell Cal. Labs. Inc.

Rev. 7.0 Jan. 24, 2014 Doc. # 1038 4189A021B&K

West Caldwell Calibration Laboratories Inc.

Certificate of Calibration

for

ACOUSTICAL CALIBRATOR

Manufactured by: BRUEL & KJAER
Model No: 4231
Serial No: 2513184
Calibration Recall No: 25471

Submitted By:

Customer:
Company: Aercoustics Engineering, LTD.
Address:

The subject instrument was calibrated to the indicated specification using standards traceable to the National Institute of Standards and Technology or to accepted values of natural physical constants. This document certifies that the instrument met the following specification upon its return to the submitter.

West Caldwell Calibration Laboratories Procedure No. 4231 BRUE

Upon receipt for Calibration, the instrument was found to be:

Within (X)

tolerance of the indicated specification. See attached Report of Calibration.

West Caldwell Calibration Laboratories' calibration control system meets the requirements, ISO 10012-1 MIL-STD-45662A, ANSI/NCSL Z540-1, IEC Guide 25, ISO 9001:2008 and ISO 17025.

Note: With this Certificate, Report of Calibration is included.

Approved by:

Calibration Date: 01-Jul-15

Certificate No: 25471 - 1

Felix Christopher (QA Mgr.)
ISO/IEC 17025:2005

QA Doc. #1051 Rev. 2.0 10/1/01

Certificate Page 1 of 1

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor, NY 14564, U.S.A.



Calibration Lab. Cert. # 1533.01

West Caldwell Calibration Laboratories, Inc.
 uncompromised calibration
 1575 State Route 96, Victor NY 14564



Calibration Lab. Cert. # 1533.01

REPORT OF CALIBRATION

Brüel & Kjær Acoustical Calibrator

for
 Model No.: 4231

Serial No.: 2513184

Company : Aercoustics Engineering, LTD.

I. D. No: XXXX

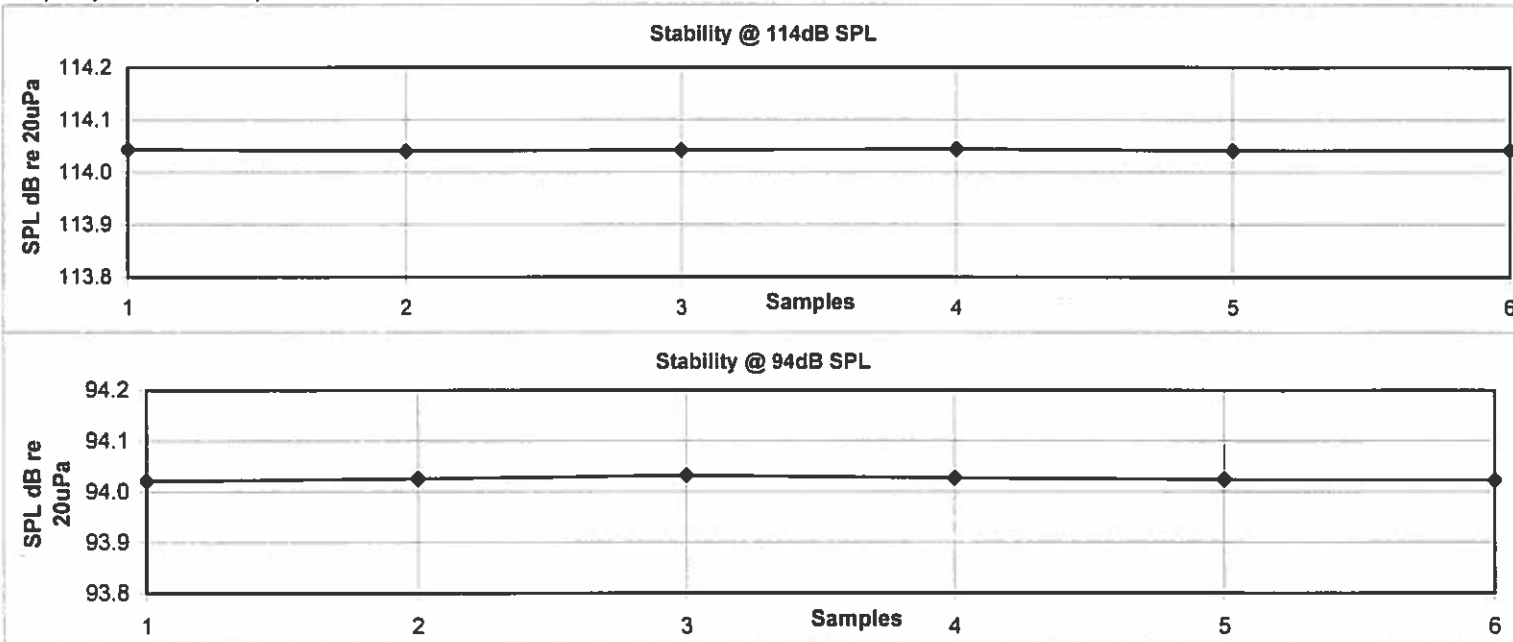
Calibration results: Sound Pressure Level at 999.9 Hz and pressure of 1013 hPa (mbar) was 114.0 dB re 20µPa (Calibrator tested with ½" adaptor UC 0210) IEC 1094-4 Type WS 2 P Microphone was used for measurement.		Before data: After data: Before & after data same: ...X...	
	114dB 94dB	Laboratory Environment: Ambient Temperature: 22.3 °C Ambient Humidity: 49.4 % RH Ambient Pressure: 98.407 kPa Calibration Date: 1-Jul-2015 Re-calibration Due: 1-Jul-2016 Report Number: 25471 -1 Control Number: 25471	
Sound Pressure Level:	Pass Pass		
Frequency:	Pass Pass		
Distortion:	Pass Pass		
Stability:	Pass Pass		
All tested parameters:	Pass		

The above listed instrument meets or exceeds the tested manufacturer's specifications
 The IEC 942:1988 Class 1 specifications, passed.
 The ANSI S1.4-1984 specifications, passed.

This Calibration is traceable through NIST test numbers: 683/284413-14

The expanded uncertainty of calibration: 0.09dB at 95% confidence level with a coverage factor of k=2.

Graph represents six samples of Sound Pressure Level measured at 5sec. interval.



The above listed instrument was checked using calibration procedure documented in West Caldwell Calibration Laboratories Inc. procedure : Rev. 7.0 Jan. 24, 2014 Doc. # 1038 4231B&K

Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NC SL Z540-1, (MIL-STD-45662A) and ISO 9001:2008, ISO 17025

Cal. Date: 1-Jul-2015

Measurements performed by:

Calibrated on WCCL system type 9700

Joanne Lemmon

This document shall not be reproduced, except in full, without the written approval from West Caldwell Cal. Labs. Inc.

Rev. 7.0 Jan. 24, 2014 Doc. # 1038 4231B&K




SOH Wind Engineering LLC

141 Leroy Road · Williston, VT 05495 · USA
Tel 802.999.3309 · Fax 802.735.9106 · www.sohwind.com

CERTIFICATE FOR CALIBRATION OF CUP ANEMOMETER

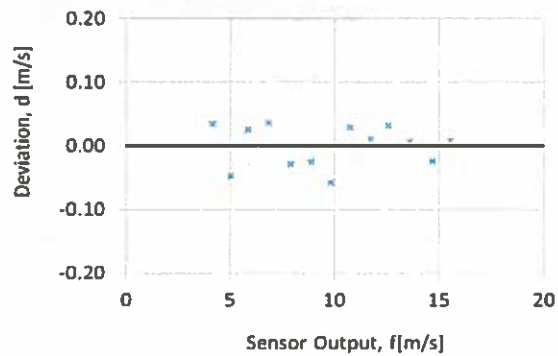
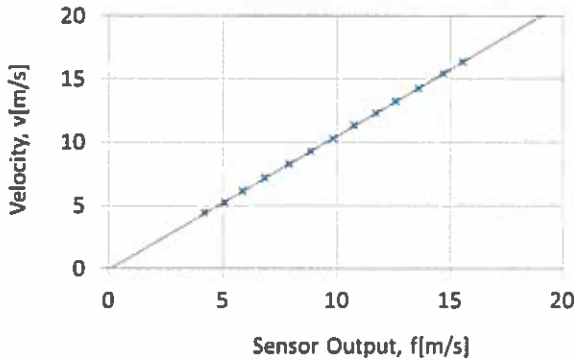
Certificate number: 15.US1.00445 **Date of issue:** February 6, 2015
Type: Vaisala Weather Transmitter, WXT520 **Serial number:** K4250007
Manufacturer: VAISALA Oyj, PI 26, FIN-00421 Helsinki, Finland

Client: Aercoustics Engineering Ltd., 50 Ronson Dr, Suite 165, Toronto, ON M9W 1B3, Canada
Anemometer received: January 13, 2015 **Anemometer calibrated:** 15:11 February 6, 2015
Calibrated by: ejf **Calibration procedure:** IEC 61400-12-1:2005(E) Annex F
Certificate prepared by: Software Revision 6 **Approved by:** Calibration engineer, rds

Calibration equation obtained: $v [m/s] = 1.02127 \cdot f [m/s] + -0.05225$ 
Standard uncertainty, slope: 0.00250 **Standard uncertainty, offset:** -0.49323
Covariance: -0.0000682 (m/s)²/Hz **Coefficient of correlation:** $\rho = -0.99997$
Absolute maximum deviation: 0.056 m/s at 9.950 m/s

Barometric pressure: 1001.6 hPa **Relative humidity:** 8.4% **Sensor Orientation:** 0°

Succession	Velocity pressure, q. [Pa]	Temperature in wind tunnel [°C]	d.p. box [°C]	Wind velocity, v. [m/s]	Sensor Wind velocity, f. [m/s]	Deviation, d. [m/s]	Uncertainty $u_c (k=2)$ [m/s]
2	10.83	22.1	27.4	4.256	4.186	0.033	0.064
4	15.38	22.1	27.4	5.071	5.062	-0.046	0.054
6	21.15	22.1	27.4	5.948	5.852	0.025	0.047
8	28.84	22.1	27.4	6.945	6.817	0.035	0.041
10	38.32	22.1	27.4	8.006	7.917	-0.028	0.037
12	48.22	22.1	27.4	8.981	8.869	-0.024	0.034
13-last	59.18	22.1	27.4	9.950	9.848	-0.056	0.033
11	71.94	22.1	27.4	10.970	10.766	0.028	0.032
9	85.24	22.1	27.4	11.942	11.734	0.010	0.032
7	98.65	22.1	27.4	12.847	12.600	0.032	0.032
5	114.83	22.1	27.4	13.861	13.617	0.006	0.032
3	133.35	22.1	27.4	14.937	14.700	-0.023	0.033
1-first	150.48	22.0	27.4	15.867	15.579	0.009	0.033



AC-1746

Standard: ISO/IEC 17025

EQUIPMENT USED

Serial Number	Description
Njord 1	Wind tunnel, blockage factor = 1.004
2254	Control cup anemometer
-	Mounting tube, D = 30 mm
TT001	Summit RT-AUI, wind tunnel
TP001	Summit RT-AUI, differential pressure box
DP005	Setra Model 239 pressure transducer
HY002	Dwyer Instruments RHP-2D20 humidity transmitter
BP003	Setra Model 278 barometer
PL7	Pitot tube
XB002	Computer Board. 16 bit A/D data acquisition board
9PRZRW1	PC dedicated to data acquisition

Traceable calibrations of the equipment are carried out by external accredited institutions: TRANSCAT, Atlantic Scale, & Furness Controls. A real-time analysis module within the data acquisition software detects pulse frequency.



Photo of the wind tunnel setup. The cross-sectional area is 2.5 x 2.5 m.

UNCERTAINTIES

The documented uncertainty is the total combined uncertainty at 95% confidence level ($k=2$) in accordance with EA-4/02. The uncertainty at 10 m/s comply with the requirements in the IEC 61400-12-1:2005 procedure. See Document US.12.01.004 for further details.

Certificate number: 15.US1.00445



SOH Wind Engineering LLC

141 Leroy Road · Williston, VT 05495 · USA
Tel 802.999.3309 · Fax 802.735.9106 · www.sohwind.com

CERTIFICATE FOR CALIBRATION OF CUP ANEMOMETER

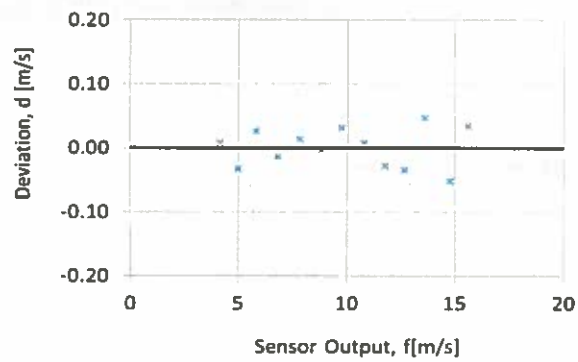
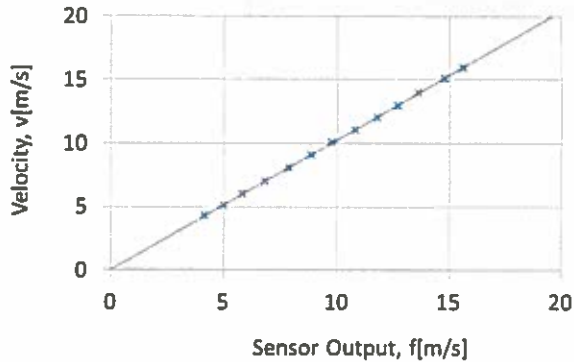
Certificate number: 15.US1.00446 **Date of issue:** February 6, 2015
Type: Vaisala Weather Transmitter, WXT520 **Serial number:** K4250007
Manufacturer: VAISALA Oyj, PI 26, FIN-00421 Helsinki, Finland

Client: Aercooustics Engineering Ltd., 50 Ronson Dr, Suite 165, Toronto, ON M9W 1B3, Canada
Anemometer received: January 13, 2015 **Anemometer calibrated:** 15:52 February 6, 2015
Calibrated by: ejf **Calibration procedure:** IEC 61400-12-1:2005(E) Annex F
Certificate prepared by: Software Revision 6 **Approved by:** Calibration engineer, rds

Calibration equation obtained: $v [m/s] = 1.01755 \cdot f [m/s] + 0.04689$ *Robert D. Hart*
Standard uncertainty, slope: 0.00242 **Standard uncertainty, offset:** 0.53046
Covariance: -0.0000594 (m/s)²/Hz **Coefficient of correlation:** $\rho = 0.99997$
Absolute maximum deviation: -0.052 m/s at 14.800 m/s

Barometric pressure: 1001.4 hPa **Relative humidity:** 8.5% **Sensor Orientation:** 90°

Succession	Velocity pressure, q, [Pa]	Temperature in wind tunnel [°C]	d.p. box [°C]	Tunnel Wind velocity, v, [m/s]	Sensor Wind velocity, f, [m/s]	Deviation, d, [m/s]	Uncertainty $u_c (k=2)$ [m/s]
2	10.88	22.0	27.4	4.292	4.165	0.007	0.064
4	15.37	22.0	27.4	5.101	5.000	-0.033	0.054
6	21.20	22.0	27.4	5.991	5.816	0.026	0.047
8	28.84	22.0	27.4	6.989	6.835	-0.014	0.041
10	38.38	22.0	27.4	8.062	7.865	0.013	0.037
12	48.37	22.0	27.4	9.051	8.852	-0.003	0.034
13-last	59.45	22.0	27.4	10.034	9.784	0.032	0.033
11	72.23	22.0	27.4	11.060	10.816	0.007	0.032
9	85.39	22.0	27.4	12.026	11.800	-0.028	0.031
7	98.97	22.0	27.4	12.948	12.713	-0.035	0.031
5	115.14	22.0	27.4	13.965	13.632	0.047	0.032
3	133.81	22.0	27.4	15.055	14.800	-0.052	0.032
1-first	150.56	21.9	27.4	15.968	15.613	0.034	0.033



AC-1746

Standard: ISO/IEC 17025

EQUIPMENT USED

Serial Number	Description
Njord 1	Wind tunnel, blockage factor = 1.004
2254	Control cup anemometer
-	Mounting tube, D = 30 mm
TT001	Summit RT-AUI, wind tunnel
TP001	Summit RT-AUI, differential pressure box
DP005	Setra Model 239 pressure transducer
HY002	Dwyer Instruments RHP-2D20 humidity transmitter
BP003	Setra Model 278 barometer
PL7	Pitot tube
XB002	Computer Board. 16 bit A/D data acquisition board
9PRZRW1	PC dedicated to data acquisition

Traceable calibrations of the equipment are carried out by external accredited institutions: TRANSCAT, Atlantic Scale, & Furness Controls. A real-time analysis module within the data acquisition software detects pulse frequency.



Photo of the wind tunnel setup. The cross-sectional area is 2.5 x 2.5 m.

UNCERTAINTIES

The documented uncertainty is the total combined uncertainty at 95% confidence level ($k=2$) in accordance with EA-4/02. The uncertainty at 10 m/s comply with the requirements in the IEC 61400-12-1:2005 procedure. See Document US.12.01.004 for further details.

Certificate number: 15.US1.00446

CERTIFICATE OF CALIBRATION

Customer: AEROCOUSTICS ENGINEERING LTD
50 RONSON DRIVE
SUITE 165
TORONTO, ON M9W 1B3

Customer Nbr: 9-322110-000
PO Nbr: 2015-01-05C
Date Received: January 07, 2015

Cert/SO Nbr: 33-80856-1-1
Manufacturer: Nokeval
Model Nbr: 7470

Date Completed: January 13, 2015
Due Date: January 13, 2016

Description: Serial to Analog Converter
Serial Nbr: A165164
ID Nbr: NONE
Unit Barcode: 901B0188547

Calibrated To: Manufacturer Specification
Calibration Proc: 1-AC58014-0
Item Received: In Tolerance
Item Returned: In Tolerance

Transcat Calibration Laboratories have been audited and found in compliance with ISO/IEC 17025:2005. Accredited calibrations performed within the Lab's Scope of Accreditation are indicated by the presence of the Accrediting Body's Logo and Certificate Number on this Certificate of Calibration. Any measurements on an accredited calibration not covered by that Lab's Scope are listed in the notes section of the certificate. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Transcat calibrations, as applicable, are performed in compliance with the requirements of ISO 9001:2008, ISO TS16949:2009, ANSI/NCSL Z540.1-1994 (R2002), and ISO 10012:2003. When specified contractually, the requirements of 10CFR21, 10CFR50 App. B and ASME NQA-1.2012 are also covered.

Metrological Traceability includes no less than: An unbroken chain of comparison, realization of SI units, measurement uncertainty (MU), documentation, competence, periodic recalibration, and measurement assurance. Transcat documents the traceability of measurements to the SI units through the National Institute of Standards and Technology (NIST) or the National Research Council of Canada (NRC), or other recognized national measurement institutes (NMI's) or international standard bodies, or to measurable conditions created in our laboratory, or accepted fundamental and/or natural physical constants, ratio type of calibration, or by comparison to consensus standards. The specific path of traceability for the reported measurement results is maintained at the Transcat facility and is available there for review. Uncertainty of the measurement is required for further dissemination of traceability.

Complete records of work performed are maintained by Transcat and are available for inspection. Laboratory standards used in the performance of this calibration are shown on the Supplemental Report.

The results in this report relate only to the item calibrated or tested, and the determination of in or out of tolerance is specific to the model/serial no. referenced above based on the tolerances shown on the supplemental report, these tolerances are either the original equipment manufacturer's (OEM's) warranted specifications or the client's requested specifications.

Uncertainties are reported with a coverage factor $k=2$, providing a level of confidence of approximately 95%. The Test Uncertainty Ratio (TUR) is calculated as per NCSL International RP-9, section 8.2. All calibrations have been performed using processes having a TUR of 4:1 or better (3:1 for mass calibrations), unless otherwise noted on the Supplemental Report. Calibrations at these TUR thresholds (or greater) provide reasonable confidence that the instrument is within the stated tolerances. For mass calibrations: Conventional mass referenced to 8.0 g/cm³.

Any number of factors can cause a unit to drift out of tolerance at any time following its calibration. Limitations on the uses of this instrument are detailed in the OEM's operating instructions.

Notes:

Calibrated At:

4043 Carling Avenue
Ottawa, ON K2K 2A4
By: Shabeba Bucknor

Facility Responsible:

4043 Carling Avenue
Ottawa, ON K2K 2A4
613-591-8140

 Digitally Signed By Keith Powell

Date: January 13, 2015

Keith Powell
Lab Manager

 Digitally Signed On January 13, 2015

Revision 0

This certificate may not be reproduced except in full, without the written approval of Transcat. Additional information, if applicable may be included on separate report(s).

FIG13R27 11A03/14

Appendix F.02

Summary of Measurement Results

Summary of Measurement Results

1.1 Sound Power Levels

From Table 11 of IEC test report 15156.01.T31.RP3:

Wind Speed (m/s)	Apparent L_{WA} , (dBA)	Maximum Sound Power Level (dBA)* REA # 5663-9R9JTB
6	102.8	103.5
7	103.1	103.5
8	103.1	103.5
9	103.7	103.5
10	104.1	103.5

*Includes +0.5 dB, per Section E3.1 of the MOECC Compliance Protocol for Wind Turbine Noise

1.2 Tonal Audibility Values

From Table 12 of IEC test report 15156.01.T31.RP3:

Wind Speed (m/s)	Frequency (Hz)	Tonal audibility, ΔL_a (dB)	Tonal Audibility from AAR* (dB)
6	129	-2.0	2
6	557	2.6	2
7	130	1.6	2
7	261	-2.3	2
7	558	5.8	2
8	130	-1.6	2
8	558	5.7	2
9	555	5.2	2
10	559	3.6	2

*Adelaide Wind Energy Centre – Noise Impact Assessment Report (April 2013)

1.3 Statement of Compliance

Based on the results in Table 11 of the IEC 61400-11 test report to which this statement is attached, the maximum apparent sound power level of the test turbine does not comply with the sound level in REA # 8980-95RSLP and Section E3.1 of the MOECC Compliance Protocol for Wind Turbine Noise.

Based on the results in Table 12 of the IEC 61400-11 to which this statement is attached, the maximum tonal audibility of the test turbine does not comply with the maximum tonal audibility of 2 dB as indicated in the statement from the manufacturer in Appendix E of the Acoustic Assessment Report dated April, 2013.

The owner/operator intends to demonstrate compliance at the worst-case receptors in accordance with Section E3.1 of the E-Audit review process in the Compliance Protocol for Wind Turbine Noise. Specifically, the owner/operator pursues Option 2: where I-Audit has been chosen to demonstrate compliance at the worst-case receptor(s).

Appendix F.03 E-Audit Checklist

2017 Compliance Protocol Appendix F5: E-Audit checklist for IEC 61400-11:2002 +A1:2006

Wind Energy Project – Screening Document – Acoustic Audit Report – Emission IEC61400-11:2002 +A1:2006 Standard
Information Required in the Acoustic Audit Report – Emission

Item #	Description	Complete?	Comment
1	Characterization of the wind turbine Items 1 to 26; IEC61400-11:2013, Section 10.2	✓	Report Section 2.1
2	Physical environment Items 27 to 33; IEC61400-11:2013, Section 10.3, Physical Environment	✓	Report Section 2.2, 3.2, 4.2, Appendix A
3	Measurement instrumentation Items 34 to 39; IEC61400-11:2013, Section 10.4, Instrumentation	✓	Report Section 3, Calibration Certificates provided in response letter
4	Acoustic data Items 40 to 49; IEC61400-11:2013, Section 10.5, Acoustic Data	✓	Report Section 4, 3.3, Appendix C, Appendix D
5	Non-acoustic data Items 50 to 56; IEC61400-11:2003 Section 10.6, Non-Acoustic Data	✓	Report Section 3, Appendix E, slant distance in response letter
6	Uncertainty the apparent sound power level at integer wind speeds one-third octave band spectrum of the noise at the reference position at each integer wind speed the Tonality of the sound emissions of the wind turbine measured at the reference position	✓	Report Section 4, Appendix C
7	Additional information Item 60; NPC-233, Section 10, Report Format, bullet point number 4, Conclusions and Recommendations Item 61; NPC-233, Section 12.3, Acoustic Audit – Acoustical Data, bullet point number 8, All necessary and supporting calculations Item 62; NPC-233, Section 12.3, Acoustic Audit – Acoustical Data, bullet point number 3, Details of measurement procedure	✓	Report Section 3, data in Excel provided separately; and compliance statement provided in response letter

Appendix F.04

Standardized Wind Speed Sample Calc

SAMPLE CALCULATION

This calculation example demonstrates the calculation of hub height wind speed through power curve and the calculation of standardized wind speed at hub height with Nacelle anemometer as per IEC 61400-11 Edition 2.1 section 7.3.1.1.

Sample calculations have been based on measurement data collected and reported for Adelaide Wind Energy Centre (Report ID: 15156.01.T31.RP2) for data points collected during Turbine ON measurements [Data point #3 (13-18) and #31 (182-187)]

7.3.1.1 Determination of Wind Speed through power curve (m/s)

Step 1: Determine Acceptable Range of Power Curve

The power curve relates the power to the wind speed at hub height. The wind speed is determined from the measured electric power. Correlation between measured sound level and measured electric power is very high up to the point of maximum power.

Step2: Determine Hub Height Wind Speed from linear interpolation from power curve for Data Point # 3

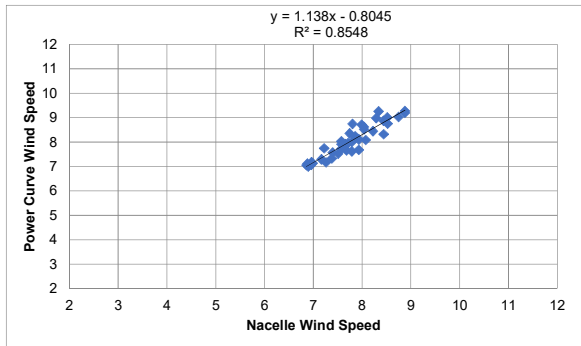
Average Active Power measured for Data Point #3 (x) = 1034 kW

$$y = y_0 + (x - x_0) \frac{y_1 - y_0}{x_1 - x_0} = \frac{y_0(x_1 - x) + y_1(x - x_0)}{x_1 - x_0}$$

$y_0 =$	7	m/s
$x_0 =$	838	kW
$y_1 =$	8	m/s
$x_1 =$	1219	kW
$x =$	1034	kW
$y =$	7.51	m/s

7.3.1.1.1 Determination of Wind Speed with Nacelle Anemometer

Step 3: For all data points with power levels between 5% to 95% of rated power, a linear regression using the nacelle wind speed V_n and the hub height wind speed. The resulting linear regression plot and equation are shown below. The k factor method, outlined in Section 7.3.1.1.2 was not used in the calculation.



Determine standardized hub height wind speed for points with >95% power, the linear regression relationship was used. Ex. for Data Point #31

$V_{nac,m} =$	8.49	m/s
$V_h =$	8.85	m/s

For points between 5% to 95% power, the standardized wind speed is determined by the power curve, as outlined in Step 2.

Table 1 - Power Curve and Acceptable Range of Power Curve

Power Curve	
Hub Wind Speed (m/s)	Power [kW]
0	0
1	0
2	0
3	4
4	97
5	281
6	528
7	838
8	1219
9	1478
10	1597
11	1620
12	1620
13	1620
14	1620
15	1620
16	1620
17	1620
18	1620
19	1620
20	1620
21	1620
22	1620
23	1620
24	1620
25	1620

Table 2 - Power Curve & Required Wind Speeds

Power Curve & Required Wind Speeds		
Power Curve Tolerance	1%	
Power Output	1620	kW
95% Power	1539	kW

SAMPLE CALCULATION

This calculation example demonstrates the calculation of standardized wind speeds as per IEC 61400-11 Edition 2.1 section 7.3.1.1

Table 1 - Information to calculate V_h

Data ID#	Data Point Excluded 1=yes, 0=no	Power (kW)	Anemometer Wind Speed, V_a (m/s)	Hub Height Wind Speed (m/s) from power curve	data points between 5-95% (1=yes, 0=no)	Wind Speed at hub Height by Linear Regression, V_h (m/s)	Corrected Wind Speed at hub Height, $V_{h,c}$ (m/s)
1-6	1	967	7.40		0		
7-12		883	6.88	7.12	1	7.12	
13-18		1034	7.51	7.51	1	7.51	
19-24		836	6.90	6.99	1	6.99	
25-30		858	6.86	7.05	1	7.05	
31-36		869	7.26	7.16	1	7.16	
37-42		1085	7.68	7.65	1	7.65	
43-48		947	7.17	7.29	1	7.29	
49-54		1301	8.44	8.32	1	8.32	
55-60		1282	7.86	8.24	1	8.24	
61-66		1053	7.39	7.56	1	7.56	
67-72		865	6.96	7.07	1	7.07	
73-78		963	6.97	7.17	1	7.17	
79-84		1095	7.83	7.67	1	7.67	
85-90		1239	8.07	8.08	1	8.08	
91-96		1111	7.57	7.72	1	7.72	
97-102		961	7.38	7.32	1	7.32	
103-108		1072	7.79	7.61	1	7.61	
109-114		887	6.99	7.13	1	7.13	
115-120		1362	8.04	8.51	1	8.51	
121-126		1121	7.22	7.74	1	7.74	
127-132		1228	7.58	8.03	1	8.03	
133-138		1389	7.74	8.35	1	8.35	
139-144		1442	8.44	8.86	1	8.86	
145-150		1187	7.66	7.92	1	7.92	
151-156		1200	7.71	7.95	1	7.95	
157-162		1220	8.00	8.00	1	8.00	
163-168		1378	8.04	8.61	1	8.61	
169-174		1403	7.99	8.71	1	8.71	
175-180		1183	7.87	7.91	1	7.91	
182-187		1549	8.49		0	8.85	8.85
188-193		1617	8.92		0	9.34	9.34
194-199		1621	9.06		0	10.62	10.62
200-205		1627	9.20		0	9.66	9.66
206-211		1586	8.46		0	8.82	8.82
212-217		1413	8.52		1	8.75	8.75
218-223		1604	9.04		0	9.37	9.37
224-229		1411	7.80	8.74	1	8.74	
230-235		1618	9.40		0	9.89	9.89
236-241		1618	9.69		0	10.09	10.09
242-247		1626	9.69		0	10.22	10.22
248-253		1622	10.18		0	10.78	10.78
254-259		1621	10.26		0	11.21	11.21
260-265		1626	9.74		0	10.28	10.28
266-271		1612	9.79		0	10.34	10.34
272-277		1615	9.47		0	9.97	9.97
278-283		1615	9.87		0	10.43	10.43
284-289		1478	8.52		9.00	9.00	
290-295		1481	8.75		9.02	9.02	
296-301		1472	8.29		8.98	8.98	
302-307		1620	8.81		9.22	9.22	
308-313		1616	8.88		9.30	9.30	
314-319		1610	8.65		9.03	9.03	
320-325		1613	9.79		10.34	10.34	
326-331		1623	9.02		9.46	9.46	
332-337		1624	9.97		10.54	10.54	
338-343		1618	9.36		9.85	9.85	
344-349		1622	8.26		8.60	8.60	
350-355		1631	9.43		9.93	9.93	
356-361		1623	10.02		10.60	10.60	
362-367		1623	9.86		10.42	10.42	
368-373		1622	11.19		11.93	11.93	
374-379		1623	10.87		11.57	11.57	
380-385		1623	11.09		11.82	11.82	
386-391		1622	10.42		11.06	11.06	
392-397		1624	10.40		11.03	11.03	
398-403		1624	9.25		9.72	9.72	
404-409		1622	11.56		12.35	12.35	
410-415		1621	10.38		11.01	11.01	
416-421		1605	9.24		9.71	9.71	
422-427		1608	10.06		10.65	10.65	
428-433		1628	9.26		9.66	9.66	
434-439		1624	9.70		10.30	10.30	
440-445		1624	10.10		10.69	10.69	
446-451		1624	9.67		10.20	10.20	
452-457		1623	10.75		11.42	11.42	
458-463		1623	9.41		9.91	9.91	
464-469		1621	10.64		11.30	11.30	
470-475		1624	9.62		10.02	10.02	
476-481		1624	8.84		9.26	9.26	
482-487		1620	10.85		11.55	11.55	
488-493		1628	9.13		9.59	9.59	
494-499		1617	8.00		8.42	8.42	
500-505		1622	9.10		9.55	9.55	
506-511		1615	10.75		11.43	11.43	
512-517		1624	9.72		10.25	10.25	
518-523		1628	10.59		11.25	11.25	
524-529		1621	9.68		10.21	10.21	

(1)

Data ID#	Data Point Excluded 1=yes, 0=no	Power (kW)	Nacelle Anemometer Wind Speed, V_a (m/s)	Hub Height Wind Speed (m/s) from power curve, V_h	data points between 5-95% (1=yes, 0=no)	Wind Speed at hub Height by Linear Regression, V_h (m/s)	Corrected Wind Speed at hub Height, $V_{h,c}$ (m/s)
530-535		1627	9.10		0	9.55	9.55
536-541		1623	9.89		0	10.45	10.45
542-547	1	1410	8.63		0		
548-553	1	1244	9.02		0		
554-559	1	1031	8.57		0		
560-565	1	821	9.32		0		
566-571	1	881	8.15		0		
572-577	1	1075	9.36		0		
578-583	1	1278	8.99		0		
584-589	1	1441	10.06		0		
590-595		1604	9.33		0	9.81	9.81
596-601		1628	9.29		0	9.76	9.76
602-607		1619	9.75		0	10.29	10.29
608-613		1623	9.36		0	9.85	9.85
614-619		1629	9.57		0	10.09	10.09
620-625		1617	9.44		0	9.94	9.94
626-631		1627	9.36		0	9.85	9.85
632-637		1246	7.94	8.10	1	8.10	
638-643		1333	8.22	8.44	1	8.44	
644-649		1501	8.88	9.19	1	9.19	
650-655		1073	8.54		0	8.92	8.92
656-661		1508	8.34	9.25	1	9.25	
662-667		1510	8.88	9.27	1	9.27	
668-673		1620	9.40		0	9.89	9.89
674-679		1618	8.81		0	9.22	9.22
680-685		1626	9.48		0	9.99	9.99
686-691		1625	8.00		0	10.51	10.51
692-697		1627	10.18		0	11.38	11.38
698-703		1618	9.23		0	9.69	9.69
704-709		1623	9.46		0	9.96	9.96
710-715		1628	9.16		0	9.59	9.59
716-721		1623	9.63		0	10.19	10.19
722-727		1622	10.52		0	11.22	11.22
728-733		1623	9.03		0	9.47	9.47
734-739		1627	8.84		0	9.25	9.25
740-745		1616	10.07		0	10.66	10.66
746-751		1625	9.69		0	10.21	10.21
752-757		1626	10.15		0	10.75	10.75
760-765	1	1623	10.20		0		
766-771	1	1623	10.32		0		
772-777		1623	10.03		0	10.62	10.62
778-783		1619	10.47		0	11.11	11.11
784-789		1626	9.81		0	9.22	9.22
790-795		1622	10.66		0	11.33	11.33
796-801		1626	9.23		0	9.70	9.70
802-807		1625	9.81		0	10.36	10.36
808-813		1623	10.31		0	10.93	10.93
814-819		1620	11.21		0	11.95	11.95
820-825		1626	10.27		0	10.89	10.89
826-831		1624	11.81		0	12.41	12.41
832-837		1623	11.53		0	12.31	12.31
838-843		1626	10.76		0	11.45	11.45
844-849		1618	10.23		0	10.84	10.84
850-855		1625	10.43		0	11.06	11.06
856-861		1624	9.84		0	10.40	10.40
862-867		1623	10.12		0	10.72	10.72
868-873		1623	9.89		0	10.45	10.45
874-879		1623	10.33		0	10.95	10.95
880-885		1619	9.93		0	10.49	10.49
886-891		1627	9.68		0	10.22	10.22
892-897		1624	10.66		0	11.33	11.33
898-903		1624	9.78		0	10.33	10.33
904-909		1542	10.28		0	10.90	10.90
910-915	1	1371	9.91		0		
916-921	1	1201	9.69		0		
922-927	1	1234	10.60		0		
928-933		1624	9.72		0	10.78	10.78
934-939		1438	9.69		0		
941-946	1	188	9.54		0		
947-952	1	100	8.81		0		
953-958	1	186	8.95		0		
959-964	1	400	8.97		0		
965-970	1	628	9.23		0		
971-976	1	831	8.75		0		
977-982	1	1071	9.22		0		
983-988	1	1229	8.18		0		
989-994	1	1300	8.67		0		
995-1000	1	1200	9.79		0		
1001-1006	1	1474	9.19		0		
1007-1012	1	1601	9.26		0		
1013-1018	1	1612	9.86		0		
1019-1024	1	1442	10.34		0		
1025-1030	1	1286	9.42		0		
1031-1036	1	1077	9.30		0		
1037-1042	1	915	8.01		0		
1043-1048	1	711	8.87		0		
1049-1054	1	978	9.45		0		
1055-1060	1	465	10.15		0		

Data ID#	Data Point Excluded 1=yes, 0=no	Power (kW)	Nacelle Anemometer Wind Speed, V_a (m/s)	Hub Height Wind Speed (m/s) from power curve, V_h	data points between 5-95% (1=yes, 0=no)	Wind Speed at hub Height by Linear Regression, V_h
----------	---------------------------------	------------	--	---	---	--

End of Report

