

# BEL/SA/3: Appendices

PINS Ref: APP/Z2830/A/11/2165035

## TOWN AND COUNTRY PLANNING ACT 1990

An appeal by Broadview Energy Developments Limited  
concerning Land at Spring Farm Ridge to the North of  
Welsh Lane, between Greatworth and Helmdon

APPENDICES OF STEPHEN ARNOTT BSc(Hons) MSc MIOA  
on behalf of Broadview Energy Developments Limited

**APPENDIX 1**  
**IOA Good Practice Guidance Review**

## **Introduction**

This briefing note was prepared following the pre inquiry meeting with Inspector Woolcock held on Friday 31<sup>st</sup> July 2013.

The ‘Companion Guide’ to PPS22 was cancelled in July 2013 when the Department for Communities and Local Government (DCLG) published ‘*Planning practice guidance for renewable and low carbon energy*’ which states quite unequivocally that:

*“ETSU-R-97 should be used by local planning authorities when assessing and rating noise from wind energy developments. Good practice guidance on noise assessments of wind farms has been prepared by the Institute Of Acoustics. The Department of Energy and Climate Change accept that it represents current industry good practice and endorses it as a supplement to ETSU-R-97.”*

The Institute of Acoustics (IOA) published on 20<sup>th</sup> May 2013, ‘*A good practice guide [GPG] to the application of ETSU-R-97 for the assessment and rating of wind turbine noise*’.

The following information submitted in support of Appeal APP/Z2830/A/11/2165035 illustrates that the noise assessment has been completed in accordance with current good practice.

No new environmental information has been introduced, although some of the existing baseline data has been re-interpreted in accordance with current good practice.

Table 1 considers each of the requirements expressed within the good practice guidance and shows how each specific requirement was met.

Accompanying Figures IOA GPG SG1-11 show the choice of polynomials, the number of datapoints per wind speed bin, the impact of alternative candidate turbines and illustrate the effect of the flat lining as required at higher and lower wind speeds, while Figures IOA GPG TS 1(a-e) - TS11(a-e) show the time series graphs used to determine the influence, if any, of birdsong.

This confirms that the submissions made meet all the requirements of relevant good practice.

Stephen Arnott

7<sup>th</sup> August 2013

**Table 1 Compliance with IOA Good Practice Guidelines: Spring Farm Ridge**

Item	IOA GPG Summary Blue Box Text (exact wording)	TNEI site specific comment& reasoning for rated risk
SB1	Engagement of all of the relevant parties from an early stage and throughout the project is desirable. This includes from site scoping to the drafting of planning conditions.	There was engagement with the Environmental Health Officer (EHO) at South Northamptonshire Council (SNC), with the relevant correspondence detailed in the original report. There was also engagement with residents to obtain access for monitoring.
SB2	The study area should cover at least the area predicted to exceed 35 dB LA90 at up to 10 m/s wind speed from all existing and proposed turbines.	This was already a requirement in ETSU-R-97 and was met.
SB3	Any contribution to background noise levels of noise from an existing wind farm must be excluded when assigning background noise and setting noise limits for a new development.	No other operational turbines in the area
SB4	The background noise monitoring locations within the study area should be selected on the basis of professional judgment, with the objective of collecting sufficient data to enable the background noise levels at each noise-sensitive receptor within the study area to be characterised.	<p>Eleven monitoring locations were used in all, two of those locations (H1 and H7) had to be moved during the survey due to resident requests.</p> <p>Proxy data was used for the following assessment locations:</p> <ul style="list-style-type: none"> <li>H6 Greatworth Hall - Data from H5 Bungalow Farm was used due to interference from an unknown night-time noise source affecting the data collected at H6. The H5 data was used as it was deemed quieter and more representative.</li> <li>H10 Stuchbury Manor Farm - Proxy data from H8 Manor Farm was used at this assessment location. No noise monitoring was undertaken at this location.</li> <li>H11 Ash Vale - Proxy data from H4 Spring Farm was used at this assessment location. No noise monitoring was undertaken at this location.</li> </ul> <p>Windspeeds greater than 10.3m/s quiet daytime and 9.9m/s night-time were not recorded during the survey and so noise limits at higher windspeeds were set equal to 10m/s daytime and 9m/s night-time. The number of data points per wind speed bin is sufficient. Limits were flat lined at lower wind speeds as necessary but this was not material.</p>
SB5	The LPA (most usually the Environmental Health Department) should be informed of the plan to carry out background noise surveys and invited to become involved. Landowners or project representatives should make the initial approach to arrange access for monitoring. A description of the monitoring process should ideally be provided to residents in writing.	Consultation was undertaken with the LPA and the EHO prior to the original background noise monitoring. The EHO was invited but did not attend installation, however he did provide comments and agreed both the methodology and monitoring locations, as detailed in original report along with copies of correspondence.

SB6	<p>Background noise surveys may be carried out at any time of the year provided that seasonal effects leading to raised noise levels can be excluded by selection of measurement position or by exclusion of non-typical data during analysis.</p>	<p>Background noise monitoring was undertaken from March to May 2010. There were no locations likely to be particularly affected by nearby streams.</p> <p>Periods when residents noted high noise levels were investigated, removed where appropriate and detailed in the original assessment report.</p> <p>Some splits in background data due to dawn chorus were observed and removed. See SB15 below for dawn chorus exclusion discussion.</p>
SB7	<p>Noise measurement equipment and calibrators used on site should comply with Class 1/Type 1 of the relevant standard(s). Enhanced microphone windscreens should be used. Standard windshields of a diameter of less than 100 mm cannot be relied upon to provide sufficient reduction of wind noise in most circumstances.</p>	<p>TNEI's uses RION NL31, NL32, NA28 noise meters which all meet the requirement of Class 1. The wind shields are over 100mm and widely used for wind farm noise surveys. Calibration drift correction was not required.</p>
SB8	<p>Measurements should be made in amenity areas between 3.5 and 20 metres from a dwelling. The measurement position should permit measurement of 'background noise levels judged to be typical/ indicative of the area around the associated dwelling and any other dwellings for which the measurement location will serve as a proxy. The influence of noise from local sources should be taken into account when selecting measurement locations. The person selecting background noise monitoring positions and visiting these locations should record subjective impressions of sources contributing to local ambient noise levels. Residents should be consulted to establish the occurrence of unusual noise events during the monitoring period. Photographs showing the positions of measuring equipment should be provided.</p>	<p>Some of the noise monitoring locations (NMLs), while agreed with residents and within the amenity space, were greater than 20m from the dwelling (NML 1, 8, 9 10).</p> <p>NML1 was within the large front garden ~35m from the dwelling.</p> <p>NML 8 was in the large rear garden ~25m from the dwelling.</p> <p>NML 9 was ~35m from the dwelling, in order to avoid adverse noise from fans associated with agricultural buildings to the west of the dwelling.</p> <p>NML 10 was over 200m from the dwelling, but this was due to the resident requesting we stop monitoring at their property (NML1) after two weeks.</p> <p>Periods when residents noted high noise levels were investigated, removed where appropriate and detailed in the original assessment report.</p> <p>TNEI are satisfied that the noise monitoring locations are appropriate and representative of the noise assessment locations.</p>

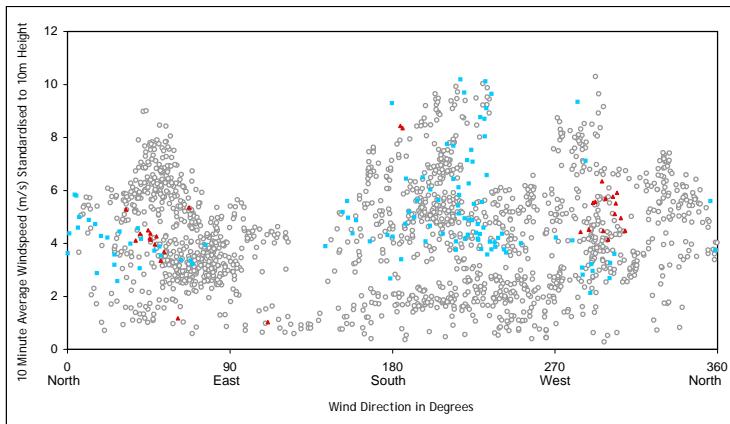
SB9	Noise measurements should be correlated with values of standardised 10 metre wind speed, calculated from hub height wind speed. Hub height wind speed is either measured directly or calculated from measurements made at two heights with the higher measurement height being no lower than 60% of hub height. Remote-sensing methods (SODAR or LIDAR) may be used as alternatives to mast-mounted anemometers. The operator of such equipment and the person analysing the data should have appropriate experience of these operations. An anemometer on a 10 metre mast may be used to provide wind speed data for smaller developments. If 10 metre mast data is used, corrections must be made to allow for wind shear characteristics at the turbine site, and these are generally applied to the predicted turbine noise levels.	Standardised 10m wind speed data was derived using hub height Lidar data (for the first month) and subsequently 60m large mast data (measured at heights of 60m and 40m). Both methodologies are in line with IOA GPG.
SB10	A recording rain gauge should be deployed (or other methods can be used with care) to identify noise data affected by rainfall	Rain data was removed. Rain data was recorded by the Lidar unit for the first month. There was no rain logger on the 60m mast so Met Office data was subsequently utilised. This is acceptable in line with methods detailed in the IOA GPG
SB11	Measurement intervals for wind speed, noise level and rainfall should be synchronised to within at most one minute over the survey period. Logging devices may use different time references (GMT or BST) and the logging protocol may apply a time marker at either the start or end of a measurement interval. Such differences must be taken into account. Synchronisation of rainfall measurements is less critical.	This was already a requirement in ETSU-R-97 and was met.

SB12	The survey duration is determined entirely by the requirement to collect sufficient valid data over an adequate range of wind speeds. For pitch-regulated turbines, data should cover the range of wind speeds between cut-in and the speed at which maximum sound power level is achieved. As a guideline, no fewer than 200 valid data points should be recorded in each of the amenity hours and night time periods, with no fewer than 5 valid data points in any 1 m/s wind speed bin. In specific cases (described in Section 3) where background noise levels are dependent on wind direction and data is to be 'filtered' into two or more datasets then a minimum of 100 valid data points and 3 valid data points per 1 m/s bin in each data set may be adequate. These guidelines are not prescriptive: more data points may be required if the data shows large scatter; fewer may be sufficient if data points are tightly grouped.	There were over 200 valid data points collected at each noise monitoring location during the quiet daytime and night time periods and 5 per 1 m/s wind speed bin (See Figures I-A GPG SG1-11).
SB13	Amenity Hours are defined as: Night-time Hours are defined as: 18:00 – 23:00 hrs Monday – Sunday; 23:00 – 07:00 (weekday and weekend) 13:00 – 18:00 Saturday and 07.00 to 18.00 Sunday (All times are local)	This was already a requirement in ETSU-R-97 and was met.
SB14	The presence of noise sources which are not common to the representative measurement locations and neighbouring noise sensitive properties should be removed from the data, using a review of time histories and scatter plots.	This was already a requirement in ETSU-R-97 and was met.
SB15	Where appropriate, clear dawn chorus effects should be removed from night-time data.	The time series analysis was reviewed particularly for 1 hour periods before dawn and dusk and some data was removed (shown in red). The resulting minor changes in background noise curves did not materially affect the derived noise limits.
SB16	Exclude any data directly affected by rainfall, or when rainfall has resulted in atypical levels.	This was already a requirement in ETSU-R-97 and was met. There were no locations likely to be particularly affected by nearby streams.

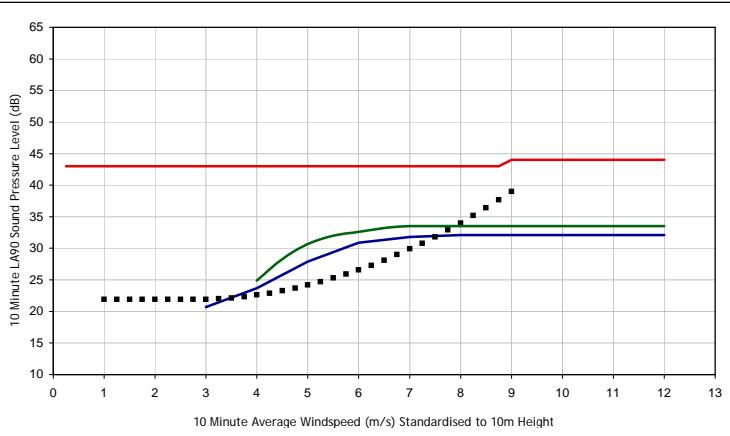
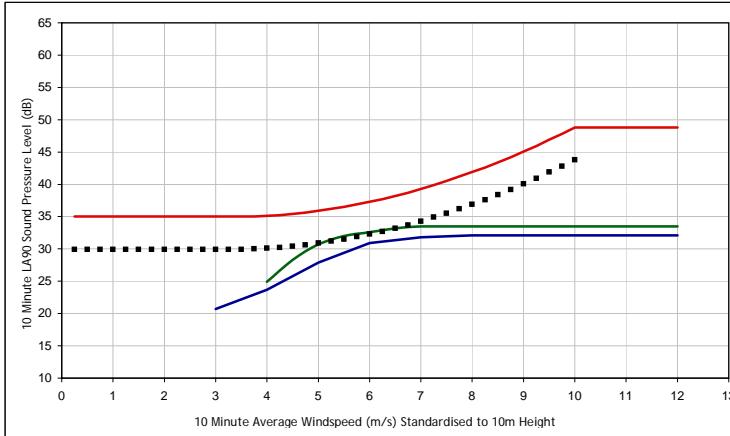
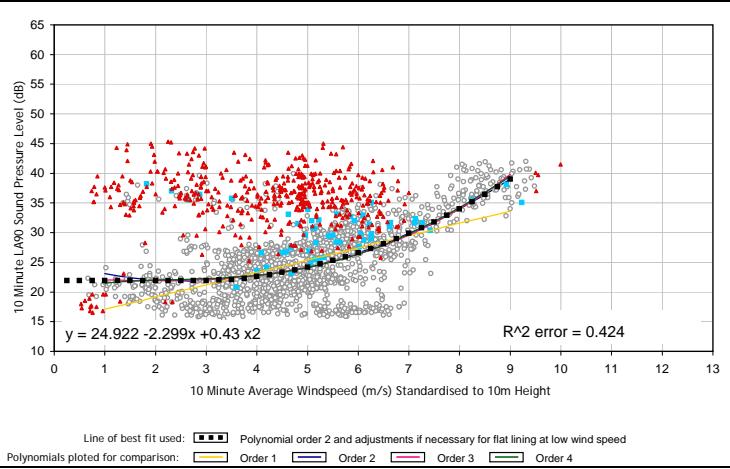
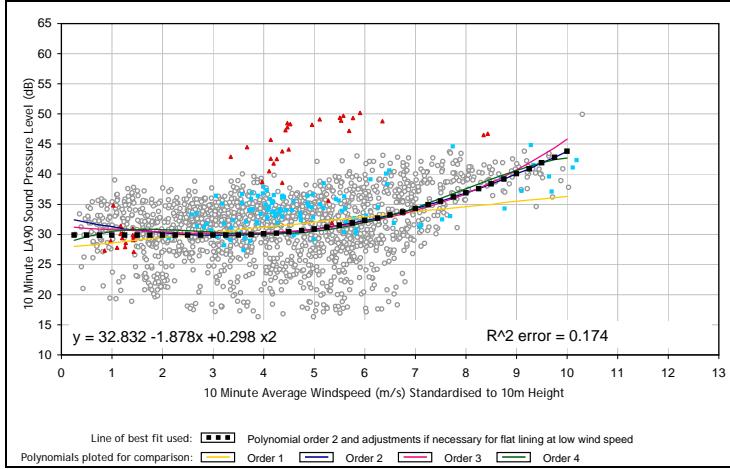
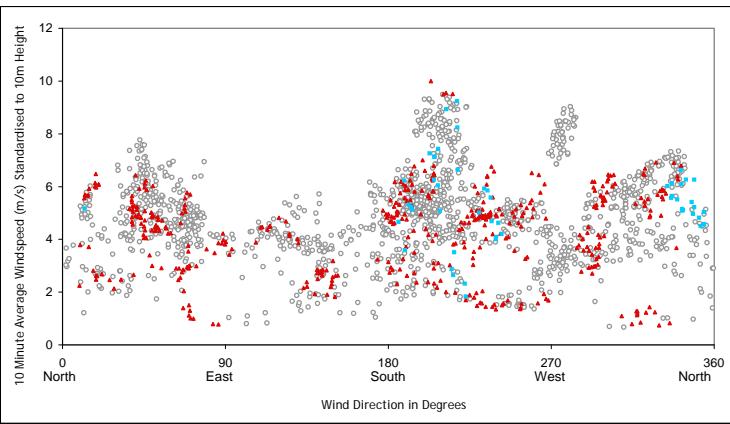
SB17	ETSU-R-97 allows the inclusion of rush hour traffic in the night period where it is a significant feature in the noise environment. If this does not routinely occur, it should be removed.	This was already a requirement in ETSU-R-97 and was met.
SB18	ETSU-R-97 states that noise levels should be plotted against wind speed to determine the prevailing background noise levels at a measurement position. The order of regression analysis to use (linear to fourth order) will depend upon the nature of the noise environment.	Alternative polynomials are shown on all Figures to demonstrate the most appropriate (shown by a dotted line) were selected.
SB19	Directional analysis of prevailing background noise levels may be necessary in specific circumstances, where a wind farm is located upwind of a receptor but a significant contributor to the background noise environment is downwind of the receptor in the same wind conditions.	Directional analysis was not considered necessary or beneficial.
SB20	<p>Whilst it is acknowledged that some of the source documents for sound power levels may be confidential, numerical values of the source data should be clearly set out in any assessment and it is good practice to reference the data sources used.</p> <p>LA90 levels should be determined from calculated LAeq levels by subtraction of 2 dB.</p> <p>Predictions should be based on octave band frequency data whenever available.</p> <p>Current good practice is that tonal issues for wind farms are generally best dealt with through a suitable planning condition.</p> <p>When applying the ISO 9613-2 standard:</p> <p>Equation 9 of the standard should be used to calculate ground effects; if no representative spectral data can be obtained, <math>A_{gr} = -3</math> dB should be used and the air absorption rate corresponding to the 250 Hz octave band;</p> <p>A ground factor of <math>G=1</math> should not be used;</p> <p>With the exception of propagation over large bodies of water or in urban areas, it is recommended to use a ground factor of <math>G=0.5</math>, in combination with emission levels which include a margin of uncertainty;</p> <p>The input data used should be clearly set out with reference to its source, and a statement on how robust it is considered to be.</p> <p>Any assumed reduced mode operation for the turbines should be clearly set out.</p> <p>A receiver height of 4.0 m, and</p>	<p>Predictions were updated for the FEI following micrositing of the turbines.</p> <p>Following IOA GPG recommendations for interpreting manufacturer data (in particular guidelines for the amount of uncertainty to be added to measured data), to accord with good practice, additional uncertainty was added to the original candidate turbine used on the assessment.</p> <p>For the REpower MM92 an additional 1dB should be added at source which would lead to an additional 1dB to be added to turbine noise predictions at receptors.</p> <p>Modelling of an alternative candidate turbine has also been shown to demonstrate compliance.</p> <p>Topographical corrections are not required.</p>

	<p>atmospheric conditions of 10°C and 70% humidity should be used.</p> <p>Topographic screening effects of the terrain (ISO 9613-2, Equation 12) should be limited to a reduction of no more than 2 dB,</p> <p>and then only if there is no direct line of sight between the highest point on the turbine rotor and the receiver location.</p> <p>A further correction of +3 dB should be added to the calculated overall A-weighted noise level for propagation across a concave ground profile.</p>	
SB21	<p>Whenever a cumulative situation is encountered, the noise limits for an individual wind farm should be determined in such a way that no cumulative excess of the total ETSU-R-97 noise limit would occur</p>	No cumulative noise issues have been identified.

### ETSU-R-97 QUIET DAYTIME - Peter's Farm(H1)



### ETSU-R-97 NIGHT TIME - Peter's Farm(H1)



#### Summary Table:

	211	272	275	297	248	146	67	33	8	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	29.9	29.9	30.1	30.9	32.3	34.3	36.9	40.1	43.8	-	-
ETSU Limit	35	35	35.1	35.9	37.3	39.3	41.9	45.1	48.8	48.8	48.8
MM92 Predictions	-	-	24.9	30.7	32.6	33.5	33.5	33.5	33.5	33.5	33.5
MM92 Exceedences	-	-	-10.2	-5.2	-4.7	-5.8	-8.4	-11.6	-15.3	-15.3	-15.3
V90 2MW Predictions	-	20.7	23.7	27.9	30.9	31.8	32.1	32.1	32.1	32.1	32.1
V90 2MW Exceedences	-	-14.3	-11.4	-8	-6.4	-7.5	-9.8	-13	-16.7	-16.7	-16.7

#### Summary Table:

	85	160	339	392	257	118	74	42	0	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	21.9	21.9	22.6	24.2	26.6	29.9	34	39	-	-	-
ETSU Limit	43	43	43	43	43	43	43	43	44	44	44
MM92 Predictions	-	-	24.9	30.7	32.6	33.5	33.5	33.5	33.5	33.5	33.5
MM92 Exceedences	-	-	-18.1	-12.3	-10.4	-9.5	-9.5	-10.5	-10.5	-10.5	-10.5
V90 2MW Predictions	-	20.7	23.7	27.9	30.9	31.8	32.1	32.1	32.1	32.1	32.1
V90 2MW Exceedences	-	-22.3	-19.3	-15.1	-12.1	-11.2	-10.9	-11.9	-11.9	-11.9	-11.9

#### Legend:

- L<sub>A90</sub> 10 Minute Measurement Point
- Line of best fit used for the assessment
- ETSU-R-97 Noise Criterion
- Predicted Wind Turbine Noise MM92
- Predicted Wind Turbine Noise V90 2MW
- ▲ Manually Excluded Data
- Excluded Rain Data

Assume worst case downwind propagation, mixed ground (G=0.5) and receiver height of 4m  
Consideration of shear as per the methodology defined in the IOA Bulletin March 2009

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Ltd

Title Summary Graphs for IOA GPG Review  
Peter's Farm(H1)

Figure Number IOA GPG SG1

Scale NTS

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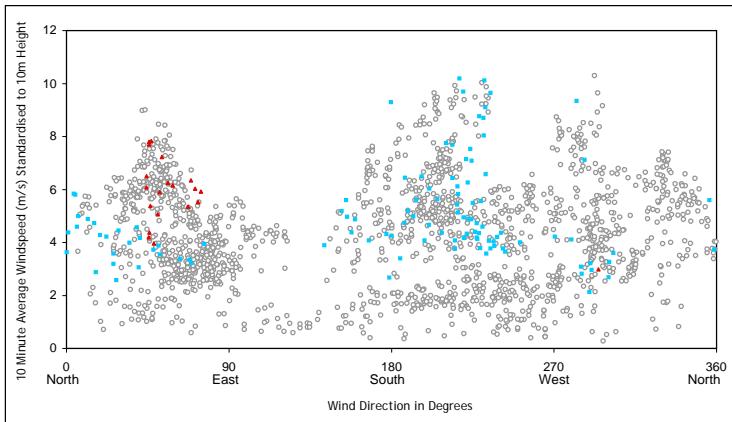
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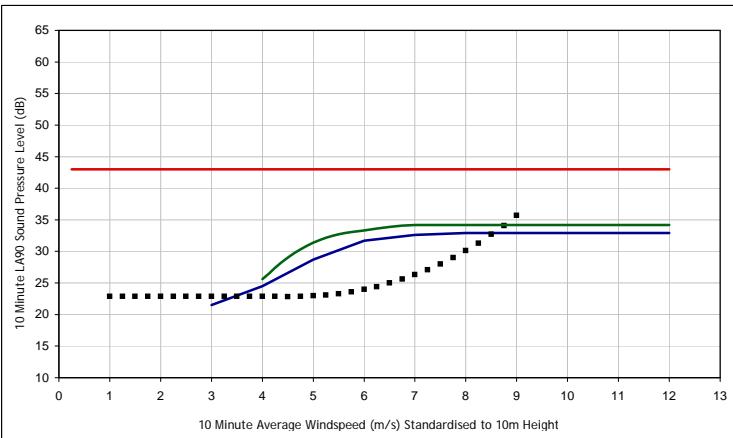
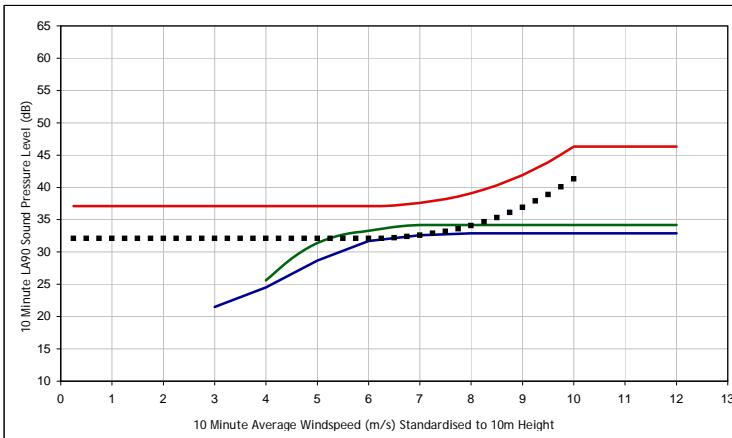
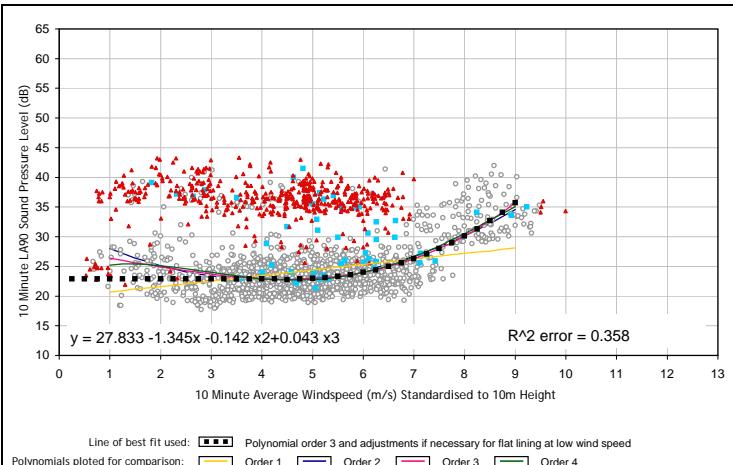
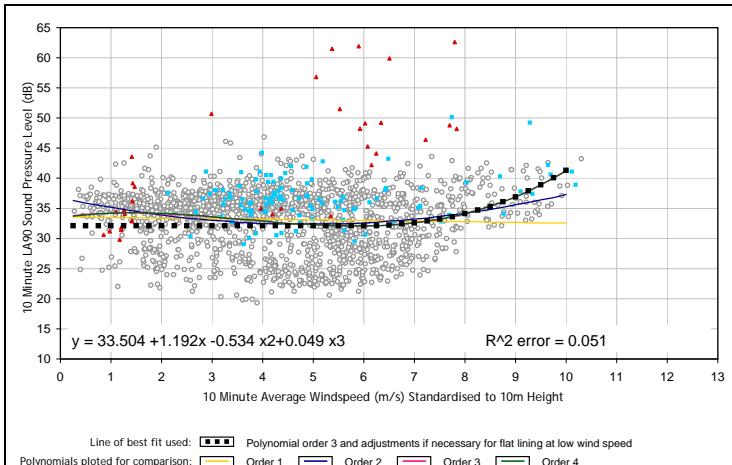
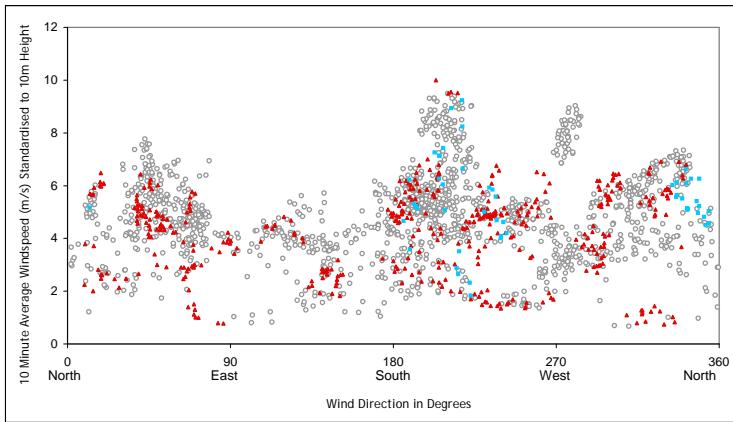


TNEI Services Limited Telephone 01912111400  
Newcastle upon Tyne Website [www.tnei.co.uk](http://www.tnei.co.uk)

### ETSU-R-97 QUIET DAYTIME - Property on Station Road(H2)



### ETSU-R-97 NIGHT TIME - Property on Station Road(H2)



**Summary Table:**

1571 total data points as follows:												
Wind Speed (m/s)	211	272	285	299	253	144	66	33	8	0	0	0
Measured Noise	32.1	32.1	32.1	32.1	32.1	32.6	34.1	36.9	41.3	-	-	-
ETSU Limit	37.1	37.1	37.1	37.1	37.1	37.6	39.1	41.9	46.3	46.3	46.3	46.3
MM92 Predictions	-	-	25.6	31.4	33.3	34.2	34.2	34.2	34.2	34.2	34.2	34.2
MM92 Exceedences	-	-	-11.5	-5.7	-3.8	-3.4	-4.9	-7.7	-12.1	-12.1	-12.1	-12.1
V90 2MW Predictions	-	21.5	24.5	28.7	31.7	32.6	32.9	32.9	32.9	32.9	32.9	32.9
V90 2MW Exceedences	-	-15.6	-12.6	-8.4	-5.4	-5	-6.2	-9	-13.4	-13.4	-13.4	-13.4

**Summary Table:**

1571 total data points as follows:												
Wind Speed (m/s)	84	160	337	391	257	118	74	42	0	0	0	0
Measured Noise	22.9	22.9	22.9	23	24	26.3	30.1	35.7	-	-	-	-
ETSU Limit	43	43	43	43	43	43	43	43	43	43	43	43
MM92 Predictions	-	-	25.6	31.4	33.3	34.2	34.2	34.2	34.2	34.2	34.2	34.2
MM92 Exceedences	-	-	-17.4	-11.6	-9.7	-8.8	-8.8	-8.8	-8.8	-8.8	-8.8	-8.8
V90 2MW Predictions	-	21.5	24.5	28.7	31.7	32.6	32.9	32.9	32.9	32.9	32.9	32.9
V90 2MW Exceedences	-	-21.5	-18.5	-14.3	-11.3	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4

#### Legend:

- L<sub>A90</sub> 10 Minute Measurement Point
- Line of best fit used for the assessment
- ETSU-R-97 Noise Criterion
- Predicted Wind Turbine Noise MM92
- Predicted Wind Turbine Noise V90 2MW
- △ Manually Excluded Data
- Excluded Rain Data

Assume worst case downwind propagation, mixed ground (G=0.5) and receiver height of 4m  
Consideration of shear as per the methodology defined in the IOA GPG

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Developments Limited

Title Summary Graphs for IOA GPG Review  
Property on Station Road(H2)

Figure Number IOA GPG SG2

Scale NTS

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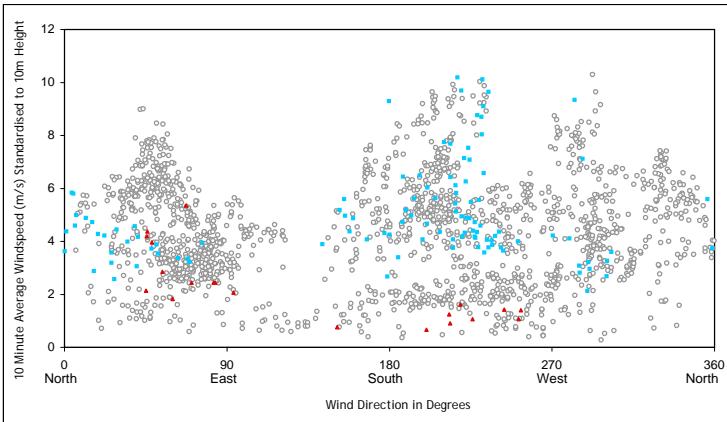
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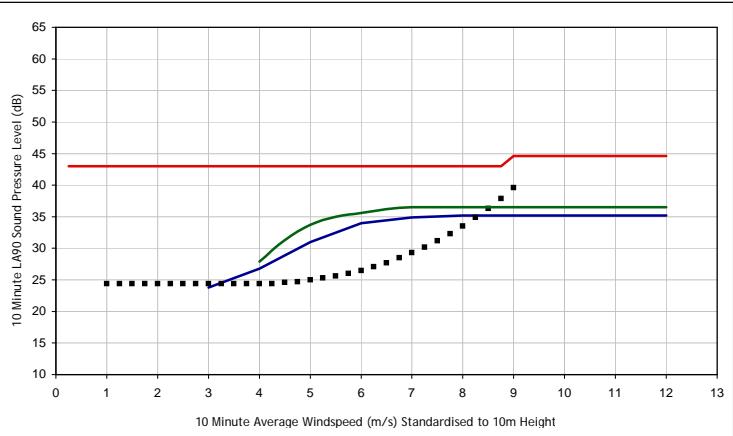
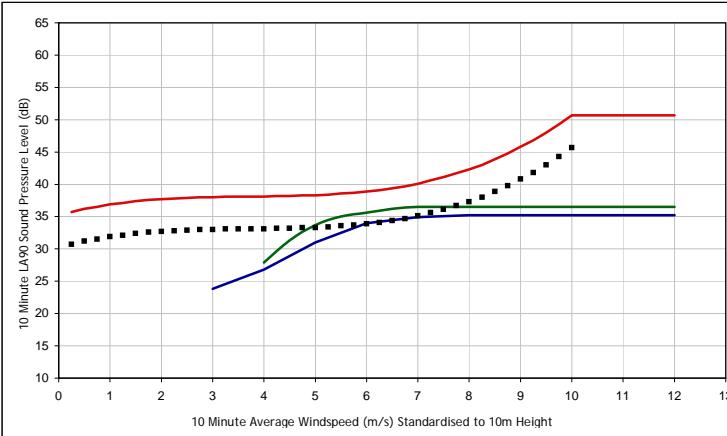
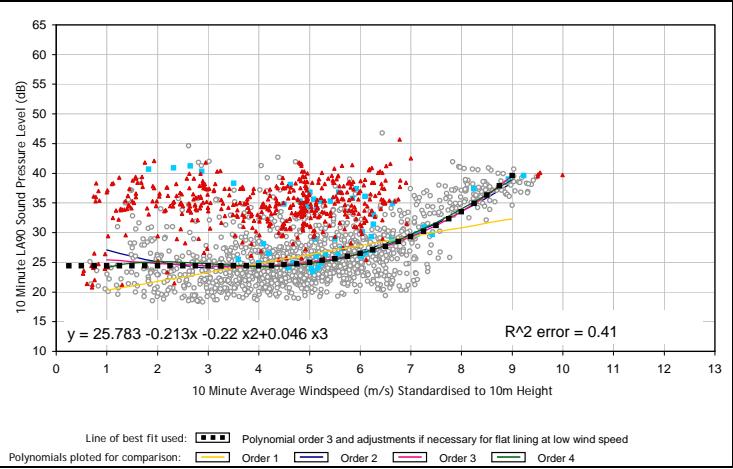
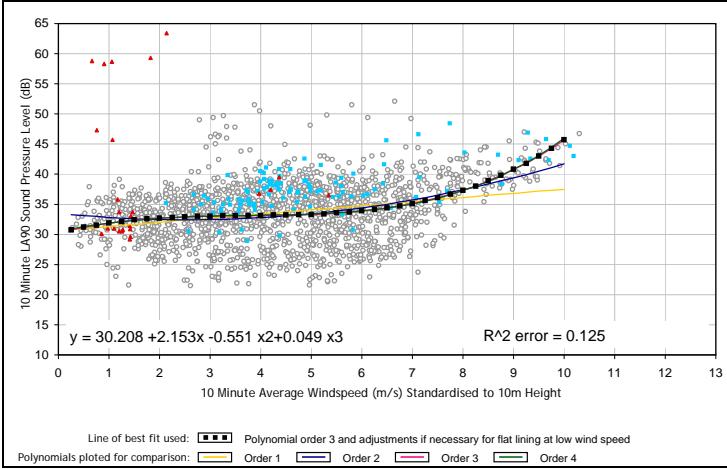
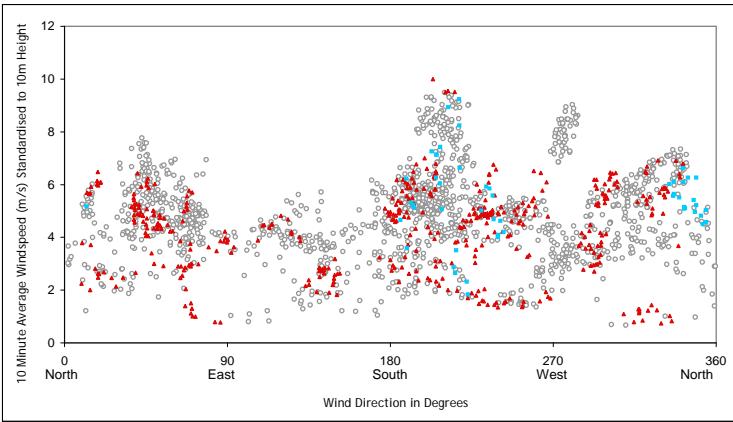


TNEI Services Limited Telephone 01912111400  
Newcastle upon Tyne Website www.tnei.co.uk

### ETSU-R-97 QUIET DAYTIME - Grange Farm(H3)



### ETSU-R-97 NIGHT TIME - Grange Farm(H3)



**Summary Table:**

1579 total data points as follows:	204	272	285	301	261	146	69	33	8	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	32.7	33	33.1	33.3	33.9	35.1	37.3	40.8	45.7	-	-
ETSU Limit	37.7	38	38.1	38.3	38.9	40.1	42.3	45.8	50.7	50.7	50.7
MM92 Predictions	-	-	27.9	33.7	35.6	36.5	36.5	36.5	36.5	36.5	36.5
MM92 Exceedences	-	-	-10.2	-4.6	-3.3	-3.6	-5.8	-9.3	-14.2	-14.2	-14.2
V90 2MW Predictions	-	23.8	26.8	31	34	34.9	35.2	35.2	35.2	35.2	35.2
V90 2MW Exceedences	-	-14.2	-11.3	-7.3	-4.9	-5.2	-7.1	-10.6	-15.5	-15.5	-15.5

**Summary Table:**

1579 total data points as follows:	83	160	338	392	258	118	74	42	0	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	24.4	24.4	24.4	25	26.5	29.3	33.5	39.6	-	-	-
ETSU Limit	43	43	43	43	43	43	43	43	44.6	44.6	44.6
MM92 Predictions	-	-	27.9	33.7	35.6	36.5	36.5	36.5	36.5	36.5	36.5
MM92 Exceedences	-	-	-15.1	-9.3	-7.4	-6.5	-6.5	-8.1	-8.1	-8.1	-8.1
V90 2MW Predictions	-	23.8	26.8	31	34	34.9	35.2	35.2	35.2	35.2	35.2
V90 2MW Exceedences	-	-19.2	-16.2	-12	-9	-8.1	-7.8	-9.4	-9.4	-9.4	-9.4

#### Legend:

- (○) L<sub>A90</sub> 10 Minute Measurement Point
- (■) Line of best fit used for the assessment
- (—) ETSU-R-97 Noise Criterion
- (—) Predicted Wind Turbine Noise MM92
- (—) Predicted Wind Turbine Noise V90 2MW
- (▲) Manually Excluded Data
- (■) Excluded Rain Data

Assume worst case downwind propagation, mixed ground (G=0.5) and receiver height of 4m  
Consideration of shear as per the methodology defined in the IOA Bulletin March 2009

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Ltd

Title Summary Graphs for IOA GPG Review  
Grange Farm(H3)

Figure Number IOA GPG SG3

Scale NTS

Drawn MCL

Checked DRAFT

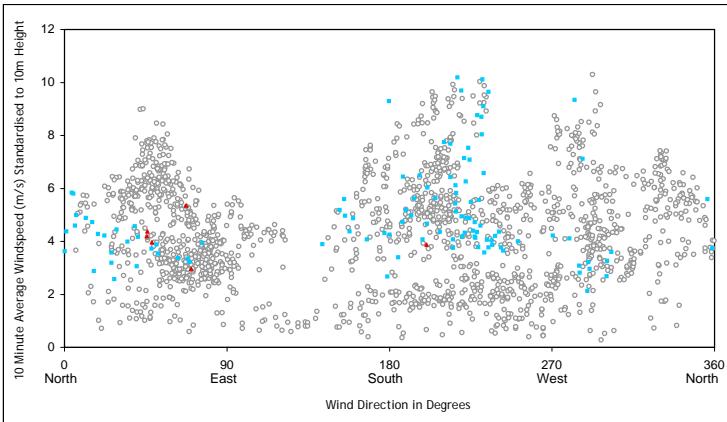
Date 31/07/2013

Document Reference 8418-04-N-003-SG

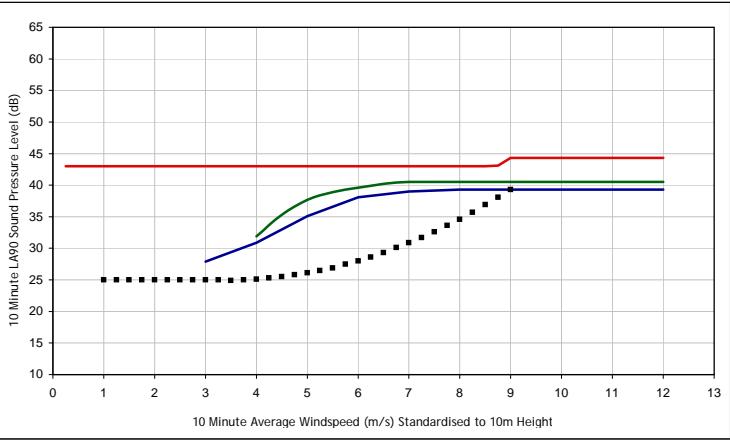
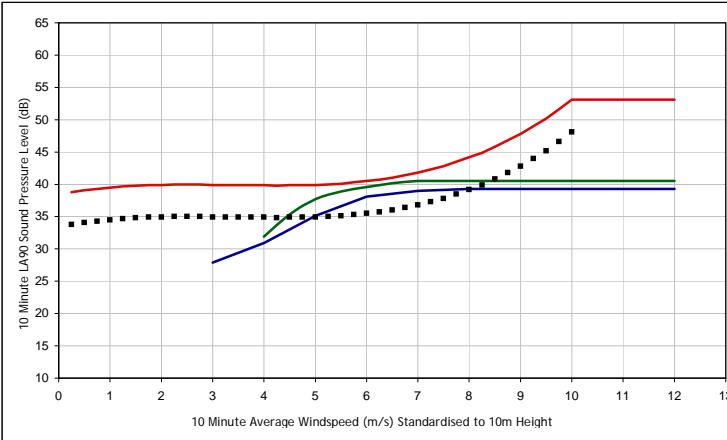
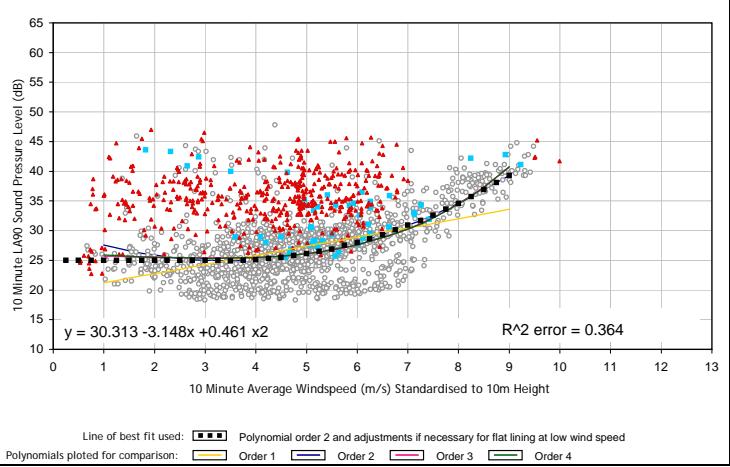
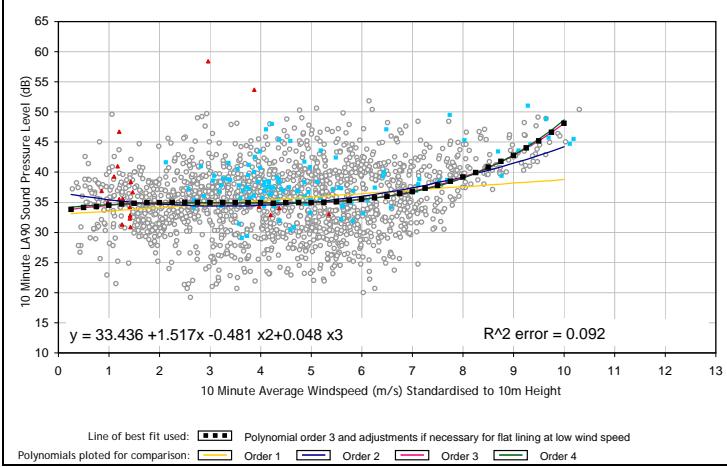
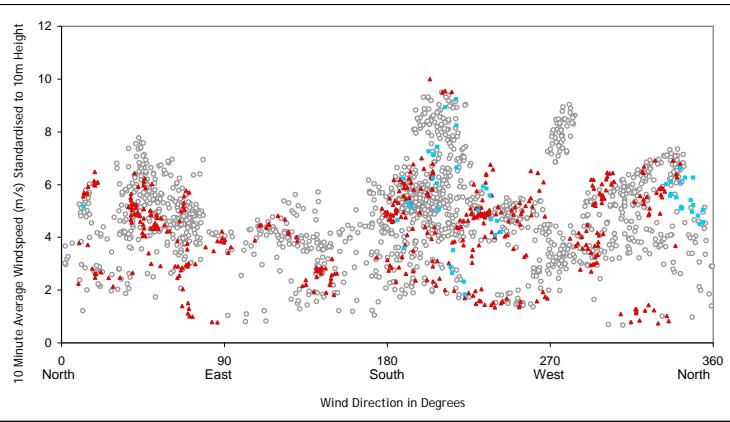


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### ETSU-R-97 QUIET DAYTIME - Spring Farm (H4)



### ETSU-R-97 NIGHT TIME - Spring Farm (H4)



#### Summary Table:

	1585 total data points as follows:	211	272	284	301	261	146	69	33	8	0	0	0
Wind Speed (m/s)		2	3	4	5	6	7	8	9	10	11	12	
Measured Noise		34.9	34.9	34.9	34.9	35.5	36.8	39.2	42.8	48.1	-	-	-
ETSU Limit		39.9	39.9	39.9	39.9	40.5	41.8	44.2	47.8	53.1	53.1	53.1	53.1
MM92 Predictions		-	-	31.9	37.7	39.6	40.5	40.5	40.5	40.5	40.5	40.5	40.5
MM92 Exceedences		-	-	-8	-2.2	-0.9	-1.3	-3.7	-7.3	-12.6	-12.6	-12.6	-12.6
V90 2MW Predictions		-	27.9	30.9	35.1	38.1	39	39.3	39.3	39.3	39.3	39.3	39.3
V90 2MW Exceedences		-	-12	-9	-4.8	-2.4	-2.8	-4.9	-8.5	-13.8	-13.8	-13.8	-13.8

#### Summary Table:

	1585 total data points as follows:	85	161	336	394	257	118	74	42	0	0	0	0
Wind Speed (m/s)		2	3	4	5	6	7	8	9	10	11	12	
Measured Noise		25	25	25.1	26.1	28	30.9	34.6	39.3	-	-	-	-
ETSU Limit		43	43	43	43	43	43	43	43	44.3	44.3	44.3	44.3
MM92 Predictions		-	-	31.9	37.7	39.6	40.5	40.5	40.5	40.5	40.5	40.5	40.5
MM92 Exceedences		-	-	-11.1	-5.3	-3.4	-2.5	-2.5	-3.8	-3.8	-3.8	-3.8	-3.8
V90 2MW Predictions		-	27.9	30.9	35.1	38.1	39	39.3	39.3	39.3	39.3	39.3	39.3
V90 2MW Exceedences		-	-15.1	-12.1	-7.9	-4.9	-4	-3.7	-5	-5	-5	-5	-5

#### Legend:

- L<sub>A90</sub> 10 Minute Measurement Point
- Line of best fit used for the assessment
- ETSU-R-97 Noise Criterion
- Predicted Wind Turbine Noise MM92
- Predicted Wind Turbine Noise V90 2MW
- ▲ Manually Excluded Data
- Excluded Rain Data

Assume worst case downwind propagation, mixed ground (G=0.5) and receiver height of 4m  
Consideration of shear as per the methodology defined in the IOA Bulletin March 2009

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Ltd

Title Summary Graphs for IOA GPG Review  
Spring Farm (H4)

Figure Number IOA GPG SG4

Scale NTS

Drawn MCL

Checked DRAFT

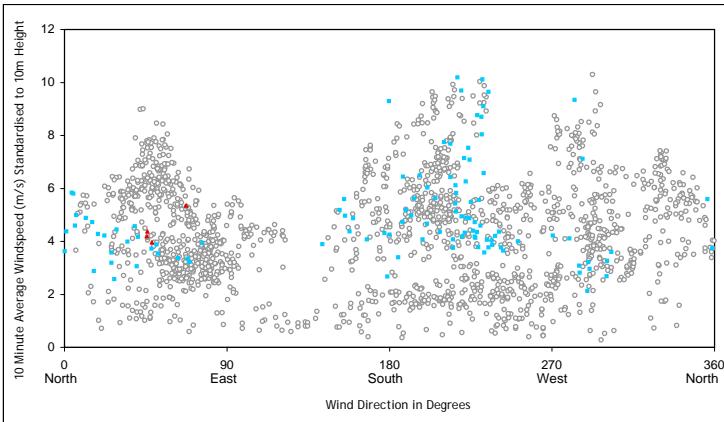
Date 31/07/2013

Document Reference 8418-04-N-004-SG

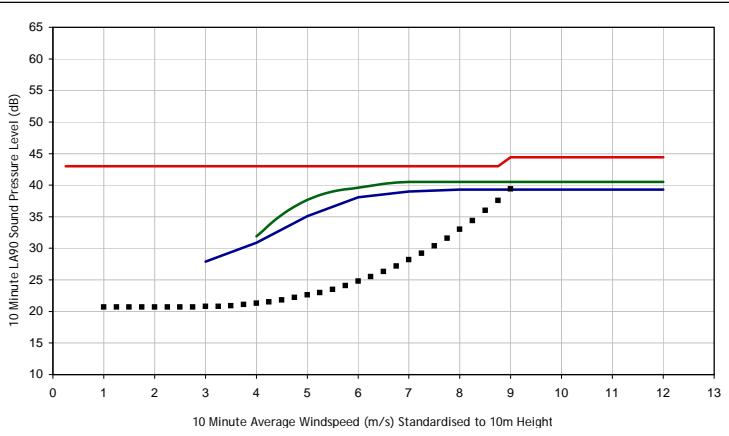
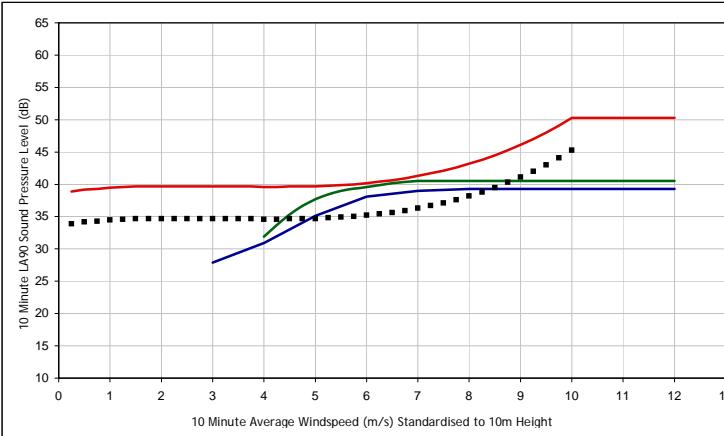
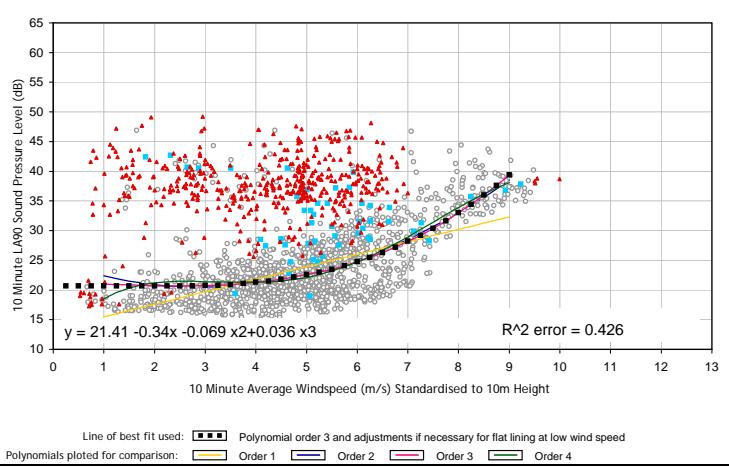
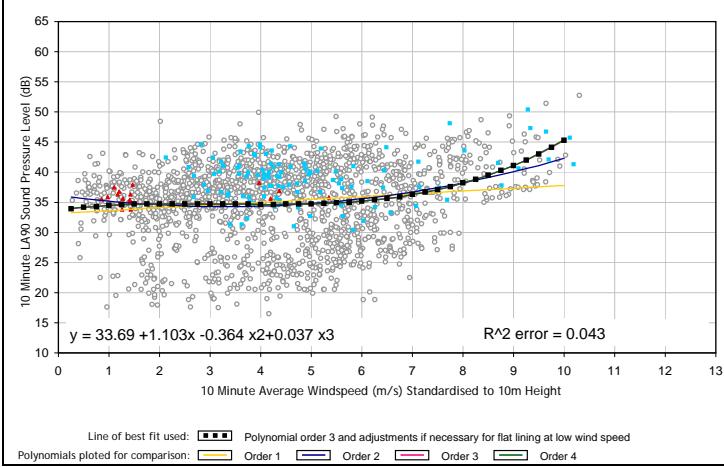
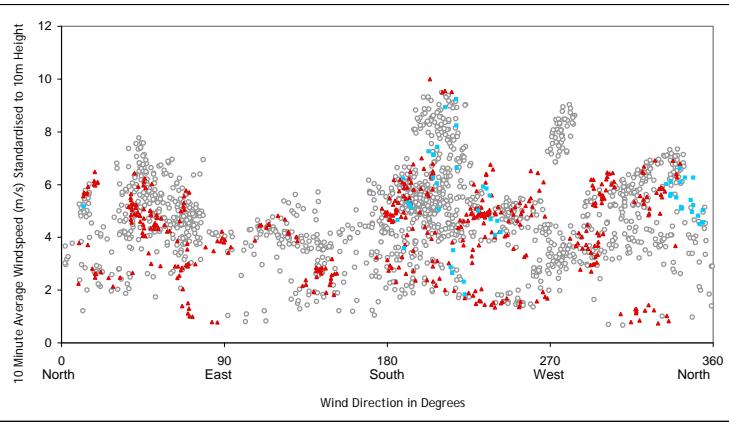
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### ETSU-R-97 QUIET DAYTIME - Bungalow Farm(H5)



### ETSU-R-97 NIGHT TIME - Bungalow Farm(H5)



#### Summary Table:

1587 total data points as follows:	211	273	285	301	261	146	69	33	8	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	34.7	34.7	34.6	34.7	35.2	36.3	38.2	41.1	45.3	-	-
ETSU Limit	39.7	39.7	39.6	39.7	40.2	41.3	43.2	46.1	50.3	50.3	50.3
MM92 Predictions	-	-	31.9	37.7	39.6	40.5	40.5	40.5	40.5	40.5	40.5
MM92 Exceedences	-	-	-7.7	-2	-0.6	-0.8	-2.7	-5.6	-9.8	-9.8	-9.8
V90 2MW Predictions	-	27.9	30.9	35.1	38.1	39	39.3	39.3	39.3	39.3	39.3
V90 2MW Exceedences	-	-11.8	-8.7	-4.6	-2.1	-2.3	-3.9	-6.8	-11	-11	-11

#### Summary Table:

1587 total data points as follows:	85	161	339	393	257	118	74	42	0	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	20.7	20.8	21.3	22.6	24.8	28.2	33	39.4	-	-	-
ETSU Limit	43	43	43	43	43	43	43	43	44.4	44.4	44.4
MM92 Predictions	-	-	31.9	37.7	39.6	40.5	40.5	40.5	40.5	40.5	40.5
MM92 Exceedences	-	-	-11.1	-5.3	-3.4	-2.5	-2.5	-3.9	-3.9	-3.9	-3.9
V90 2MW Predictions	-	27.9	30.9	35.1	38.1	39	39.3	39.3	39.3	39.3	39.3
V90 2MW Exceedences	-	-15.1	-12.1	-7.9	-4.9	-4	-3.7	-5.1	-5.1	-5.1	-5.1

#### Legend:

- $L_{A90}$  10 Minute Measurement Point
- Line of best fit used for the assessment
- ETSU-R-97 Noise Criterion
- Predicted Wind Turbine Noise MM92
- Predicted Wind Turbine Noise V90 2MW
- ▲ Manually Excluded Data
- Excluded Rain Data

Assume worst case downwind propagation, mixed ground ( $G=0.5$ ) and receiver height of 4m  
Consideration of shear as per the methodology defined in the IOA Bulletin March 2009

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Ltd

Title Summary Graphs for IOA GPG Review  
Bungalow Farm(H5)

Figure Number IOA GPG SG5

Scale NTS

Drawn MCL

Checked DRAFT

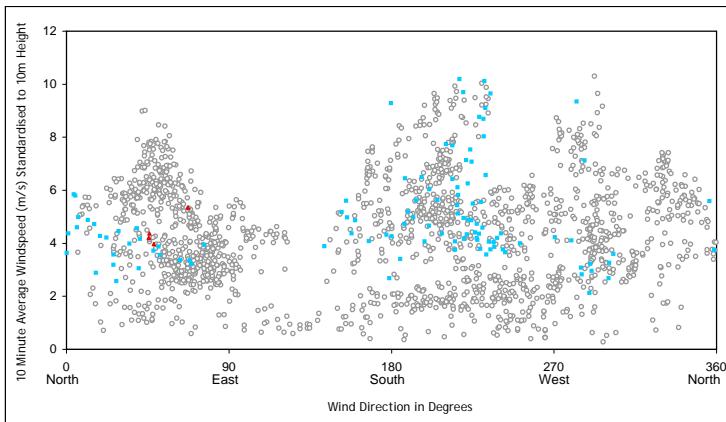
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Document Reference 8418-04-N-005-SG

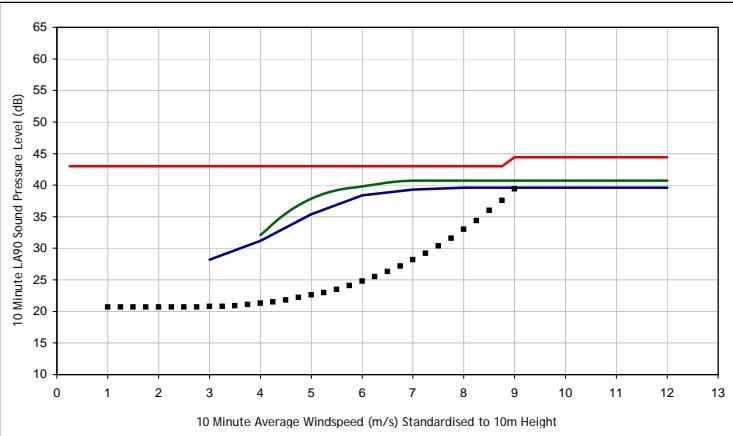
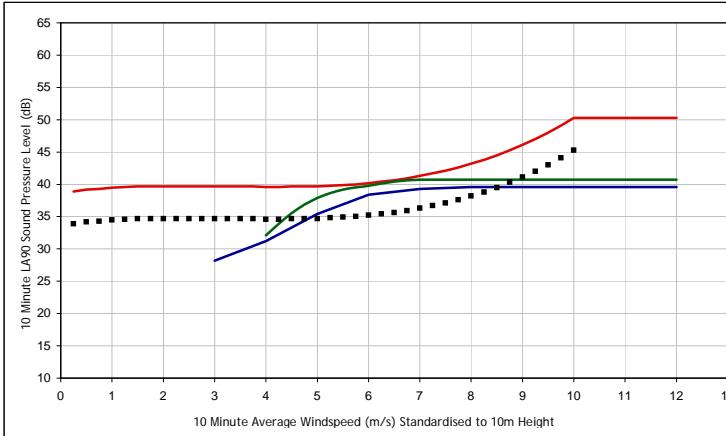
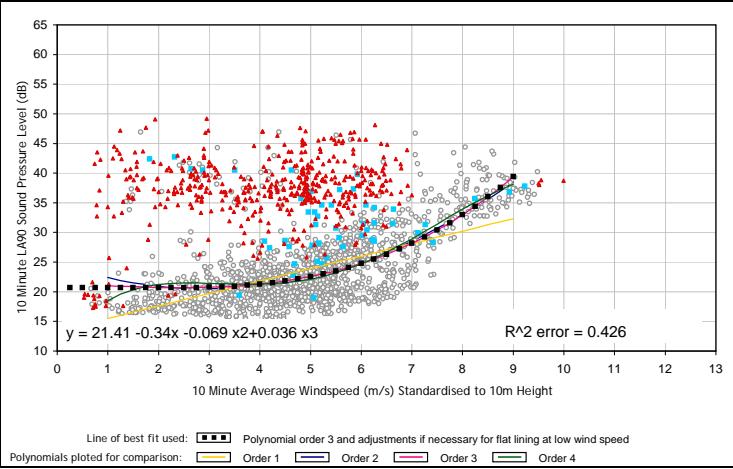
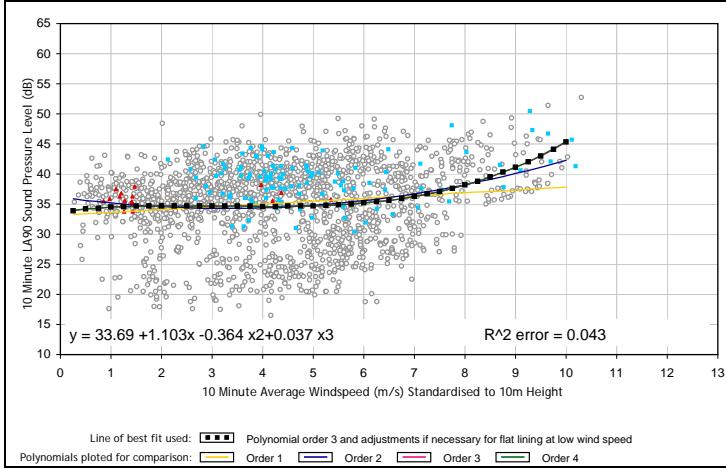
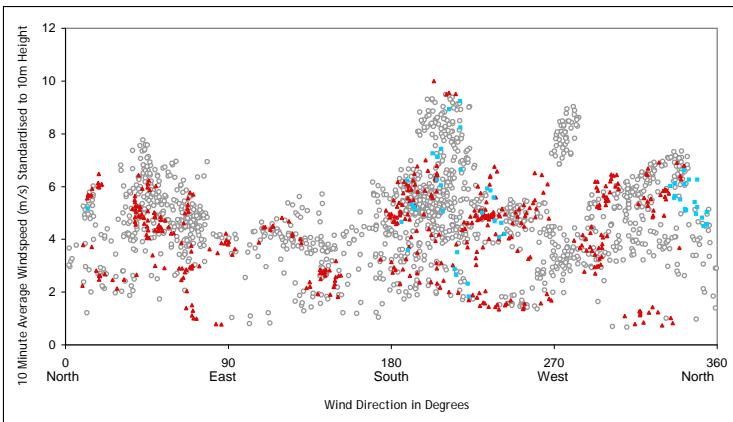


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### ETSU-R-97 QUIET DAYTIME - Greatworth Hall(H6)



### ETSU-R-97 NIGHT TIME - Greatworth Hall(H6)



#### Summary Table:

1587 total data points as follows:	211	273	285	301	261	146	69	33	8	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	34.7	34.7	34.6	34.7	35.2	36.3	38.2	41.1	45.3	-	-
ETSU Limit	39.7	39.7	39.6	39.7	40.2	41.3	43.2	46.1	50.3	50.3	50.3
MM92 Predictions	-	-	32.1	37.9	39.8	40.7	40.7	40.7	40.7	40.7	40.7
MM92 Exceedences	-	-	-7.5	-1.8	-0.4	-0.6	-2.5	-5.4	-9.6	-9.6	-9.6
V90 2MW Predictions	-	28.2	31.2	35.4	38.4	39.3	39.6	39.6	39.6	39.6	39.6
V90 2MW Exceedences	-	-11.5	-8.4	-4.3	-1.8	-2	-3.6	-6.5	-10.7	-10.7	-10.7

#### Summary Table:

1587 total data points as follows:	85	161	339	393	257	118	74	42	0	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	20.7	20.8	21.3	22.6	24.8	28.2	33	39.4	-	-	-
ETSU Limit	43	43	43	43	43	43	43	43	44.4	44.4	44.4
MM92 Predictions	-	-	32.1	37.9	39.8	39.8	40.7	40.7	40.7	40.7	40.7
MM92 Exceedences	-	-	-10.9	-5.1	-3.2	-2.3	-2.3	-3.7	-3.7	-3.7	-3.7
V90 2MW Predictions	-	28.2	31.2	35.4	38.4	38.4	39.3	39.6	39.6	39.6	39.6
V90 2MW Exceedences	-	-14.8	-11.8	-7.6	-4.6	-3.7	-3.4	-4.8	-4.8	-4.8	-4.8

#### Legend:

- L<sub>A90</sub> 10 Minute Measurement Point
- Line of best fit used for the assessment
- ETSU-R-97 Noise Criterion
- Predicted Wind Turbine Noise MM92
- Predicted Wind Turbine Noise V90 2MW
- ▲ Manually Excluded Data
- Excluded Rain Data

Assume worst case downwind propagation, mixed ground (G=0.5) and receiver height of 4m  
Consideration of shear as per the methodology defined in the IOA Bulletin March 2009

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Ltd

Title Summary Graphs for IOA GPG Review  
Greatworth Hall(H6)

Figure Number IOA GPG SG6

Scale NTS

Drawn MCL

Checked DRAFT

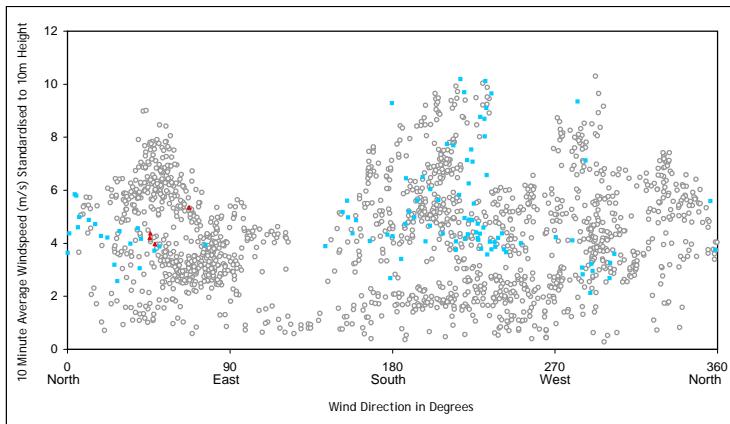
Date 31/07/2013

Document Reference 8418-04-N-006-SG

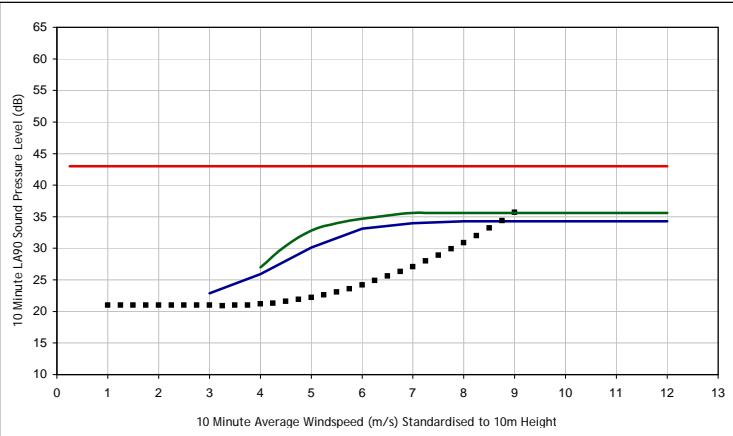
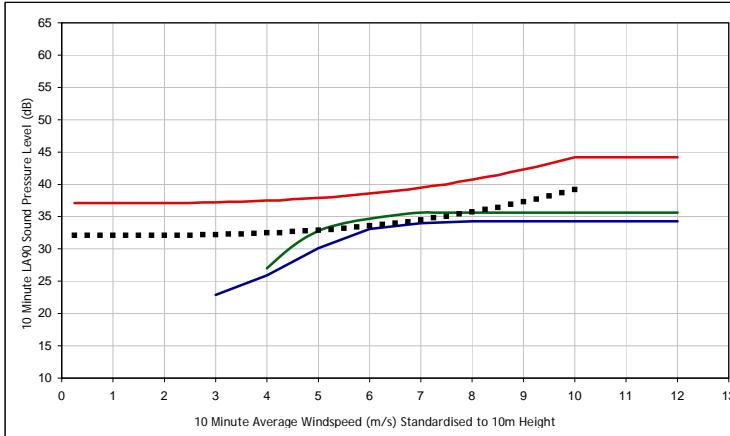
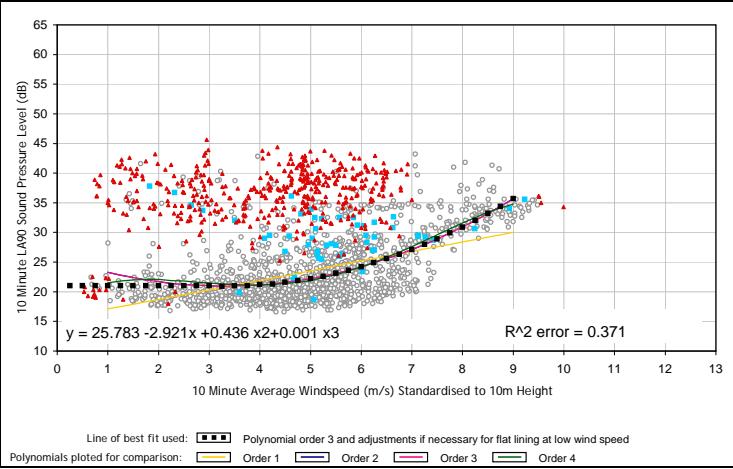
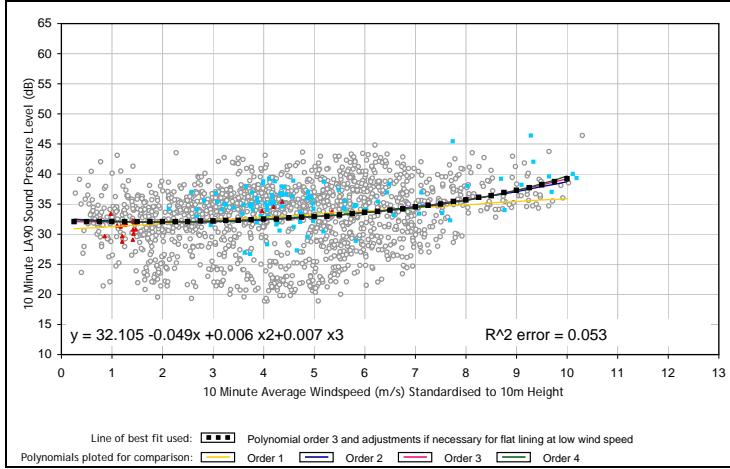
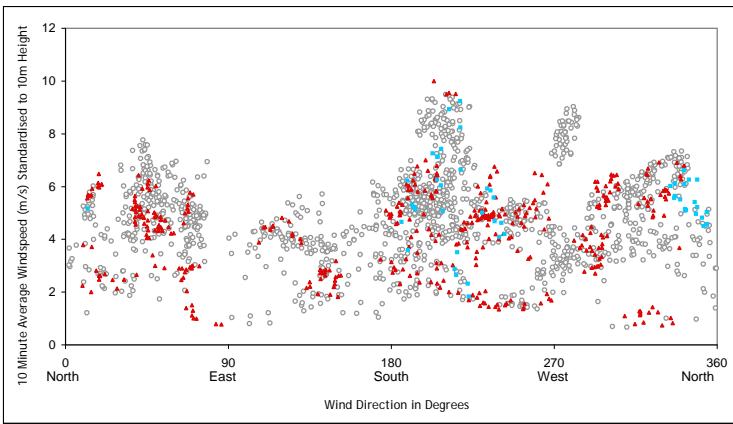


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### ETSU-R-97 QUIET DAYTIME - Greatworth(H7)



### ETSU-R-97 NIGHT TIME - Greatworth(H7)



**Summary Table:**

1538 total data points as follows:	211	270	268	278	255	146	69	33	8	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	32.1	32.2	32.5	32.9	33.6	34.5	35.7	37.3	39.2	-	-
ETSU Limit	37.1	37.2	37.5	37.9	38.6	39.5	40.7	42.3	44.2	44.2	44.2
MM92 Predictions	-	-	27	32.8	34.7	35.6	35.6	35.6	35.6	35.6	35.6
MM92 Exceedences	-	-	-10.5	-5.1	-3.9	-3.9	-5.1	-6.7	-8.6	-8.6	-8.6
V90 2MW Predictions	-	22.9	25.9	30.1	33.1	34	34.3	34.3	34.3	34.3	34.3
V90 2MW Exceedences	-	-14.3	-11.6	-7.8	-5.5	-5.5	-6.4	-8	-9.9	-9.9	-9.9

**Summary Table:**

1538 total data points as follows:	84	160	308	352	254	118	74	42	0	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	21	21	21.2	22.2	24.2	27.1	30.9	35.7	-	-	-
ETSU Limit	43	43	43	43	43	43	43	43	43	43	43
MM92 Predictions	-	-	27	32.8	34.7	35.6	35.6	35.6	35.6	35.6	35.6
MM92 Exceedences	-	-	-16	-10.2	-8.3	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4
V90 2MW Predictions	-	22.9	25.9	30.1	33.1	34	34.3	34.3	34.3	34.3	34.3
V90 2MW Exceedences	-	-20.1	-17.1	-12.9	-9.9	-9	-8.7	-8.7	-8.7	-8.7	-8.7

#### Legend:

- L<sub>A90</sub> 10 Minute Measurement Point
- Line of best fit used for the assessment
- ETSU-R-97 Noise Criterion
- Predicted Wind Turbine Noise MM92
- Predicted Wind Turbine Noise V90 2MW
- ▲ Manually Excluded Data
- Excluded Rain Data

Assume worst case downwind propagation, mixed ground (G=0.5) and receiver height of 4m  
Consideration of shear as per the methodology defined in the IOA Bulletin March 2009

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Ltd

Title Summary Graphs for IOA GPG Review  
Greatworth(H7)

Figure Number IOA GPG SG7

Scale NTS

Drawn MCL

Checked DRAFT

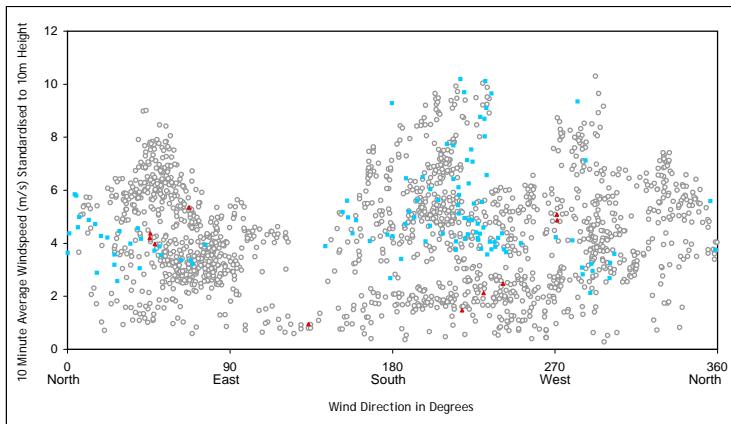
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Document Reference 8418-04-N-007-SG

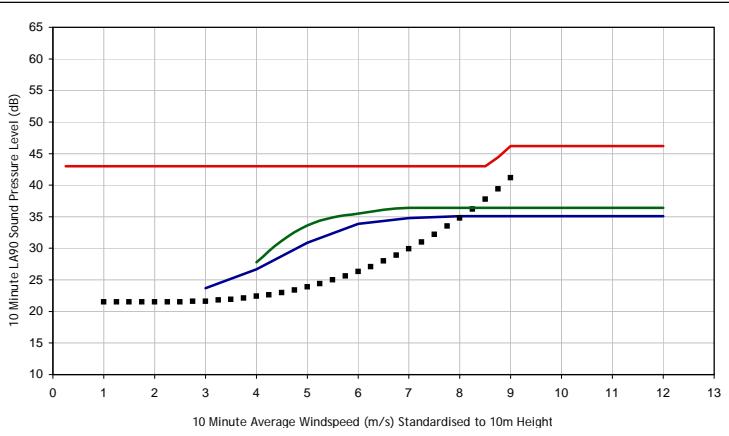
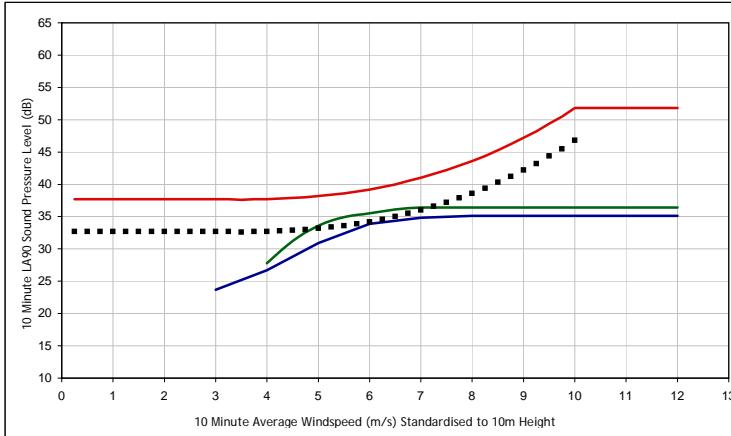
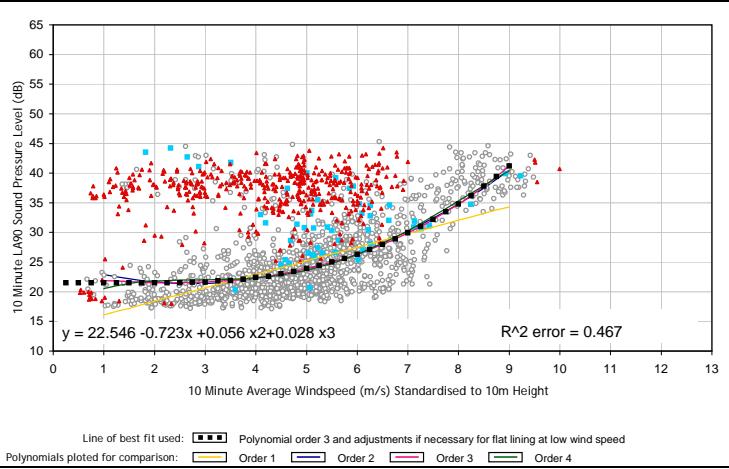
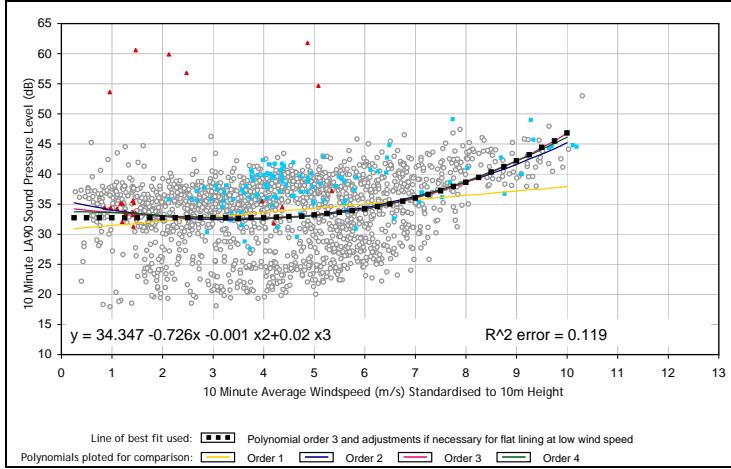
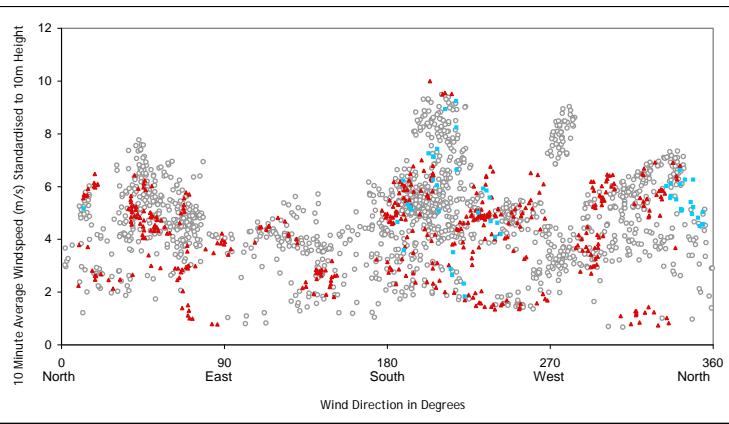


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### ETSU-R-97 QUIET DAYTIME - Manor Farm(H8)



### ETSU-R-97 NIGHT TIME - Manor Farm(H8)



#### Summary Table:

1583 total data points as follows:	209	273	285	299	261	146	69	33	8	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	32.7	32.7	32.7	33.2	34.2	36	38.6	42.2	46.8	-	-
ETSU Limit	37.7	37.7	37.7	38.2	39.2	41	43.6	47.2	51.8	51.8	51.8
MM92 Predictions	-	-	27.8	33.6	35.5	36.4	36.4	36.4	36.4	36.4	36.4
MM92 Exceedences	-	-	-9.9	-4.6	-3.7	-4.6	-7.2	-10.8	-15.4	-15.4	-15.4
V90 2MW Predictions	-	23.7	26.7	30.9	33.9	34.8	35.1	35.1	35.1	35.1	35.1
V90 2MW Exceedences	-	-14	-11	-7.3	-5.3	-6.2	-8.5	-12.1	-16.7	-16.7	-16.7

#### Summary Table:

1583 total data points as follows:	85	161	338	392	257	118	74	42	0	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	21.5	21.6	22.4	23.9	26.3	29.9	34.8	41.2	-	-	-
ETSU Limit	43	43	43	43	43	43	43	46.2	46.2	46.2	46.2
MM92 Predictions	-	-	27.8	33.6	35.5	36.4	36.4	36.4	36.4	36.4	36.4
MM92 Exceedences	-	-	-15.2	-9.4	-7.5	-6.6	-6.6	-9.8	-9.8	-9.8	-9.8
V90 2MW Predictions	-	23.7	26.7	30.9	33.9	34.8	35.1	35.1	35.1	35.1	35.1
V90 2MW Exceedences	-	-19.3	-16.3	-12.1	-9.1	-8.2	-7.9	-11.1	-11.1	-11.1	-11.1

#### Legend:

- $L_{A90}$  10 Minute Measurement Point
- Line of best fit used for the assessment
- ETSU-R-97 Noise Criterion
- Predicted Wind Turbine Noise MM92
- Predicted Wind Turbine Noise V90 2MW
- ▲ Manually Excluded Data
- Excluded Rain Data

Assume worst case downwind propagation, mixed ground ( $G=0.5$ ) and receiver height of 4m  
 Consideration of shear as per the methodology defined in the IOA Bulletin March 2009

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Ltd

Title Summary Graphs for IOA GPG Review  
 Manor Farm(H8)

Figure Number IOA GPG SG8

Scale NTS

Drawn MCL

Checked DRAFT

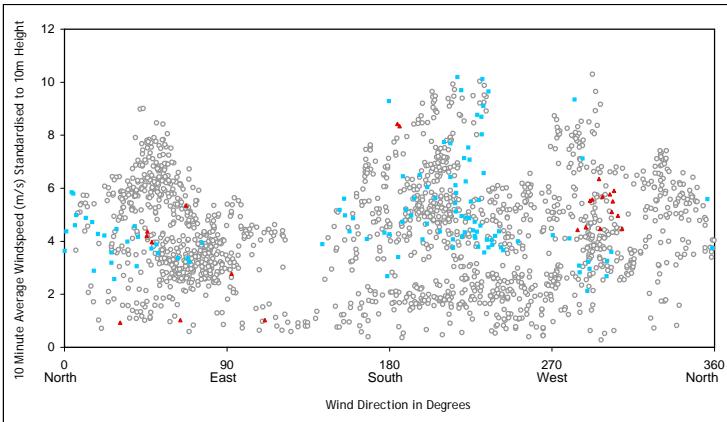
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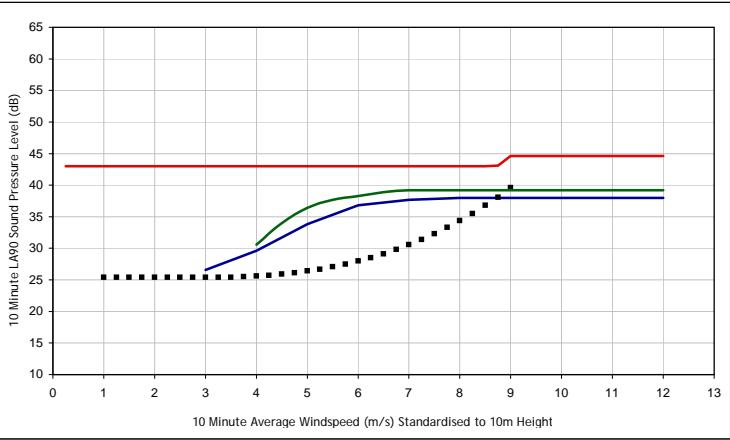
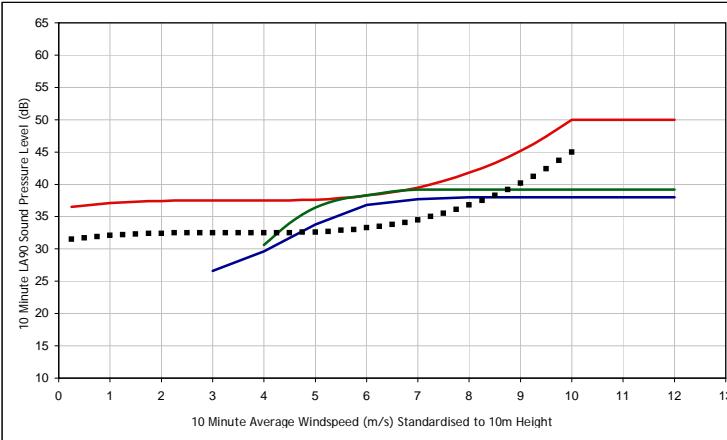
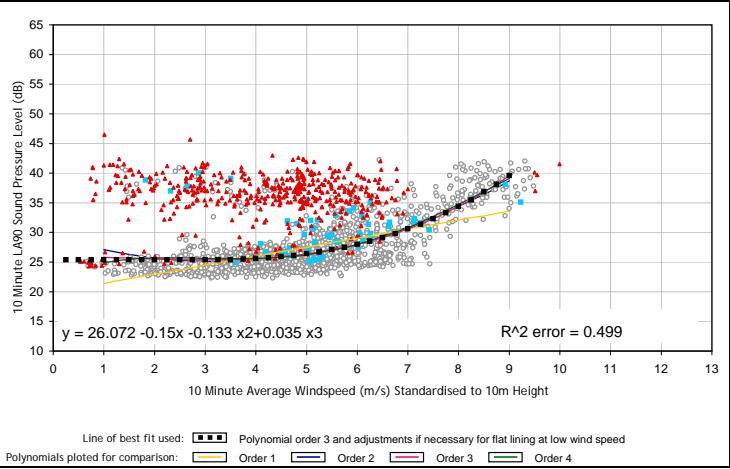
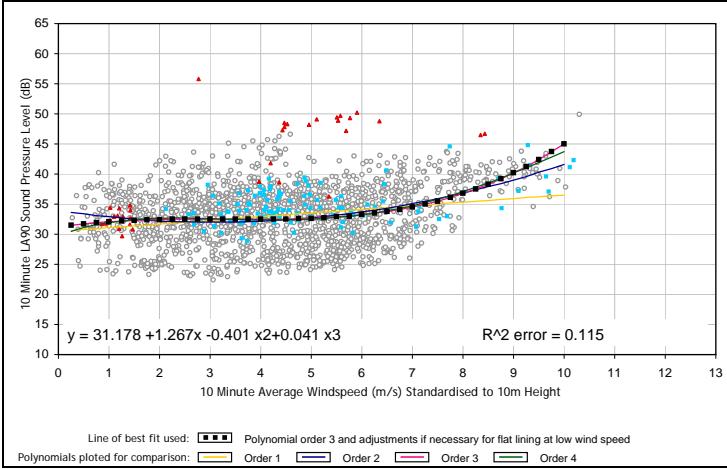
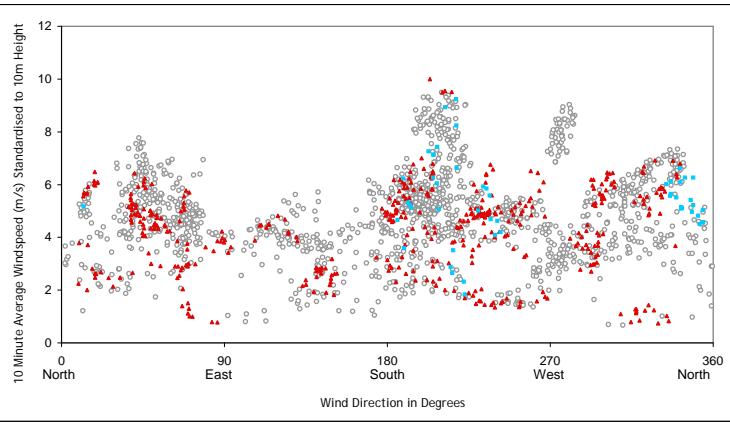


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### ETSU-R-97 QUIET DAYTIME - Stuchbury Hall Farm(H9)



### ETSU-R-97 NIGHT TIME - Stuchbury Hall Farm(H9)



#### Summary Table:

	1571 total data points as follows:	211	272	282	298	254	146	67	33	8	0	0
Wind Speed (m/s)		2	3	4	5	6	7	8	9	10	11	12
Measured Noise		32.4	32.5	32.5	32.6	33.3	34.5	36.8	40.2	45	-	-
ETSU Limit		37.4	37.5	37.5	37.6	38.3	39.5	41.8	45.2	50	50	50
MM92 Predictions		-	-	30.6	36.4	38.3	39.2	39.2	39.2	39.2	39.2	39.2
MM92 Exceedences		-	-	-6.9	-1.2	0	-0.3	-2.6	-6	-10.8	-10.8	-10.8
V90 2MW Predictions		-	26.6	29.6	33.8	36.8	37.7	38	38	38	38	38
V90 2MW Exceedences		-	-10.9	-7.9	-3.8	-1.5	-1.8	-3.8	-7.2	-12	-12	-12

#### Summary Table:

	1571 total data points as follows:	84	161	335	392	256	118	74	42	0	0	0
Wind Speed (m/s)		2	3	4	5	6	7	8	9	10	11	12
Measured Noise		25.4	25.4	25.6	26.4	28	30.6	34.4	39.6	-	-	-
ETSU Limit		43	43	43	43	43	43	43	43	44.6	44.6	44.6
MM92 Predictions		-	-	30.6	36.4	38.3	38.3	39.2	39.2	39.2	39.2	39.2
MM92 Exceedences		-	-	-12.4	-6.6	-4.7	-3.8	-3.8	-5.4	-5.4	-5.4	-5.4
V90 2MW Predictions		-	26.6	29.6	33.8	36.8	37.7	38	38	38	38	38
V90 2MW Exceedences		-	-16.4	-13.4	-9.2	-6.2	-5.3	-5	-6.6	-6.6	-6.6	-6.6

#### Legend:

- $L_{A90}$  10 Minute Measurement Point
- Line of best fit used for the assessment
- ETSU-R-97 Noise Criterion
- Predicted Wind Turbine Noise MM92
- Predicted Wind Turbine Noise V90 2MW
- ▲ Manually Excluded Data
- Excluded Rain Data

Assume worst case downwind propagation, mixed ground ( $G=0.5$ ) and receiver height of 4m  
Consideration of shear as per the methodology defined in the IOA Bulletin March 2009

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Ltd

Title Summary Graphs for IOA GPG Review  
Stuchbury Hall Farm(H9)

Figure Number IOA GPG SG9

Scale NTS

Drawn MCL

Checked DRAFT

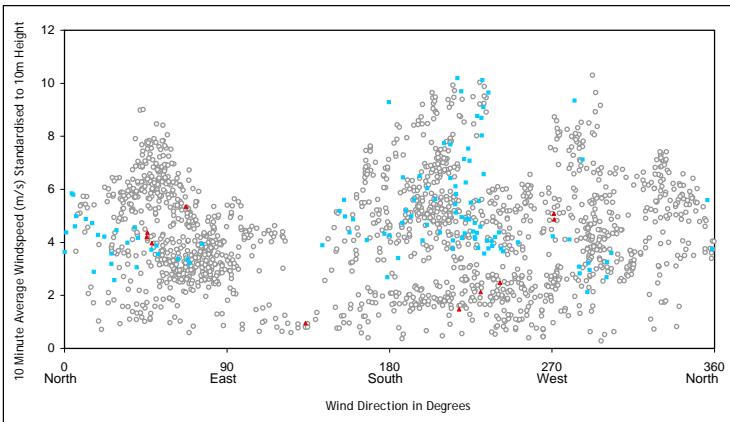
Date 31/07/2013

Document Reference 8418-04-N-009-SG

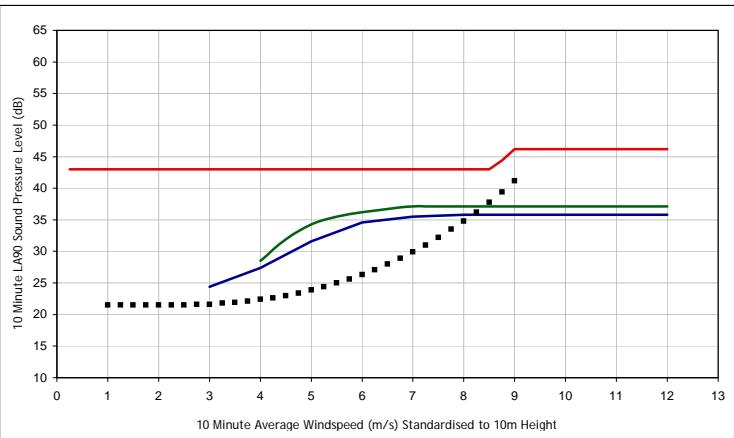
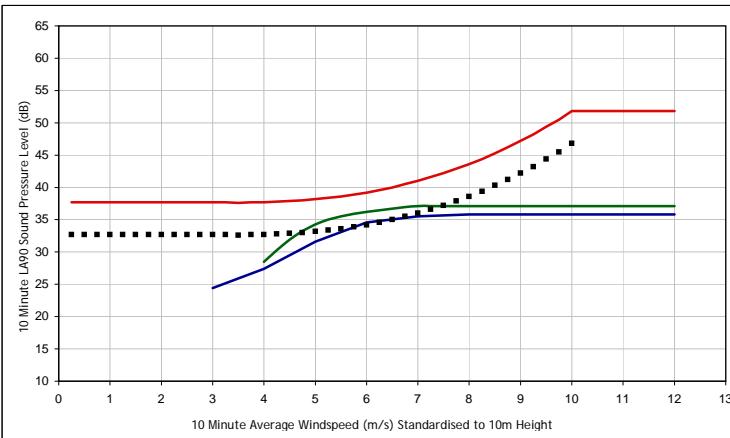
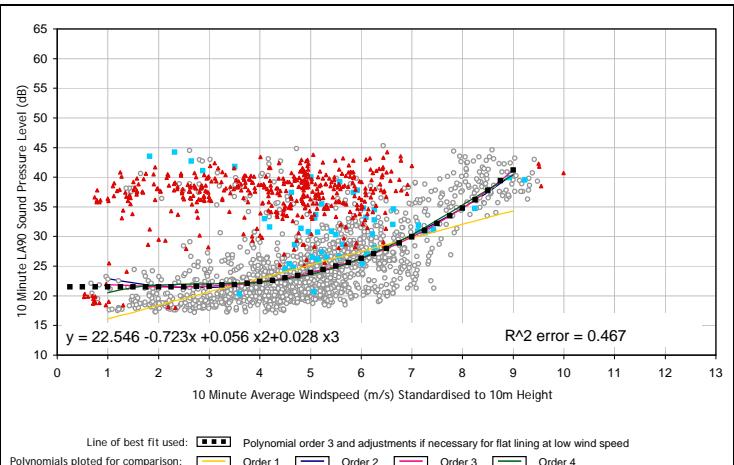
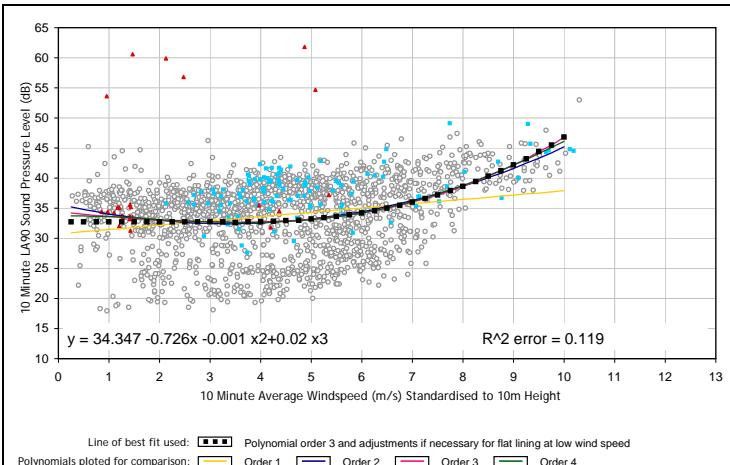
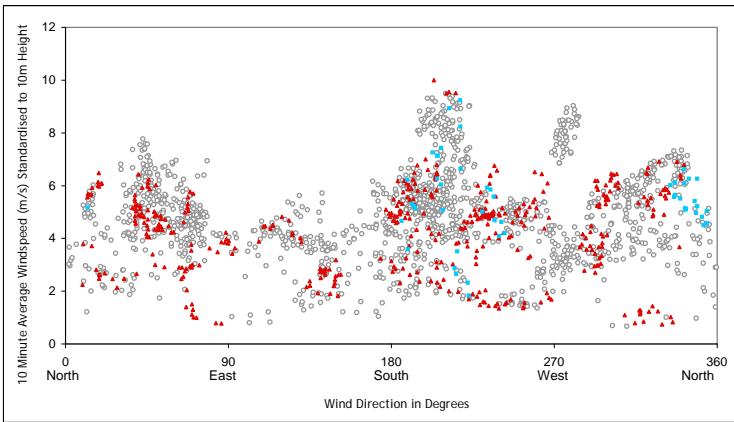


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### ETSU-R-97 QUIET DAYTIME - Stuchbury Manor Farm(H10)



### ETSU-R-97 NIGHT TIME - Stuchbury Manor Farm(H10)



**Summary Table:**

1583 total data points as follows:												
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	13
Measured Noise	32.7	32.7	32.7	33.2	34.2	36	38.6	42.2	46.8	-	-	-
ETSU Limit	37.7	37.7	37.7	38.2	39.2	41	43.6	47.2	51.8	51.8	51.8	51.8
MM92 Predictions	-	-	28.5	34.3	36.2	37.1	37.1	37.1	37.1	37.1	37.1	37.1
MM92 Exceedences	-	-	-9.2	-3.9	-3	-3.9	-6.5	-10.1	-14.7	-14.7	-14.7	-14.7
V90 2MW Predictions	-	24.4	27.4	31.6	34.6	35.5	35.8	35.8	35.8	35.8	35.8	35.8
V90 2MW Exceedences	-	-13.3	-10.3	-6.6	-4.6	-5.5	-7.8	-11.4	-16	-16	-16	-16

**Summary Table:**

1583 total data points as follows:												
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12	13
Measured Noise	21.5	21.6	22.4	23.9	26.3	29.9	34.8	41.2	-	-	-	-
ETSU Limit	43	43	43	43	43	43	43	43	46.2	46.2	46.2	46.2
MM92 Predictions	-	-	28.5	34.3	36.2	37.1	37.1	37.1	37.1	37.1	37.1	37.1
MM92 Exceedences	-	-	-14.5	-8.7	-6.8	-5.9	-5.9	-9.1	-9.1	-9.1	-9.1	-9.1
V90 2MW Predictions	-	24.4	27.4	31.6	34.6	35.5	35.8	35.8	35.8	35.8	35.8	35.8
V90 2MW Exceedences	-	-18.6	-15.6	-11.4	-8.4	-7.5	-7.2	-10.4	-10.4	-10.4	-10.4	-10.4

#### Legend:

- 10 Minute Measurement Point
- Line of best fit used for the assessment
- ETSU-R-97 Noise Criterion
- Predicted Wind Turbine Noise MM92
- Predicted Wind Turbine Noise V90 2MW
- ▲ Manually Excluded Data
- Excluded Rain Data

Assume worst case downwind propagation, mixed ground (G=0.5) and receiver height of 4m  
Consideration of shear as per the methodology defined in the IOA GPG

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Developments Limited

Title Summary Graphs for IOA GPG Review  
Stuchbury Manor Farm(H10)

Figure Number IOA GPG SG10

Scale NTS

Drawn MCL

Checked JM

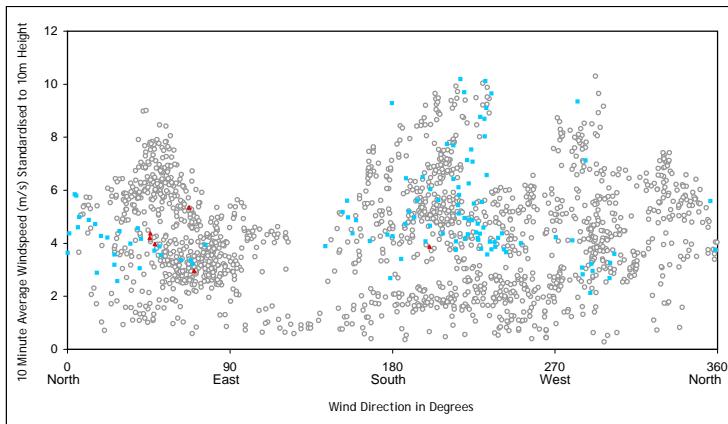
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Document Reference 8418-04-N-010-SG

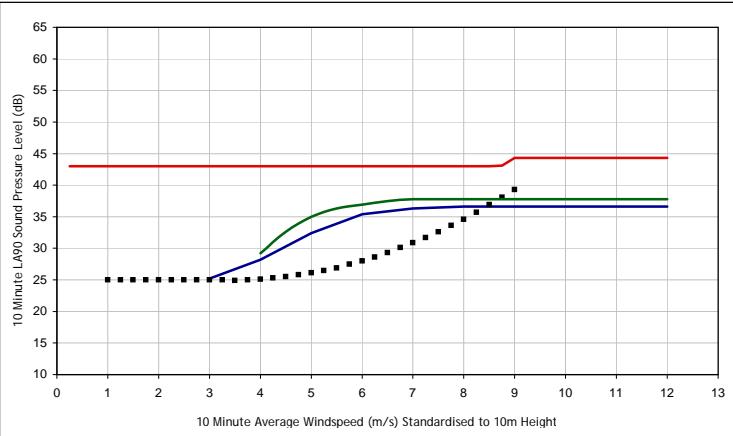
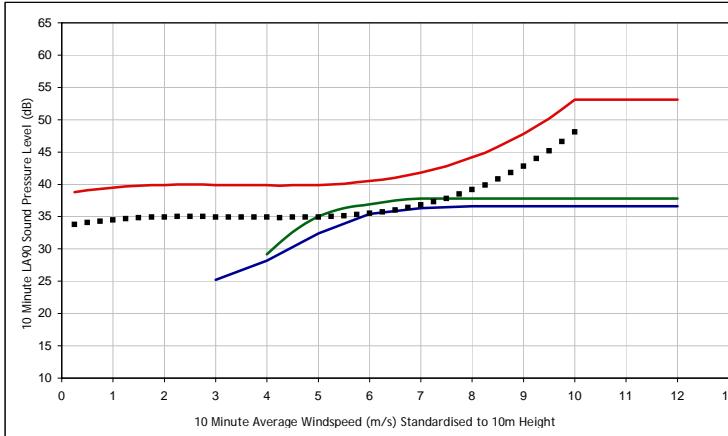
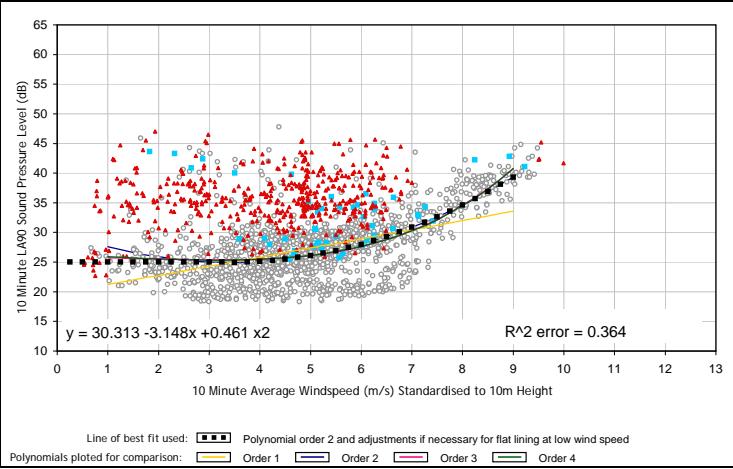
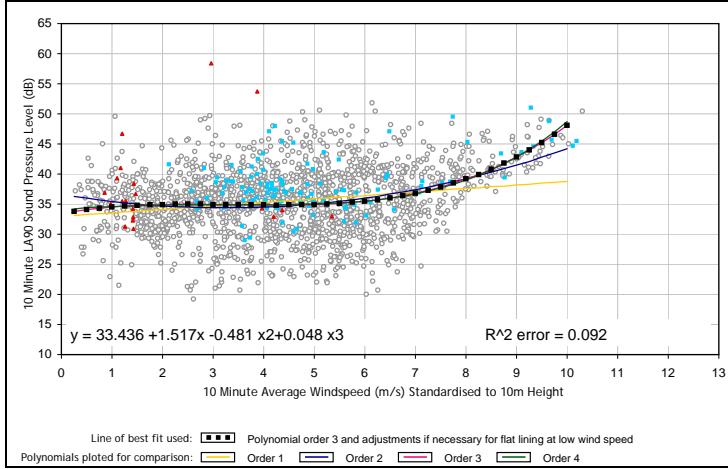
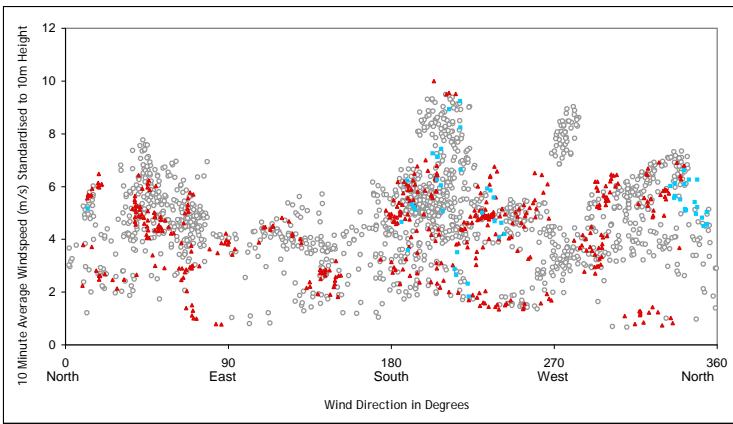


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### ETSU-R-97 QUIET DAYTIME - Ash Vale(H11)



### ETSU-R-97 NIGHT TIME - Ash Vale(H11)



#### Summary Table:

	211	272	284	301	261	146	69	33	8	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	34.9	34.9	34.9	34.9	35.5	36.8	39.2	42.8	48.1	-	-
ETSU Limit	39.9	39.9	39.9	39.9	40.5	41.8	44.2	47.8	53.1	53.1	53.1
MM92 Predictions	-	-	29.2	35	36.9	37.8	37.8	37.8	37.8	37.8	37.8
MM92 Exceedences	-	-	-10.7	-4.9	-3.6	-4	-6.4	-10	-15.3	-15.3	-15.3
V90 2MW Predictions	-	25.2	28.2	32.4	35.4	36.3	36.6	36.6	36.6	36.6	36.6
V90 2MW Exceedences	-	-14.7	-11.7	-7.5	-5.1	-5.5	-7.6	-11.2	-16.5	-16.5	-16.5

#### Summary Table:

	85	161	336	394	257	118	74	42	0	0	0
Wind Speed (m/s)	2	3	4	5	6	7	8	9	10	11	12
Measured Noise	25	25	25.1	26.1	28	30.9	34.6	39.3	-	-	-
ETSU Limit	43	43	43	43	43	43	43	43	44.3	44.3	44.3
MM92 Predictions	-	-	29.2	35	36.9	37.8	37.8	37.8	37.8	37.8	37.8
MM92 Exceedences	-	-	-13.8	-8	-6.1	-5.2	-5.2	-6.5	-6.5	-6.5	-6.5
V90 2MW Predictions	-	25.2	28.2	32.4	35.4	35.4	36.3	36.6	36.6	36.6	36.6
V90 2MW Exceedences	-	-17.8	-14.8	-10.6	-7.6	-6.7	-6.4	-7.7	-7.7	-7.7	-7.7

#### Legend:

- L<sub>A90</sub> 10 Minute Measurement Point
- Line of best fit used for the assessment
- ETSU-R-97 Noise Criterion
- Predicted Wind Turbine Noise MM92
- Predicted Wind Turbine Noise V90 2MW
- ▲ Manually Excluded Data
- Excluded Rain Data

Assume worst case downwind propagation, mixed ground (G=0.5) and receiver height of 4m  
Consideration of shear as per the methodology defined in the IOA Bulletin March 2009

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Ltd

Title Summary Graphs for IOA GPG Review  
Ash Vale(H11)

Figure Number IOA GPG SG11

Scale NTS

Drawn MCL

Checked DRAFT

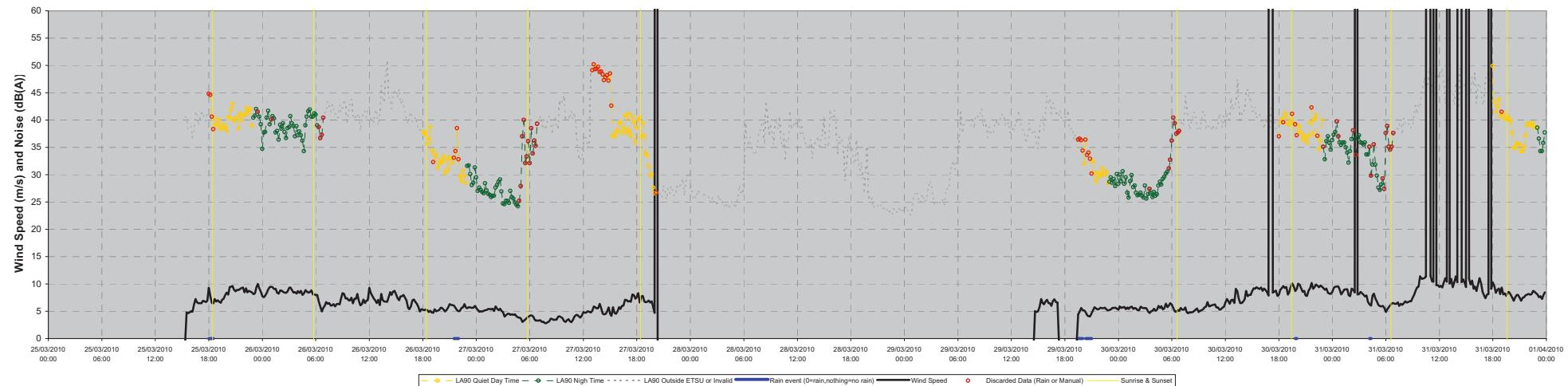
Date 31/07/2013

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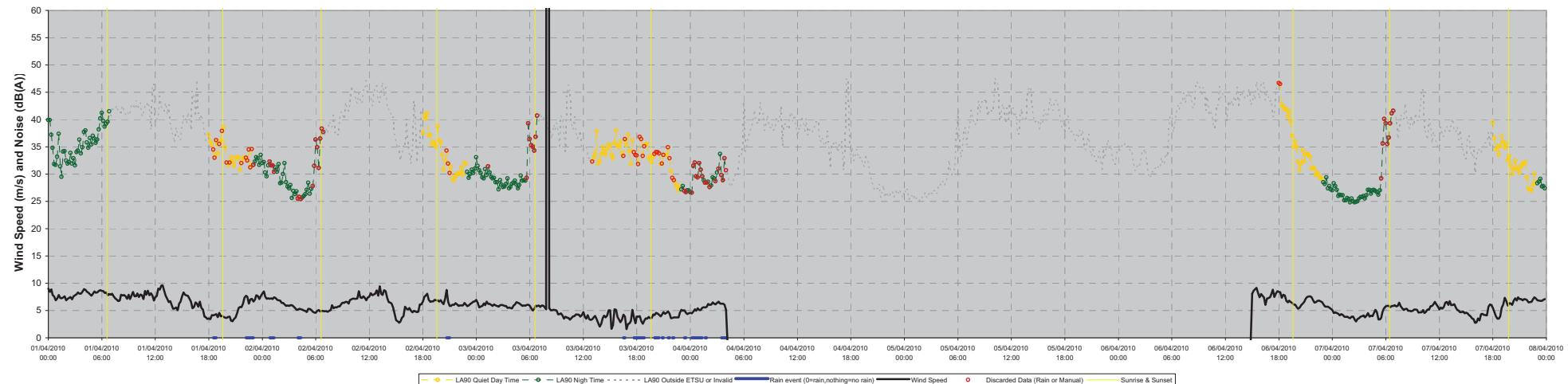
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25/03/2010 to 01/04/2010



01/04/2010 to 08/04/2010



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Title Time Series for Peter's Farm (H1) Page 1 of 5

Figure Number IOA GPG TS1a

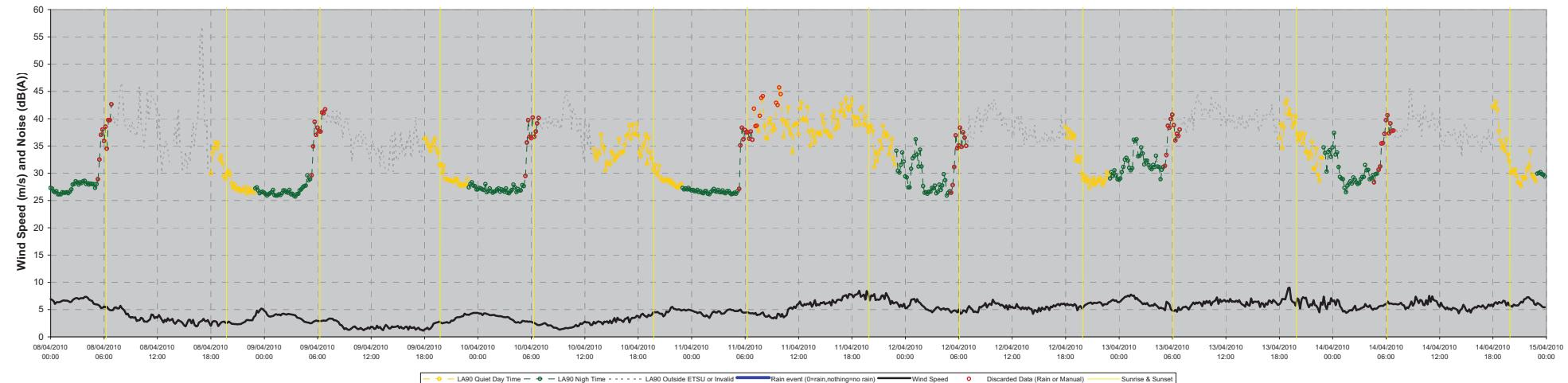
Date 31/07/2013 Document Reference 8418-04-N-001 TS



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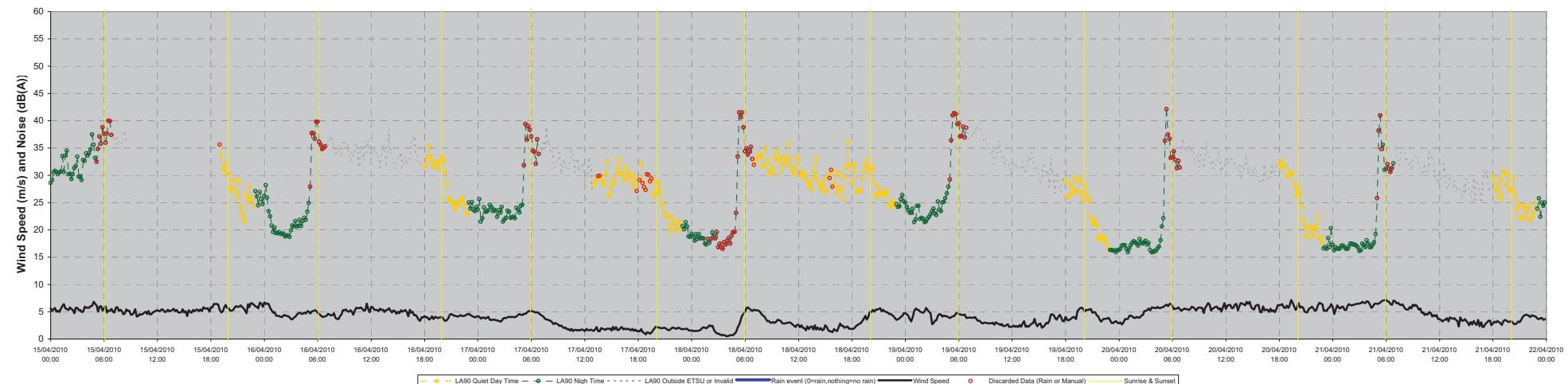
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15/04/2010 to 22/04/2010



20

Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Developments Limited

Title Time Series for Peter's Farm (H1) Page 2 of 5

Figure Number IOA GPG TS1b

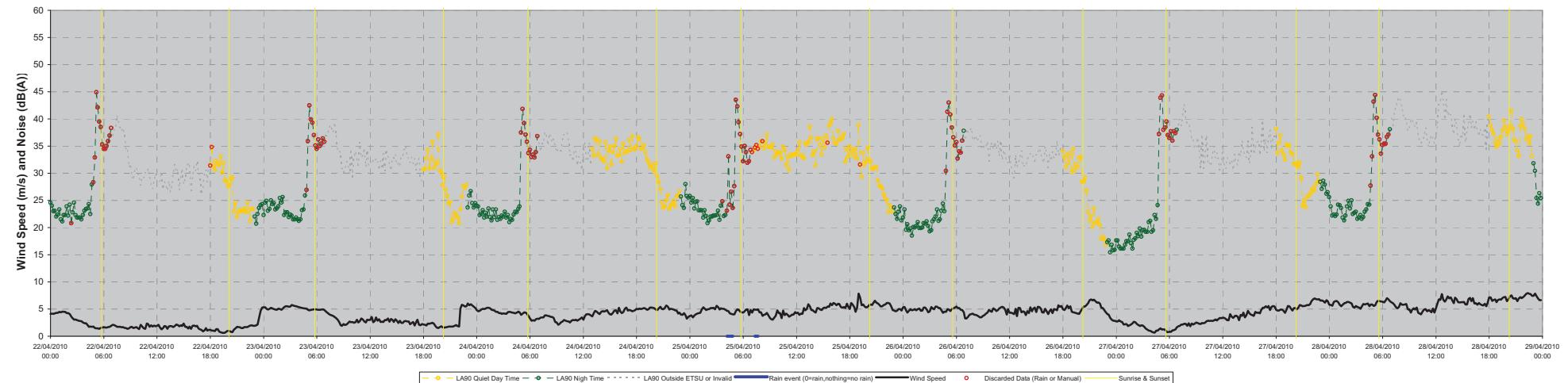
Date 31/07/2013 Document Reference 8418-04-N-001 TS



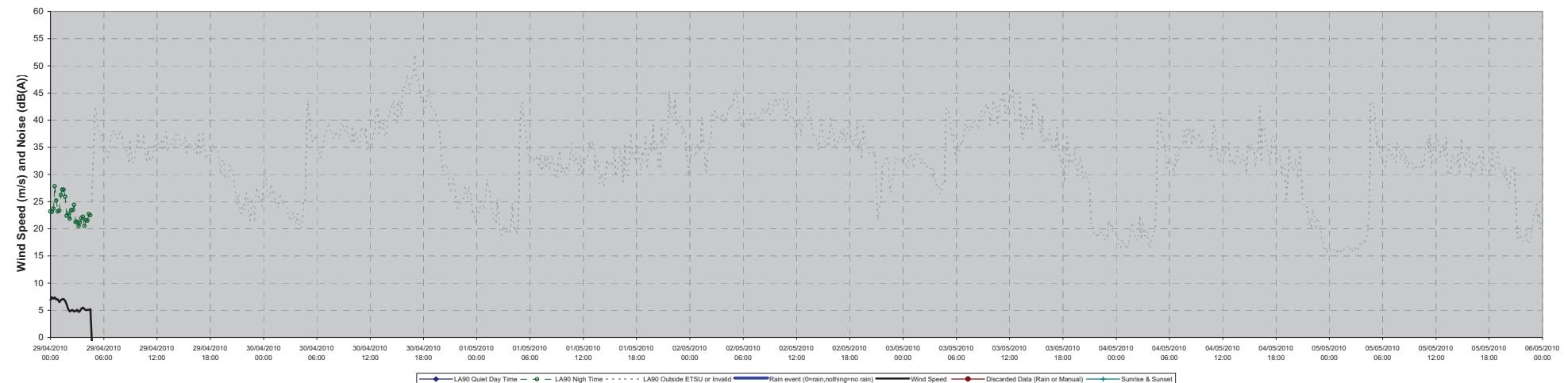
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22/04/2010 to 29/04/2010



29/04/2010 to 06/05/2010



Project Spring Farm Ridge Renewable Energy Project

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Title Time Series for Peter's Farm (H1) Page 3 of 5

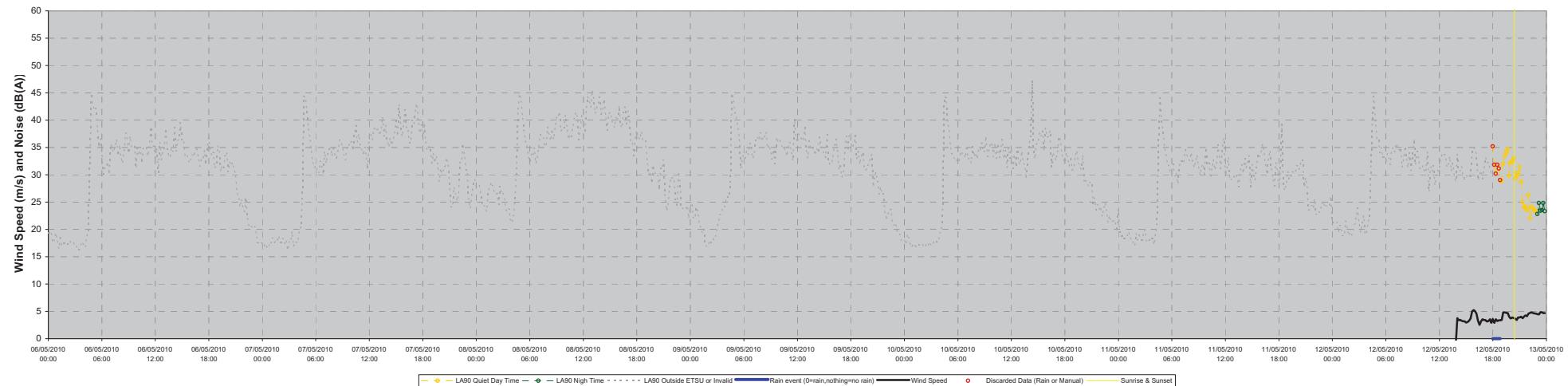
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Date 31/07/2013 Document Reference 8418-04-N-001 TS

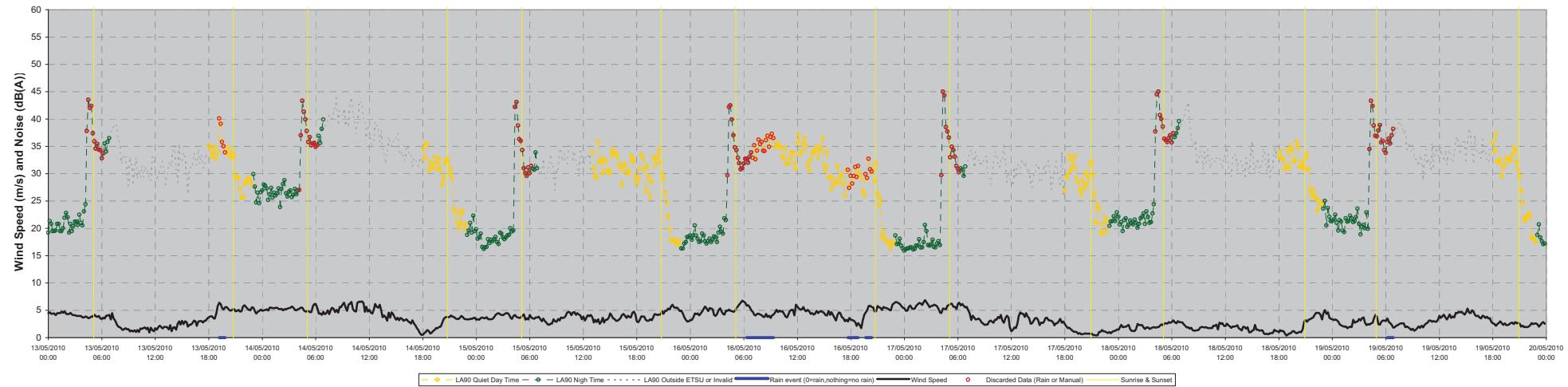


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06/05/2010 to 13/05/2010



13/05/2010 to 20/05/2010



Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Developments Limited

Title Time Series for Peter's Farm (H1) Page 4 of 5

Figure Number IOA GPG TS1d

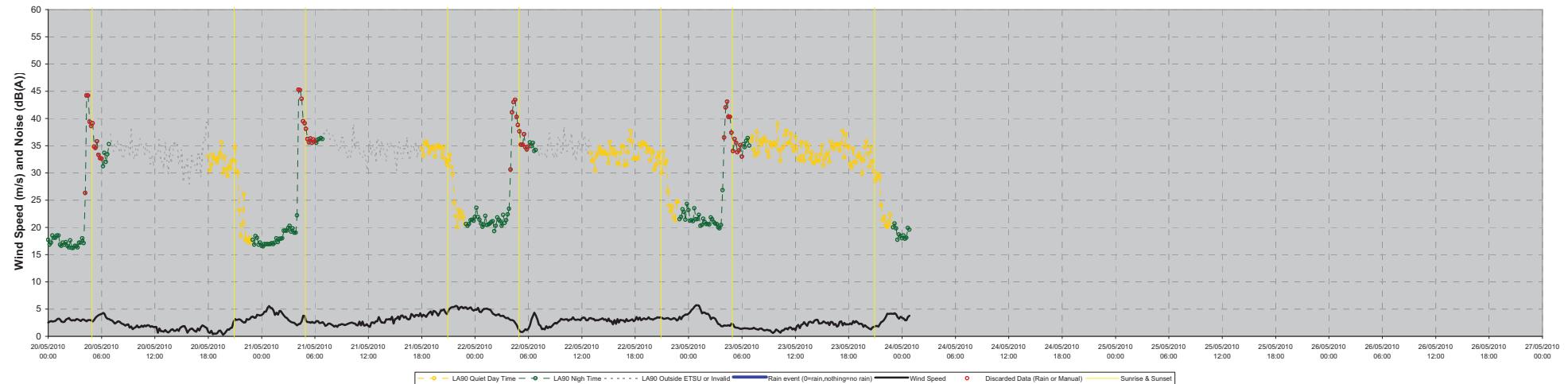
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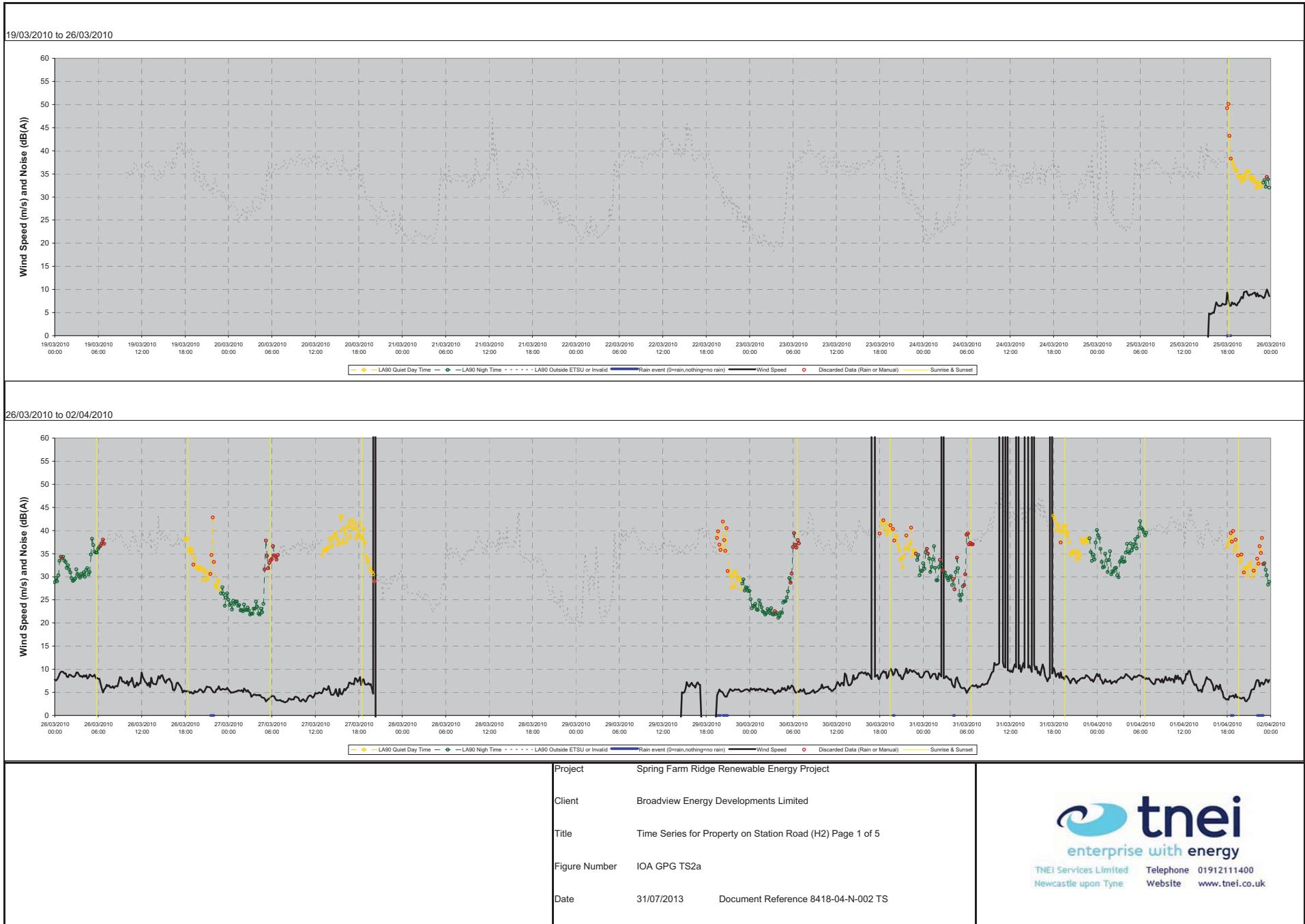
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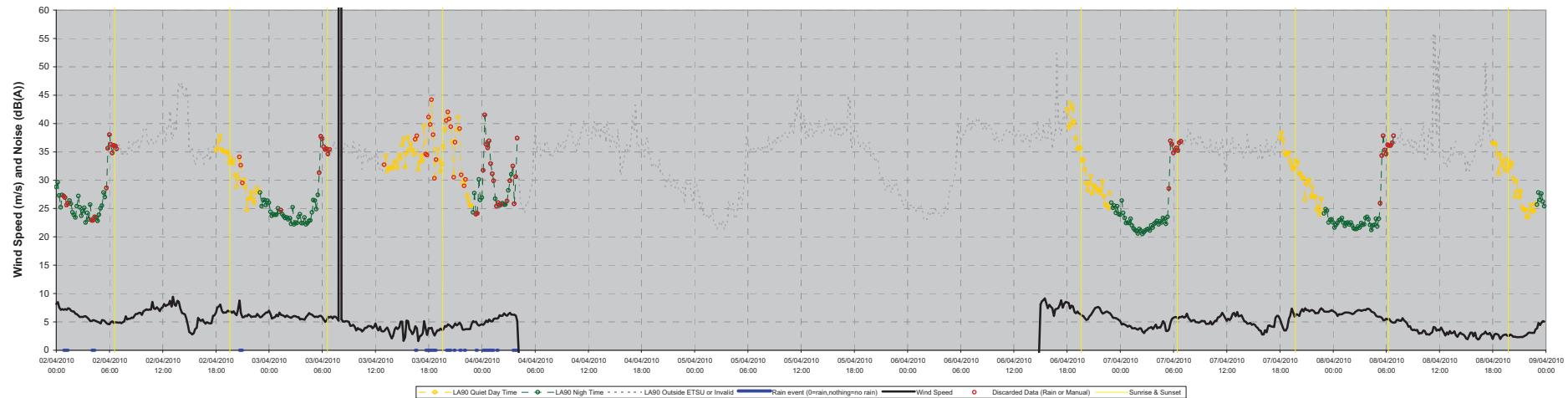
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Client	Broadview Energy Developments Limited
Title	Time Series for Peter's Farm (H1) Page 5 of 5
Figure Number	IOA GPG TS1e
Date	31/07/2013 Document Reference 8418-04-N-001 TS



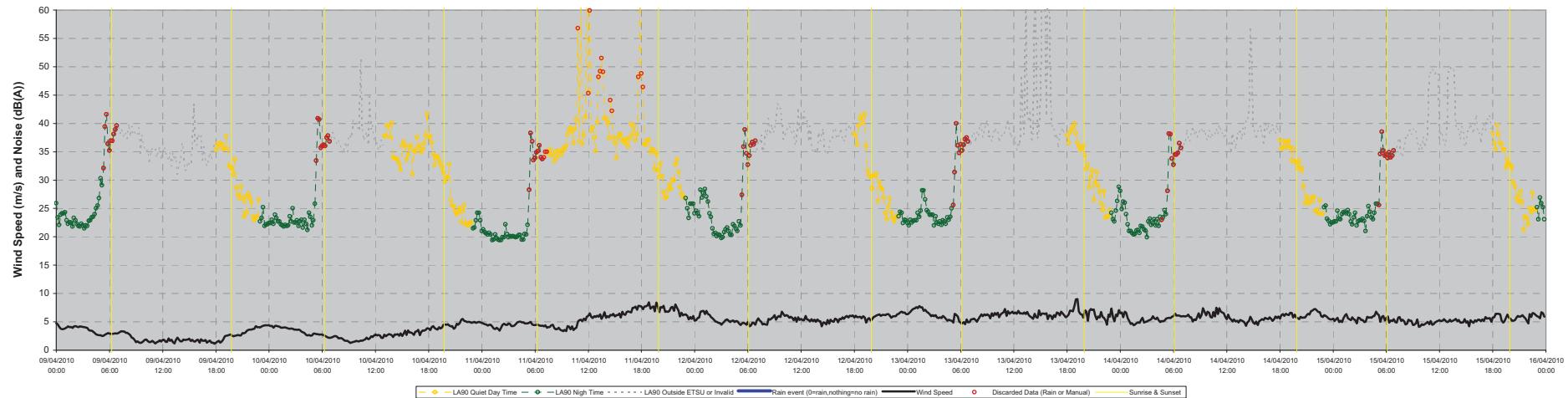
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02/04/2010 to 09/04/2010



09/04/2010 to 16/04/2010



Project Spring Farm Ridge Renewable Energy Project

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Title Time Series for Property on Station Road (H2) Page 2 of 5

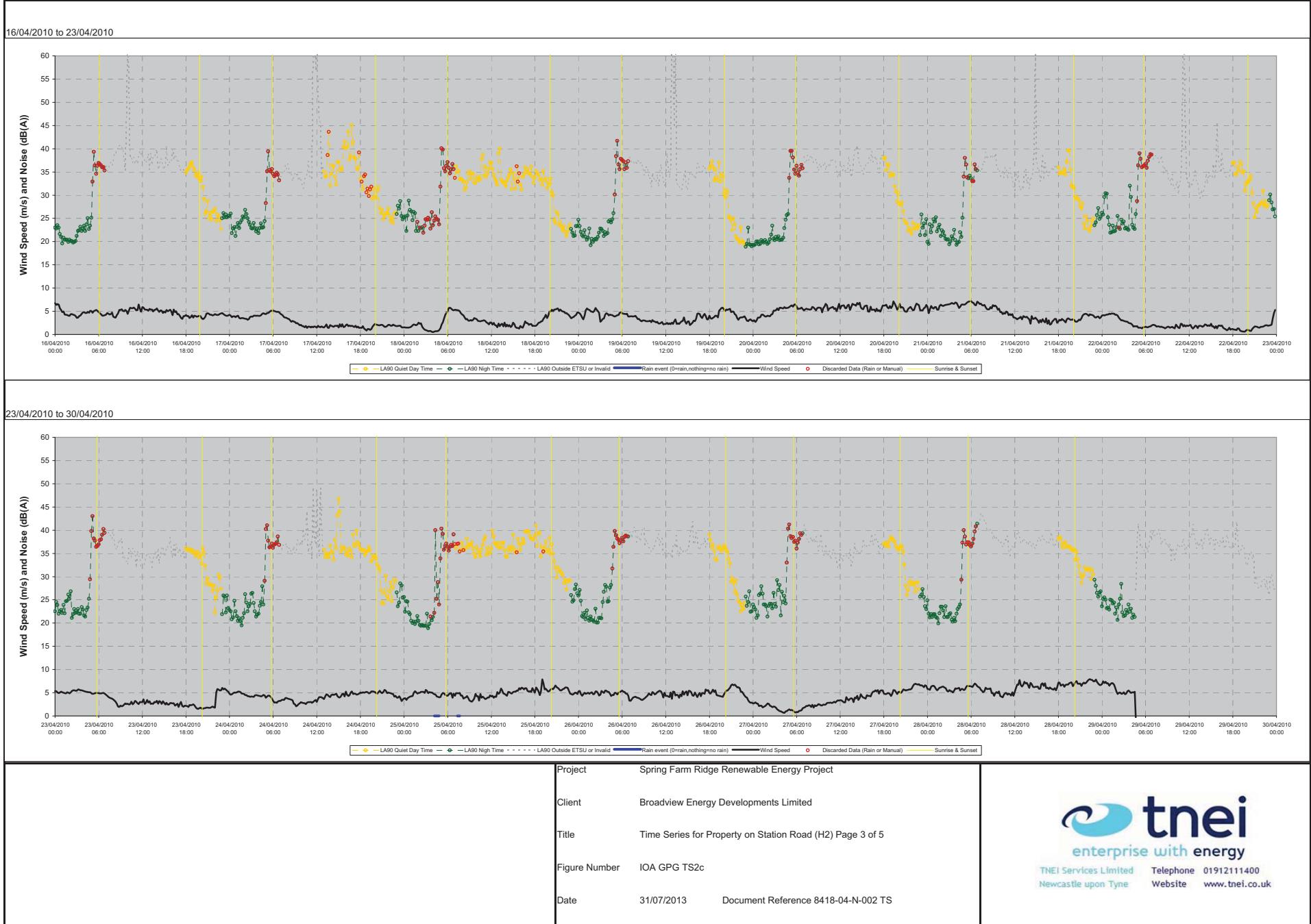
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Date 31/07/2013 Document Reference 8418-04-N-002 TS

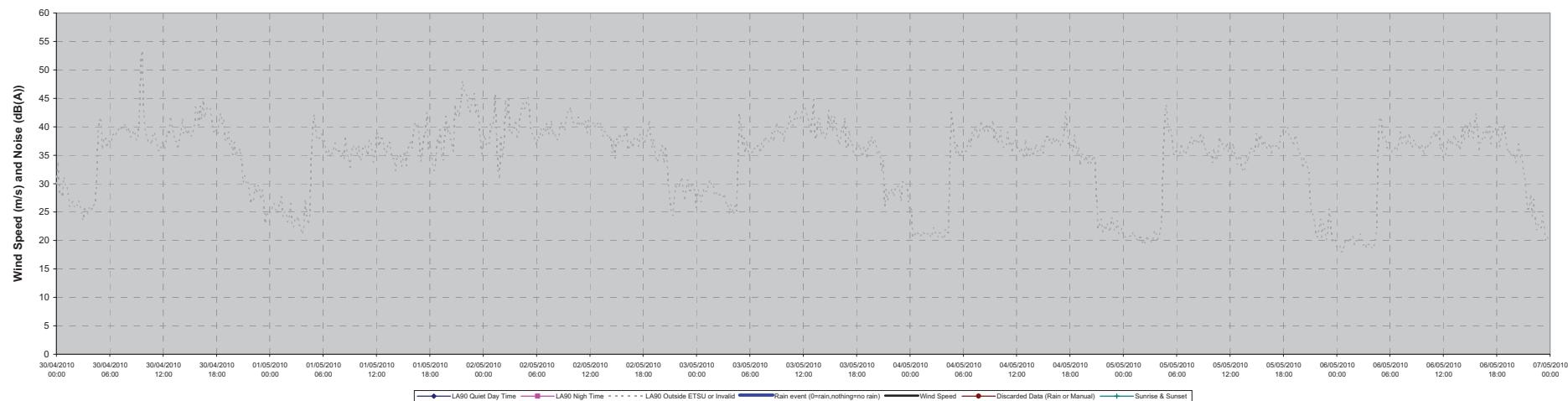


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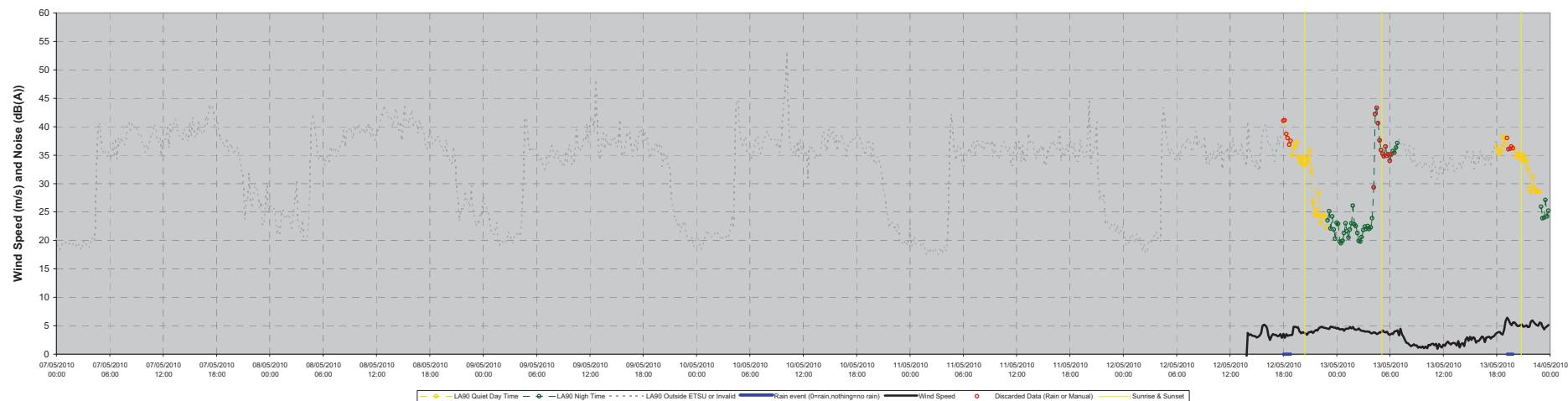
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30/04/2010 to 07/05/2010



07/05/2010 to 14/05/2010



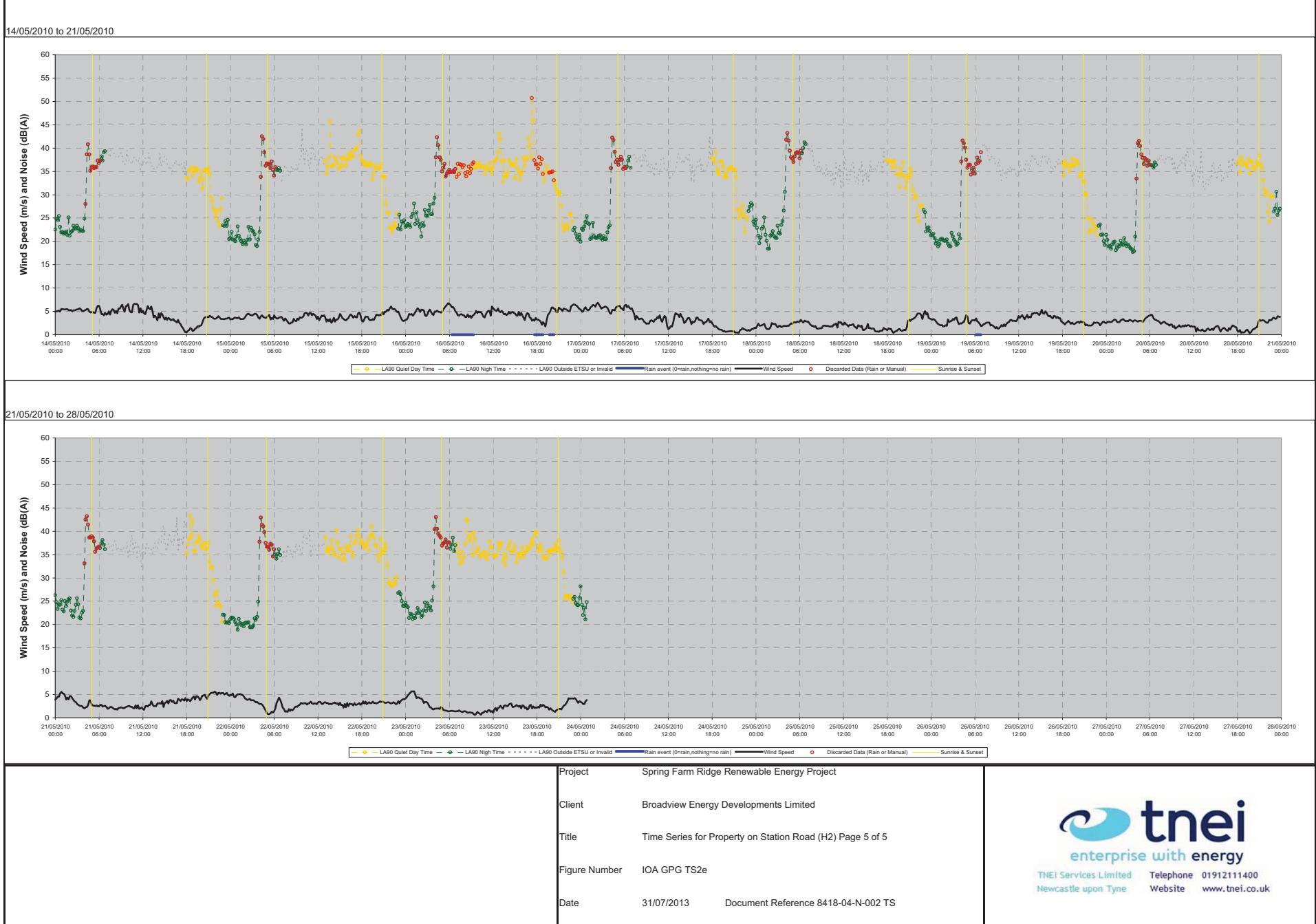
Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Developments Limited

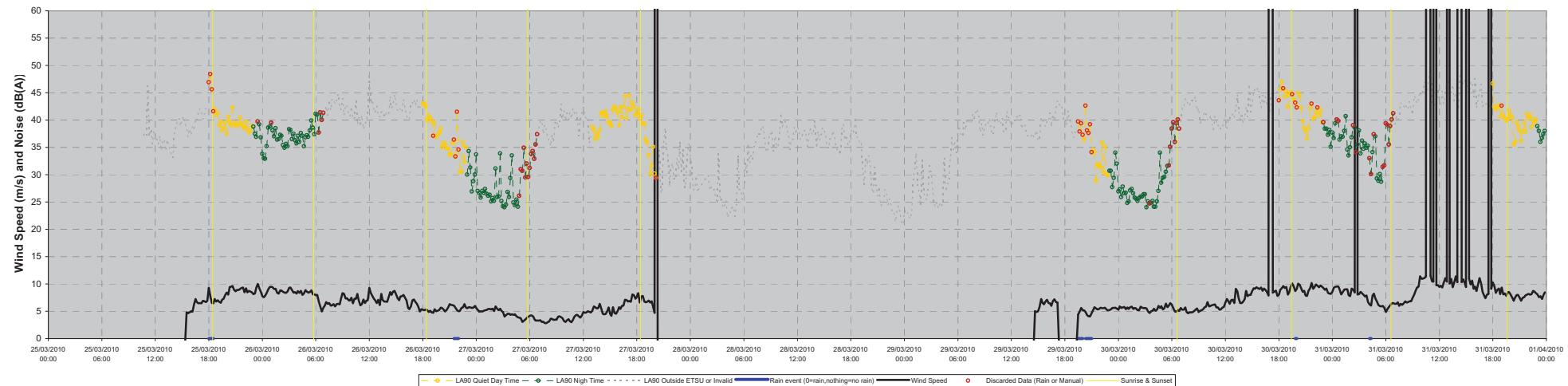
Title Time Series for Property on Station Road (H2) Page 4 of 5

Figure Number IOA GPG TS2d

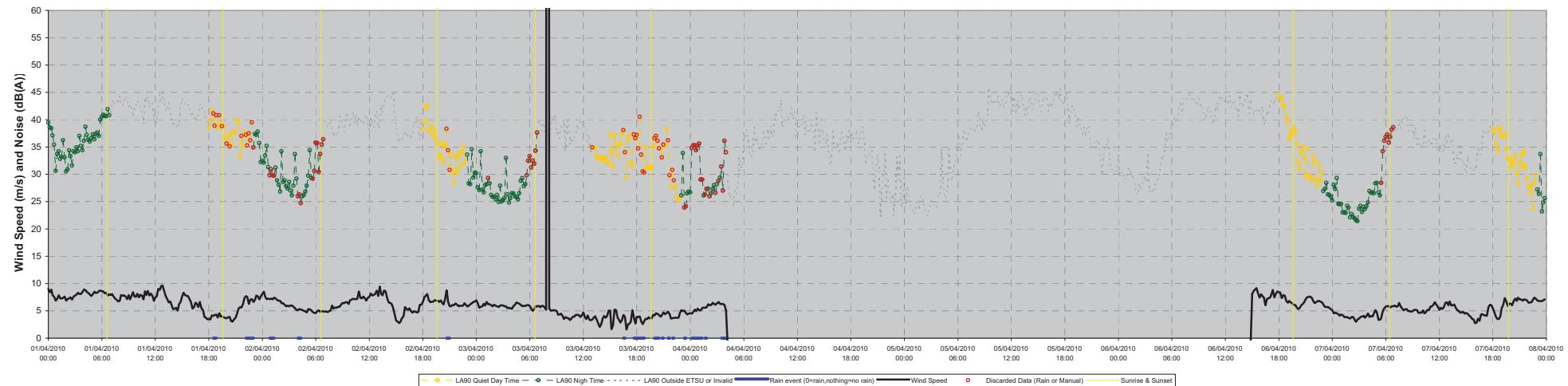
Date 31/07/2013 Document Reference 8418-04-N-002 TS



25/03/2010 to 01/04/2010



01/04/2010 to 08/04/2010



Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Developments Limited

Title Time Series for Grange Farm (H3) Page 1 of 5

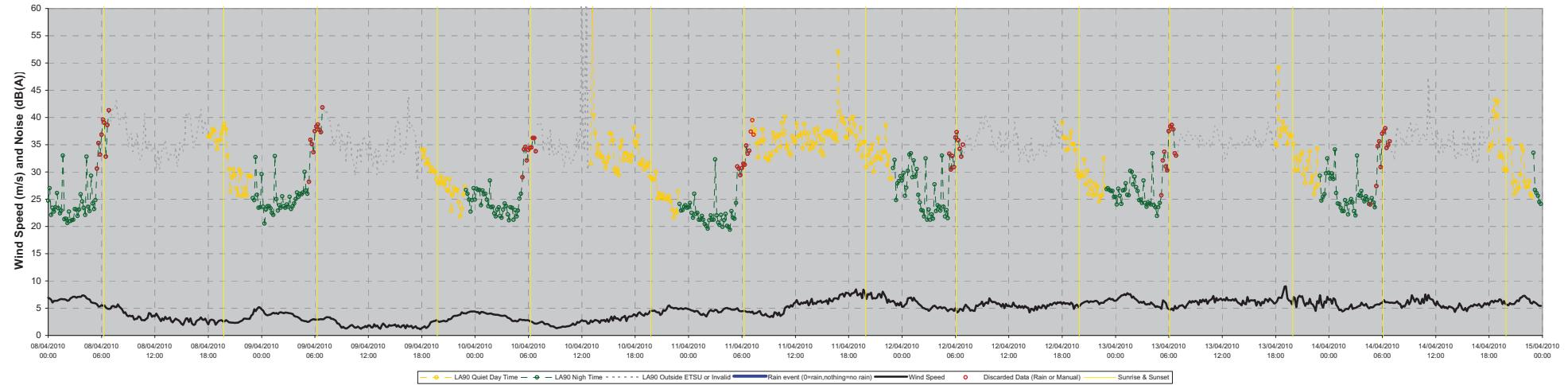
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Date 31/07/2013 Document Reference 8418-04-N-003 TS

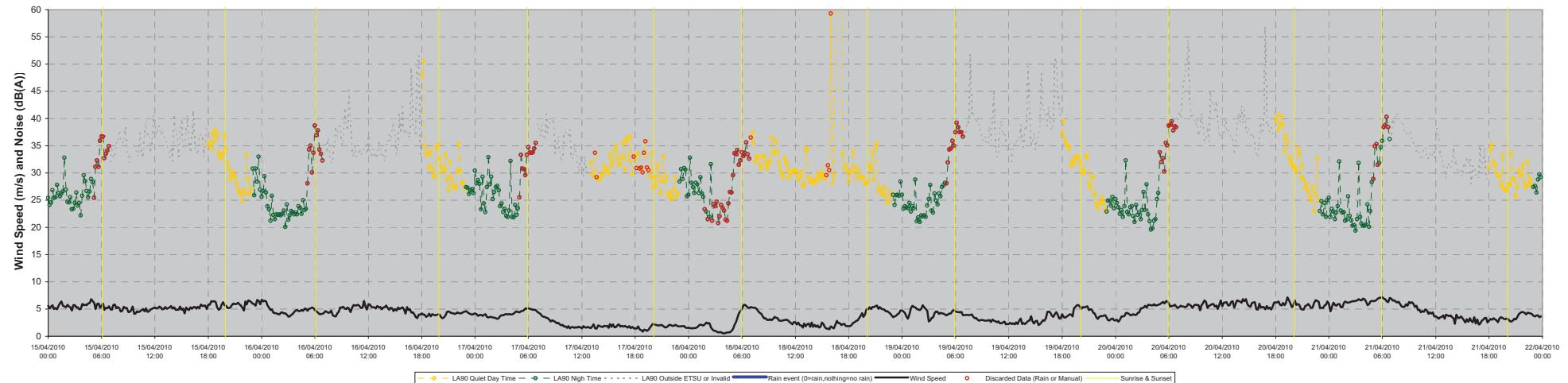


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15/04/2010 to 22/04/2010



Project Spring Farm Ridge Renewable Energy Project

Client Broadview Energy Developments Limited

Title Time Series for Grange Farm (H3) Page 2 of 5

Figure Number IOA GPG TS3b

Date 31/07/2013 Document Reference 8418-04-N-003 TS

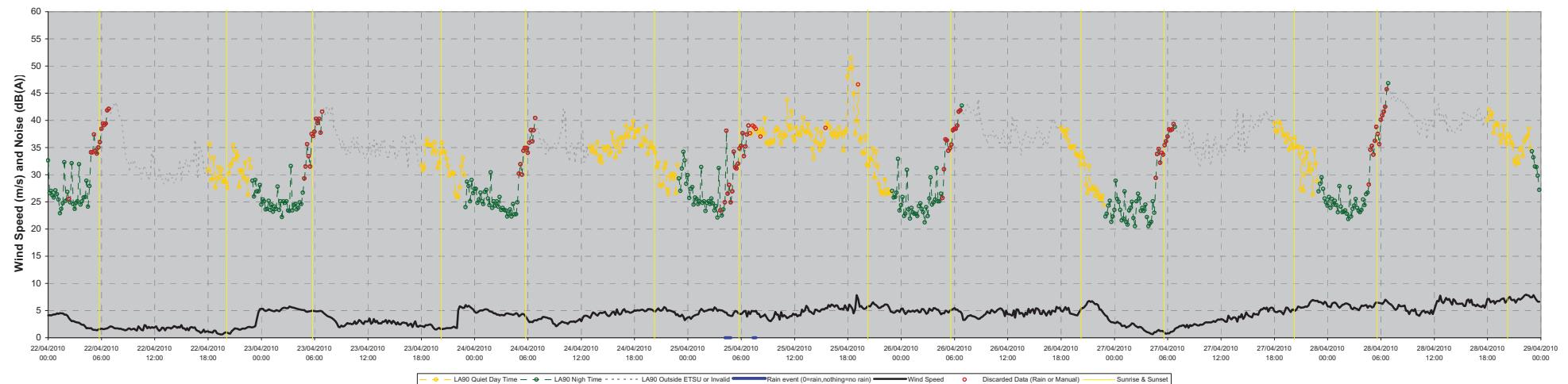


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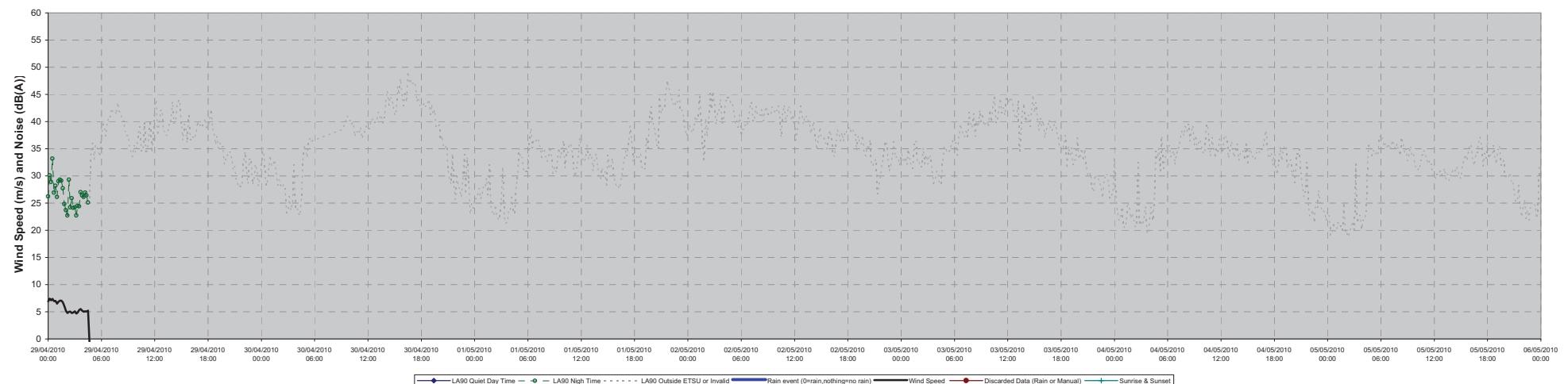
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22/04/2010 to 29/04/2010

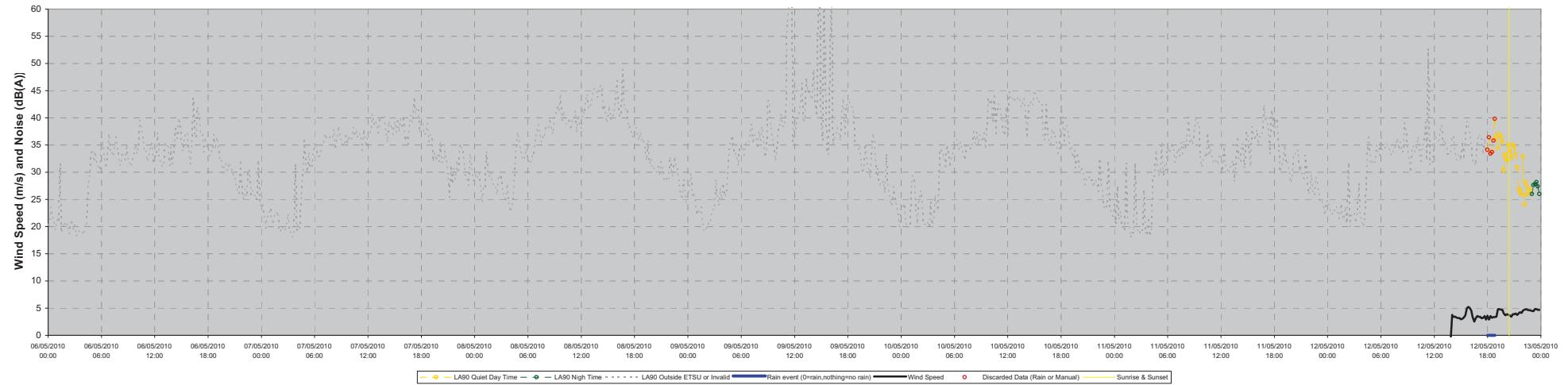


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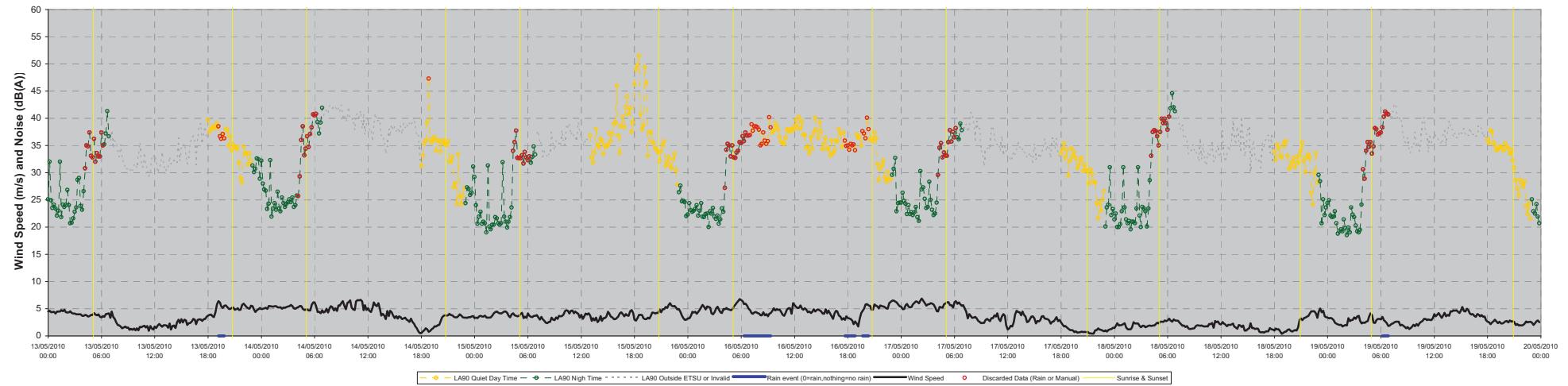


Project	Spring Farm Ridge Renewable Energy Project
Client	Broadview Energy Developments Limited
Title	Time Series for Grange Farm (H3) Page 3 of 5
Figure Number	IOA GPG TS3c
Date	31/07/2013 Document Reference 8418-04-N-003 TS

06/05/2010 to 13/05/2010



13/05/2010 to 20/05/2010



Project Spring Farm Ridge Renewable Energy Project

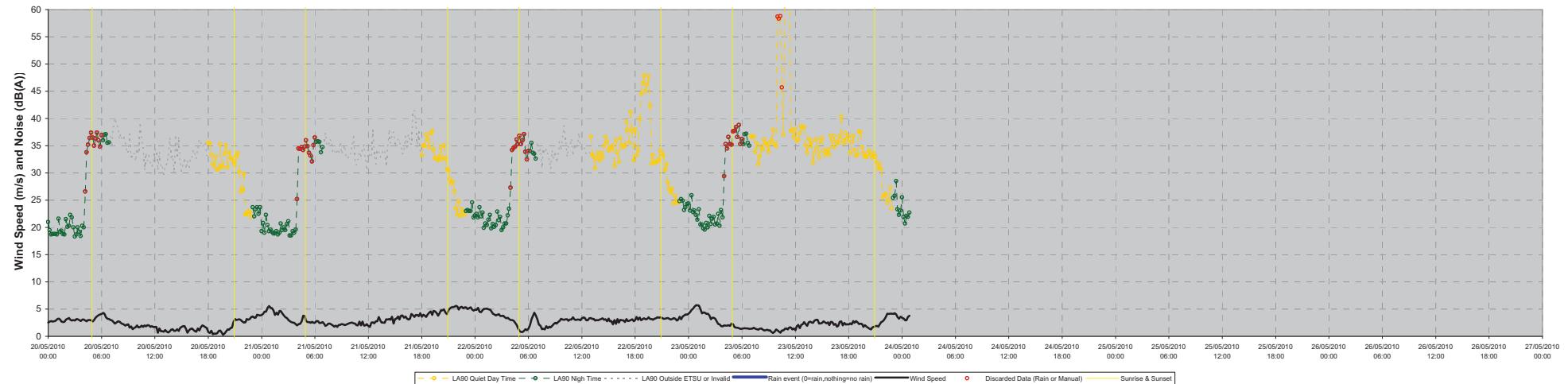
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Title Time Series for Grange Farm (H3) Page 4 of 5

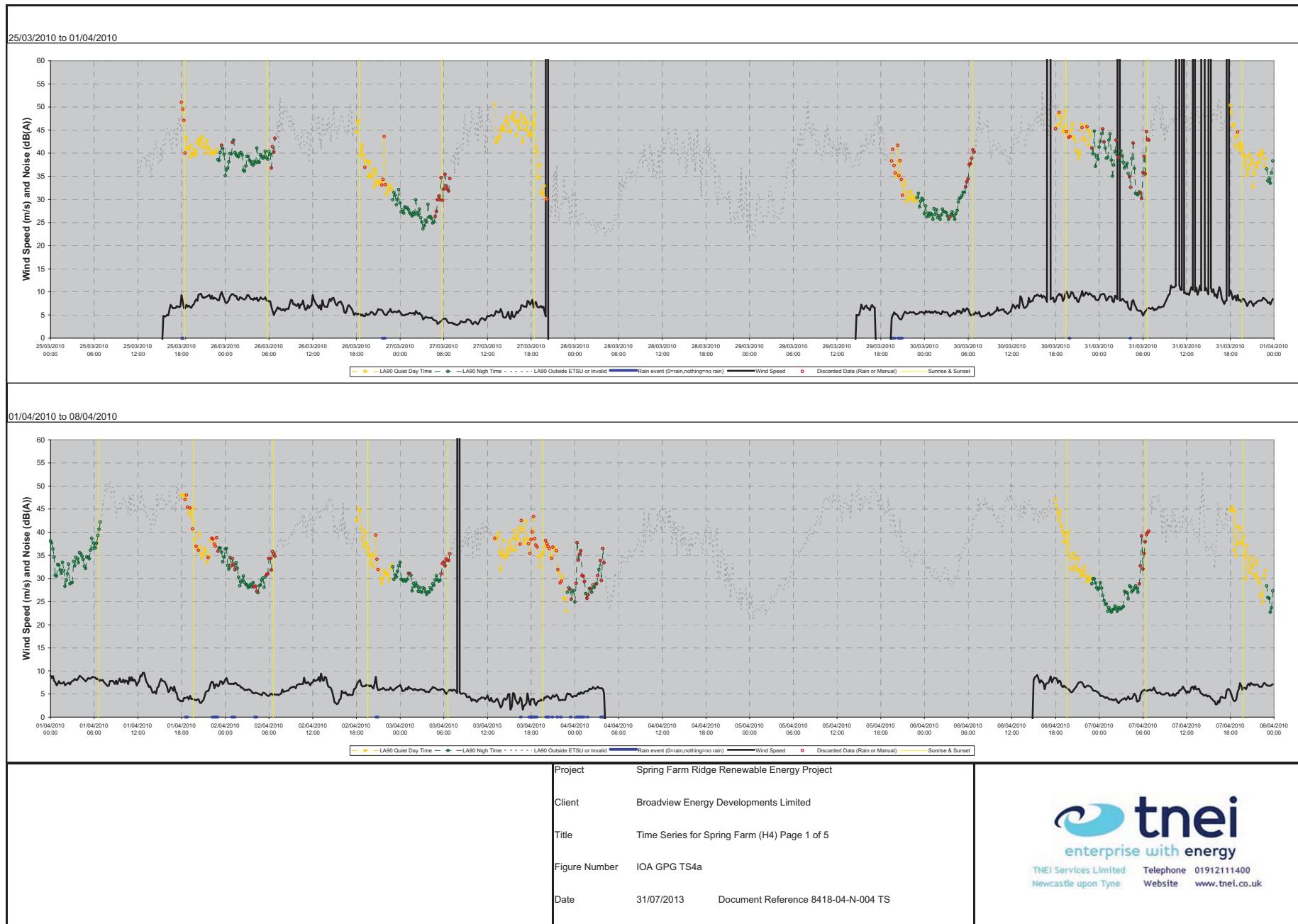
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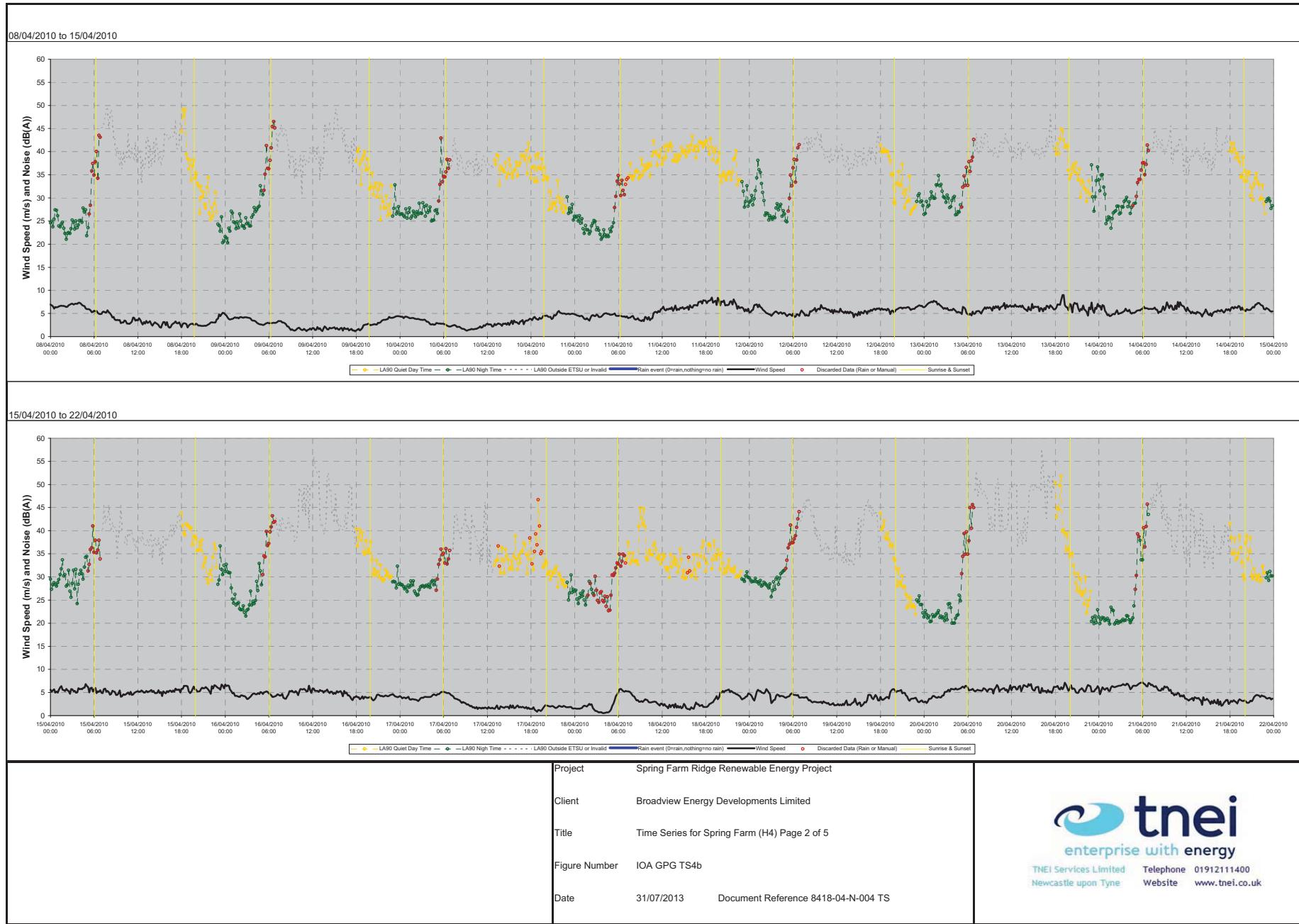
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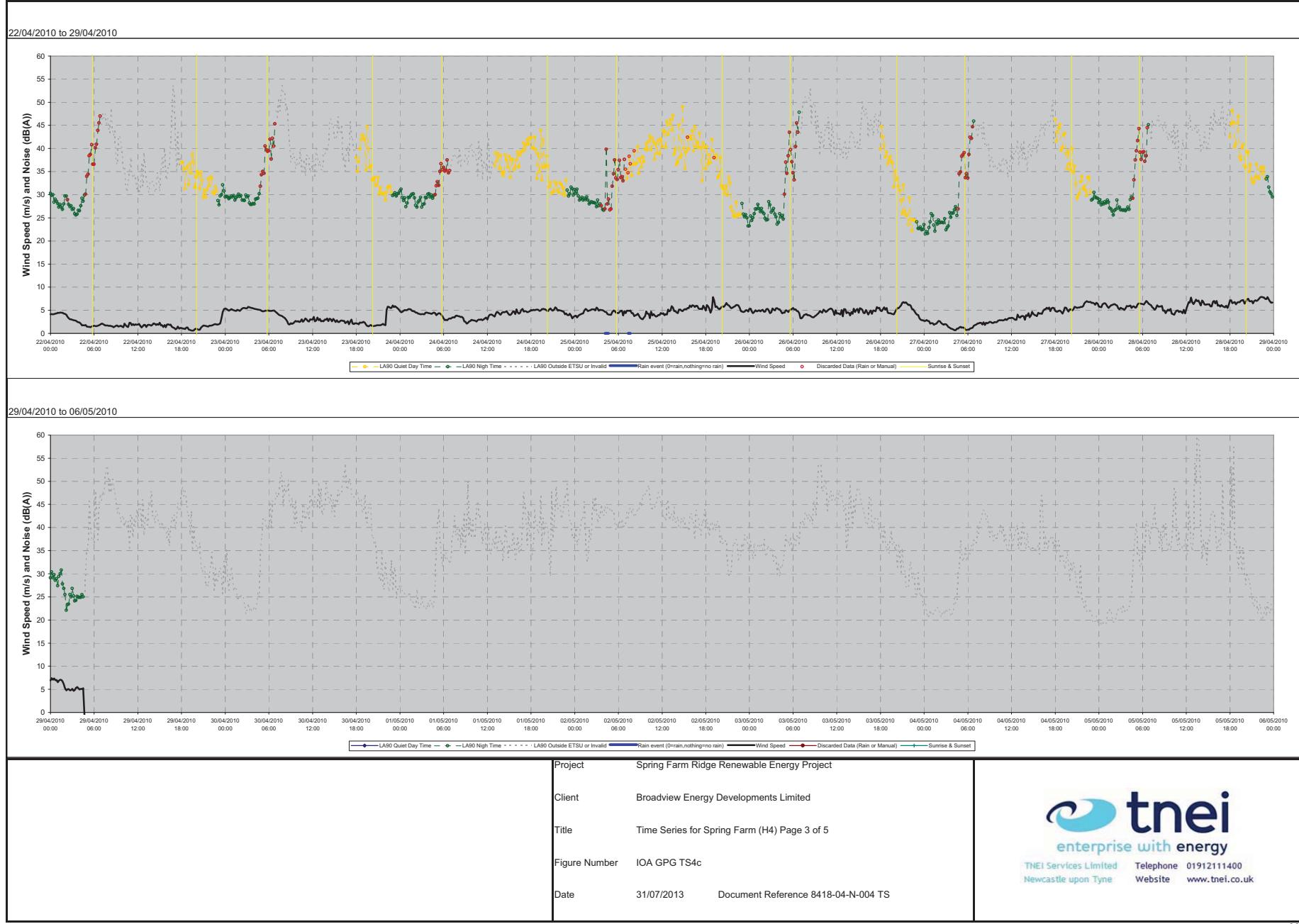
20/05/2010 to 27/05/2010



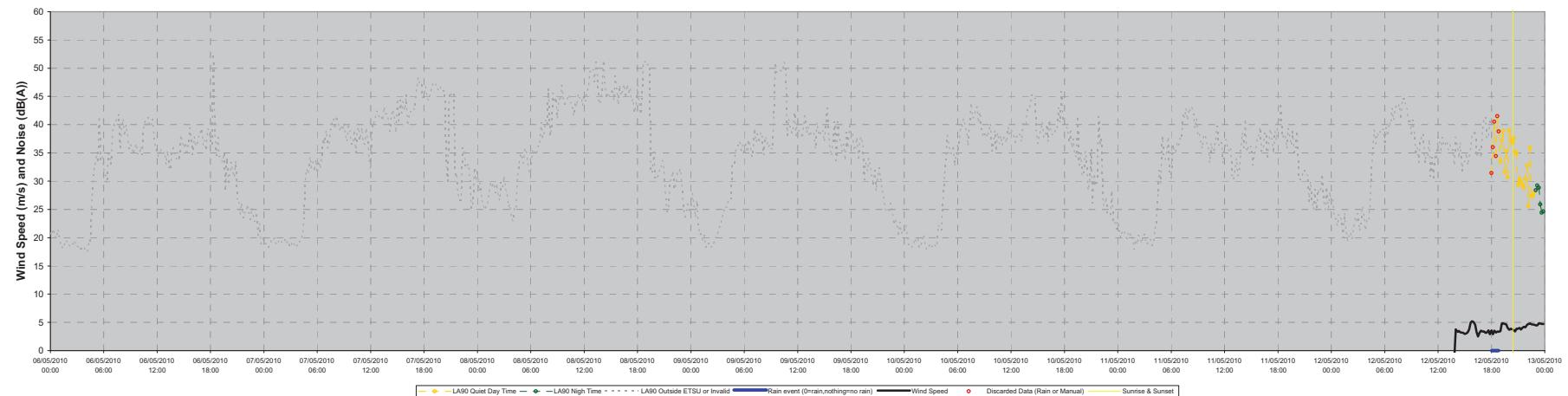
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Client	Broadview Energy Developments Limited
Title	Time Series for Grange Farm (H3) Page 5 of 5
Figure Number	IOA GPG TS3e
Date	31/07/2013 Document Reference 8418-04-N-003 TS



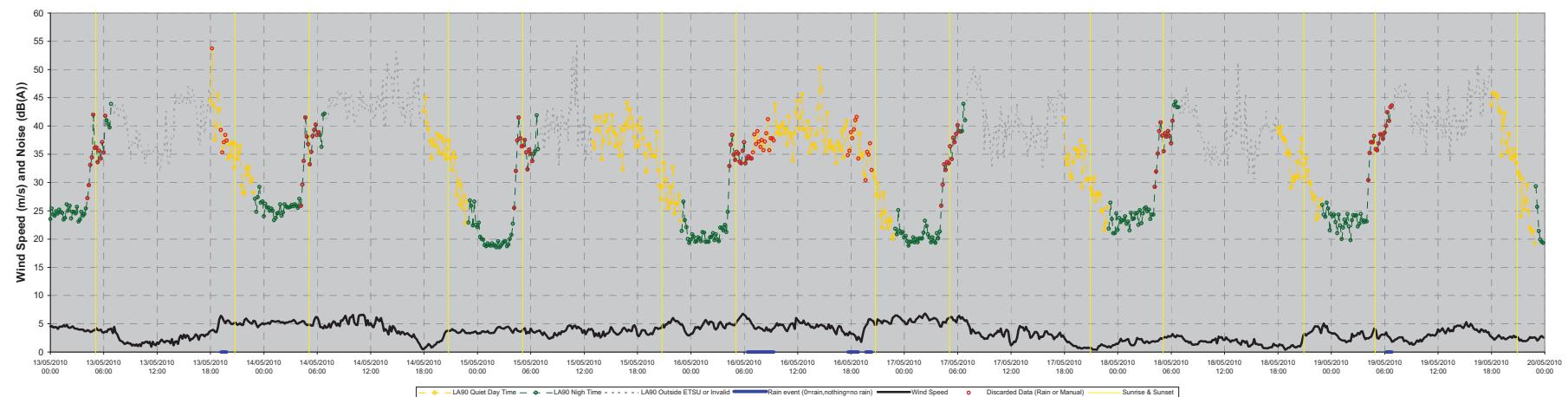




06/05/2010 to 13/05/2010



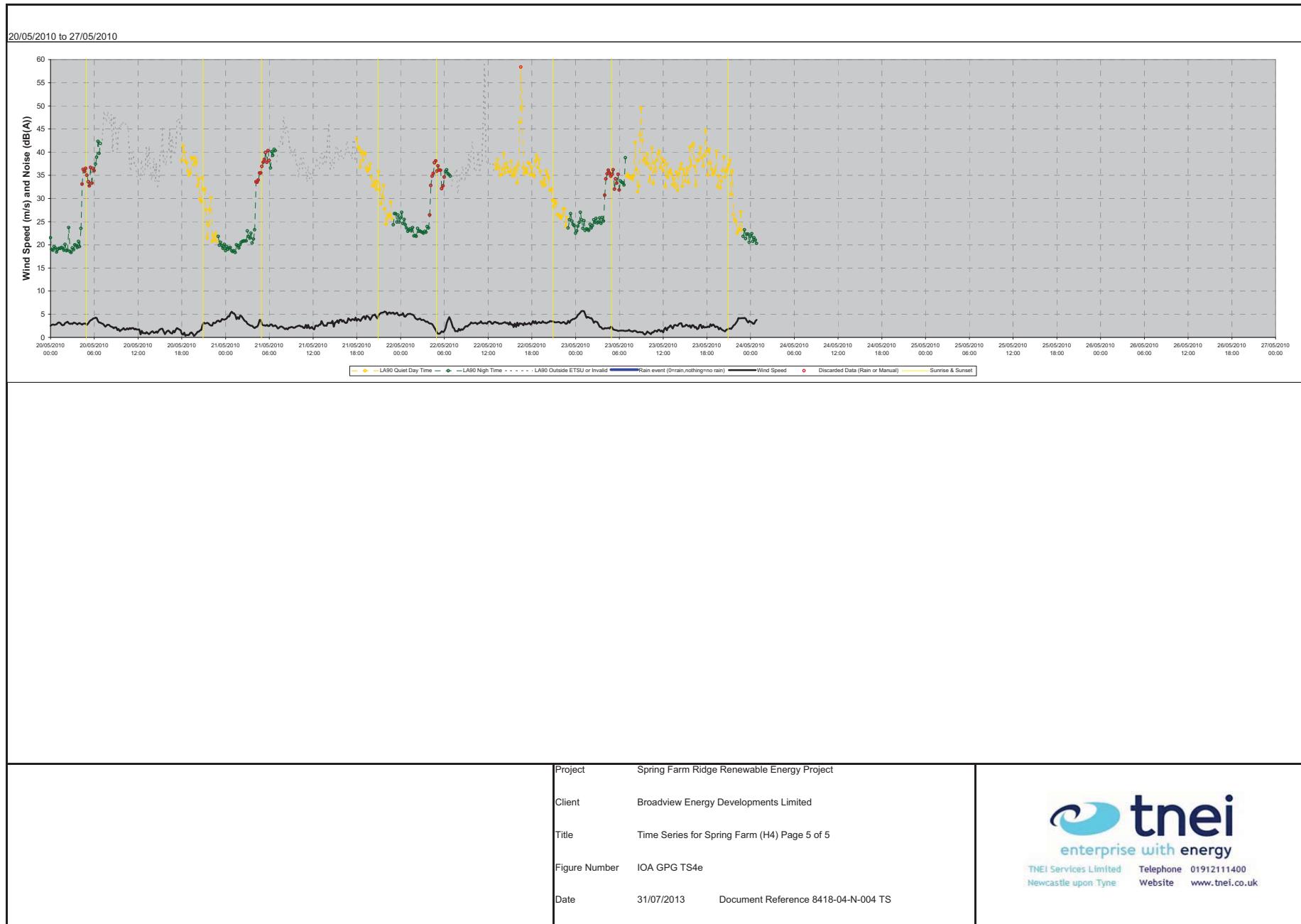
13/05/2010 to 20/05/2010



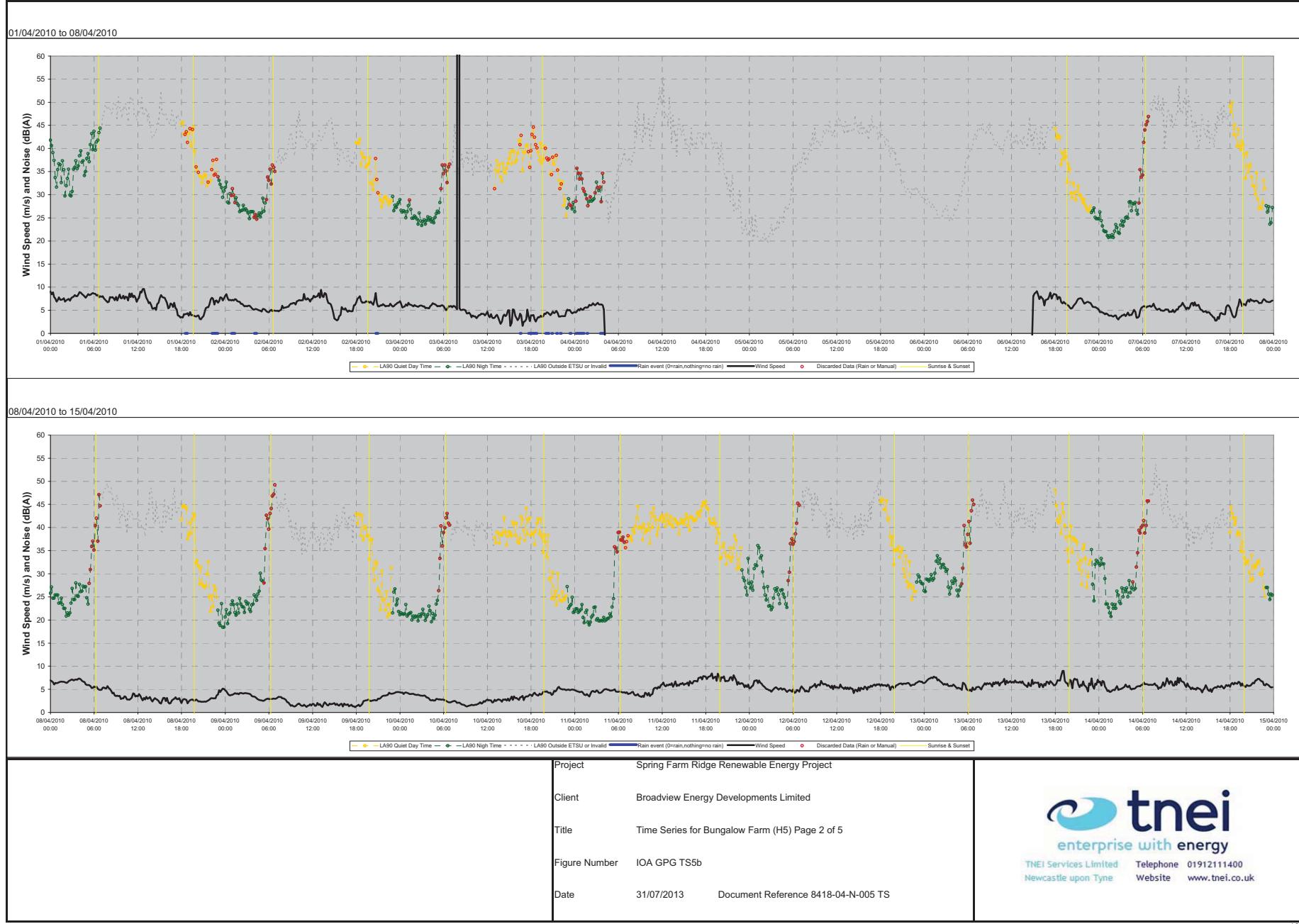
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Client	Broadview Energy Developments Limited
Title	Time Series for Spring Farm (H4) Page 4 of 5
Figure Number	IOA GPG TS4d
Date	31/07/2013 Document Reference 8418-04-N-004 TS



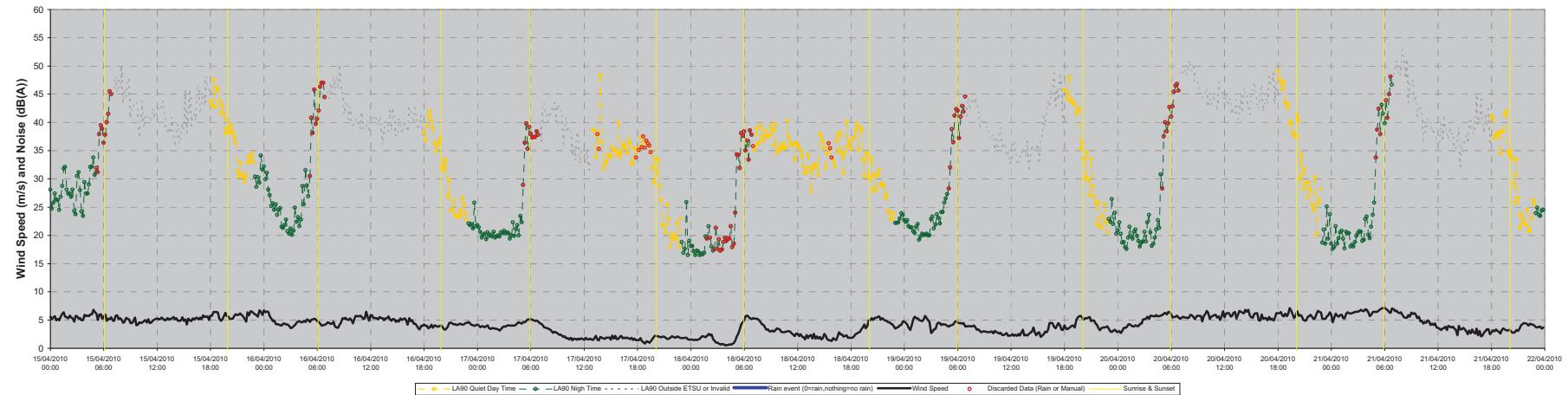
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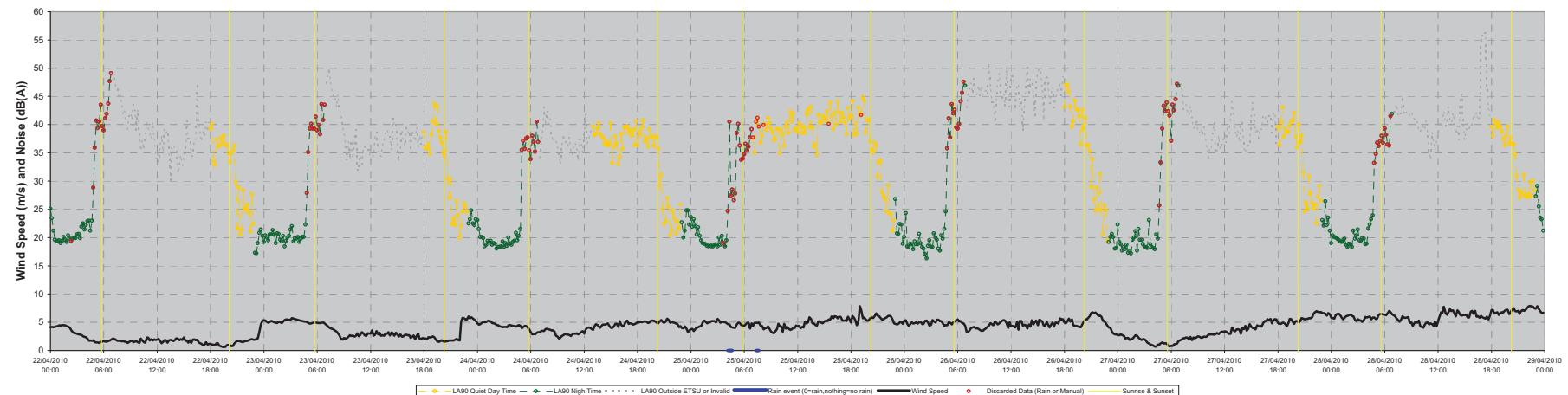




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Title Time Series for Bungalow Farm (H5) Page 3 of 5

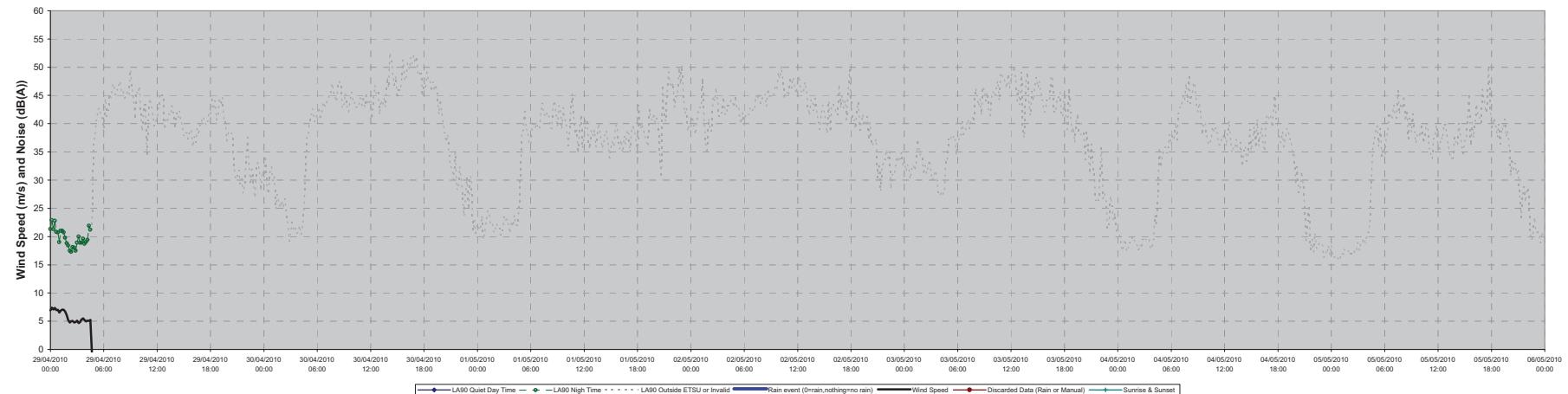
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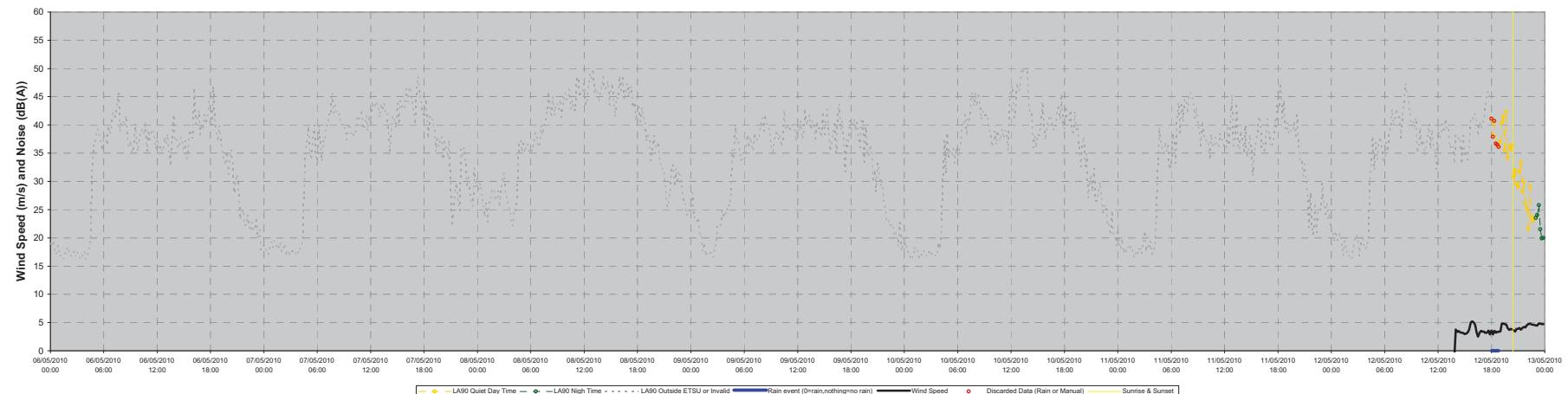


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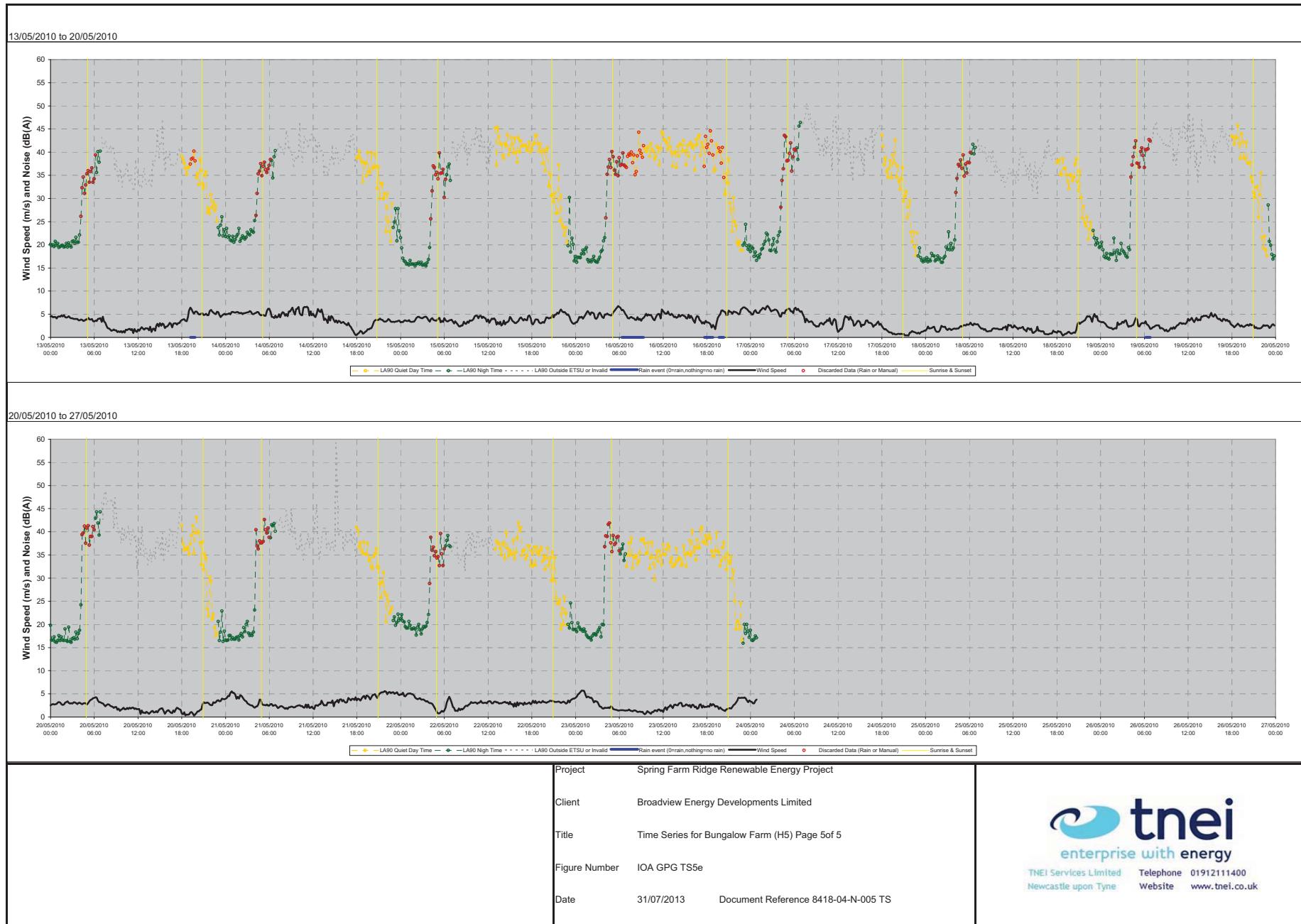
Title Time Series for Bungalow Farm (H5) Page 4 of 5

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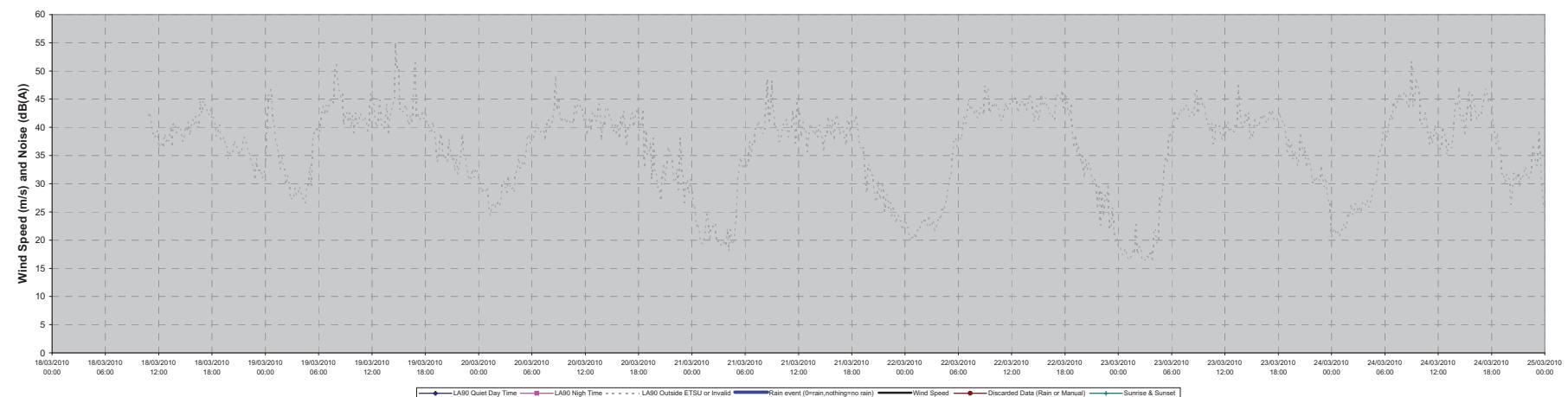
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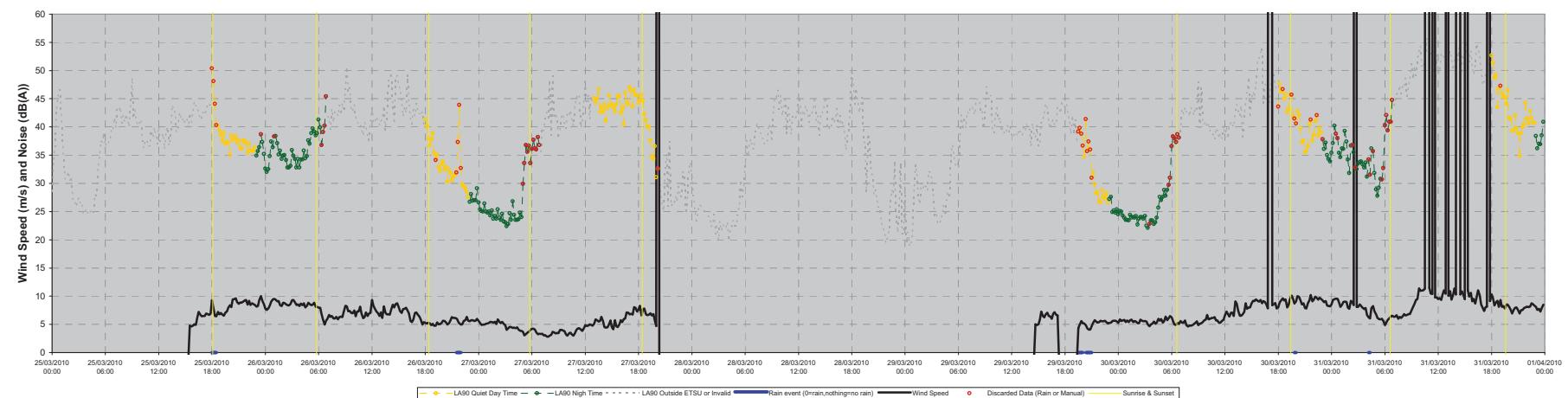
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25/03/2010 to 01/04/2010



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Title Time Series for Greatworth Hall (H6) Page 1 of 5

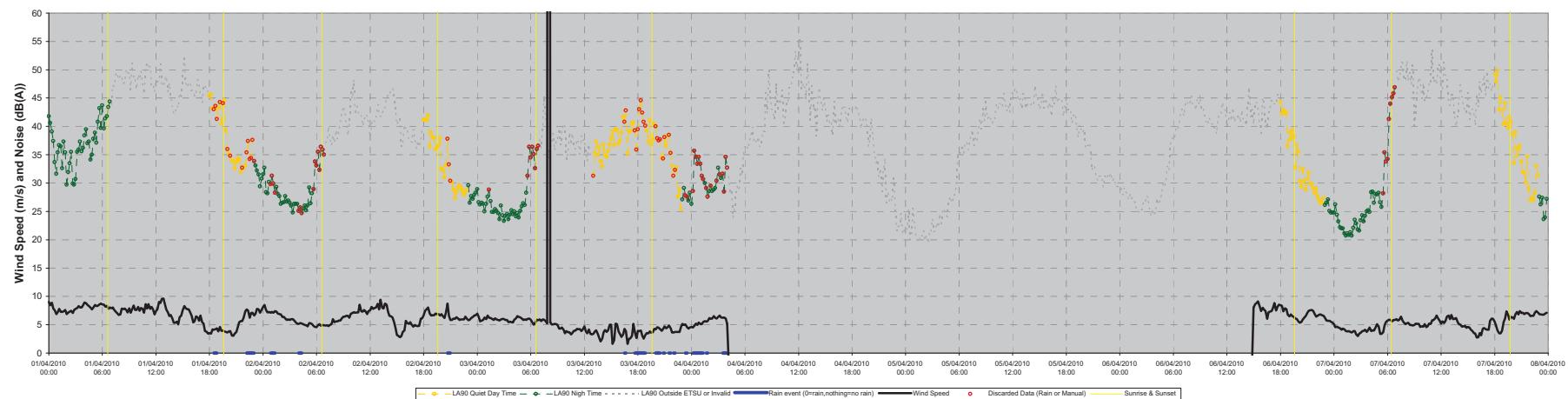
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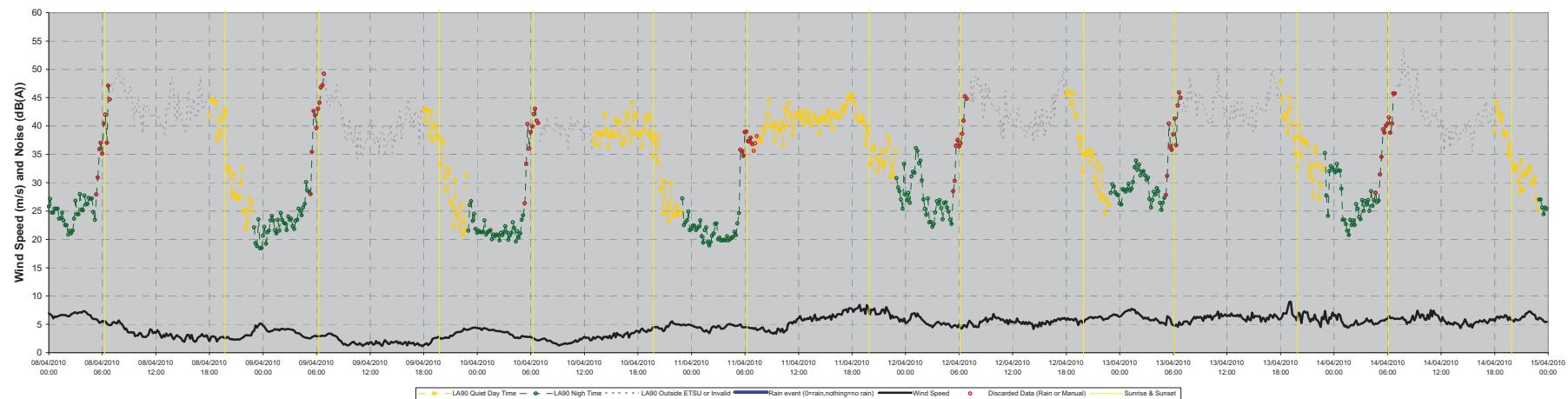


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Title Time Series for Greatworth Hall (H6) Page 2 of 5

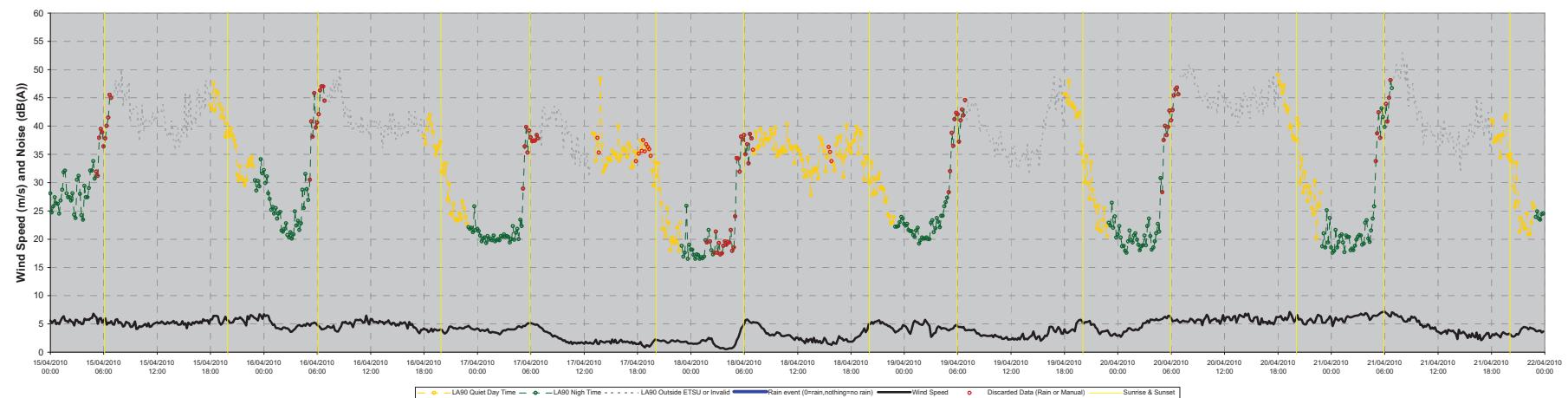
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Date 31/07/2013 Document Reference 8418-04-N-006 TS

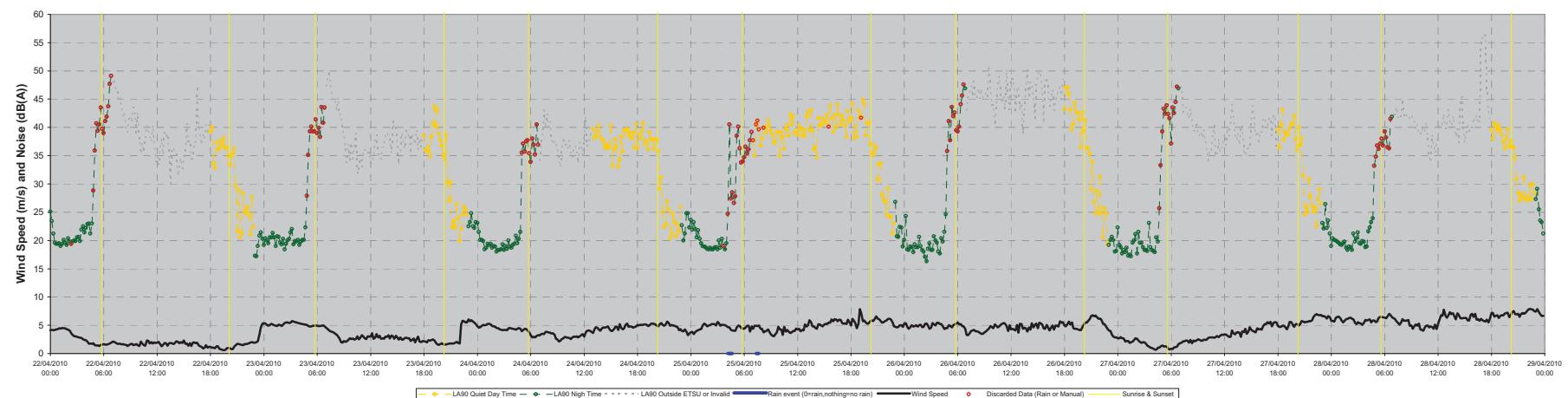


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Title Time Series for Greatworth Hall (H6) Page 3 of 5

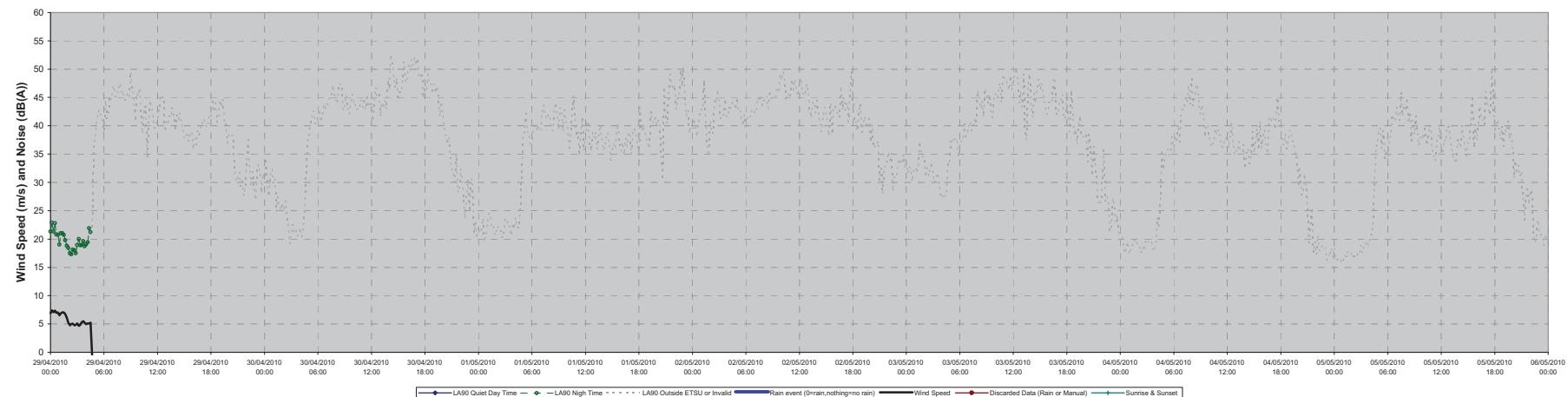
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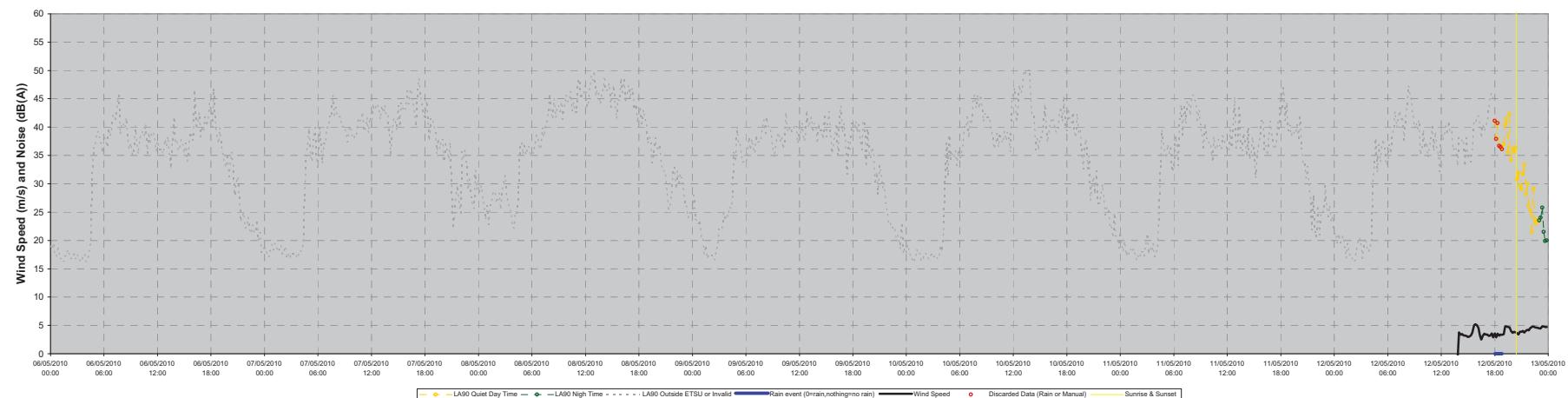


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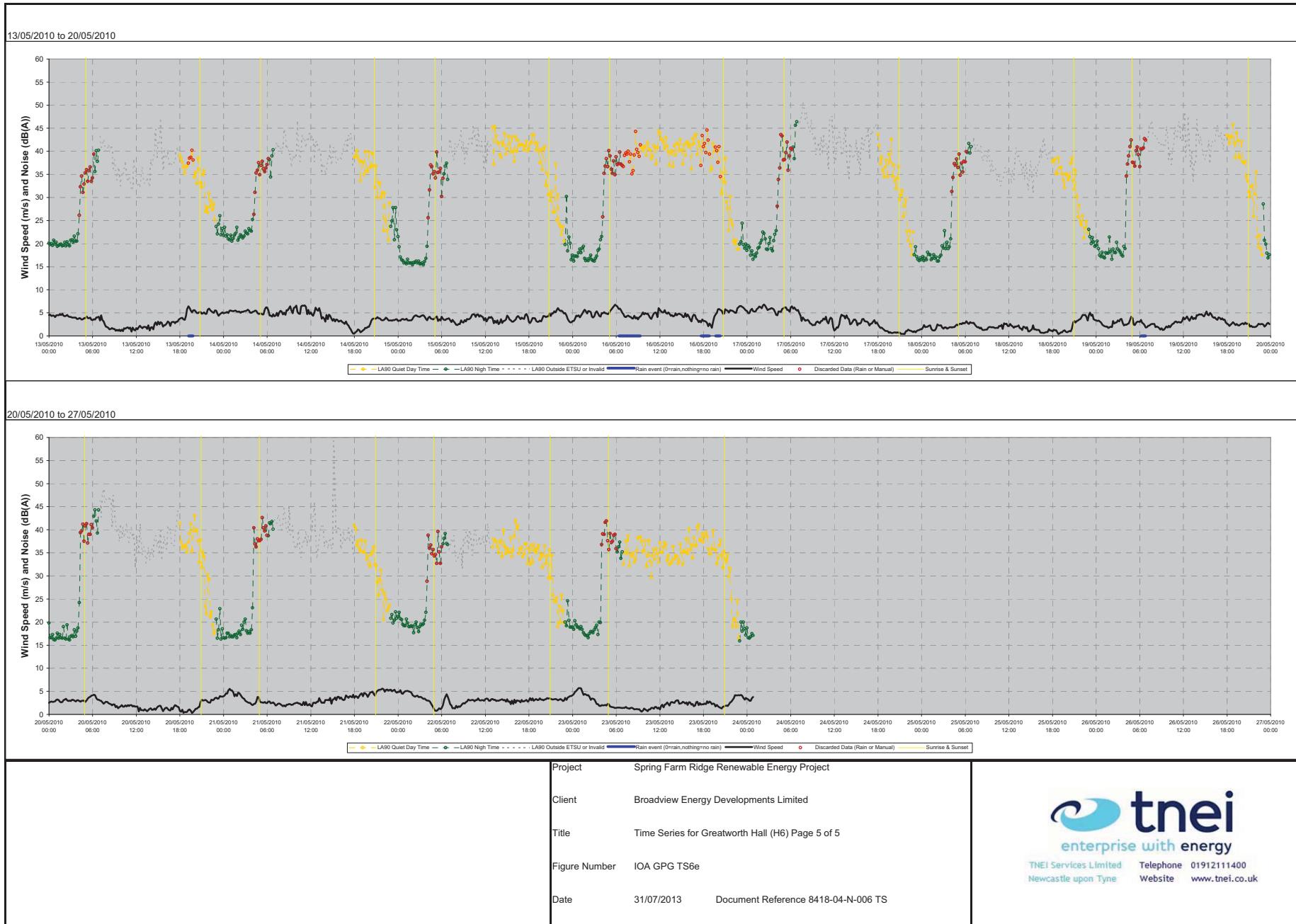
Title Time Series for Greatworth Hall (H6) Page 4 of 5

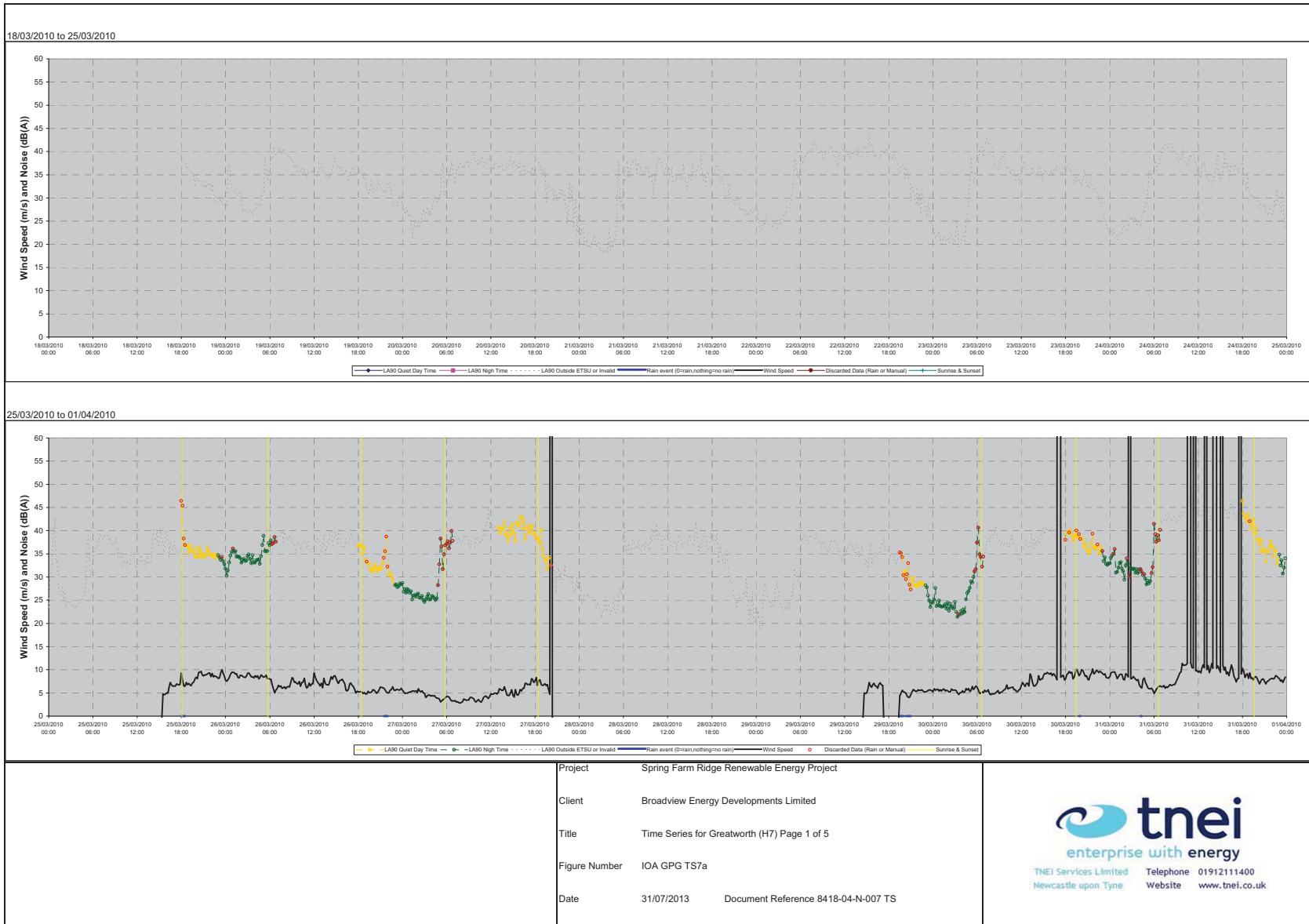
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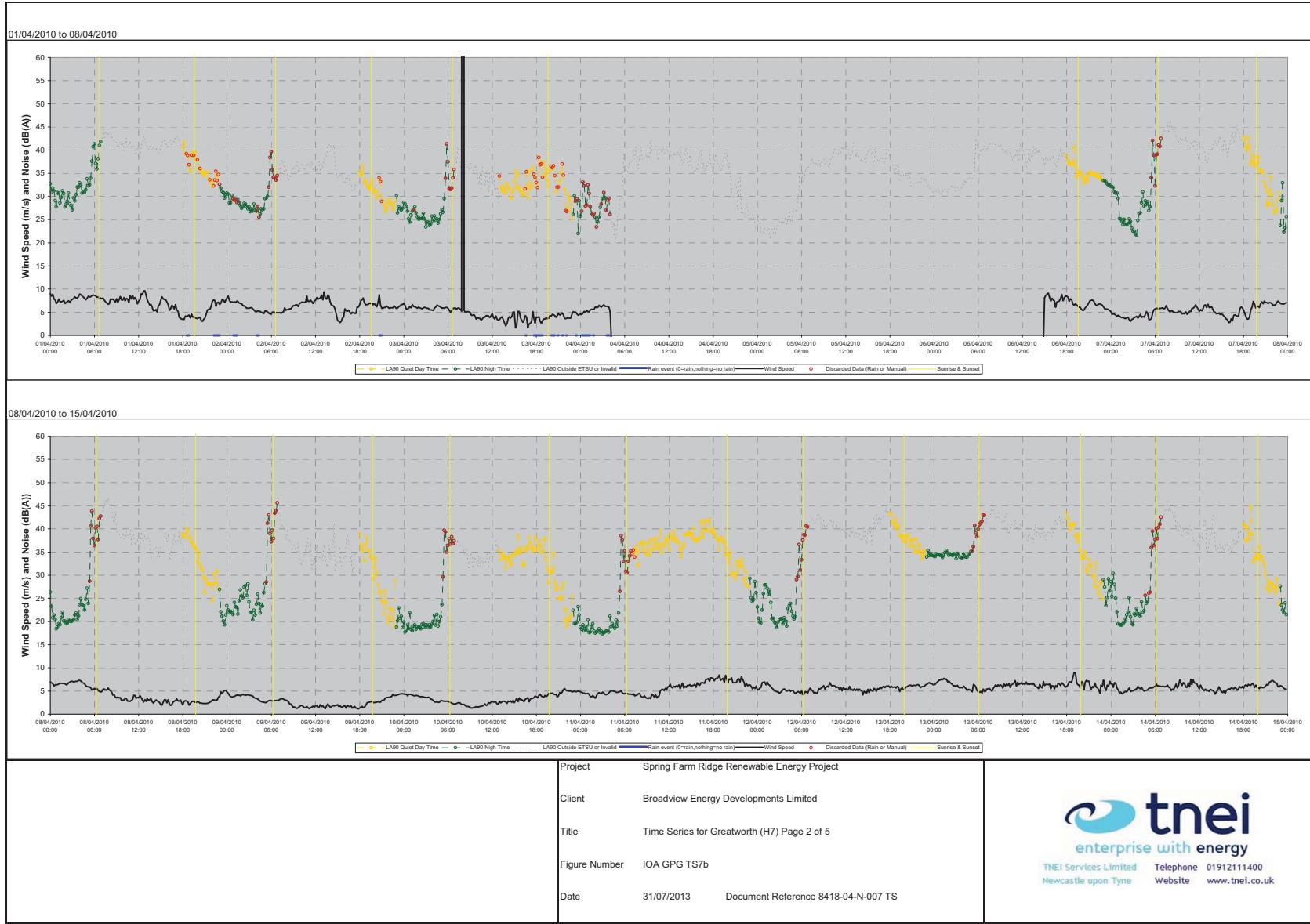
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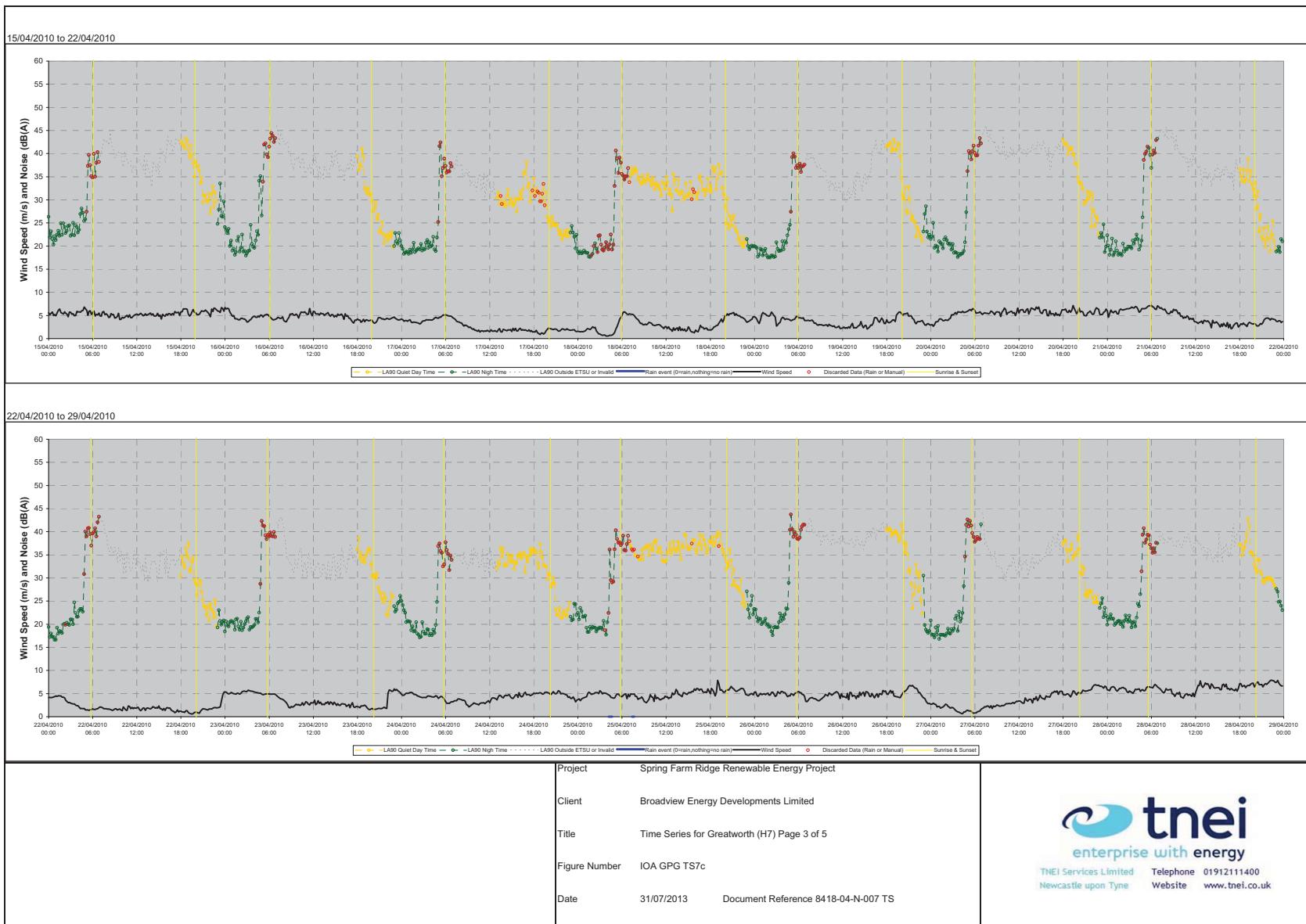


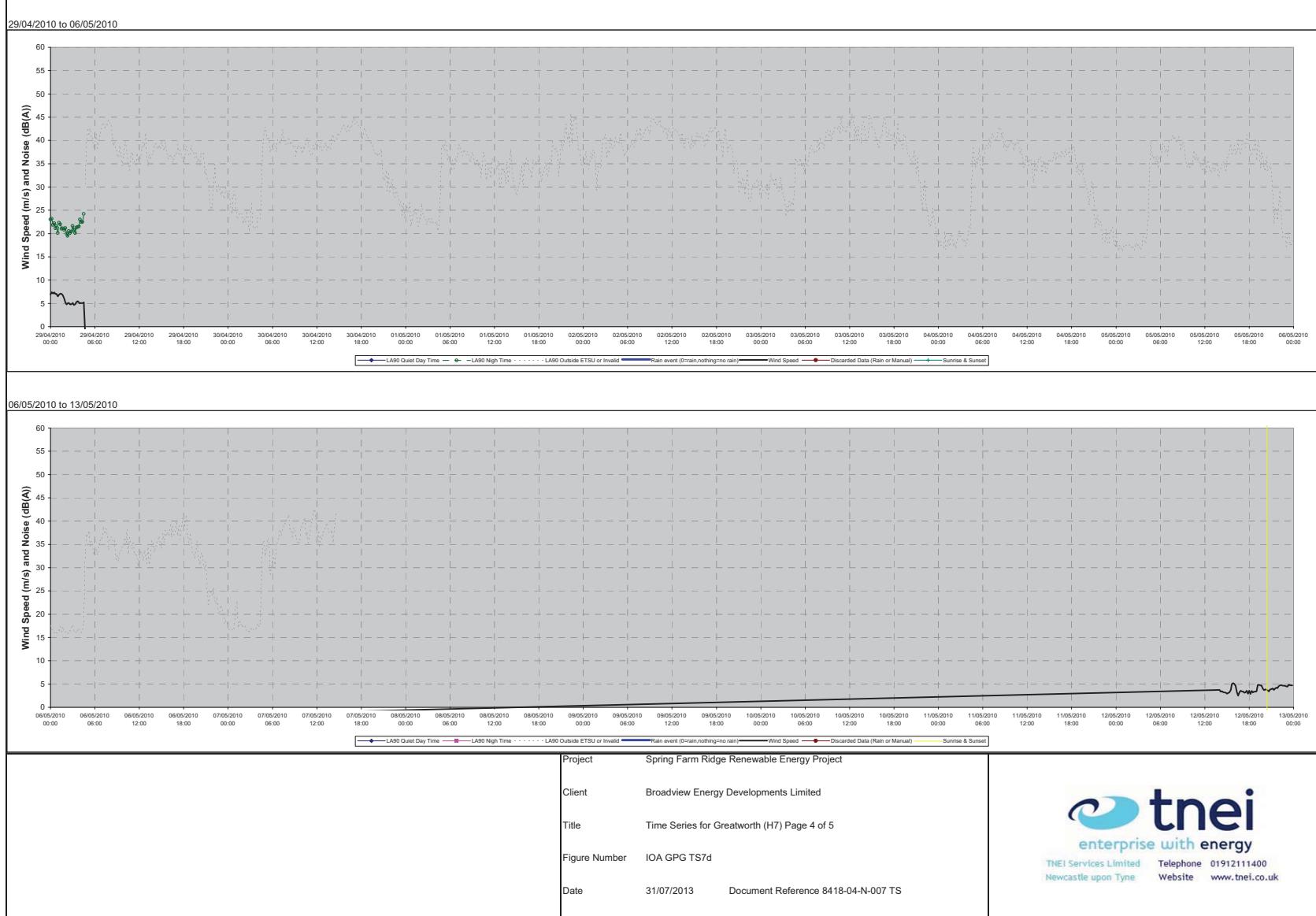
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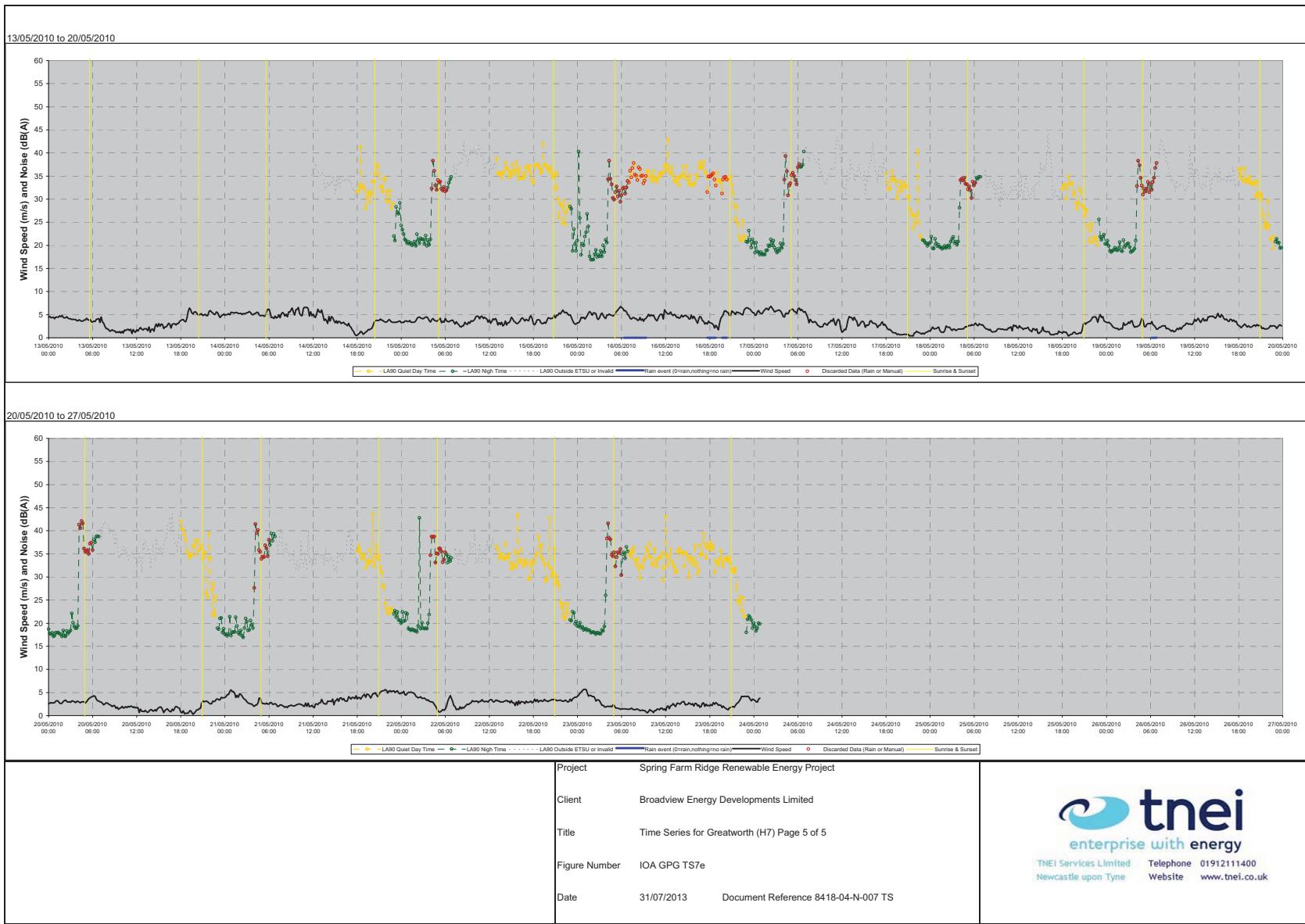


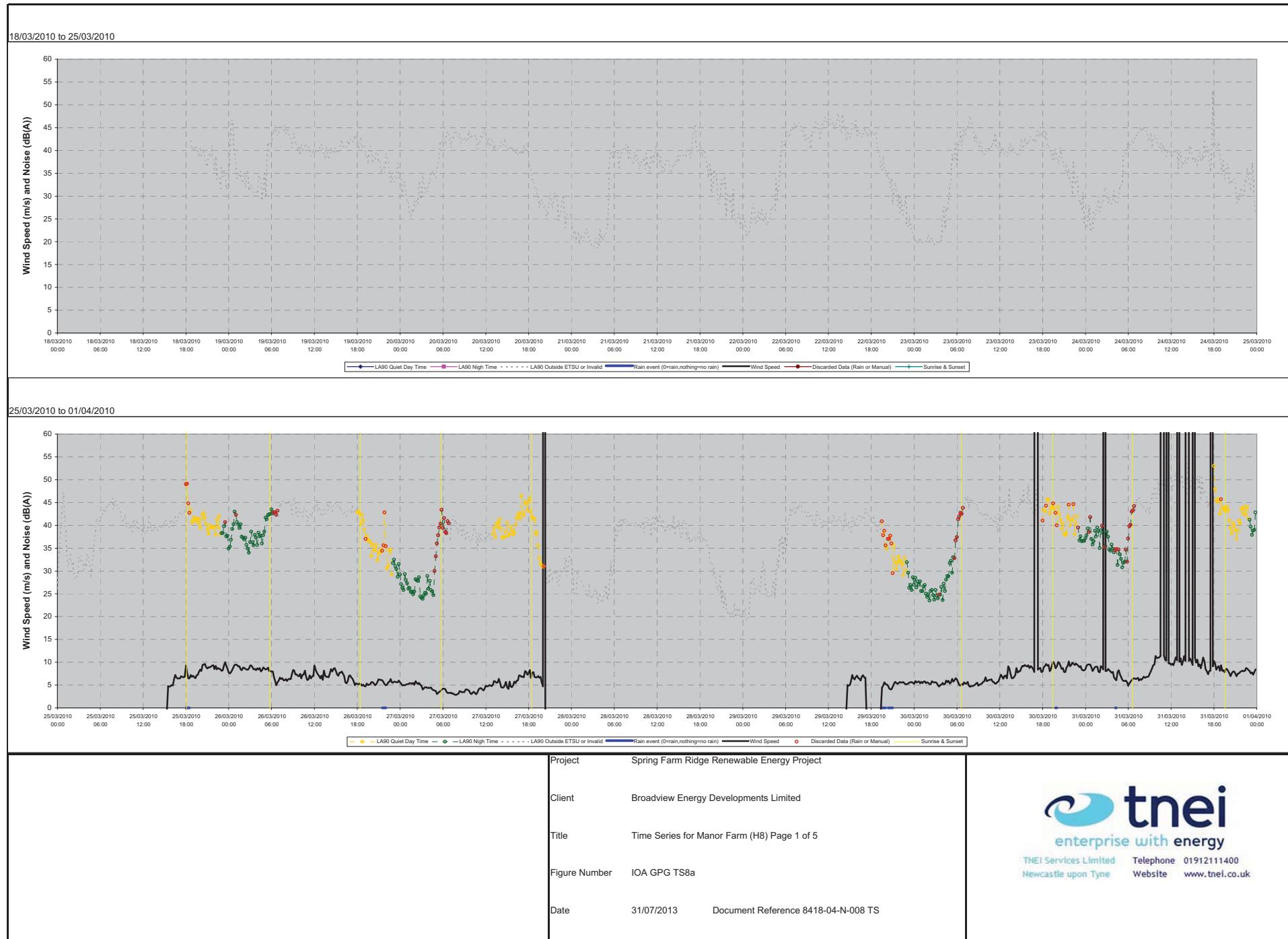


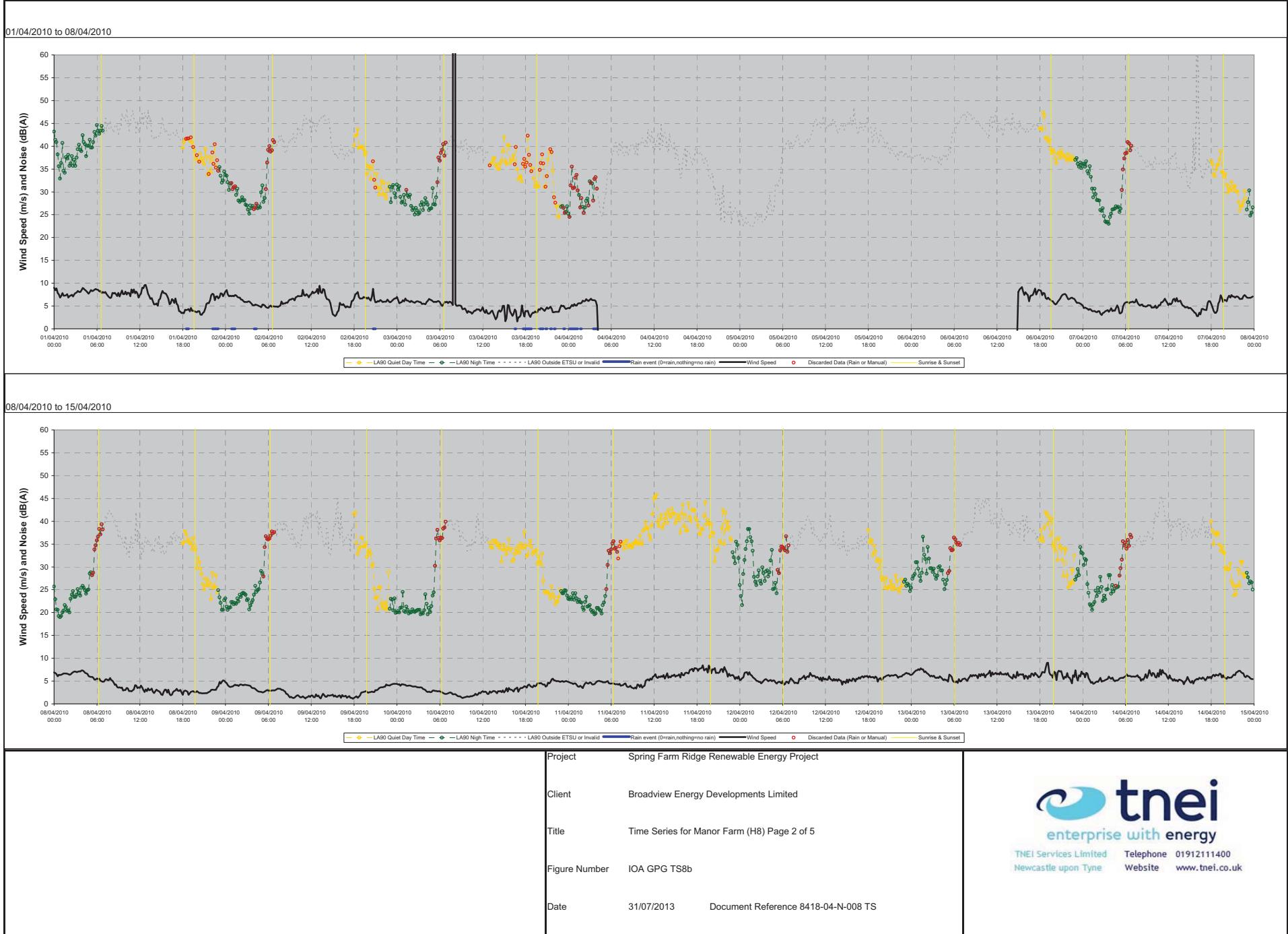


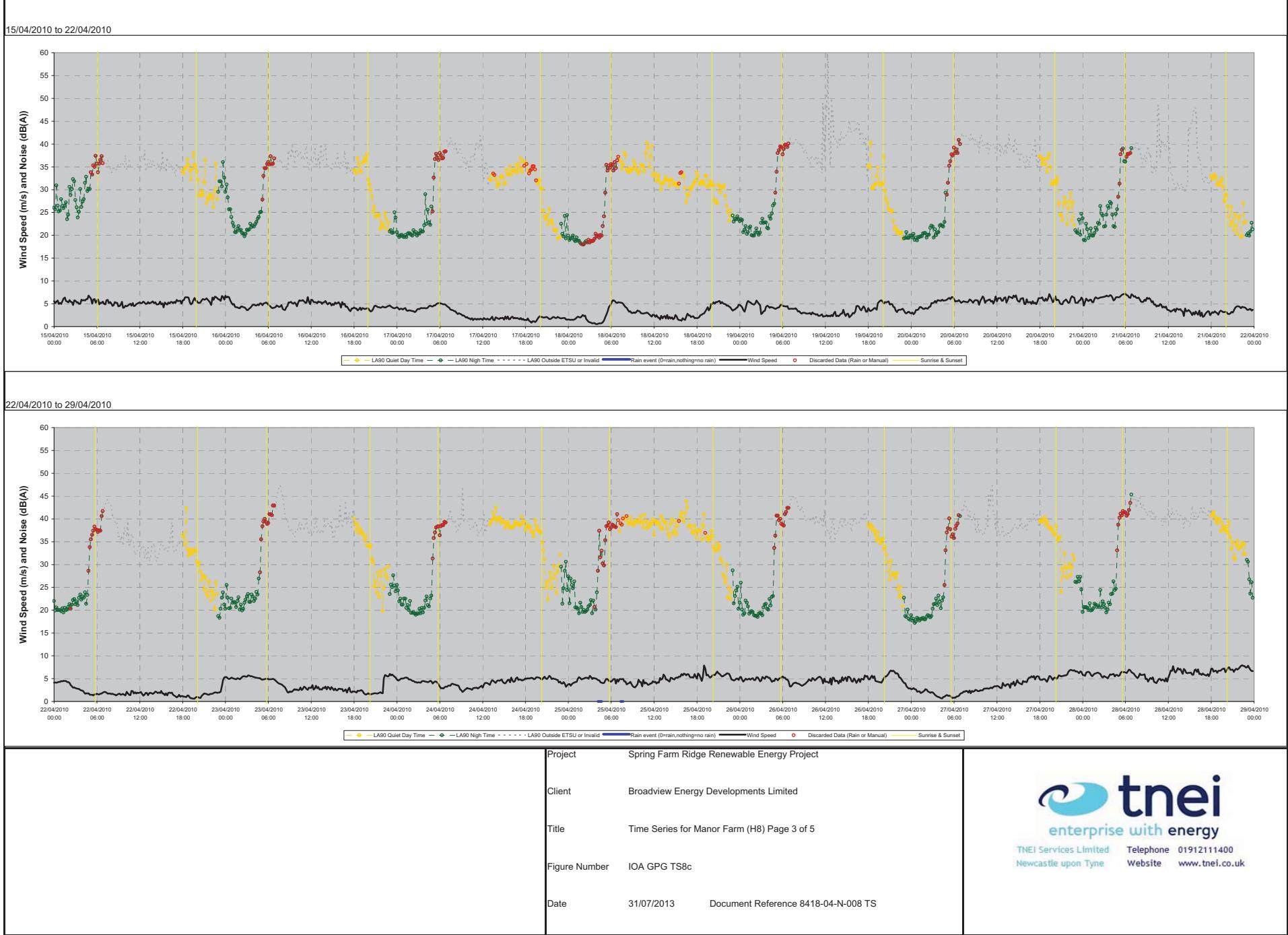




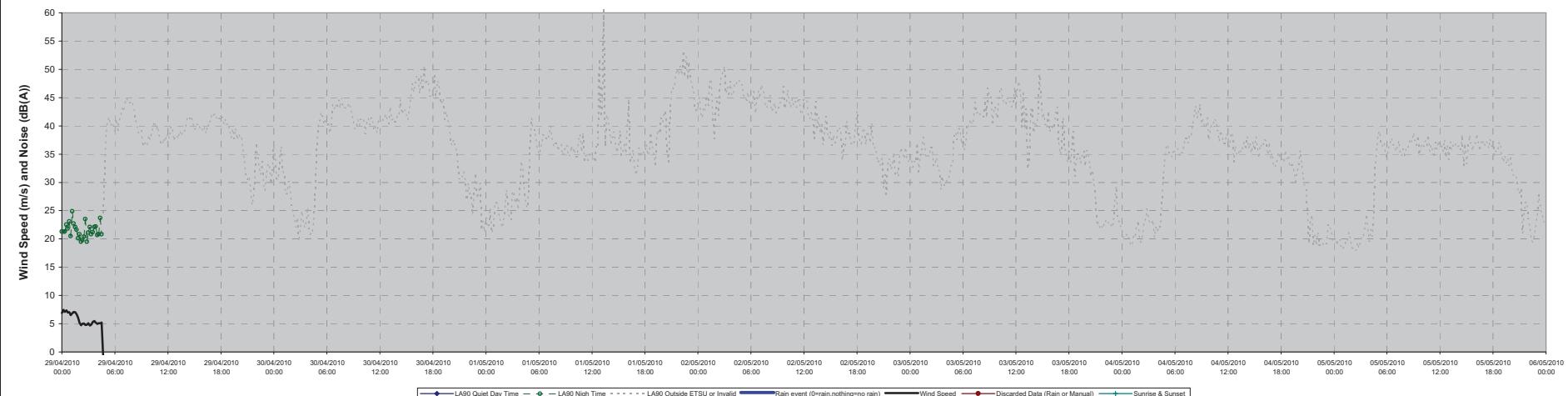




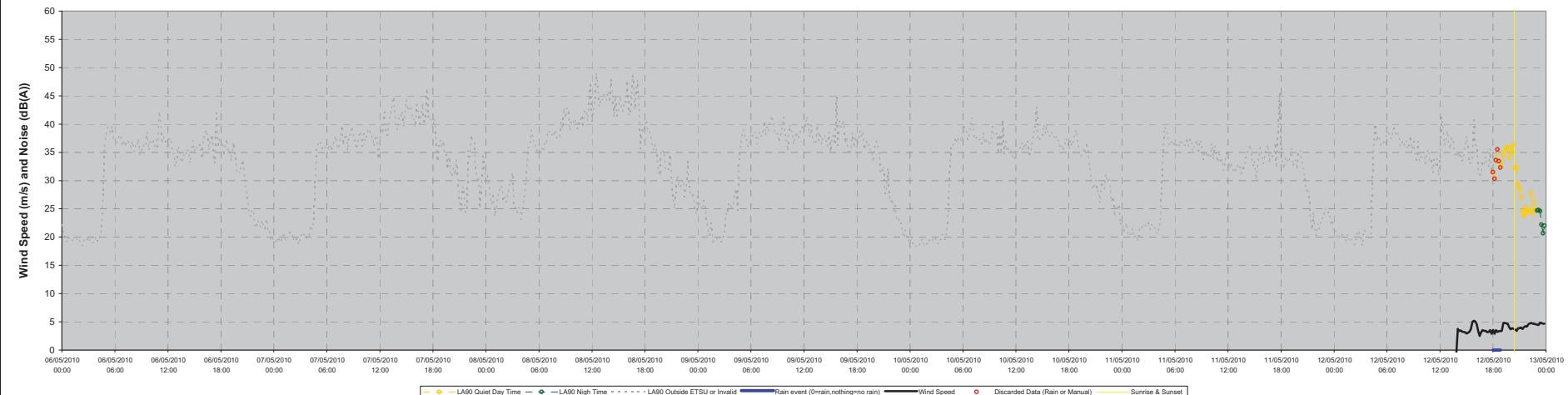




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Title Time Series for Manor Farm (H8) Page 4 of 5

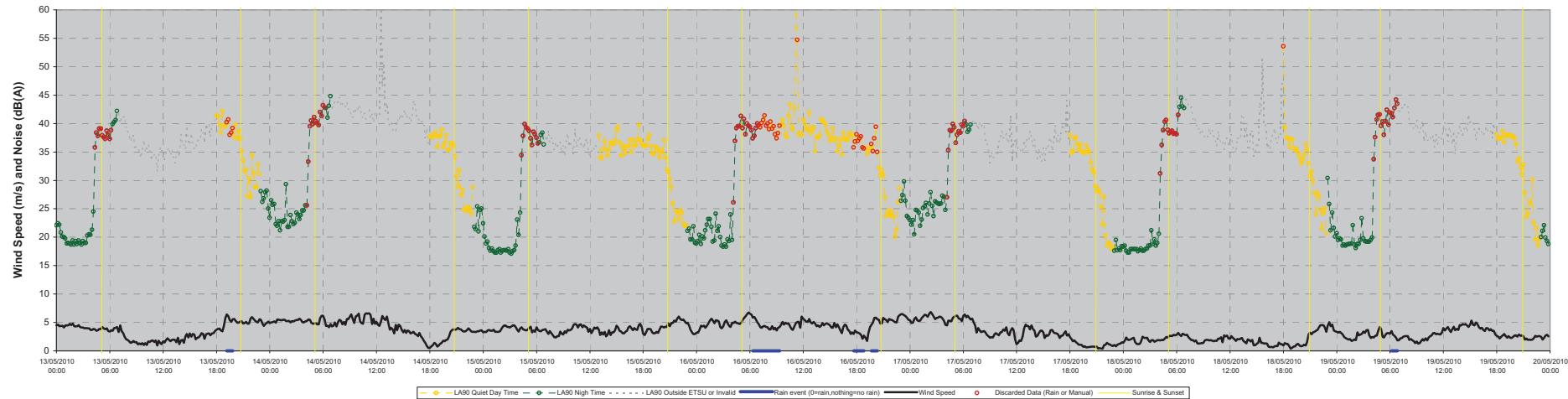
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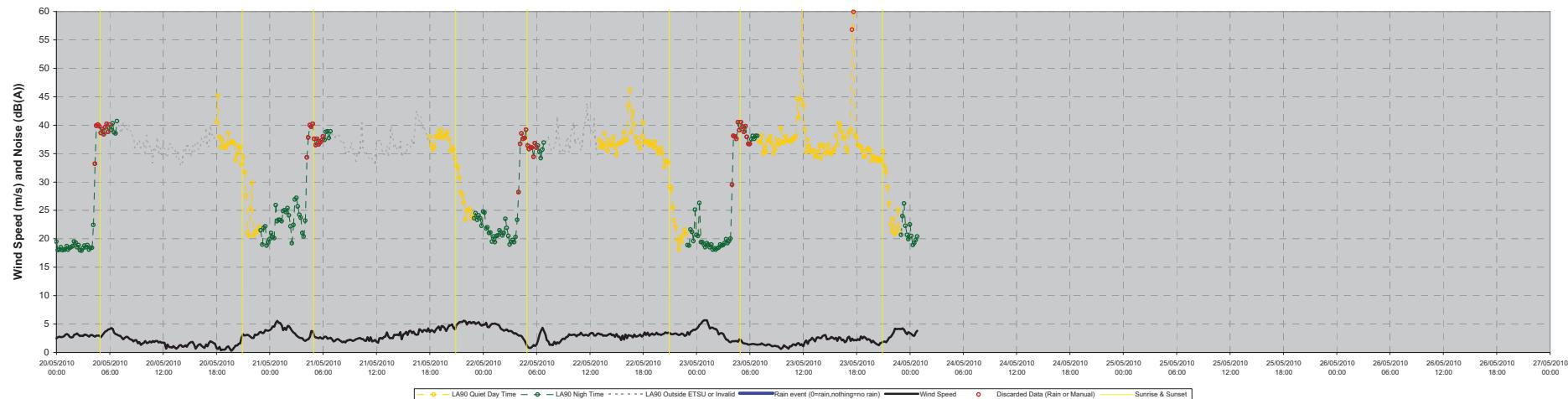


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Title Time Series for Manor Farm (H8) Page 5 of 5

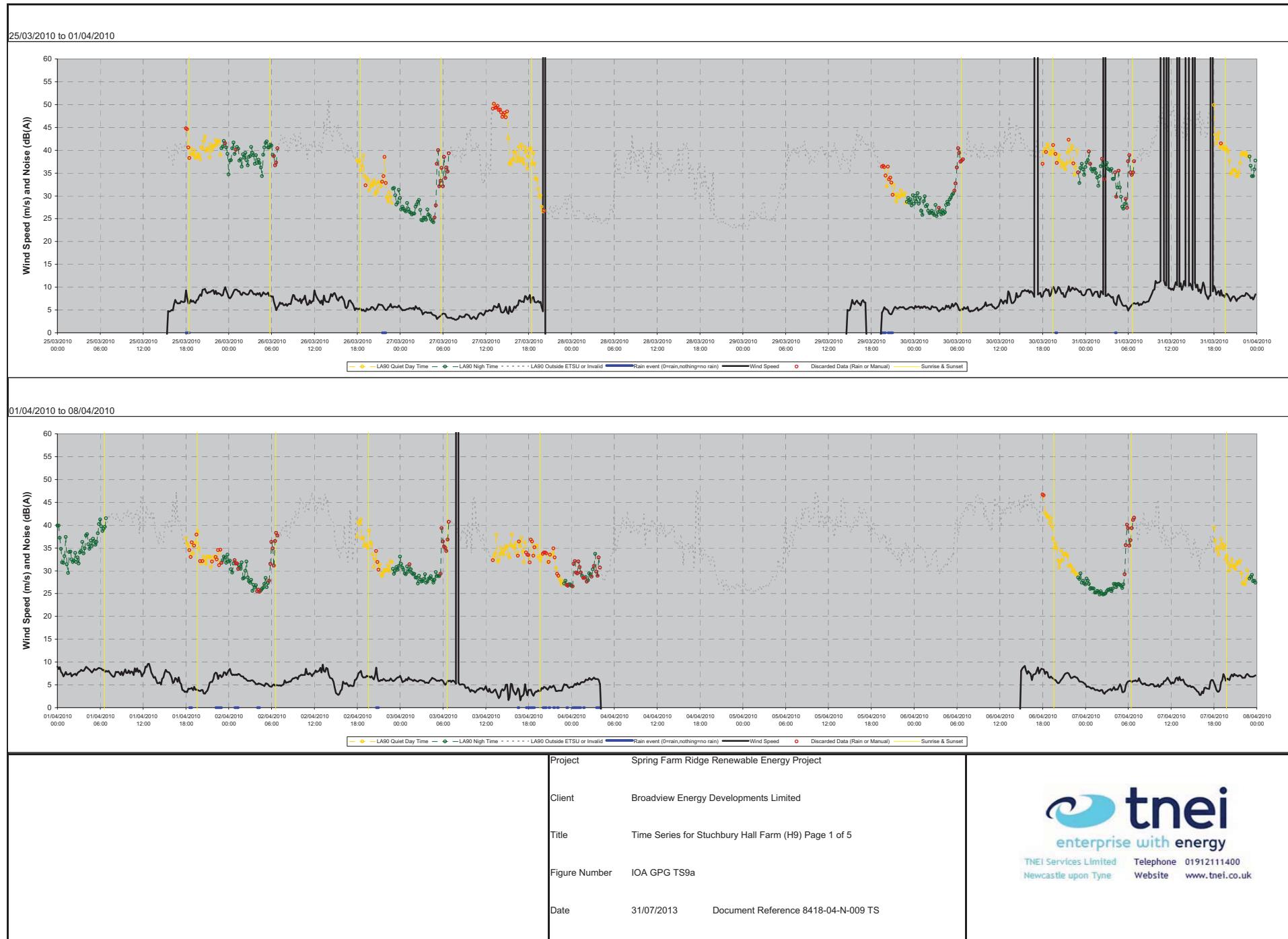
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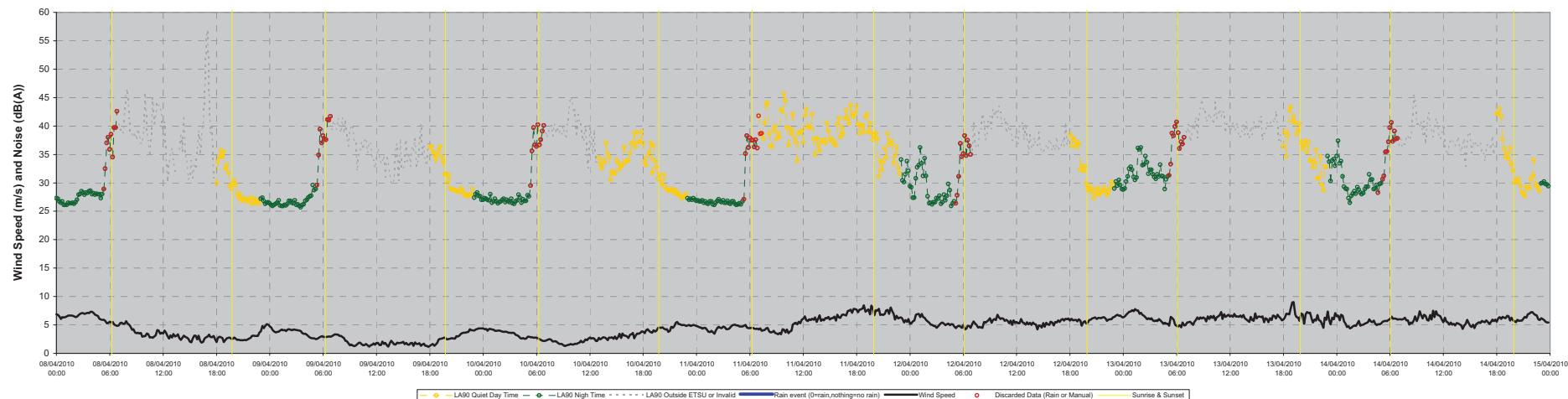


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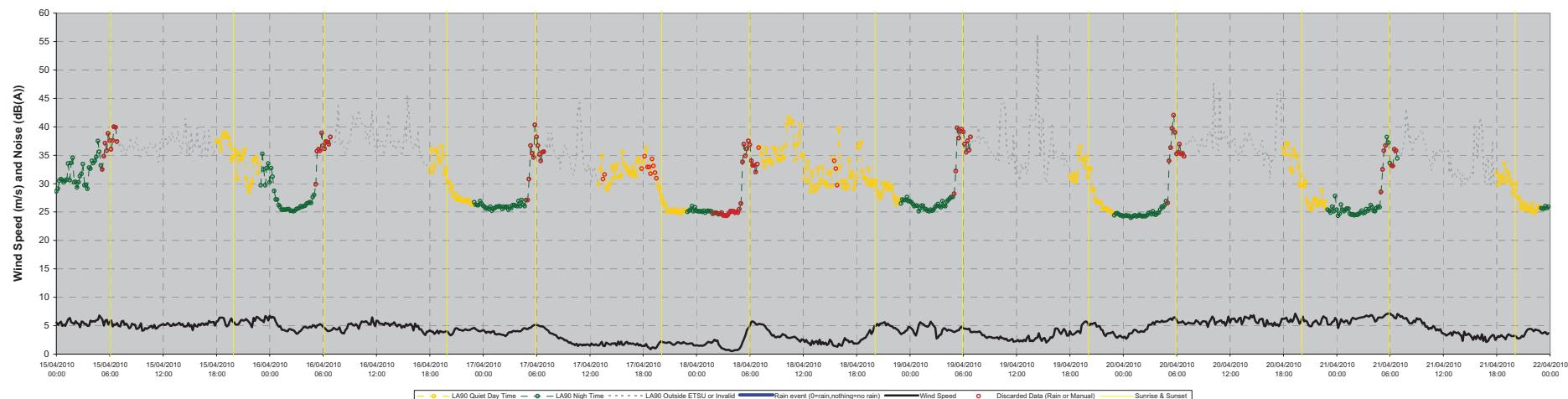
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Title Time Series for Stuchbury Hall Farm (H9) Page 2 of 5

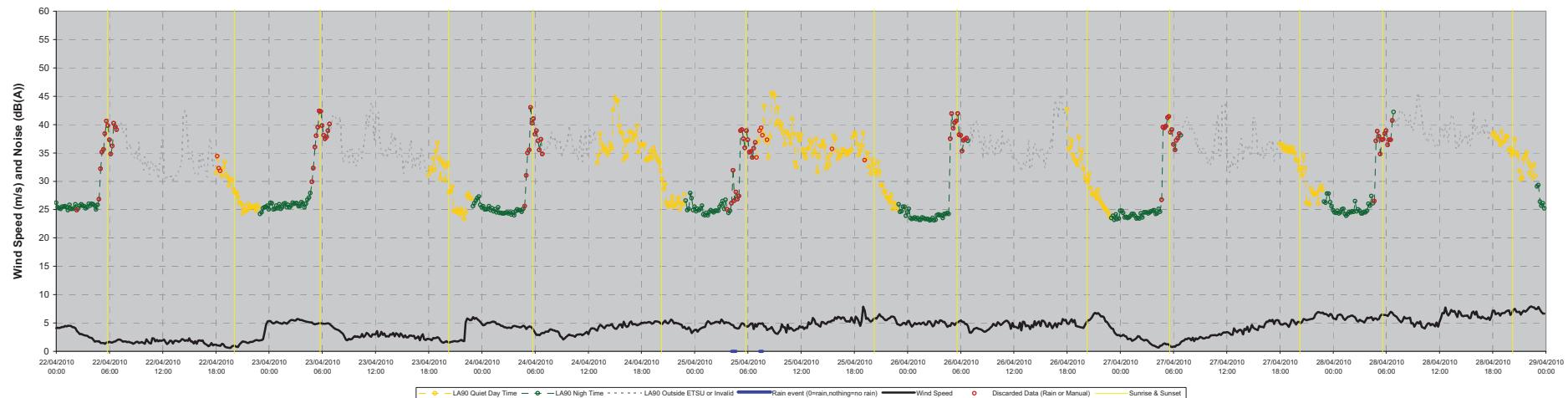
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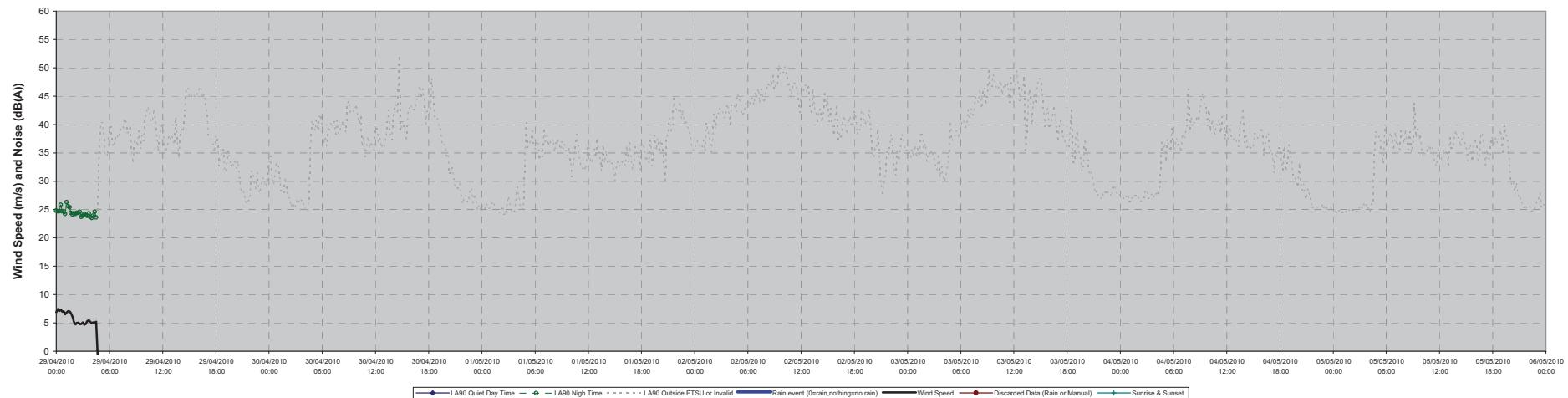


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Project

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Client

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Title

Time Series for Stuchbury Hall Farm (H9) Page 3 of 5

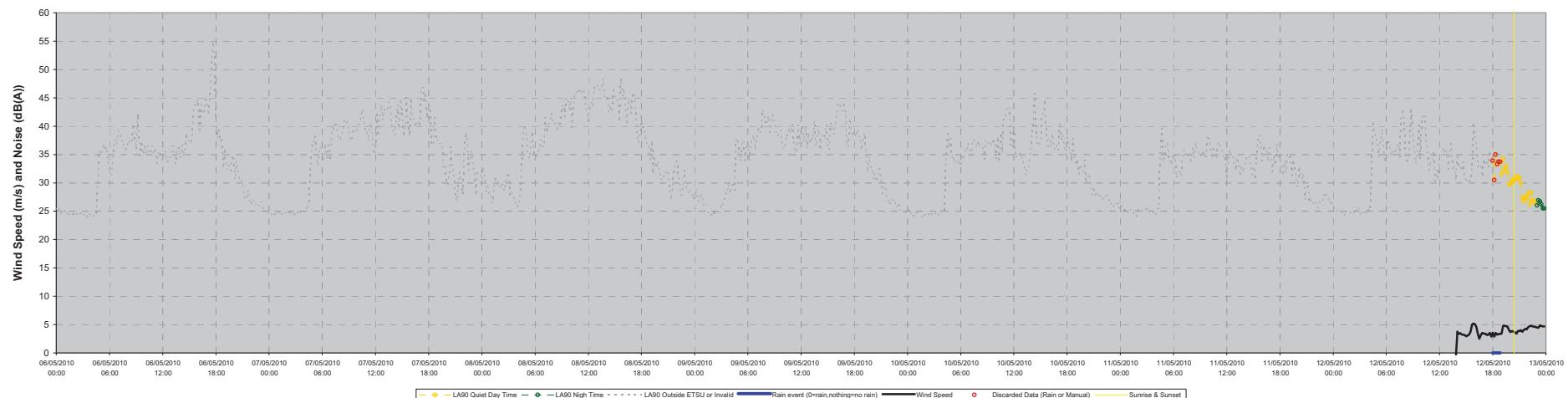
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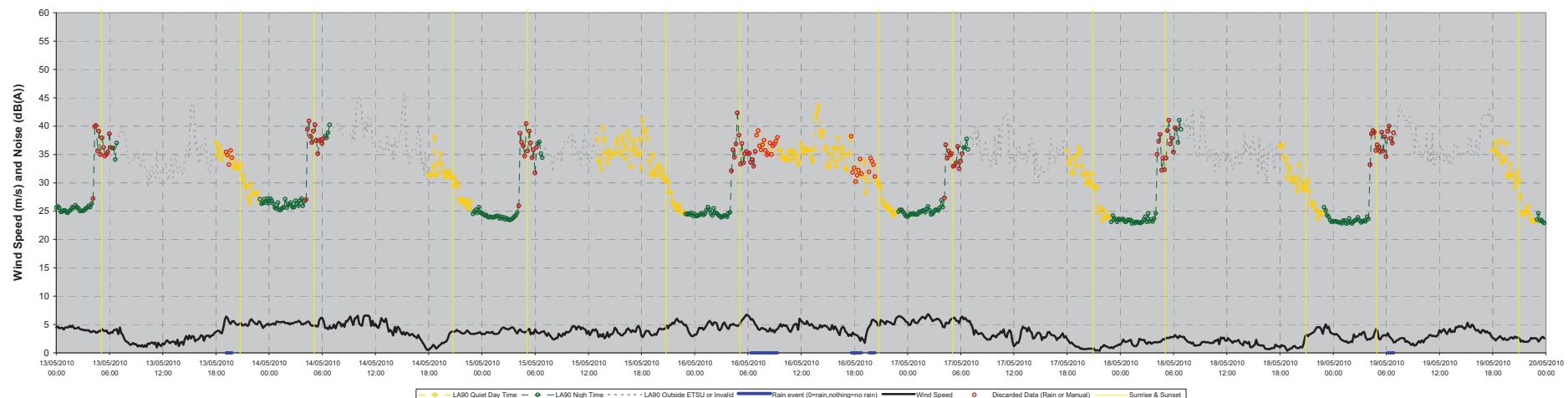
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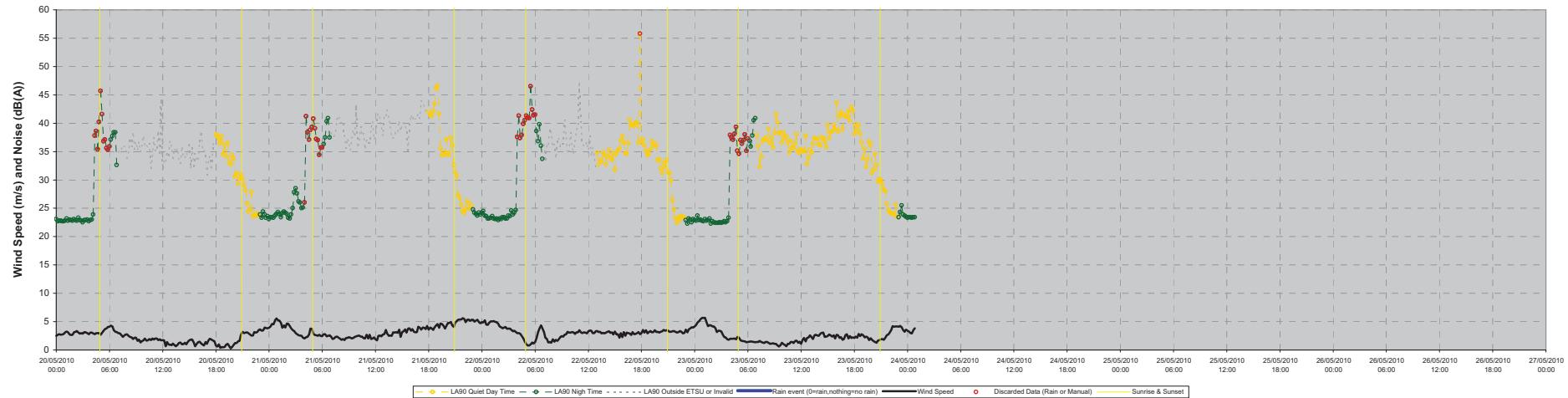
Title Time Series for Stuchbury Hall Farm (H9) Page 4 of 5

Figure Number IOA GPG TS9d

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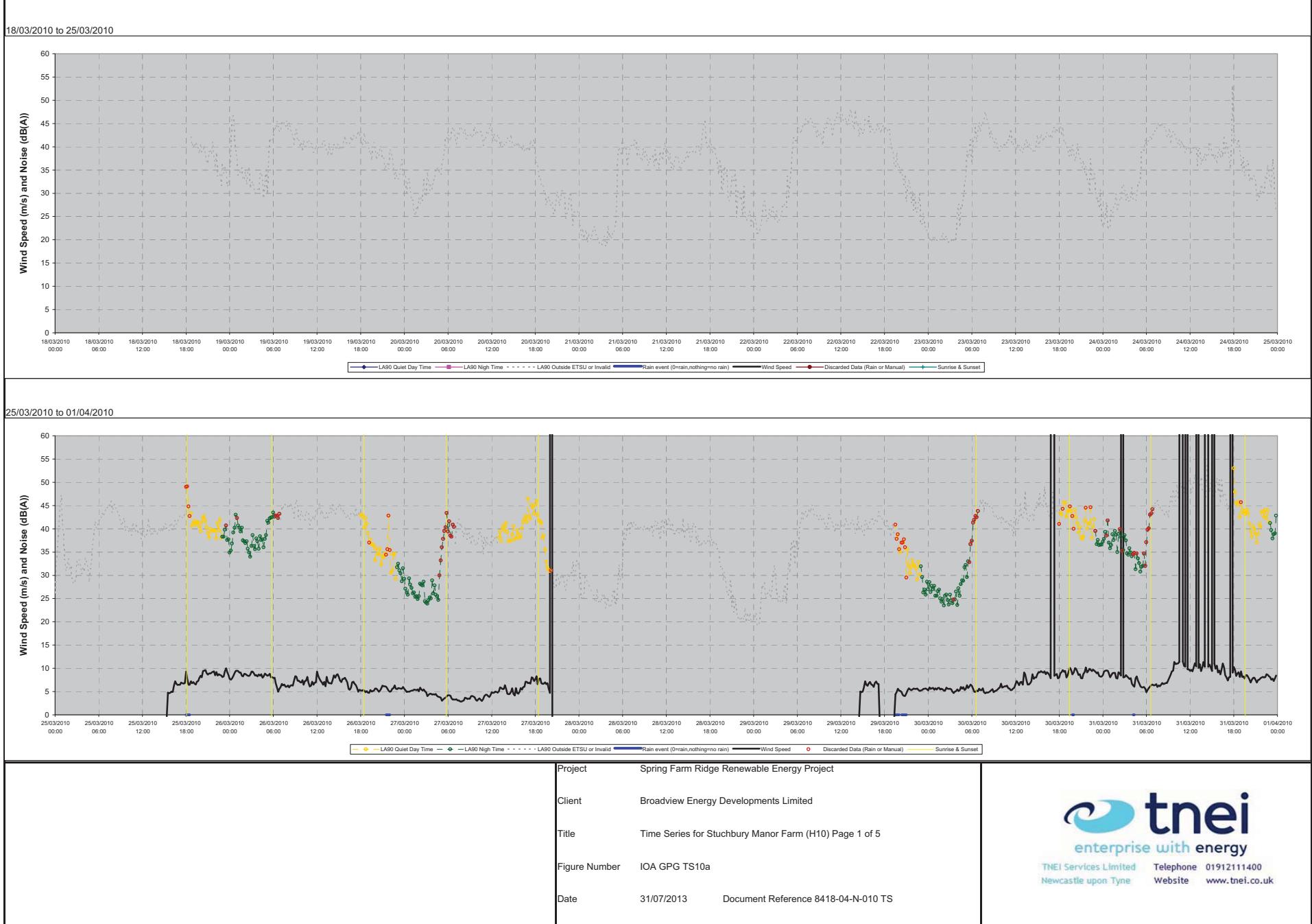
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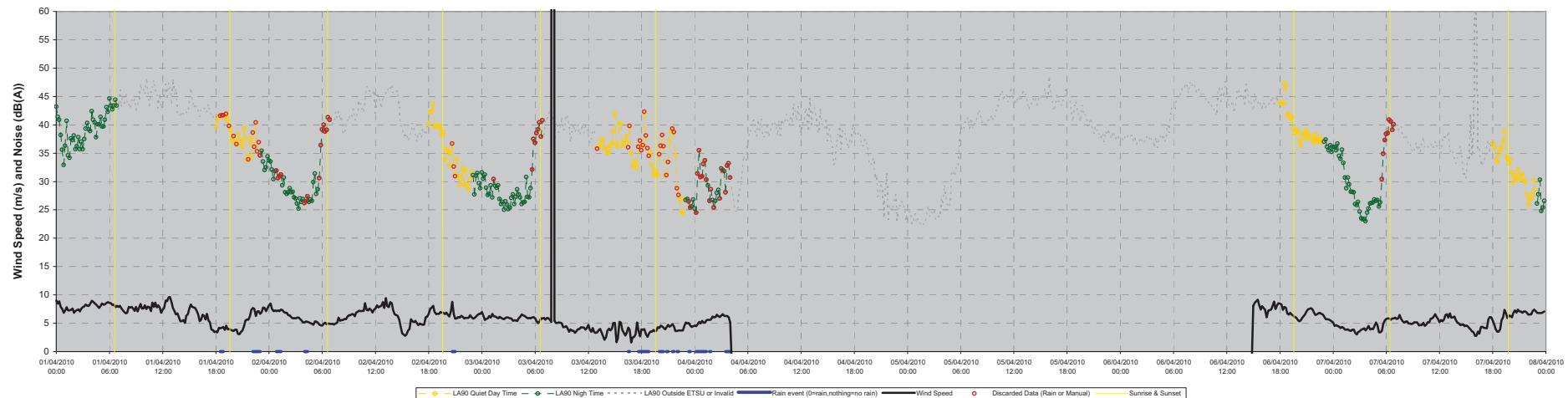
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Client	Broadview Energy Developments Limited	
Title	Time Series for Stuchbury Hall Farm (H9) Page 5 of 5	
Figure Number	IOA GPG TS9e	
Date	31/07/2013	Document Reference 8418-04-N-009 TS



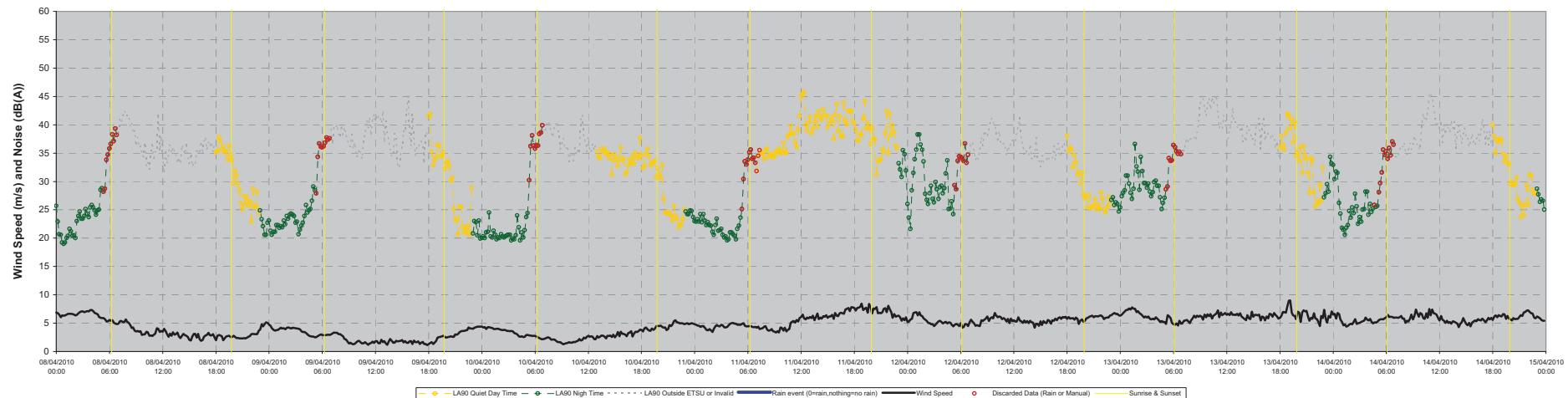
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Title Time Series for Stuchbury Manor Farm (H10) Page 2 of 5

Figure Number IOA GPG TS10b

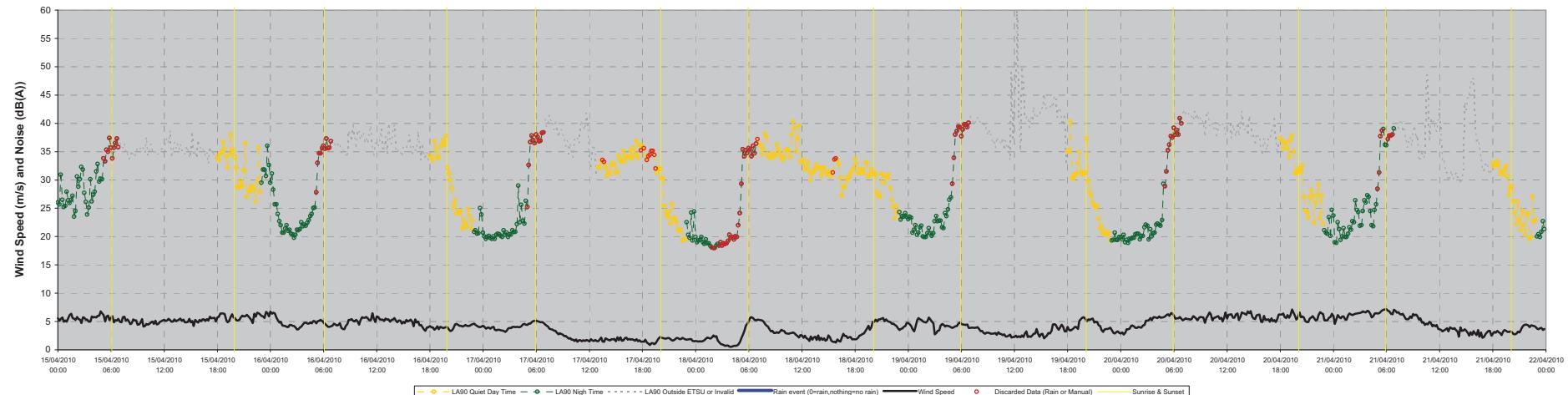
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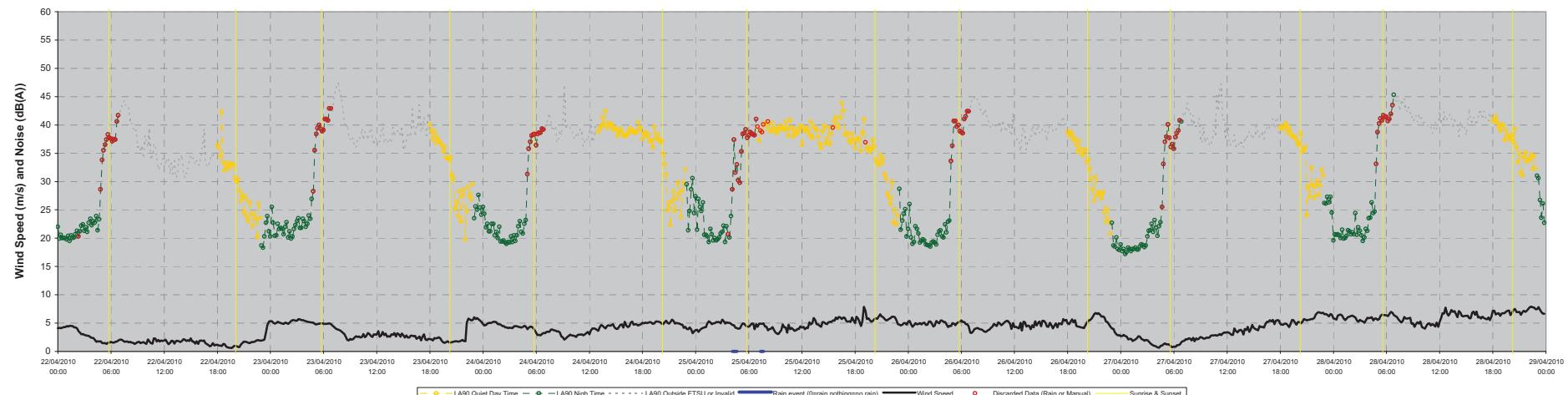
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Title Time Series for Stuchbury Manor Farm (H10) Page 3 of 5

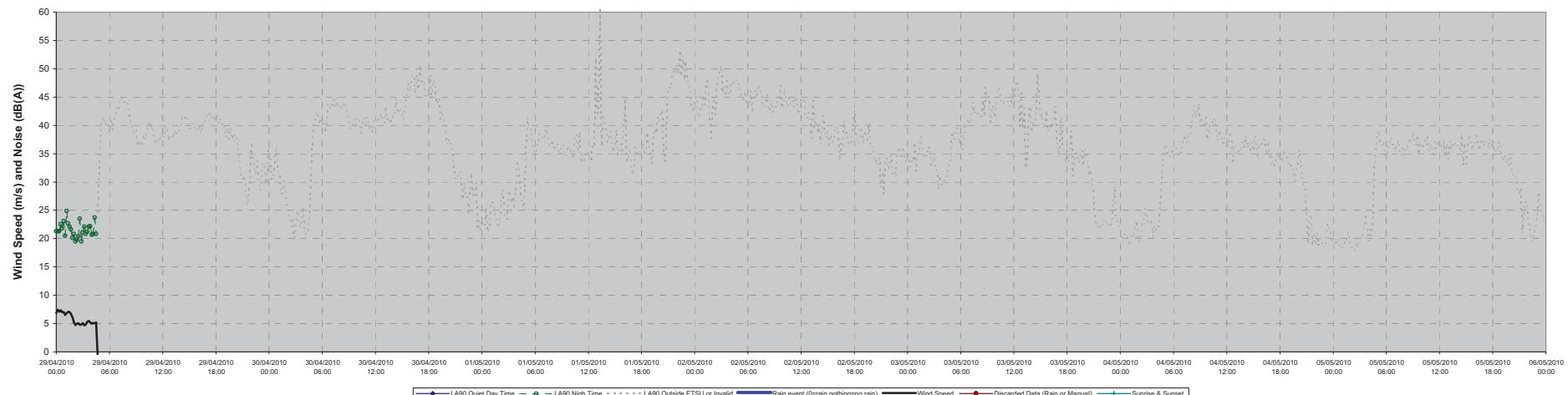
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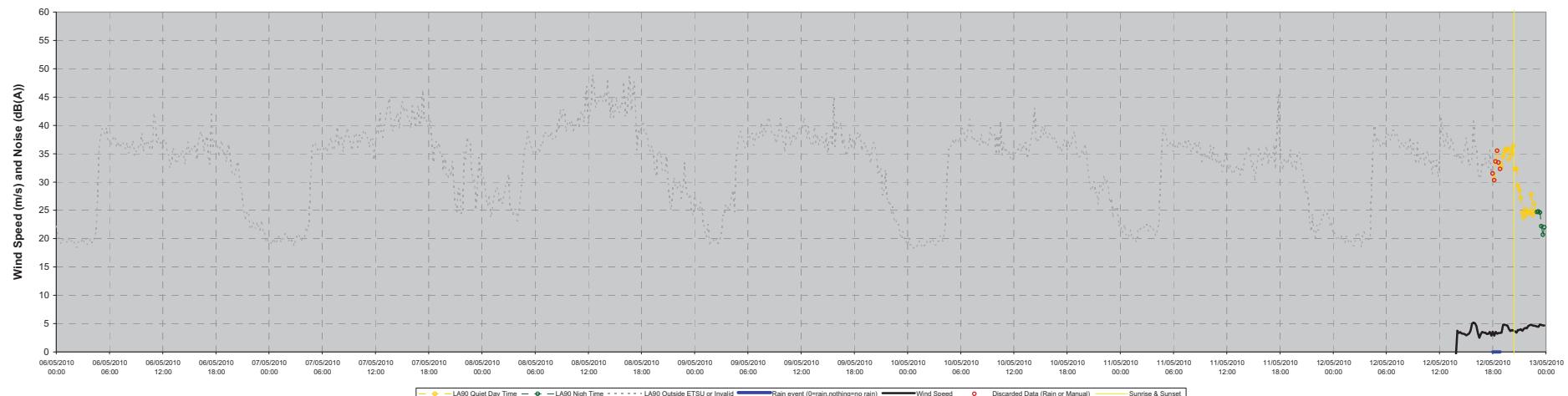


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Title Time Series for Stuchbury Manor Farm (H10) Page 4 of 5

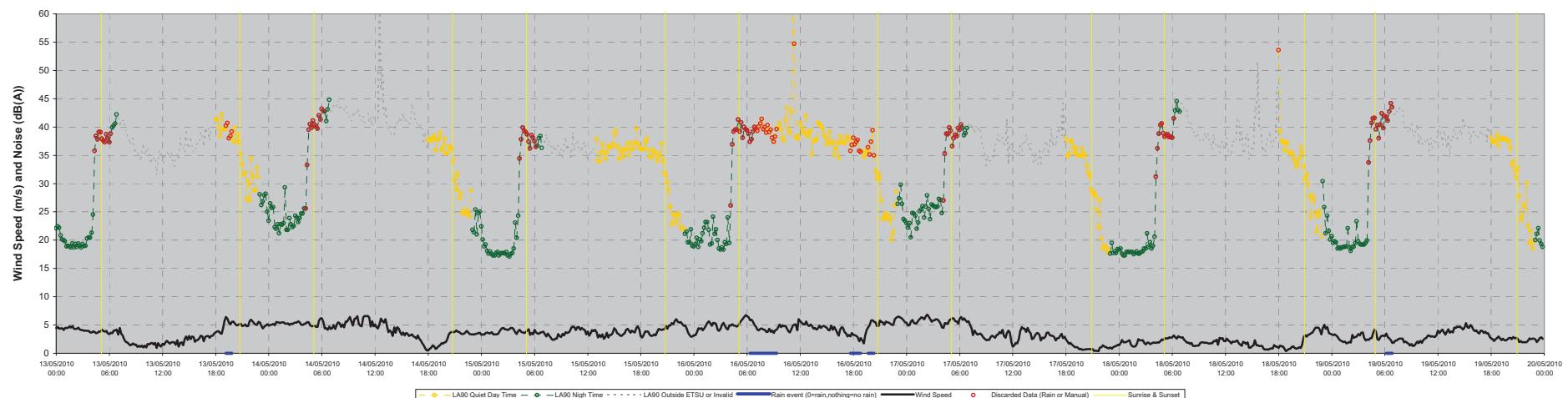
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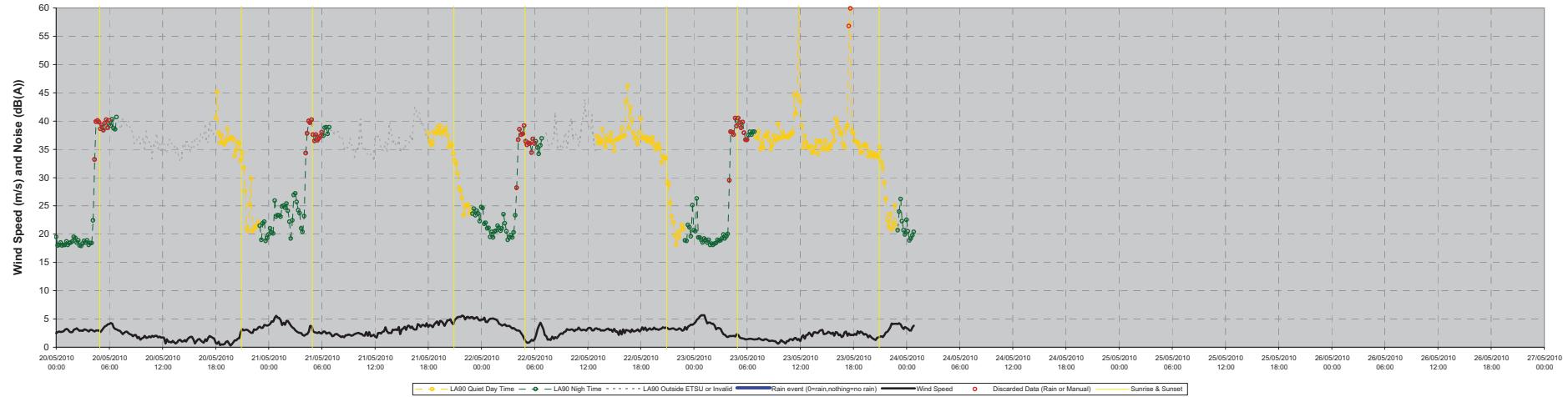


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## Project

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## Client

Broadview Energy Developments Limited

## Title

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## Figure Number

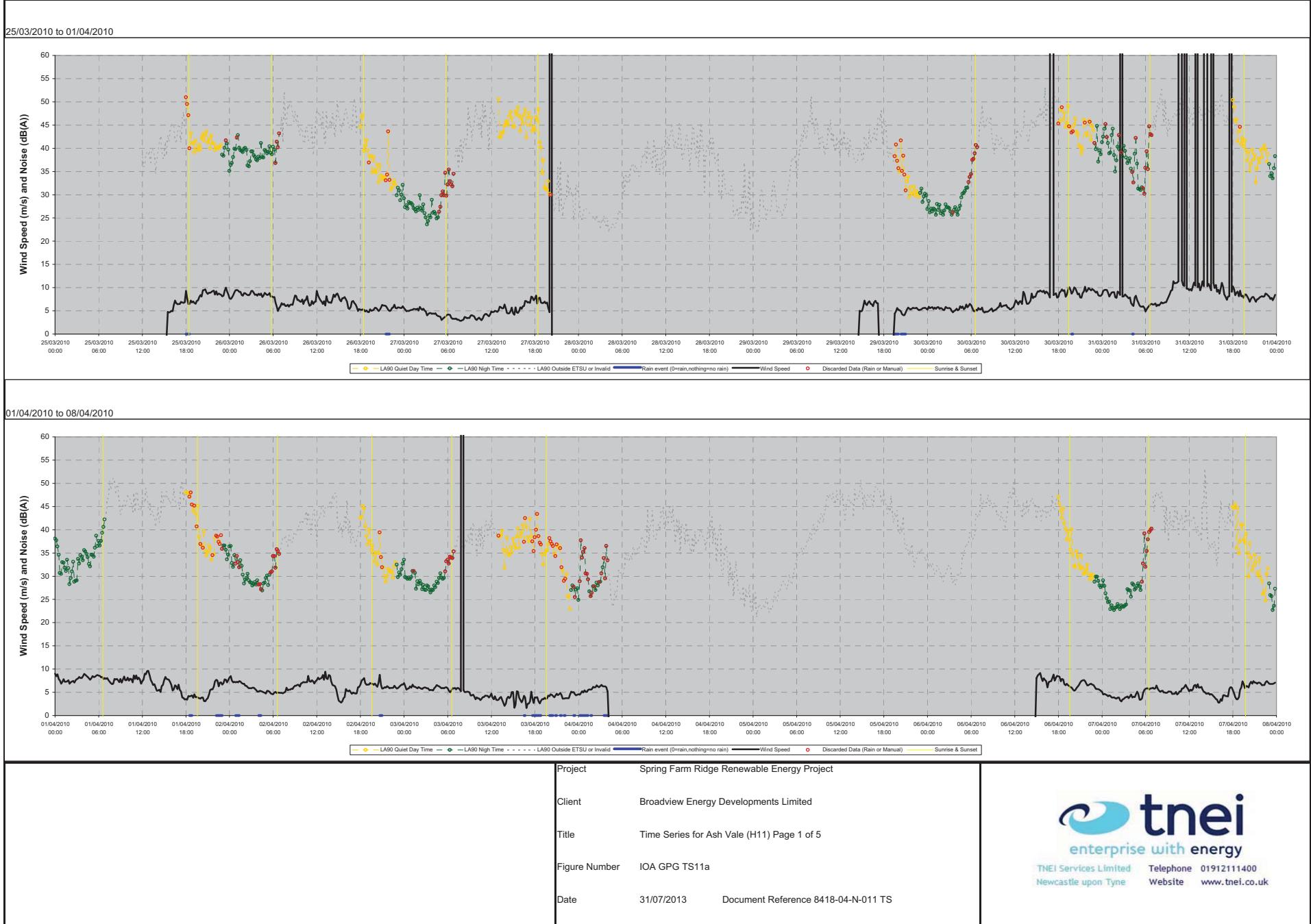
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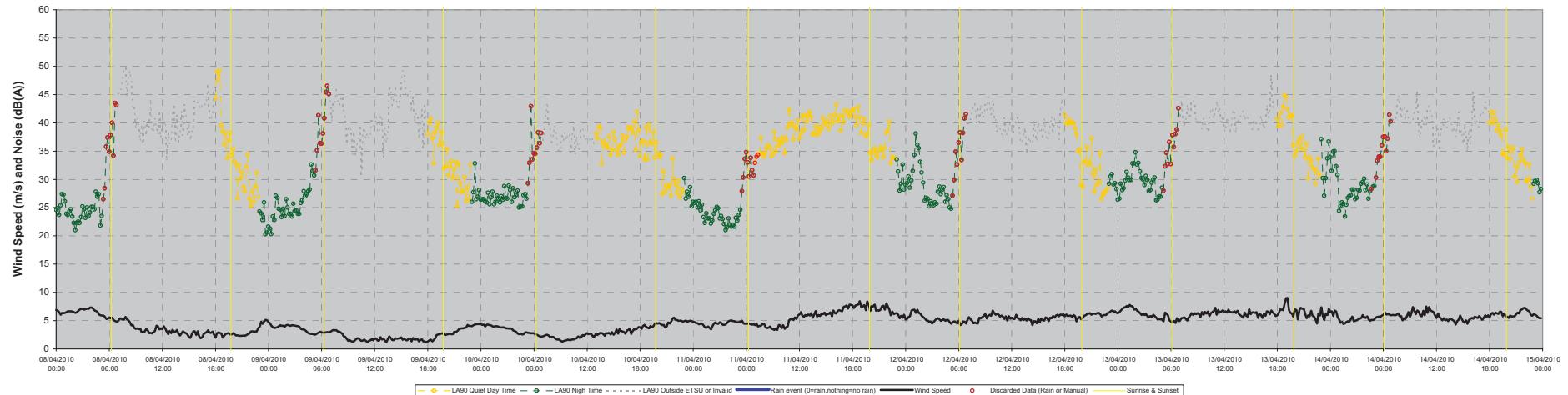
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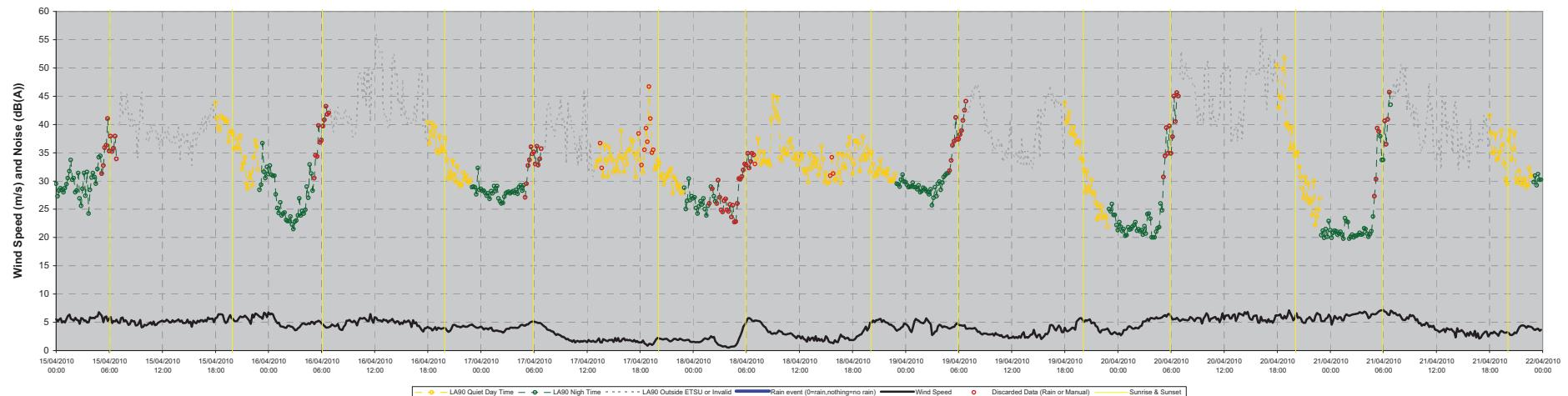
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Title Time Series for Ash Vale (H11) Page 2 of 5

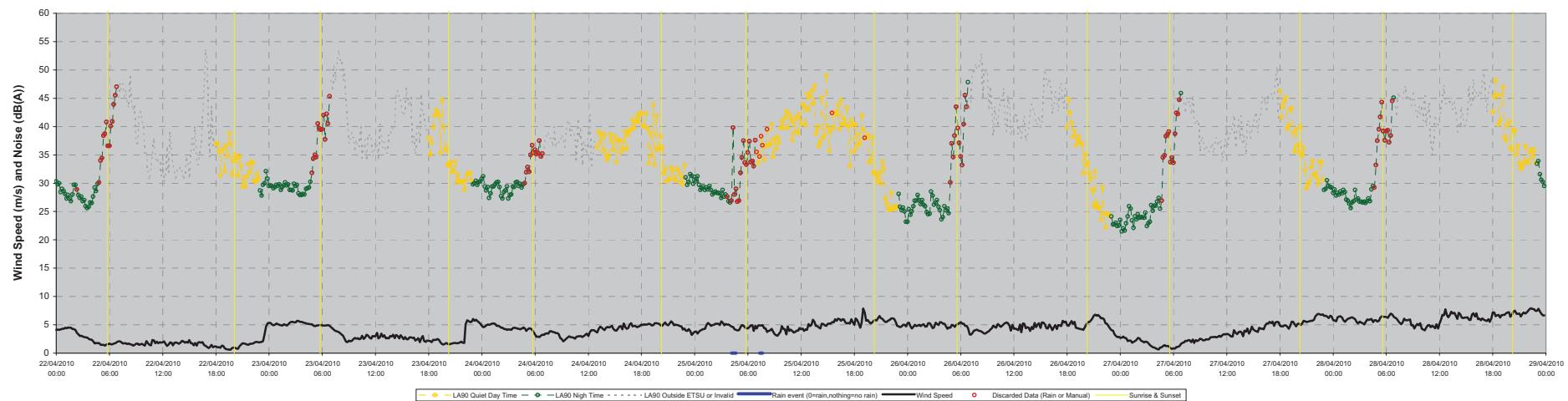
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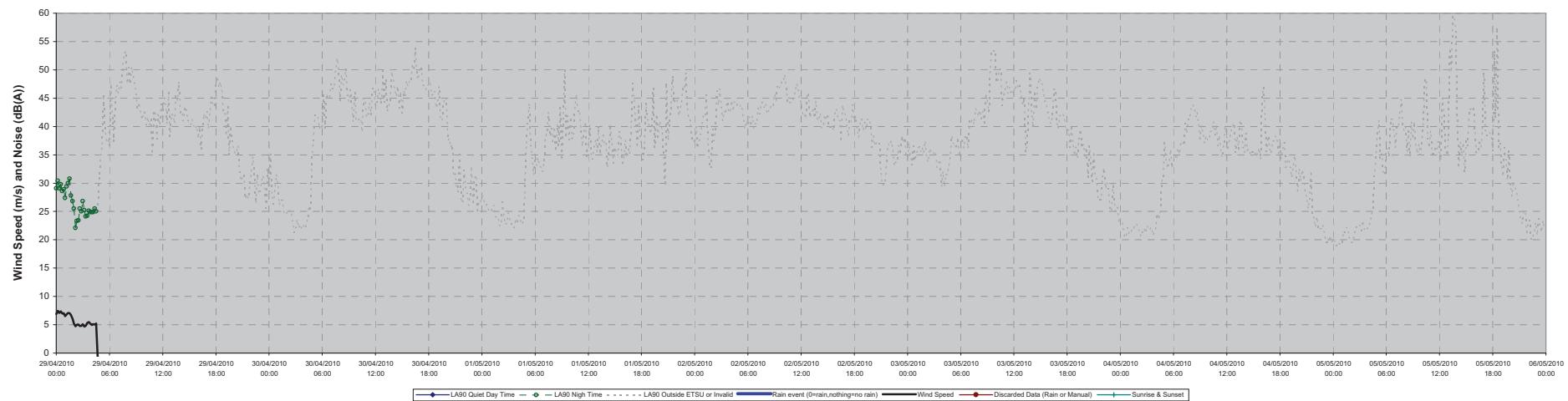


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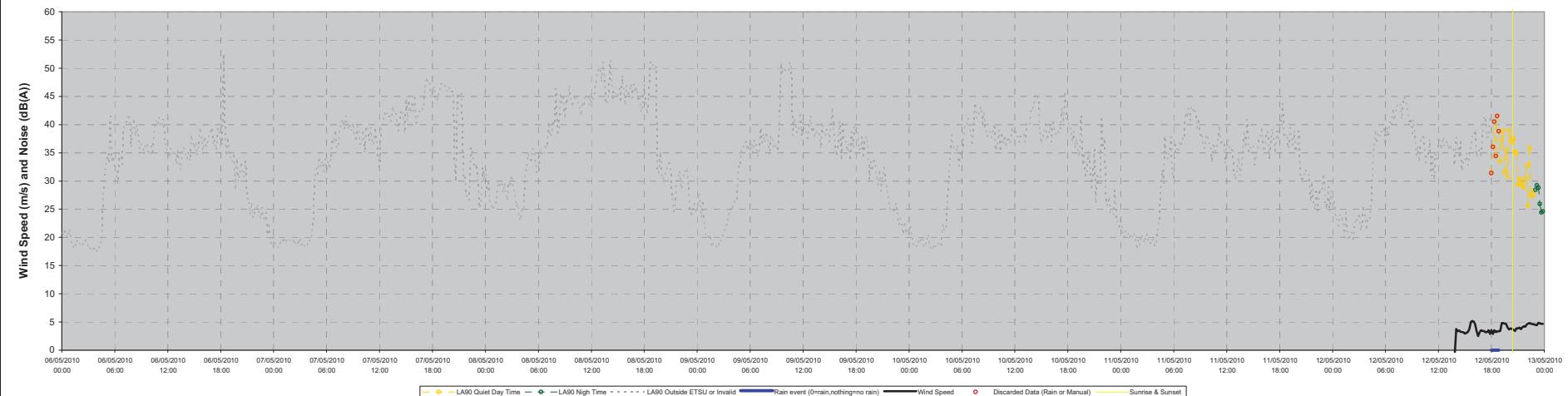
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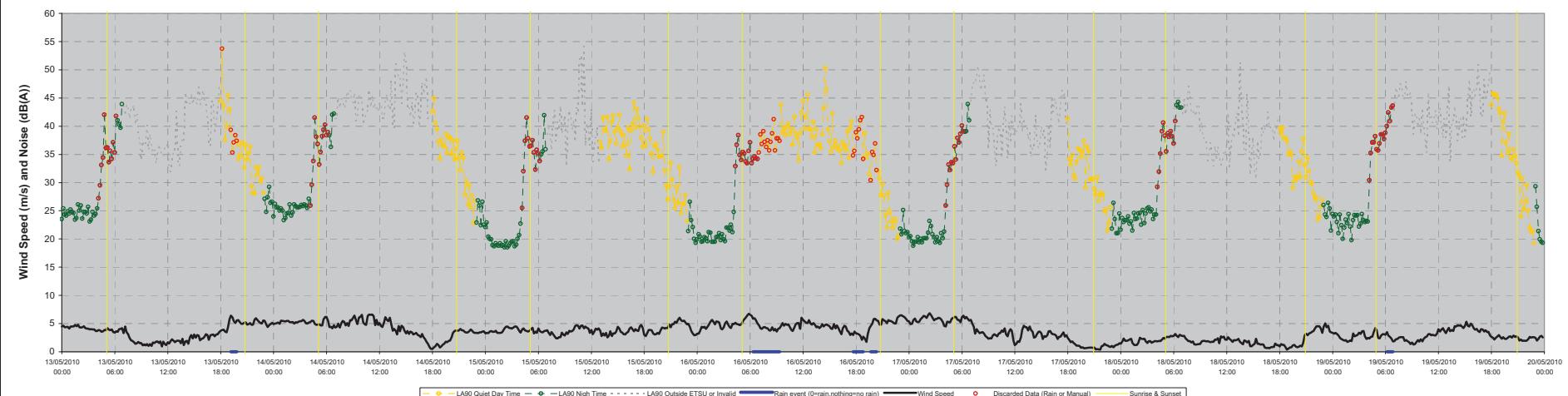
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Title Time Series for Ash Vale (H11) Page 4 of 5

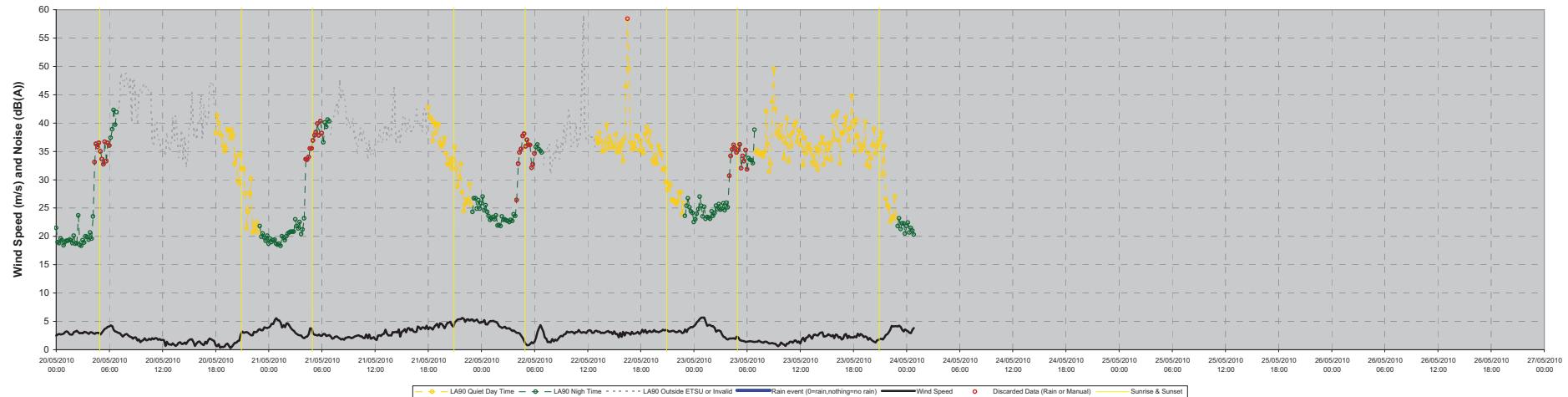
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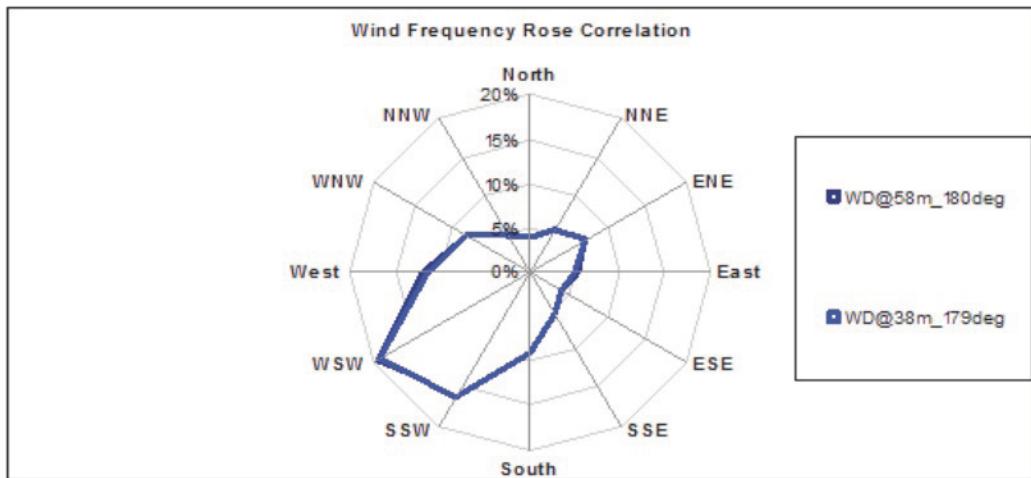
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**APPENDIX 2**  
**Long term wind rose**



### APPENDIX 3

Figure 1 Noise contour plot relative to footpaths on the site

