



Ref: L29418/BH/15-041

29 August 2018

Quarry Solutions Pty Ltd  
c/- Groundwork Plus  
6 Mayneview Street  
MILTON QLD 4064

**Attention: Mr Jim Lawler**

Dear Jim

**Re: June 2018 Noise Compliance Monitoring – Coraki Quarry, Coraki**

MWA Environmental conducted noise compliance monitoring for the Coraki Quarry in June 2018 in accordance with Condition 5(c) of the Development Consent Schedule 3.

Quarry Solutions Pty Ltd has advised that no noise complaints have been received in relation to the Coraki Quarry between the previous March 2018 noise monitoring and the June 2018 noise monitoring events.

Noise monitoring was undertaken between 6:45am and 11:00am on 13 June 2018.

Weather conditions were acceptable for noise monitoring with no rainfall and wind speeds below the 3 metres per second threshold for valid compliance monitoring in accordance with the Development Consent. During the early morning period atmospheric conditions were very stable and, whilst no objective assessment could be made, it is likely that temperature inversion conditions extended past 8am.

Wind directions transitioned from northwesterly, to westerly and then to southwesterly across the monitoring period. The prevailing wind directions and wind speeds relate to worst-case noise propagation towards sensitive receptors to the east on Spring Hill Road i.e. source to receiver winds at speeds of 2 to 3 metres per second.

It is noted that an assessment of the significance of temperature inversion conditions at the locality was undertaken for the development assessment phase of the Coraki Quarry project<sup>1</sup> in accordance with the NSW Industrial Noise Policy and concluded as follows:

*“On the basis of the objective meteorological analysis in accordance with the NSW Industrial Noise Policy, temperature inversions and winds of up to 3 m/s from source to the nearest receivers are not assessed to be significant conditions for the purposes of this noise assessment.”*

---

<sup>1</sup> *Noise and Dust Assessment – Proposed Coraki Quarry – Seelems Road, Coraki* (MWA Environmental, 4 November 2015)

Although winds from source to receiver at speeds of less than 3 metres per second were not assessed to be significant conditions in accordance with the NSW *Industrial Noise Policy* (2000), Condition 4 of the Development Consent Schedule 3 does, by our interpretation, apply the noise limit under such wind conditions. It is noted that the current NSW *Noise Policy for Industry* (2017) proposes noise criteria/limit schemes that give consideration to a relaxation of noise limits under very noise enhancing meteorological conditions.

For certain locations/measurements, extraneous noise influences included:

- Bird calls – significant influence for a number of measurements but able to be substantially but not completely filtered out through post-processing using audio recordings
- Public road traffic noise - filtered out through on-site data exclusion where practical however background noise from Casino-Coraki Road was relatively consistent during a limited number of measurements
- Wind in vegetation noise – affected several measurements to a minor degree

Coraki Quarry operations during the noise monitoring period were as follows:

- Main crushing and screening plant (commissioned in early 2018)
- Loading dump trucks by excavator and haulage from pit to plant
- Stockpile management
- Excavator mounted rock pick (hammer)
- Loading and dispatch of product (road) trucks – consistent trucks throughout the monitoring period

Noise monitoring was undertaken over generally 10 minute periods at free-field locations within 30 metres of the following six (6) residential dwellings nearest to the Coraki Quarry (refer **Figure 1**):

- R1
- R2
- R3
- R4
- R6
- R7

Attended noise monitoring was undertaken using a Bruel & Kjaer Type 2250 frequency analysing sound level meter. The sound level meter was calibrated to a reference signal of 94 dB at 1kHz prior to the monitoring and displayed no variance post-monitoring.

Condition 4 of the Development Consent Schedule 3 prescribes a 35 dB(A)  $L_{Aeq,15min}$  noise limit for privately owned residences unless formal written agreements are in place with landowners.

As allowed for by Development Consent Schedule 3 Condition 4 and EPL Condition L4.2, formal written agreements are in place with the following landowners to the effect that the land owners do not hold objections to the operation of the Coraki Quarry exceeding the noise emission criterion by up to 5 dB(A):

- R1: 200 Lagoon Road, Coraki
- R2: 95 Spring Hill Road, Coraki
- R3: 75 Spring Hill Road, Coraki
- R6: 1905 Casino-Coraki Road, Coraki
- R7: 140 Newmans Road, Coraki

A summary of the 13 June 2018 compliance noise monitoring is provided in **Attachment 1**.

**The Coraki Quarry was assessed to be non-compliant with the Development Consent and Environment Protection Licence No. 3397 noise limits for a number of measurements during the 13 June 2018 noise monitoring period.**

In response to the preliminary results of the 13 June 2018 compliance noise monitoring, Quarry Solutions Pty Ltd engaged MWA Environmental to undertake an investigation into the cause(s) of the non-compliance and identify potential corrective actions. The main crushing and screening plant was identified as the dominant cause of the non-compliance. MWA Environmental undertook a detailed noise survey of the main crushing and screening plant on 13 July 2018 and installed a noise datalogger adjacent the nearest residential dwelling (R2) on Spring Hill Road for the period 13 to 20 July 2018.

**Attachment 2** presents traces of the noise datalogger recorded 15 minute average  $L_{Aeq}$  (grey line) and  $L_{A90}$  (black line) noise levels in addition to the 5 minute average wind direction (purple line)<sup>2</sup> and wind speed (blue line in km/h) as recorded at the Coraki Quarry weather station. The noise datalogger and weather station data correlate reasonably with outcomes from the attended noise monitoring undertaken by MWA Environmental on 13 June 2018, with key observations, as follows:

- On crushing plant operational days the  $L_{Aeq}$  noise levels were significantly higher in the morning period (generally 6am to 8am) which corresponds with winter attended compliance noise monitoring results from June 2018 and June 2017.

---

<sup>2</sup> right hand side axis showing compass directions with 270° being a Westerly, 315° a Northwesterly etc.

- The corresponding elevated  $L_{A90}$  noise levels during these 6am to 8am periods indicate that the crushing plant, which generates a relatively steady-state noise component, is a significant contributor to the overall measured  $L_{Aeq}$  noise levels i.e. whilst there is likely to be some public road traffic and bird noise in the overall measured  $L_{Aeq}$  noise levels, the elevated  $L_{Aeq}$  noise levels are considered to be directly linked to the crushing plant noise.
- Wind directions during the 6am to 8am elevated noise periods were almost exclusively from westerly and west-north-westerly direction i.e. directly from the crushing plant towards the Spring Hill Road monitoring location.
- Wind directions during the 6am to 8am elevated noise periods were very consistent, indicating stable atmospheric conditions (potential Pasquill Gifford F class stability) that may be associated with a temperature inversion.
- After approximately 8am the measured  $L_{Aeq}$  and  $L_{A90}$  noise levels are lower, wind directions fluctuate and are less focussed towards the Spring Hill Road noise datalogger location and there is greater variability in wind direction, indicating less stable atmospheric conditions.
- The approximate 2 hour periods in the early morning from 6am to 8am when noise enhancing meteorological conditions appear to have a significant influence on crushing plant noise levels at Spring Hill Road represent less than 20 percent of the operating day i.e. 2 hours over a 12 hour operating day.
- During the late morning and afternoon periods when stable atmospheric conditions and consistent westerly wind directions are not enhancing noise propagation towards the Spring Hill Road monitoring location, the measured overall  $L_{Aeq}$  noise levels at times appear to exceed the 40 dB(A)  $L_{Aeq}$  noise limit that is relevant to receptor R2, albeit by a lesser amount than is evident during the early morning noise enhancing conditions. This is consistent with the attended compliance noise monitoring results from 13 June 2018. Thus, it is likely that, even under meteorological conditions that are not significantly noise enhancing, current noise associated with the main crushing plant has the potential to exceed the noise limit at the nearest residences on Spring Hill Road.

Groundwork Plus has provided historical wind speed and direction data from the Coraki Quarry weather station with an anemometer height of approximately 10 metres above ground level. The wind roses included as **Attachment 3** summarise the measured 5 minute average wind speed and direction data for the full calendar year 2017. The wind analysis indicates that the overall frequency of westerly sector<sup>3</sup> winds during the winter period was 30.9%, with 16.3% of winds being from the westerly sector and at speeds below the 3 metre per second threshold for assessment of compliance with the noise limit.

---

<sup>3</sup> 45 degree sector from 247.5 degrees to 292.5 degrees indicative of source-receiver wind directions for the nearest residences on Spring Hill Road

The winter period analysis undertaken in accordance with the NSW *Industrial Noise Policy* (2000) analysed meteorological modelling outputs and predicted an overall winter westerly wind sector component of approximately 28%. The original model-based analysis was slightly below the 30% threshold for objective assessment of significant conditions and the 2017 winter period was measured to be slightly above the 30% threshold for significant conditions. Further analysis of meteorological data for the winter 2018 period will be undertaken when the dataset is available.

Quarry Solutions Pty Ltd has instructed MWA Environmental to investigate appropriate noise mitigation strategies to ensure that the Coraki Quarry does not generate unacceptable noise levels at surrounding sensitive receptors. The scope of investigations is generally as follows:

- Quantification of source sound power levels for the main crushing plant commissioned in early 2018.
- Representation of the as-constructed main crushing plant in the SoundPLAN computer noise model with recent detailed topographical survey of the quarry land;
- Correlation of model predictions under certain meteorological conditions with measured noise levels.
- Assessment of potential noise mitigation measures which may include:
  - Acoustic shielding / enclosure of specific crushers / screens within the main plant;
  - Operational management measures to avoid operation of the main crushing plant prior to 8am during certain seasons and/or wind conditions;
  - Consultation with surrounding landowners to gauge the overall nuisance impact from the quarry.
- Preparation of a report for submission to the NSW Department of Planning and the NSW EPA outlining the proposed noise mitigation strategy and timeframes for completion.

The noise mitigation investigations have commenced and will be finalised with the favour of further compliance monitoring data to be obtained in September 2018 in accordance with Condition 5(c) of the Development Consent Schedule 3.

Quarry Solutions has committed to an **interim noise mitigation measure to not operate the main crushing plant prior to 8am when winds from the southwesterly, westerly and northwesterly directions are present until it is determined that the significant noise enhancing conditions evident in the Winter and early Spring period have passed.** The interim measure will be reviewed upon completion of the noise mitigation assessment.

A report summarising the noise mitigation assessment and proposed management strategy is to be submitted to the NSW Department of Planning and the NSW EPA by 28 September 2018 with the favour of the September 2018 compliance noise monitoring assessment.

Further noise compliance monitoring is required by 30 September 2018 in accordance with Condition 5(c) of the Development Consent Schedule 3.

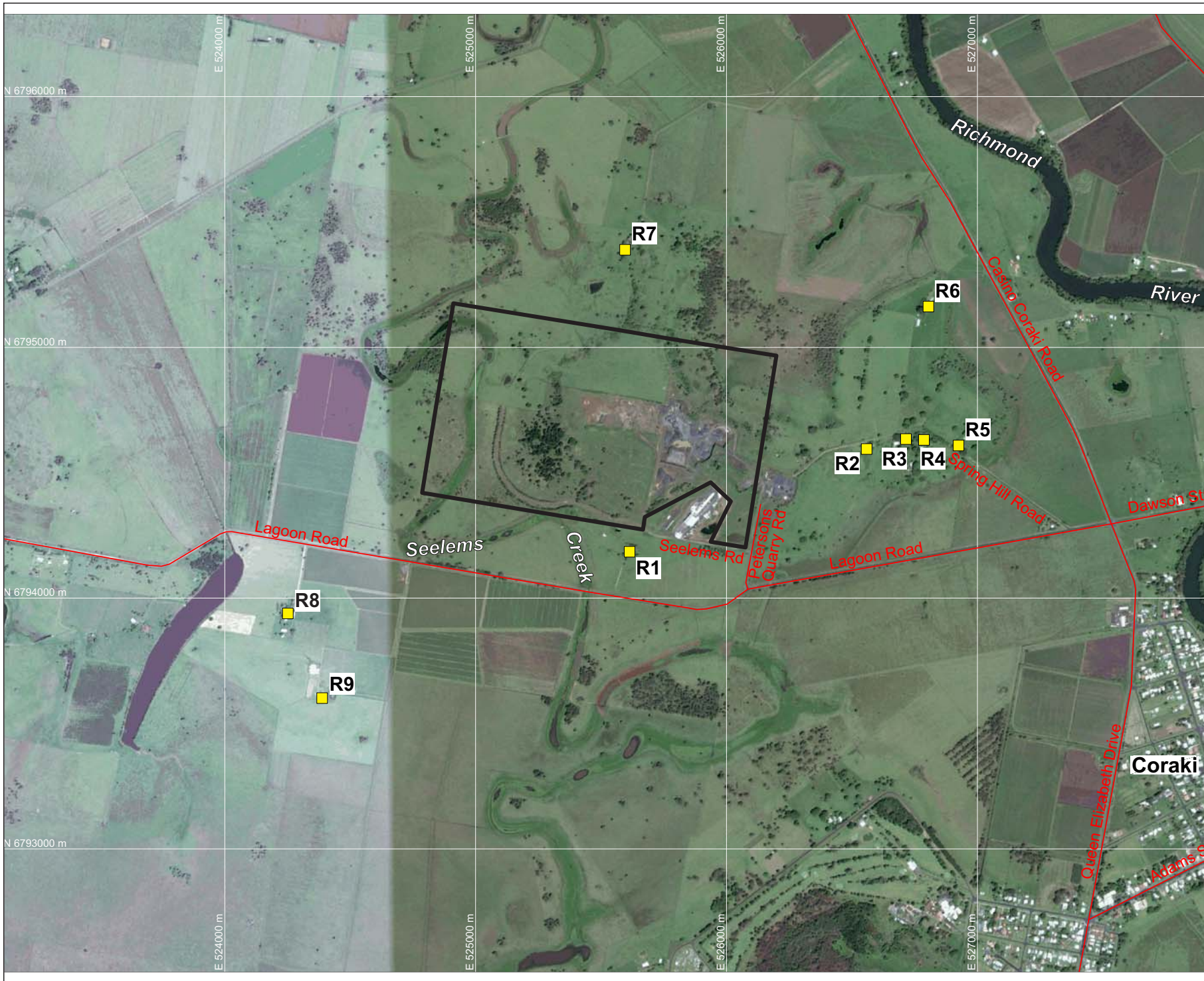
If you require any clarification or additional information please contact the undersigned.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Ben Hyde', with a stylized, cursive script.

Ben Hyde  
Environmental Engineer

## FIGURES



**LEGEND**  
SITE BOUNDARY  
R9 SURROUNDING RESIDENCES (R1-R9)

**DRAWING REFERENCE**  
GROUNDWATER PLUS SITE LOCATION PLAN  
1837.DRG.002, 13/04/15.

CLIENT  
QUARRY SOLUTIONS PTY LTD

PROJECT  
**CORAKI  
NOISE COMPLIANCE  
ASSESSMENT**  
CORAKI QUARRY  
Petersons Quarry Rd Coraki NSW

TITLE  
**AERIAL PHOTOGRAPH  
SHOWING SURROUNDING  
RESIDENCES**

JOB	CORAKI	<b>FIGURE 1</b>
JOB NO.	15-041	
DATE	16/12/16	
SCALE	1:20,000 (A4)	
REV.		<b>15-041-1</b>

Max Winders & Associates Pty Ltd tas MWA Environmental  
Level 15, 241 Adelaide St, Brisbane. GPO BOX 3137, Brisbane Qld 4001  
P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au  
W www.mwaenviro.com.au  
ABN 94 010 833 084

# **ATTACHMENT 1**

*Summary of Compliance Noise Monitoring*

MEASUREMENT #	MONITORING LOCATION	TIME	WIND	ASSESSED QUARRY NOISE Leq - dB(A)	OPERATIONS	NOISE LIMIT LAeq dB(A)	STATUS	NOTES
T003	R1	750	2.2m/s W	<36	Full Operation, no Drilling	40	Compliant	Trucks to upper pad, processing plant barely audible and only heard occasionally, birds, distant traffic noise, quarry compliant
T009		955	2.2m/s WSW	<33	Full Operation, no Drilling	40	Compliant	Plant barely audible at approx. 30dB, trucks occasionally, distant cows, chickens and birds
T004	R2	814	1.8m/s W	49.5	Full Operation, no Drilling	40	Non-Compliant	Crushing and screening plant dominant background noise, distant traffic noise, birds, plant high 40s, hammer operating
T010		1015	1.8m/s WSW => 2.2m/s WSW	48	Full Operation, no Drilling	40	Non-Compliant	Plant noise dominant background >45dB, some birds, hammer
T005	R3	825	2.2m/s W	53.0	Full Operation, no Drilling	40	Non-Compliant	Crushing and screening approx. 50dB, beeper audible at times, hammer audible, birds, plant noise increased to mid 50s for a period
T011		1027	1.8m/s WSW => 2.7m/s SW	45	Full Operation, no Drilling	40	Non-Compliant	Plant noise, hammer, some wind/tree noise, some birds
T006	R4	845	1.8m/s W	53	Full Operation, no Drilling	35	Non-Compliant	Plant is background noise + jaw rumble, louder through middle period, hammer audible, birds
T012		1040	2.7m/s SW	35	Full Operation, no Drilling	35	Compliant	Plant 32-33dB when less traffic and birds, hammer approx. 35dB intermittently
T002	R6	720	1.3m/s NW	48.0	Full Operation, no Drilling	40	Non-Compliant	Crushing and screening plant (jaw and screen noise) mid 40s when less traffic noise and up to 50 for short period, regular traffic noise on Casino-Coraki Road with greatest impact periods excluded, birds, rock hammer audible
T008		930	2.2m/s WSW => 1.3m/s WSW	<41	Full Operation, no Drilling	40	Non-Compliant	Plant audible (jaw) but quieter (generally<40dB excluding Casino-Coraki Road), hammer occasionally, Casino-Coraki Rd traffic fairly consistent, lot of birds, cows
T001	R7	655	1.3m/s NW	<35	Full Operation, no Drilling	40	Compliant	Plant generally inaudible, occasional tip + truck noise, dominant distant traffic noise from Casino-Coraki Road, bird noise. Overall near 35dB with less traffic, too many distant birds to filter but quarry well compliant
T007		910	1.3m/s WSW => 0.9m/s WSW	<35	Full Operation, no Drilling	40	Compliant	Distant traffic, birds, resident yelling for a period, dogs barking, quarry generally inaudible

## ATTACHMENT 2

*Noise Datalogger Traces*

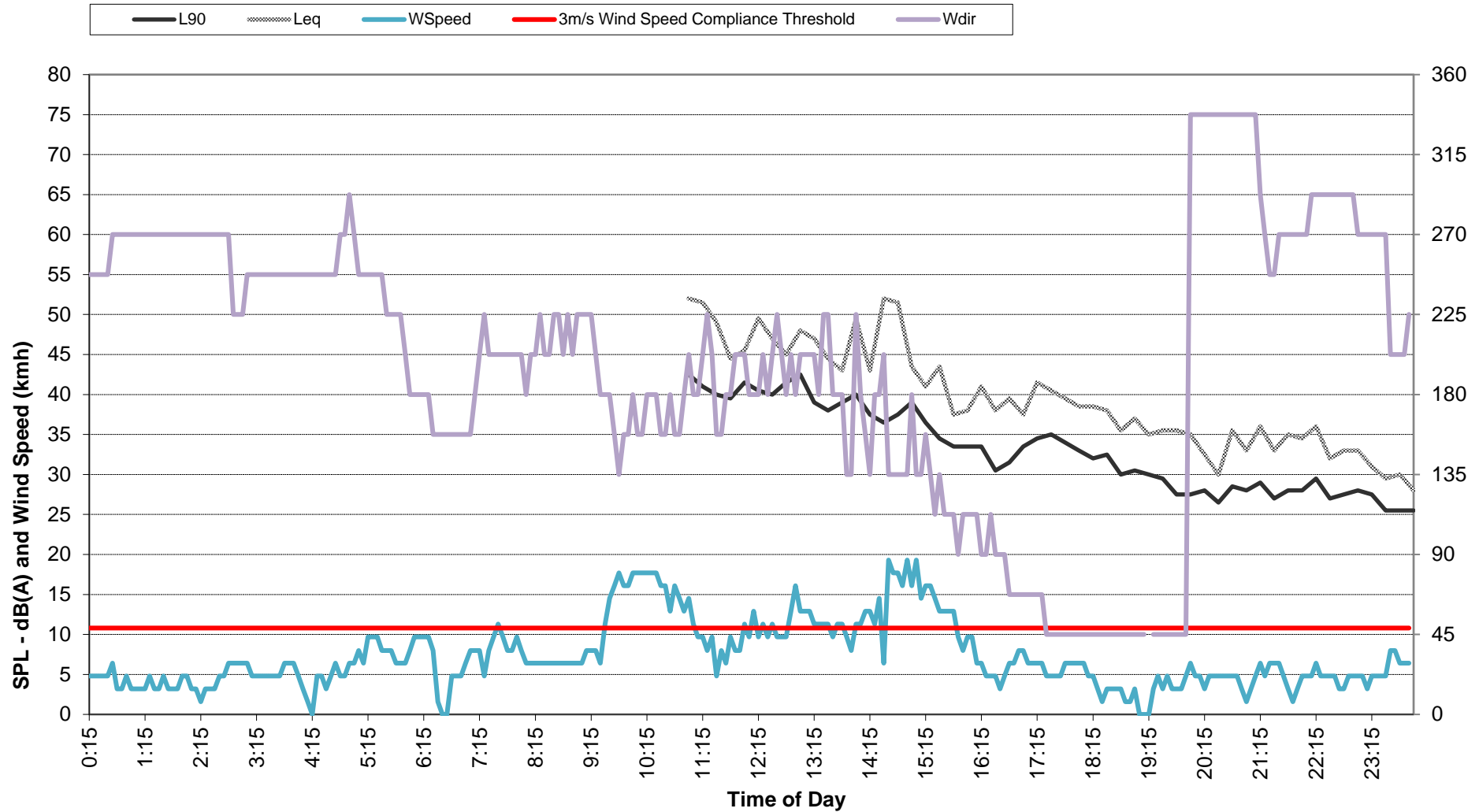
*$L_{Aeq}$  (grey line)*

*$L_{A90}$  (black line)*

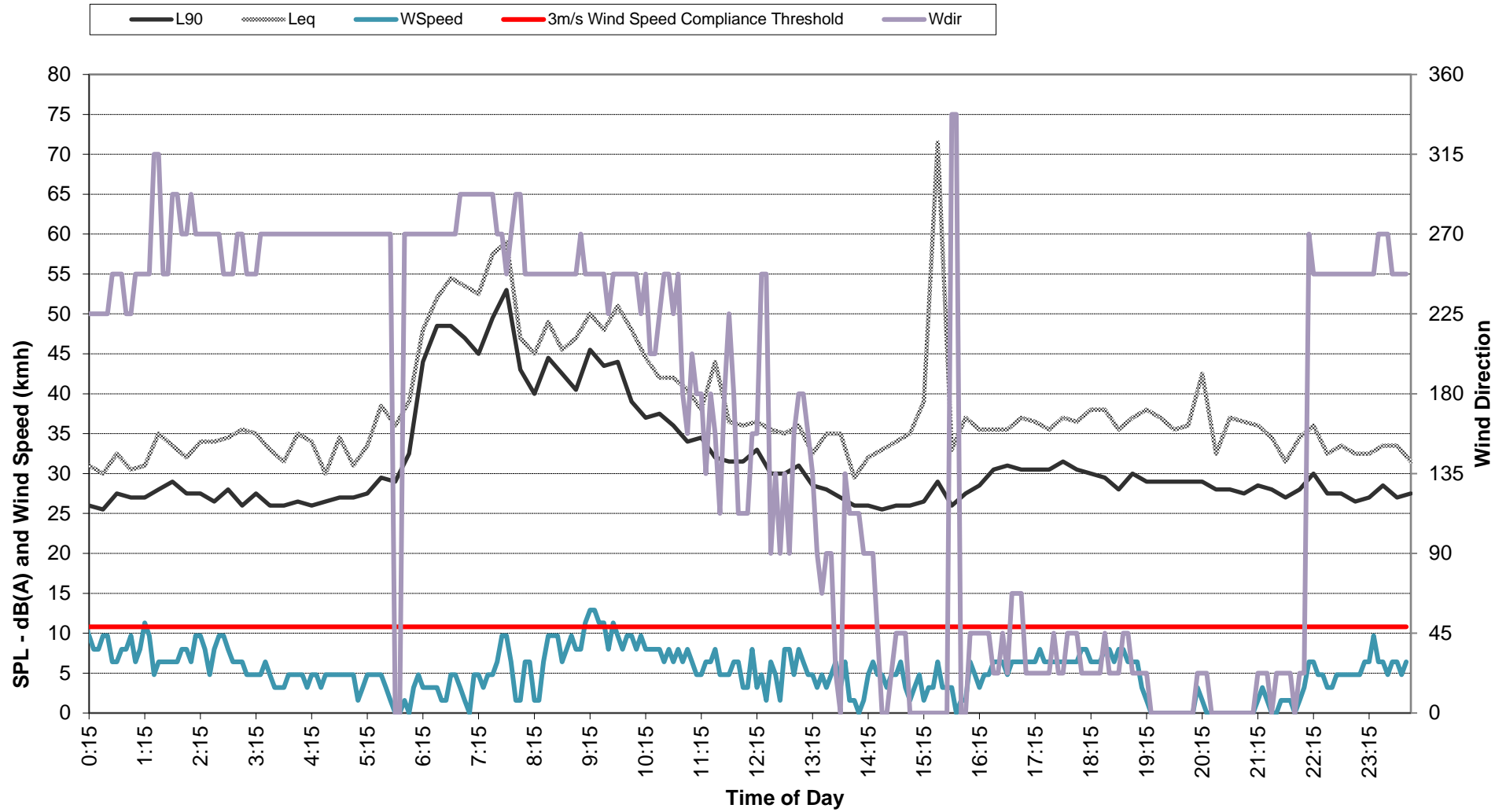
*Wind Direction (purple line)*

*Wind Speed in km/h (blue line)*

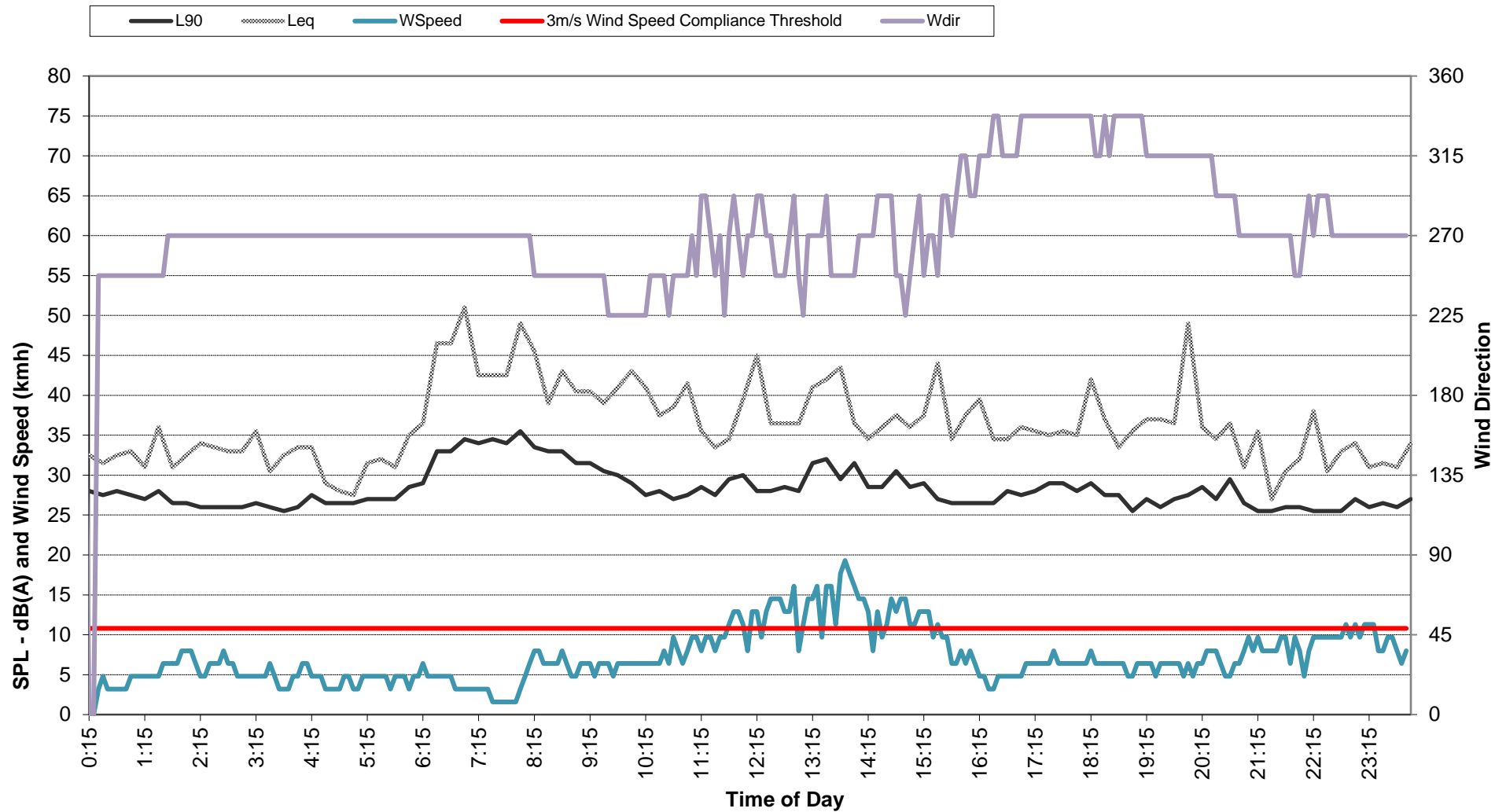
**Recorded Statistical Noise Levels for Coraki 15-041 - Springhill Rd - 13-Jul-2018 - Friday**



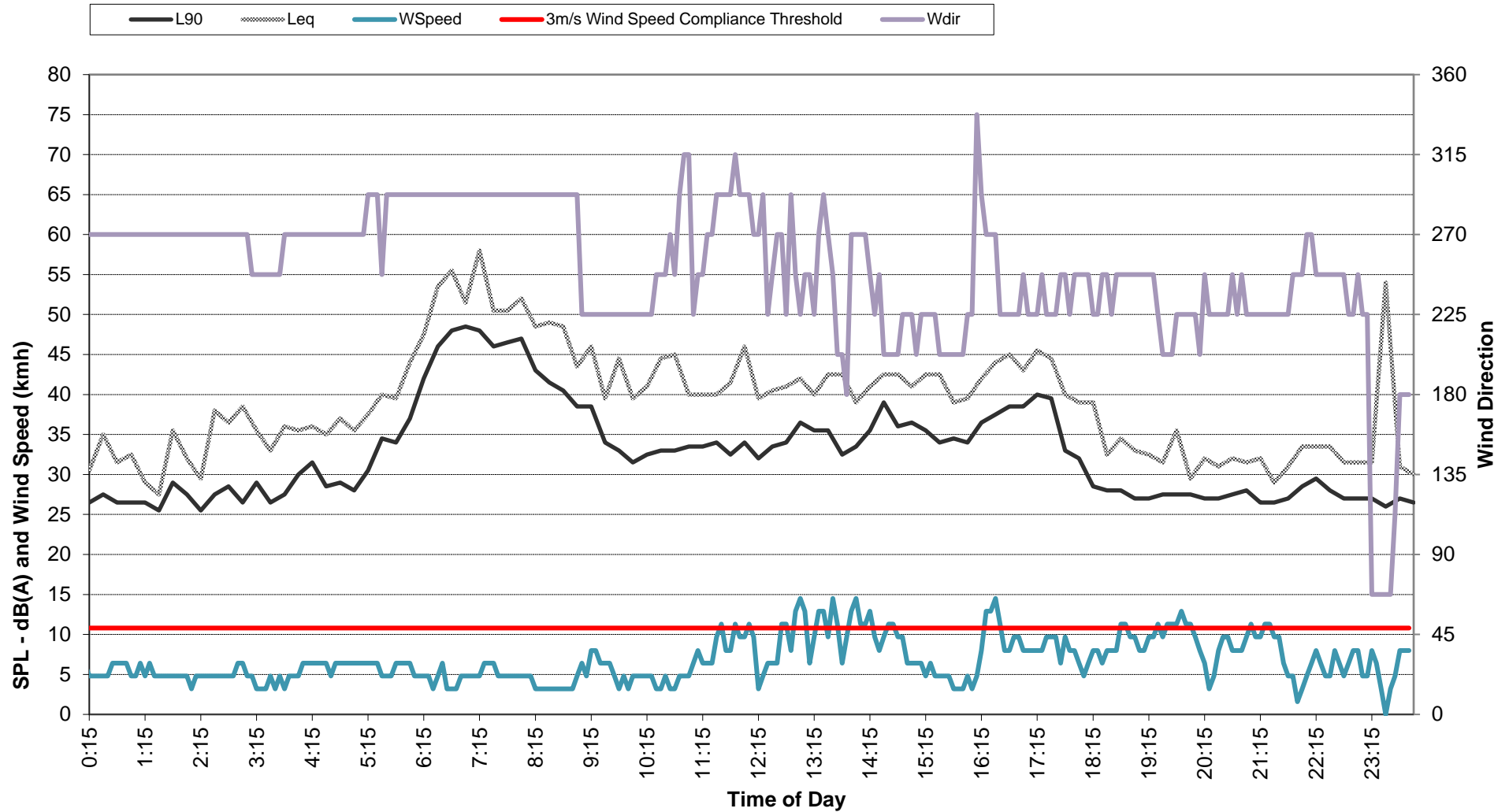
**Recorded Statistical Noise Levels for Coraki 15-041 - Springhill Rd - 14-Jul-2018 - Saturday**



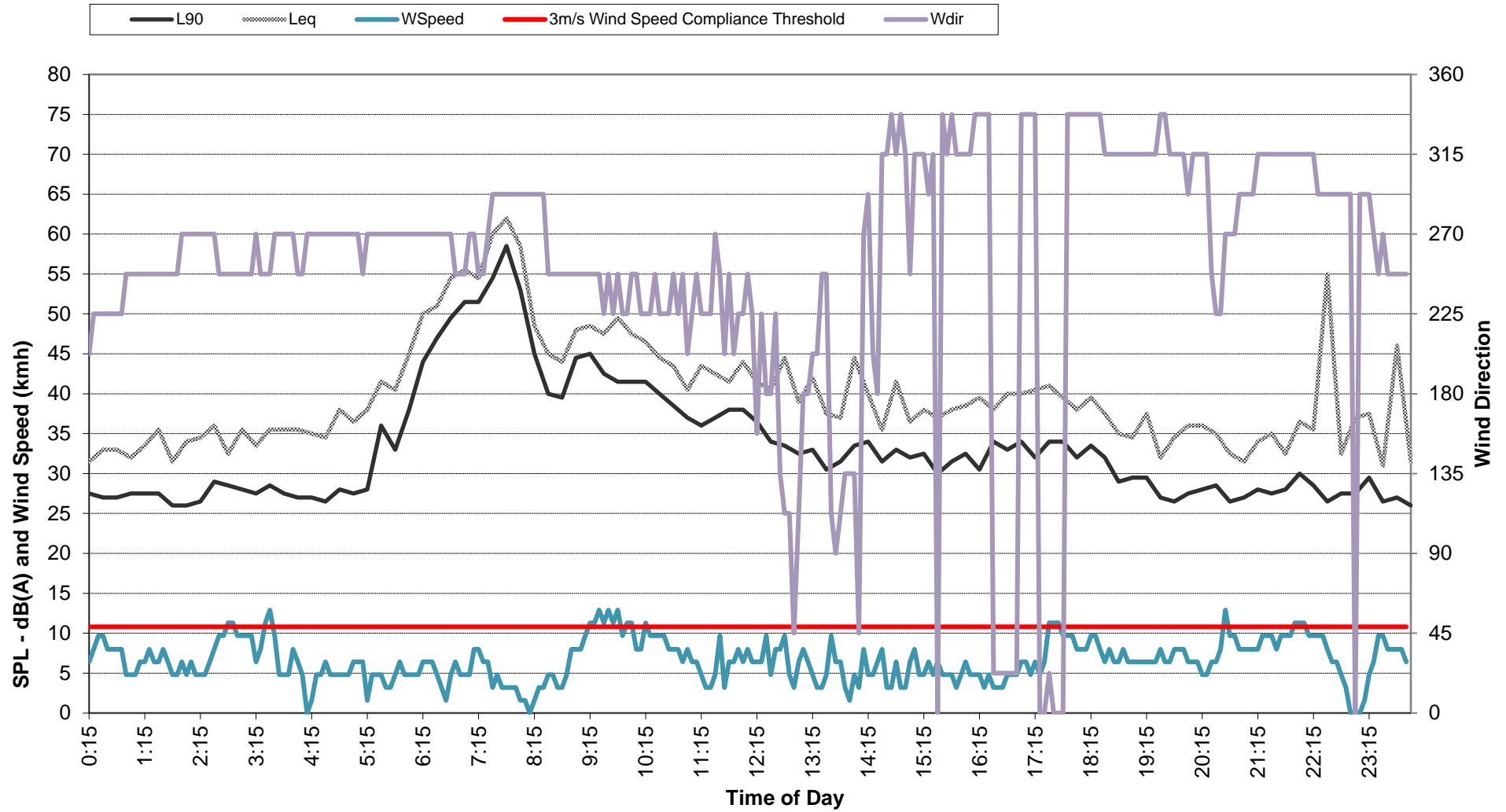
# Recorded Statistical Noise Levels for Coraki 15-041 - Springhill Rd - 15-Jul-2018 - Sunday



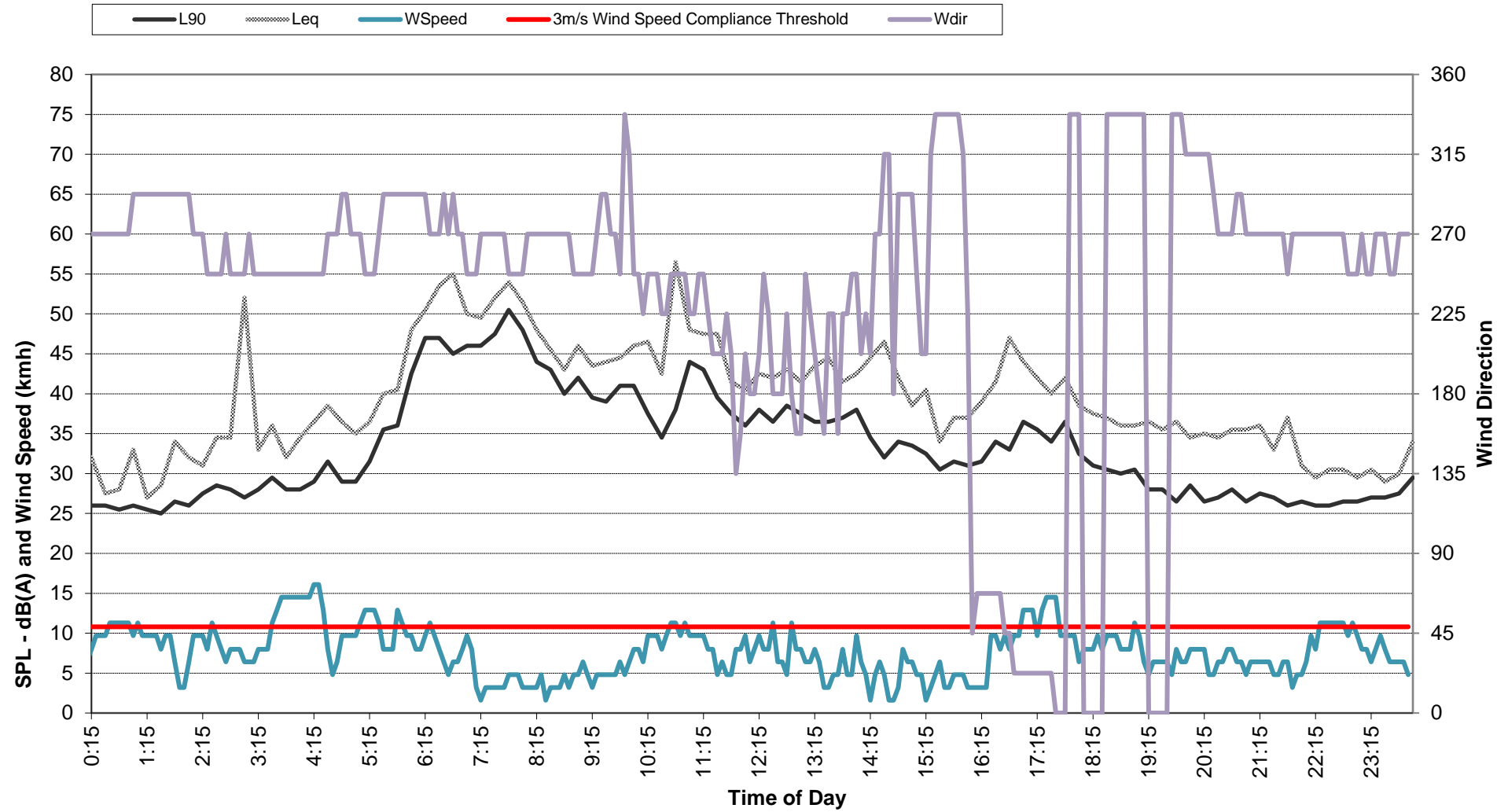
Recorded Statistical Noise Levels for Coraki 15-041 - Springhill Rd - 16-Jul-2018 - Monday



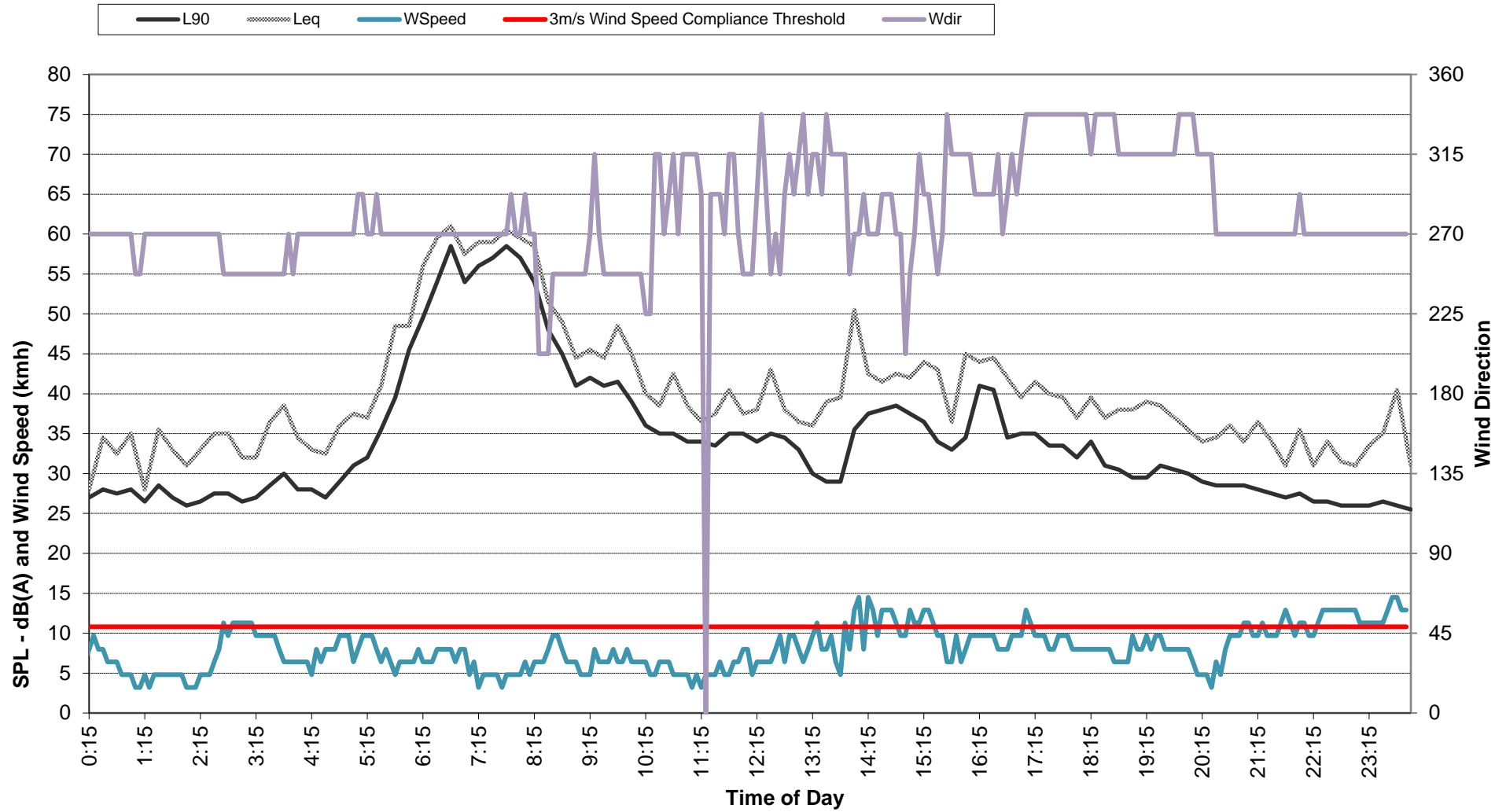
Recorded Statistical Noise Levels for Coraki 15-041 - Springhill Rd - 17-Jul-2018 - Tuesday



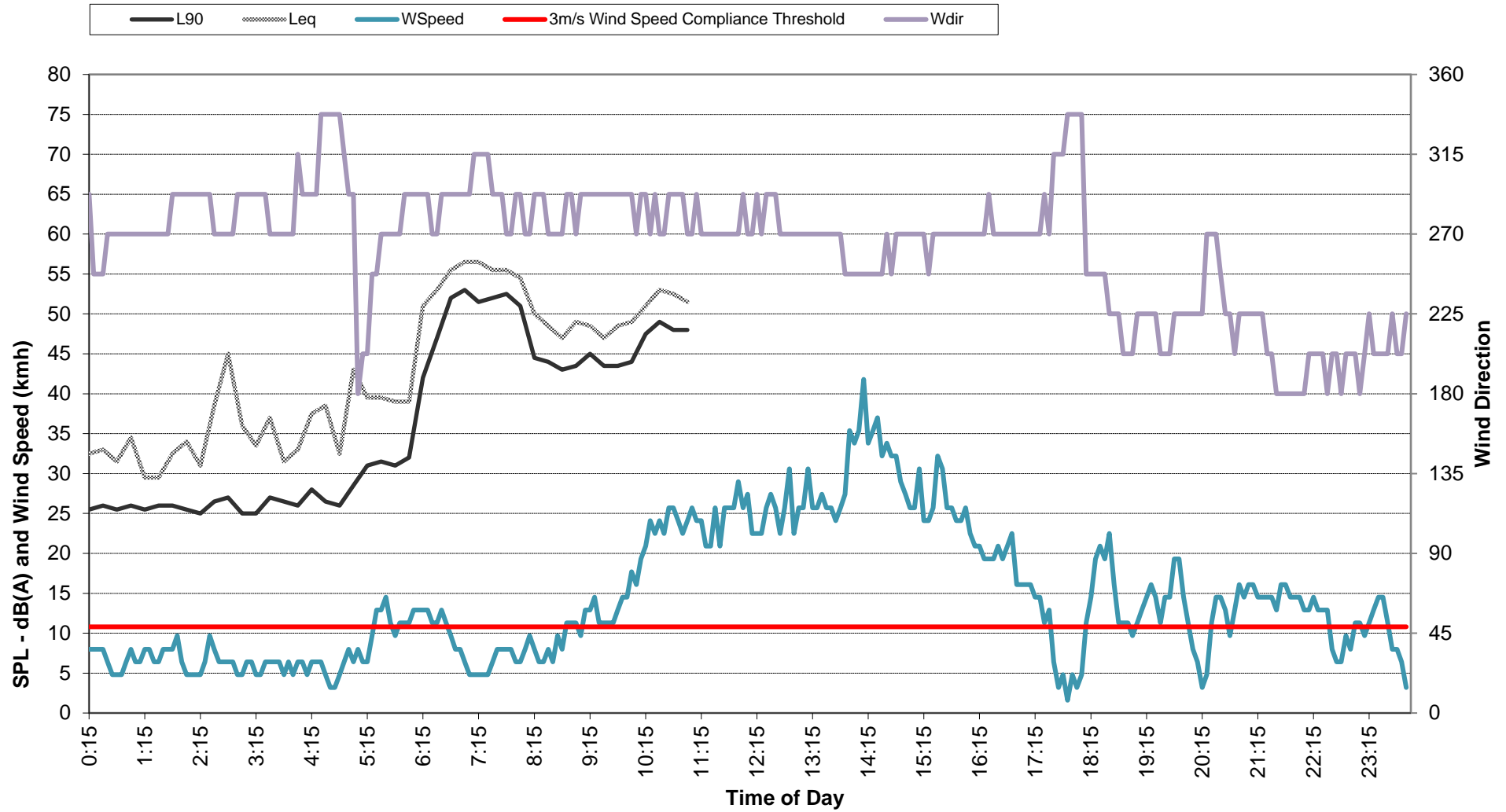
**Recorded Statistical Noise Levels for Coraki 15-041 - Springhill Rd - 18-Jul-2018 - Wednesday**



# Recorded Statistical Noise Levels for Coraki 15-041 - Springhill Rd - 19-Jul-2018 - Thursday



Recorded Statistical Noise Levels for Coraki 15-041 - Springhill Rd - 20-Jul-2018 - Friday



## **ATTACHMENT 3**

*Coraki Quarry Weather Station  
Year 2017 Wind Rose Analysis*

Wind roses for the period 6am to 7pm

