

Noise Monitoring Assessment

Rooty Hill Distribution Centre, Rooty Hill, NSW
Quarter 1 Ending March 2019.

Document Information

Noise Monitoring Assessment

Rooty Hill Distribution Centre, Rooty Hill, NSW

Quarter 1 Ending March 2019

Prepared for: Holcim (Australia) Pty Ltd

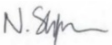

Prepared by: Muller Acoustic Consulting Pty Ltd

PO Box 262, Newcastle NSW 2300

ABN: 36 602 225 132

P: +61 2 4920 1833

www.mulleracoustic.com

Document ID	Status	Date	Prepared By	Signed	Reviewed By	Signed
MAC180611-01RP3	Final	28 March 2019	Nicholas Shipman		Rod Linnett	

DISCLAIMER

All documents produced by Muller Acoustic Consulting Pty Ltd (MAC) are prepared for a particular client's requirements and are based on a specific scope, circumstances and limitations derived between MAC and the client. Information and/or report(s) prepared by MAC may not be suitable for uses other than the original intended objective. No parties other than the client should use or reproduce any information and/or report(s) without obtaining permission from MAC. Any information and/or documents prepared by MAC is not to be reproduced, presented or reviewed except in full.

CONTENTS

1 INTRODUCTION5

2 NOISE CRITERIA7

3 METHODOLOGY9

 3.1 ATTENDED NOISE MONITORING9

 3.2 UNATTENDED NOISE MONITORING.....9

4 RESULTS 11

 4.1 ATTENDED NOISE MONITORING RESULTS 11

 4.1.1 ATTENDED ASSESSMENT RESULTS - LOCATION N1..... 11

 4.1.2 ATTENDED ASSESSMENT RESULTS - LOCATION N2..... 12

 4.1.3 ATTENDED ASSESSMENT RESULTS - LOCATION N3..... 13

 4.1.4 ATTENDED ASSESSMENT RESULTS - LOCATION N4..... 14

 4.2 UNATTENDED NOISE MONITORING RESULTS 15

5 NOISE COMPLIANCE ASSESSMENT 17

6 DISCUSSION 19

 6.1 DISCUSSION OF RESULTS - LOCATION N1 19

 6.2 DISCUSSION OF RESULTS - LOCATION N2 19

 6.3 DISCUSSION OF RESULTS - LOCATION N3 19

 6.4 DISCUSSION OF RESULTS - LOCATION N4 19

7 CONCLUSION 21

APPENDIX A – GLOSSARY OF TERMS

APPENDIX B – UNATTENDED NOISE MONITORING CHARTS

This page has been intentionally left blank

1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for the Holcim Regional Distribution Centre (RDC), at Rooty Hill, NSW.

This assessment has been undertaken at four representative monitoring locations for the Quarterly period ending March 2019 as part of the Noise Monitoring Program (NMP) to address conditions outlined in the Development Consent.

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Rooty Hill RDC Operational Noise Management Plan (NMP), 2015;
- Rooty Hill, Consolidated Consent, 2017 (Mod 2);
- Australian Standard AS 1055:2018 - Acoustics - Description and Measurement of Environmental Noise; and
- Australian Standard AS IEC 61672:2019 (AS 61672) – Electro Acoustics - Sound Level Meters Specifications Monitoring;

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

This page has been intentionally left blank

2 Noise Criteria

The noise criteria for each receiver location are outlined in the NMP and consolidated consent for the RDC are presented in **Table 1**.

Table 1 Noise Criteria, dBA						
Location	Monitoring Location	Morning Shoulder ^{1,2}	Day ^{1,2}	Evening ^{1,2}	Night ^{1,2}	
		LAeq(15min)	LAeq(15min)	LAeq(15min)	LAeq(15min)	LA1(1min)
Any residences in Station Street	N1	39	44	44	39	53
Any residences in Coughlan Crescent	N2	40	40	39	39	53
Any residences in Mavis Street	N1/N4	35	35	35	35	53
Nurragingy Reserve	N3	When Reserve is in use – 50dB, LAeq				
Colebee Centre	N3	When the Centre is in use – 50dB, LAeq				
Blacktown Olympic Park (Active recreation areas)	N4	When active recreational areas of the Park are in use – 55dB, LAeq				

Note 1: Noise criteria adopted from NMP.

Note 2: Morning shoulder 6am-7am Monday to Saturday and 6am-8am Sundays and public holidays; Day 7am-6pm Monday to Saturday and 8am-6pm Sundays and public holidays
Evening 6pm-10pm Monday to Sunday; Night 10pm-7am Monday to Saturday and 10pm-8am Sunday.

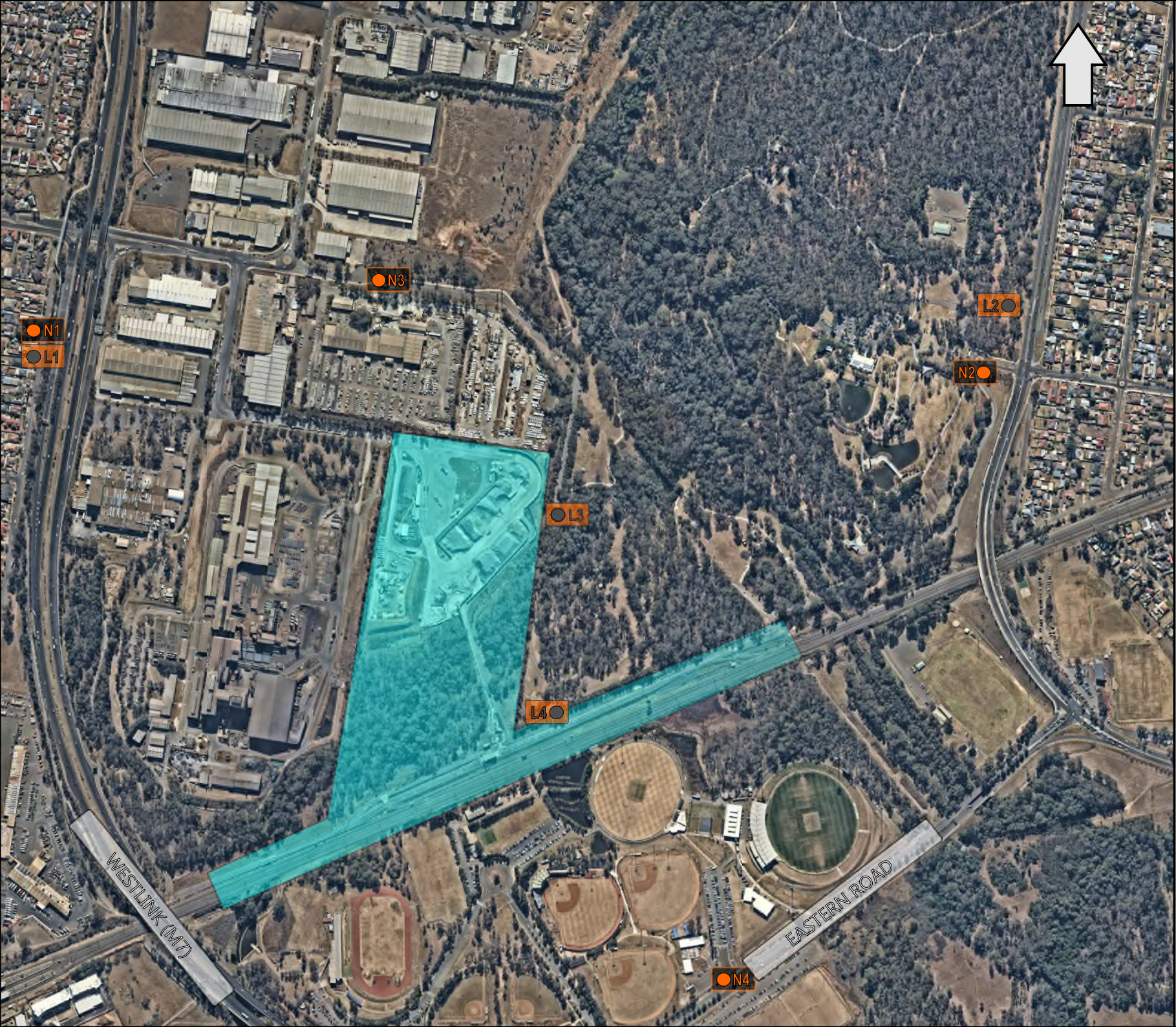
The RDC is located at Rooty Hill, NSW approximately 1km east of the railway station and town centre. Receivers in the locality surrounding the RDC are primarily industrial, recreational and urban residential. The RDC is bounded by the railway line to the south, industry to the west and recreational areas to the east. The residential areas potentially affected by noise from the operation are to the east, beyond the Nurragingy Reserve in Doonside, NSW (Crawford Street and Knox Road); and to the west, beyond industrial zones and the M7 Motorway in Station Street, Rooty Hill, NSW. Road traffic from the M7 Motorway is a dominant noise source in the area along with urban hum and railway noise.

Monitoring locations were selected in accordance with the NMP and are representative of the nearest noise sensitive receivers to the RDC.




The operational compliance monitoring locations with respect to the RDC are presented in the locality plan shown in **Figure 1** and **Table 1** along with the relevant noise criteria for each location.

FIGURE 1

LOCALITY PLAN
REF: MAC180611-01



KEY

-  MONITORING LOCATION
-  LOGGER LOCATION
-  SITE LOCATION



*Imagery Source: reamaps

3 Methodology

Noise monitoring consisted of attended and unattended monitoring during the daytime, evening and night time periods.

3.1 Attended Noise Monitoring

Attended noise monitoring was conducted in general accordance with the procedures described in Australian Standard AS 1055 and the RDC Consolidated Consent. The measurements were carried out using a Svantek Type 1, 971 noise analyser on Wednesday 13 March 2019. The acoustic instrumentation used carries current NATA calibration and complies with AS NZS IEC 61672. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA.

Attended noise monitoring was conducted for 15 minutes in duration during the daytime, evening and night time periods over one day. Where possible, throughout each measurement the operator(s) quantified the contribution of each significant noise source.

Extraneous noise sources were excluded from the analysis to determine the $L_{Aeq}(15min)$ RDC noise contribution for comparison against the relevant criteria. Where the RDC was inaudible, the RDC contribution is estimated to be at least 10dB below the ambient noise level.

3.2 Unattended Noise Monitoring

The unattended noise monitoring was conducted at locations N1 – N4 for more than seven days in general accordance with the procedures described AS 1055 and the RDC Consolidated Consent. Noise measurements were carried out using Svantek Type 1, 977 and 957 noise analysers from Wednesday 13 March 2019 to Friday 22 March 2019. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA. **Appendix B** presents the noise monitoring charts for the assessment period.

This page has been intentionally left blank

4 Results

4.1 Attended Noise Monitoring Results

4.1.1 Attended Assessment Results - Location N1

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N1 for the NMA are presented in **Table 2**.

Table 2 Operator-Attended Noise Survey Results – Location N1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
13/03/19	14:22 (Day)	67	57	54	WD: N	Traffic 56-67
					WS: 1m/s	Wind in trees <56
					Rain: Nil	RDC Inaudible
					RDC L _{Aeq} (15min) Contribution	
13/03/19	20:10 (Evening)	81	58	48	WD: E	Traffic 48-81
					WS: 1m/s	Local residential noise <48
					Rain: Nil	Wind in trees <48
					RDC L _{Aeq} (15min) Contribution	
13/03/19	23:45 (Night)	75	53	46	WD: E	Traffic 49-75
					WS: 0.1m/s	Insects <49
					Rain: Nil	Train 50-52
					RDC L _{Aeq} (15min) Contribution	

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.1.2 Attended Assessment Results - Location N2

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N2 for the NMA are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N2						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
13/03/19	15:20	72	54	50	WD: N WS: 1m/s Rain: Nil	Traffic 49-71
	(Day)					Wind in trees <49
						Birds 49-52
						RDC Inaudible
RDC L _{Aeq} (15min) Contribution						<40
13/03/19	20:56	67	59	54	WD: E WS: 2m/s Rain: Nil	Wind in trees 46-58
	(Evening)					Train 54-60
						Traffic 54-67
						RDC Inaudible
RDC L _{Aeq} (15min) Contribution						<39
14/03/19	00:27	60	50	41	WD: E WS: 0.1m/s Rain: Nil	Traffic 44-58
	(Night)					Train 41-46
						RDC Inaudible
RDC L _{Aeq} (15min) Contribution						<31

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.1.3 Attended Assessment Results - Location N3

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N3 for the NMA are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N3						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
13/03/19	15:02 (Day)	81	57	50	WD: N WS: 1m/s Rain: Nil	Holcim trucks <48
						Holcim reverse alarms <48
						Wind in trees <48
						Traffic 48-81
						Train 50-54
						Aircraft 52-59
						Birds <50
RDC L _{Aeq} (15min) Contribution						<48
13/03/19	20:32 (Evening)	67	56	54	WD: E WS: 2.5m/s Rain: Nil	Wind in trees 48-56
						Traffic 50-67
						Other industrial noise 54-56
						RDC Inaudible
RDC L _{Aeq} (15min) Contribution						<44
14/03/19	00:05 (Night)	67	53	52	WD: E WS: 0.5m/s Rain: Nil	Other industrial noise 48-54
						Holcim industrial hum <48
						Traffic <52
RDC L _{Aeq} (15min) Contribution						<48

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.1.4 Attended Assessment Results - Location N4

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N4 for the NMA are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N4						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
13/03/19	15:43 (Day)	78	62	55	WD: N WS: 0.5m/s Rain: Nil	Birds 49-53
						Traffic 48-78
						Train 52-56
						Holcim trucks 48-50
						Holcim reverse alarms <50
RDC L _{Aeq} (15min) Contribution						50
13/03/19	21:16 (Evening)	79	66	55	WD: E WS: 1m/s Rain: Nil	Traffic 44-79
						Aircraft 44-54
						RDC Inaudible
RDC L _{Aeq} (15min) Contribution						<45
14/03/19	00:48 (Night)	77	58	43	WD: E WS: 0.5m/s Rain: Nil	Traffic 44-77
						Birds 56-61
						RDC Inaudible
RDC L _{Aeq} (15min) Contribution						<33

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

4.2 Unattended Noise Monitoring Results

The summary (RBL and overall LAeq), noise levels recorded during unattended noise monitoring are presented in **Table 6**.

Table 6 Unattended Noise Monitoring Summary			
Monitoring Location	Period ¹	Measured dB LAeq,period ²	Measured Background Noise Level (LA90) dB RBL ²
L1 (N1 Station Street)	Day	58	50
	Evening	60	45
	Night	53	41
L2 (N2 Knox Road)	Day	59	50
	Evening	60	49
	Night	56	41
L3 (N3 Nurragingy Reserve)	Day	46	44
	Evening	45	44
	Night	45	43
L4 (N4 Olympic Park)	Day	59	44
	Evening	56	45
	Night	57	44

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 2: Calculated from one week of monitoring data and determined using the long term methodology for each period as per Fact Sheet A of the NPI (2017).

This page has been intentionally left blank

5 Noise Compliance Assessment

The compliance assessment summary for each monitoring location N1 to N4 are presented in **Table 7** to **Table 9** for each assessment period.

Table 7 Daytime Noise Compliance Assessment

Receiver No.	RDC Noise Contribution	RDC Noise Criteria	Compliant
	dB LAeq(15min)	dB LAeq(15min)	
N1	<44	44	✓
N2	<40	40	✓
N3	<48	50 (When in use)	✓
N4	50	55 (When in use)	✓

Note: Day - the period from 7am to 6pm Monday to Saturday, or 8am to 6pm on Sundays and public holidays.

Table 8 Evening Noise Compliance Assessment

Receiver No.	RDC Noise Contribution	RDC Noise Criteria	Compliant
	dB LAeq(15min)	dB LAeq(15min)	
N1	<38	44	✓
N2	<39	39	✓
N3	<44	50 (When in use)	✓
N4	<45	55 (When in use)	✓

Note: Evening - the period from 6pm to 10pm.

Table 9 Night Time Noise Compliance Assessment

Receiver No.	RDC Noise Contribution	RDC Noise Criteria	Compliant
	dB LAeq(15min)	dB LAeq(15min)	
N1	<36	39	✓
N2	<31	39	✓
N3	<48	50 (When in use)	✓
N4	<33	55 (When in use)	✓

Note: Night - the period from 10pm to 7am Monday to Saturday, or 10pm to 8am on Sundays and public holidays.

This page has been intentionally left blank

6 Discussion

6.1 Discussion of Results - Location N1

RDC noise emissions were inaudible during all three attended measurements conducted on Wednesday 13 March 2019, satisfying the relevant noise limits. Extraneous noise sources included traffic, wind in trees, local residential noise, insects and train pass-by.

6.2 Discussion of Results - Location N2

RDC noise emissions were inaudible during all three attended measurements conducted on Wednesday 13 March 2019, satisfying the relevant noise limits for this location. Extraneous sources measured include traffic, wind in trees, birds and train pass-by.

6.3 Discussion of Results - Location N3

Attended measurements on Wednesday 13 March 2019 identified that RDC noise was audible during two of the three measurements during the daytime and night time period, although satisfied the relevant noise limits of 50dBA. RDC sources audible on occasion included general mobile plant engine noise, reverse alarms and general hum. The RDC was inaudible during the evening measurements conducted on Wednesday 13 March 2019 thus satisfying the applicable noise criteria. Extraneous sources audible during the attended surveys included wind in trees, traffic, train pass-by, aircraft noise, birds and other industrial noise which generally masked RDC noise. For the evening and night assessment period, it is noted the receiver was not "in use", hence criteria are only referenced for completeness.

6.4 Discussion of Results - Location N4

RDC noise emissions were audible during one of three measurements conducted on Wednesday 13 March 2019. RDC sources audible during the daytime measurement included general mobile plant engine noise, reverse alarms and tipping. RDC noise contribution was estimated to be 50dBA, satisfying the relevant noise limits. Extraneous noise sources included birds, traffic, train pass-by and aircraft noise all audible throughout attended measurements at this location.

This page has been intentionally left blank

7 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Holcim (Australia) Pty Ltd for the Regional Distribution Centre (RDC), at Rooty Hill, NSW. The assessment was completed to assess compliance against relevant noise criteria for Quarter 1, ending March 2019.

Attended noise monitoring was conducted on Wednesday 13 March 2019 and unattended noise monitoring was completed between Wednesday 13 March 2019 and Friday 22 March 2019 at four representative monitoring locations. The assessment has identified that noise emissions generated by RDC were audible on some occasions throughout the attended monitoring, although remained below relevant noise criteria at all assessed residential receivers.

This page has been intentionally left blank

Appendix A – Glossary of Terms

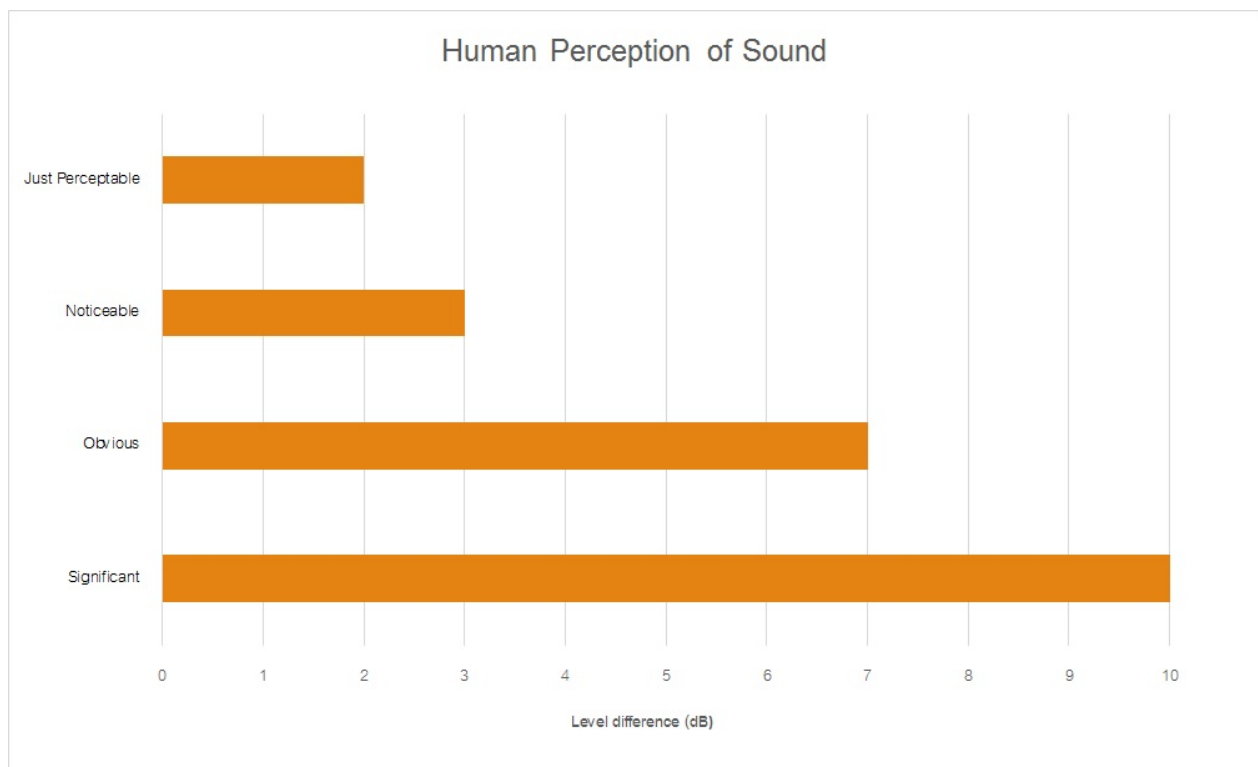
Table A1 provides a number of technical terms have been used in this report.

Table 1A Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm _{ax}	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by: $= 10 \cdot \log_{10} (W/W_0)$ Where: W is the sound power in watts and W ₀ is the sound reference power at 10-12 watts.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



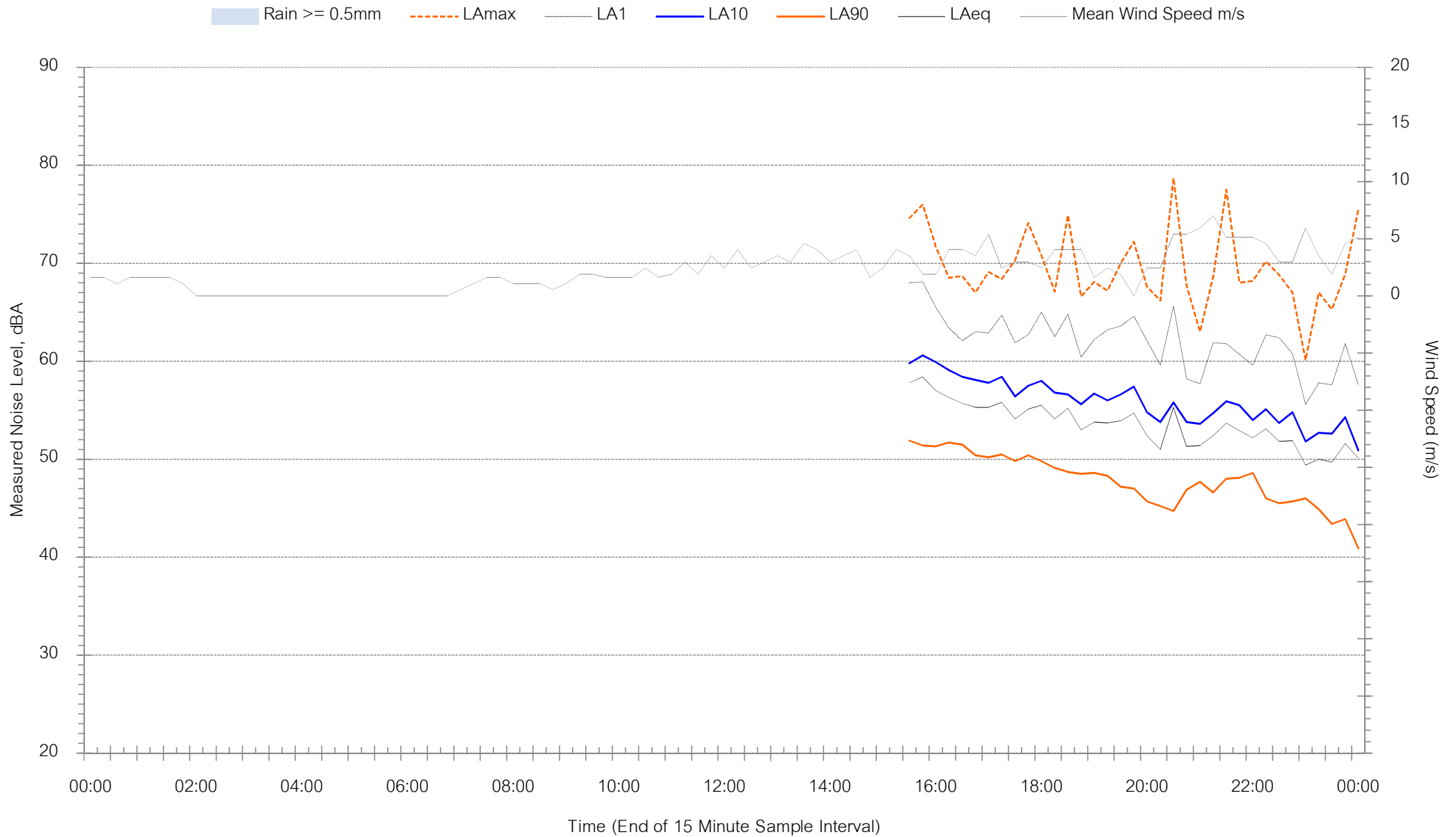
This page has been intentionally left blank

Appendix B – Unattended Noise Monitoring Charts



Background Noise Levels

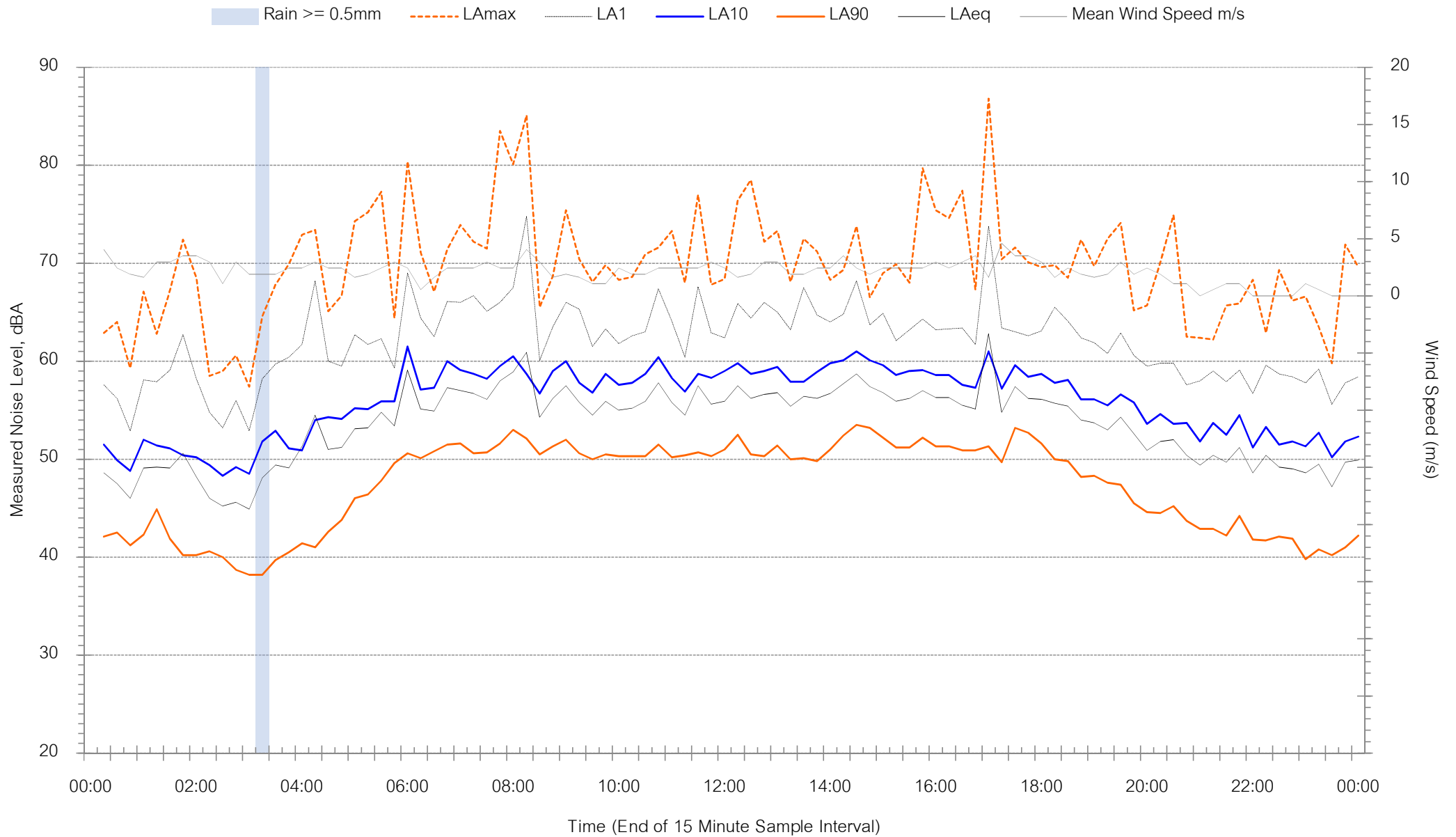
Location - N1 - Tuesday 12 March 2019





Background Noise Levels

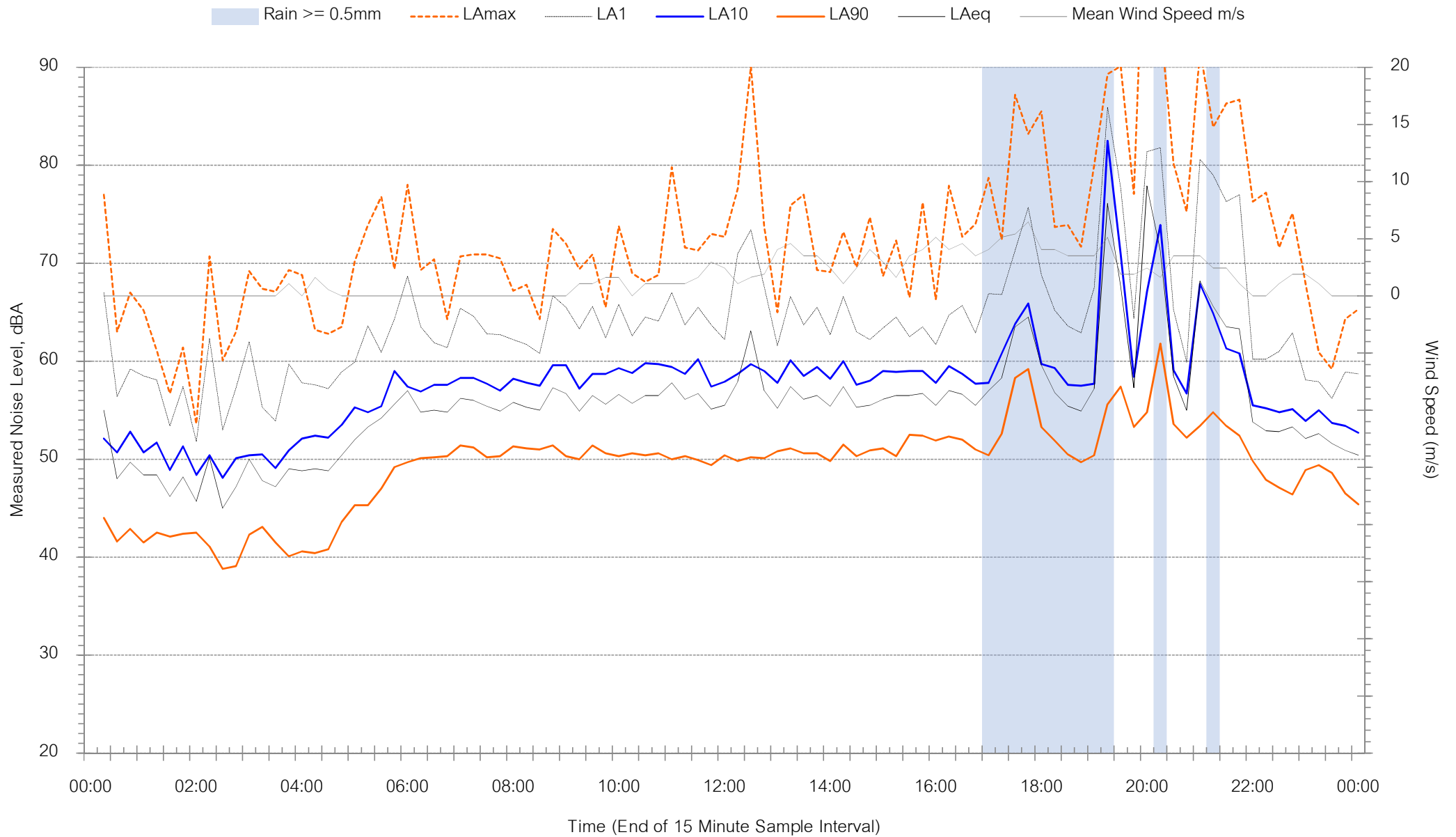
Location - N1 - Wednesday 13 March 2019





Background Noise Levels

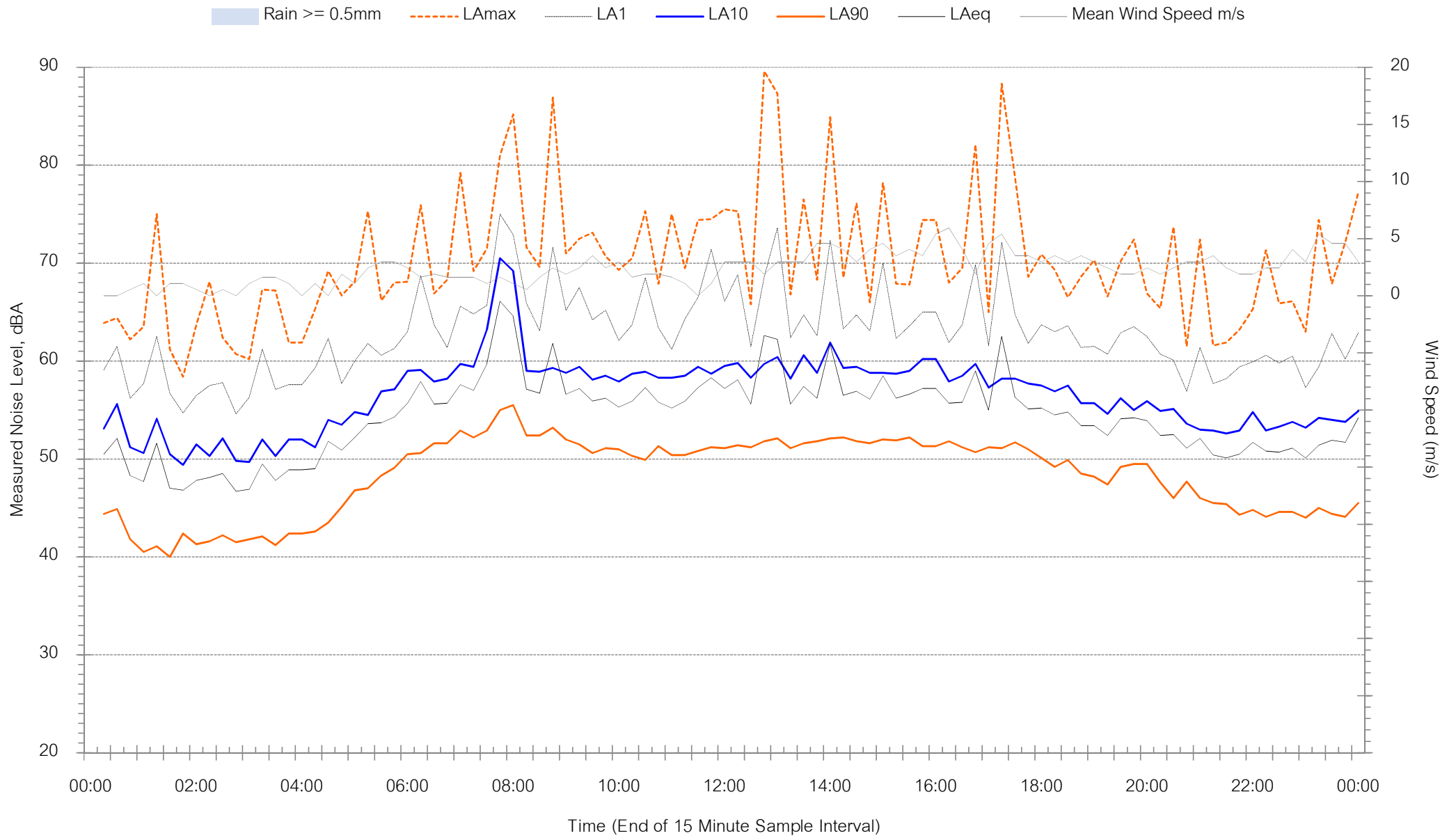
Location - N1 - Thursday 14 March 2019





Background Noise Levels

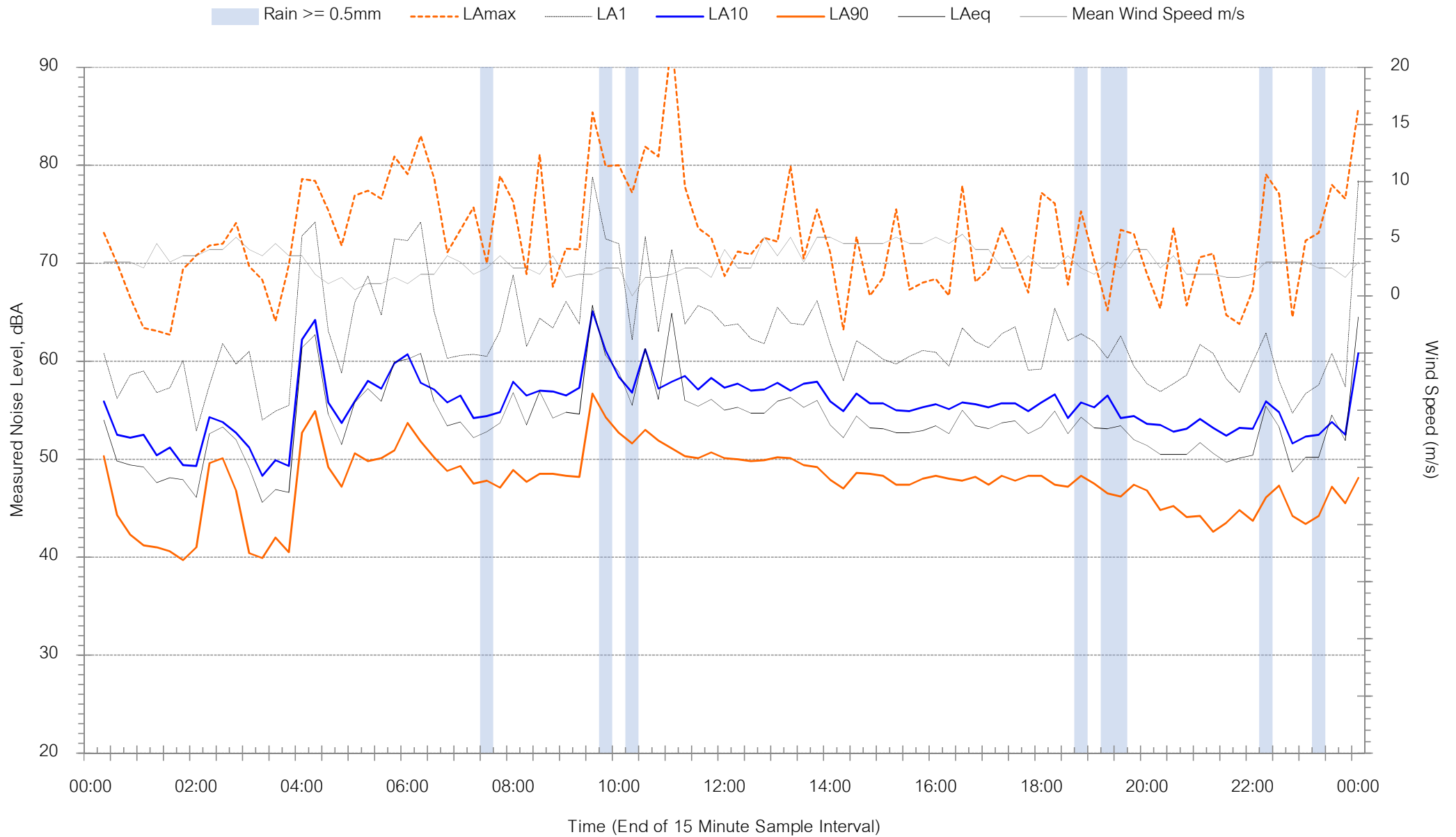
Location - N1 - Friday 15 March 2019





Background Noise Levels

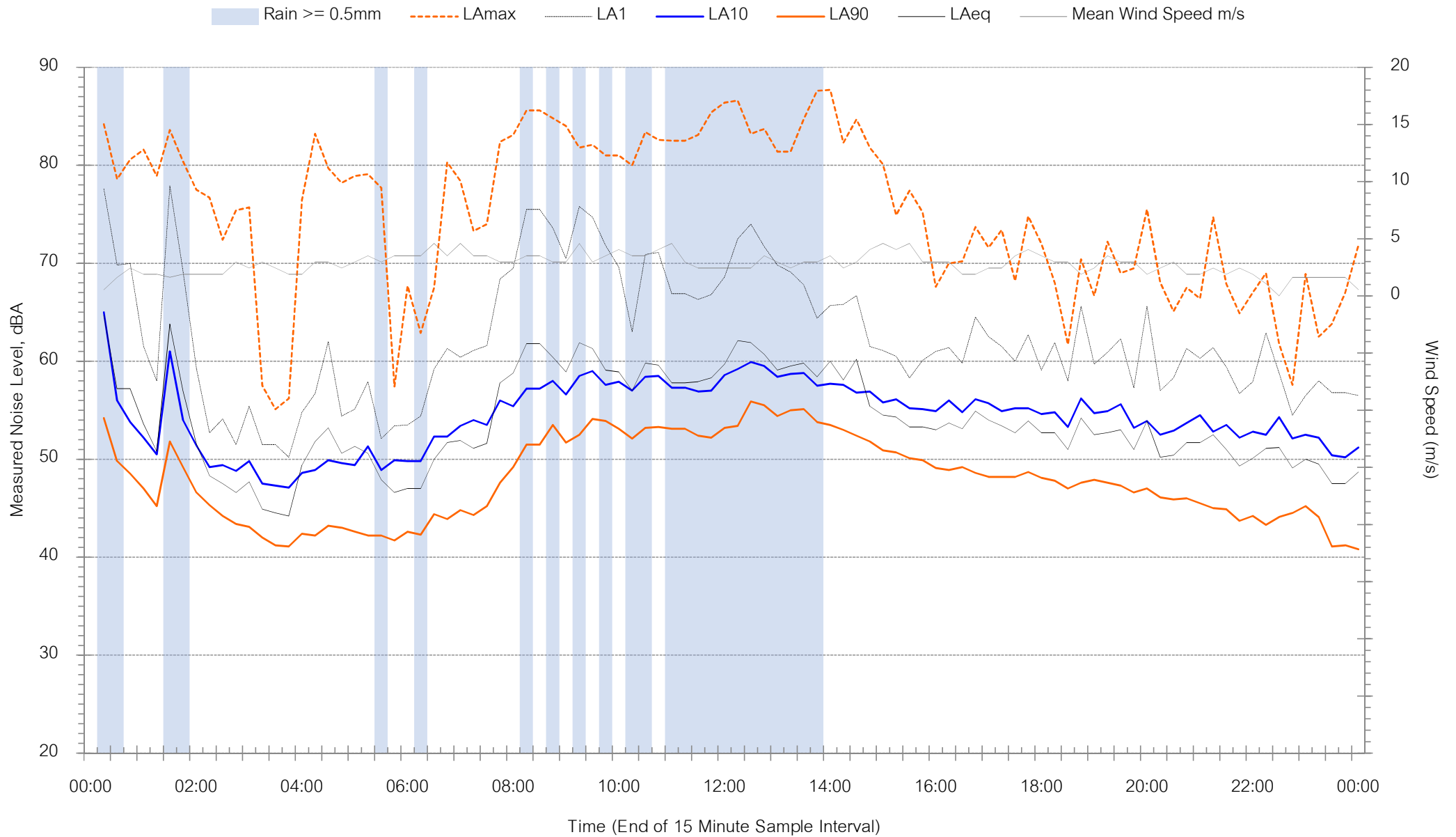
Location - N1 - Saturday 16 March 2019





Background Noise Levels

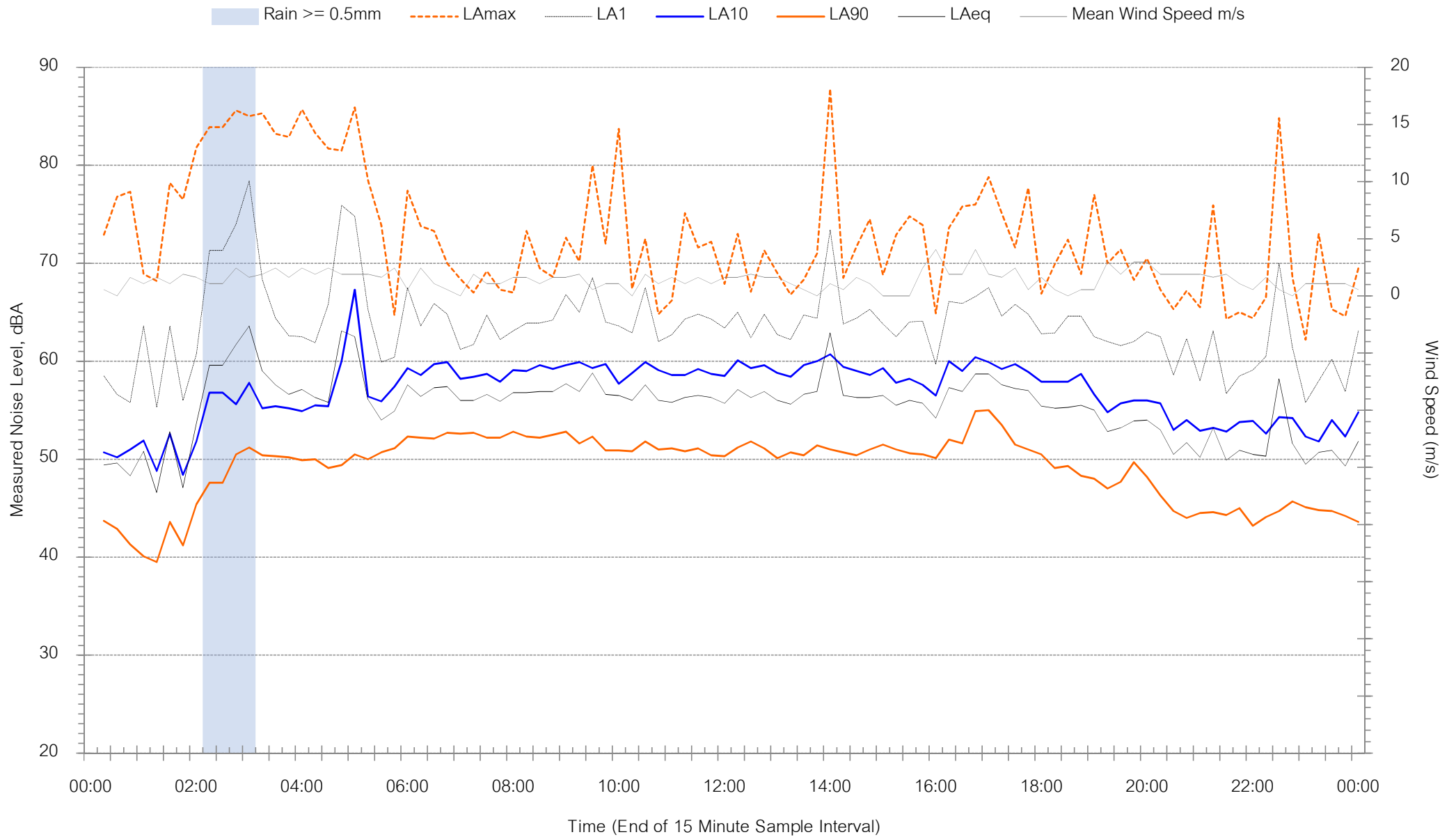
Location - N1 - Sunday 17 March 2019





Background Noise Levels

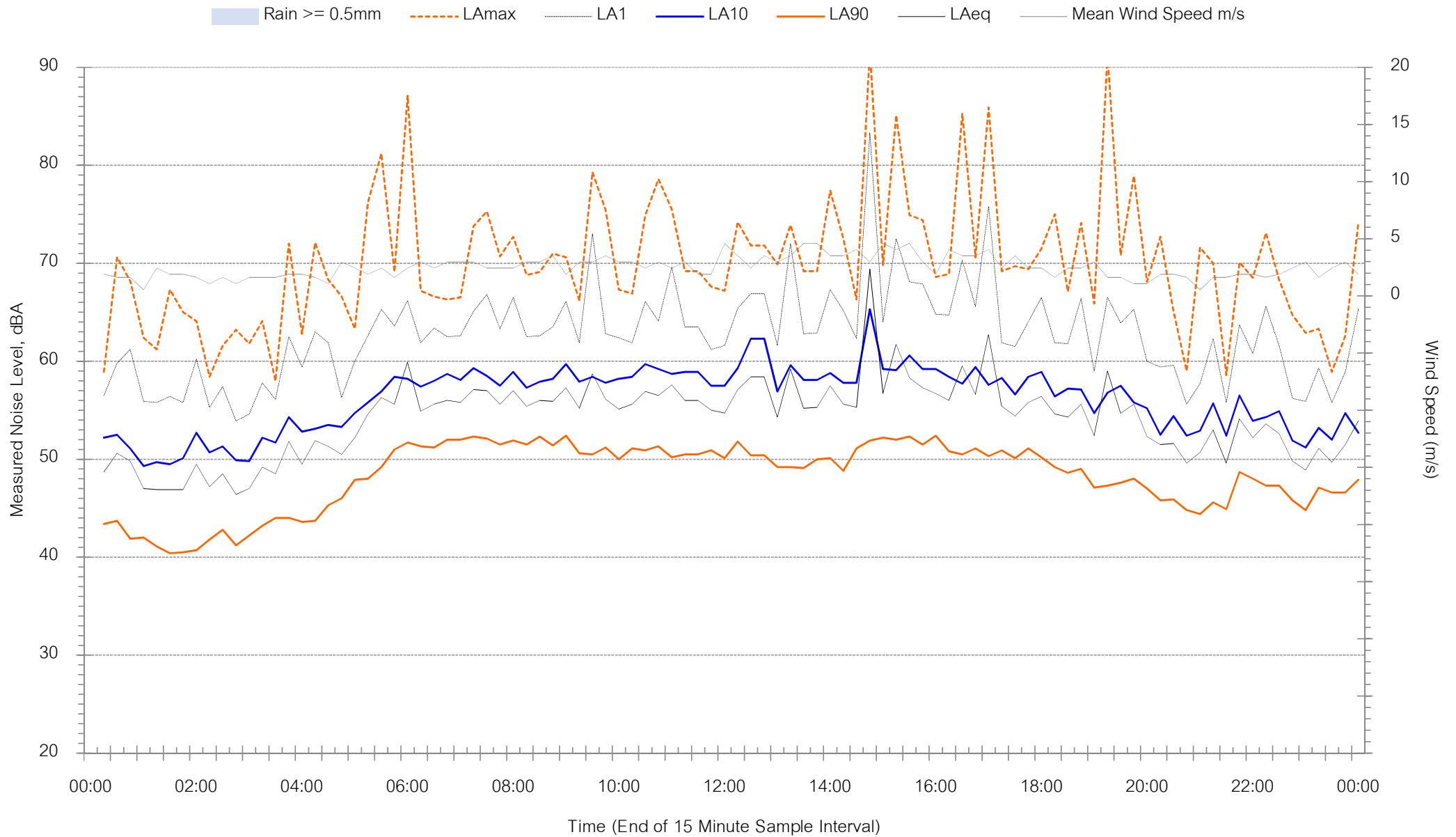
Location - N1 - Monday 18 March 2019





Background Noise Levels

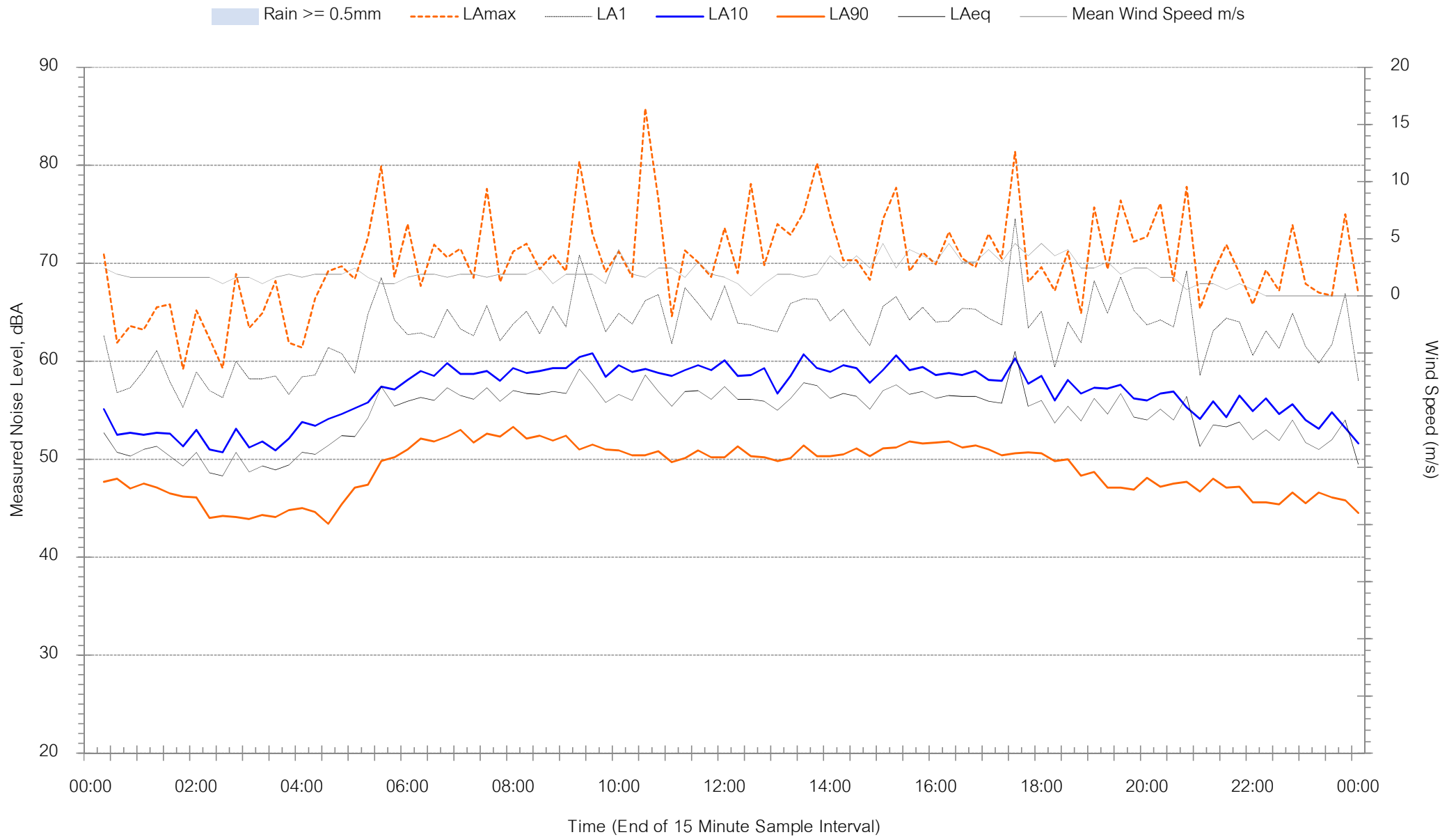
Location - N1 - Tuesday 19 March 2019





Background Noise Levels

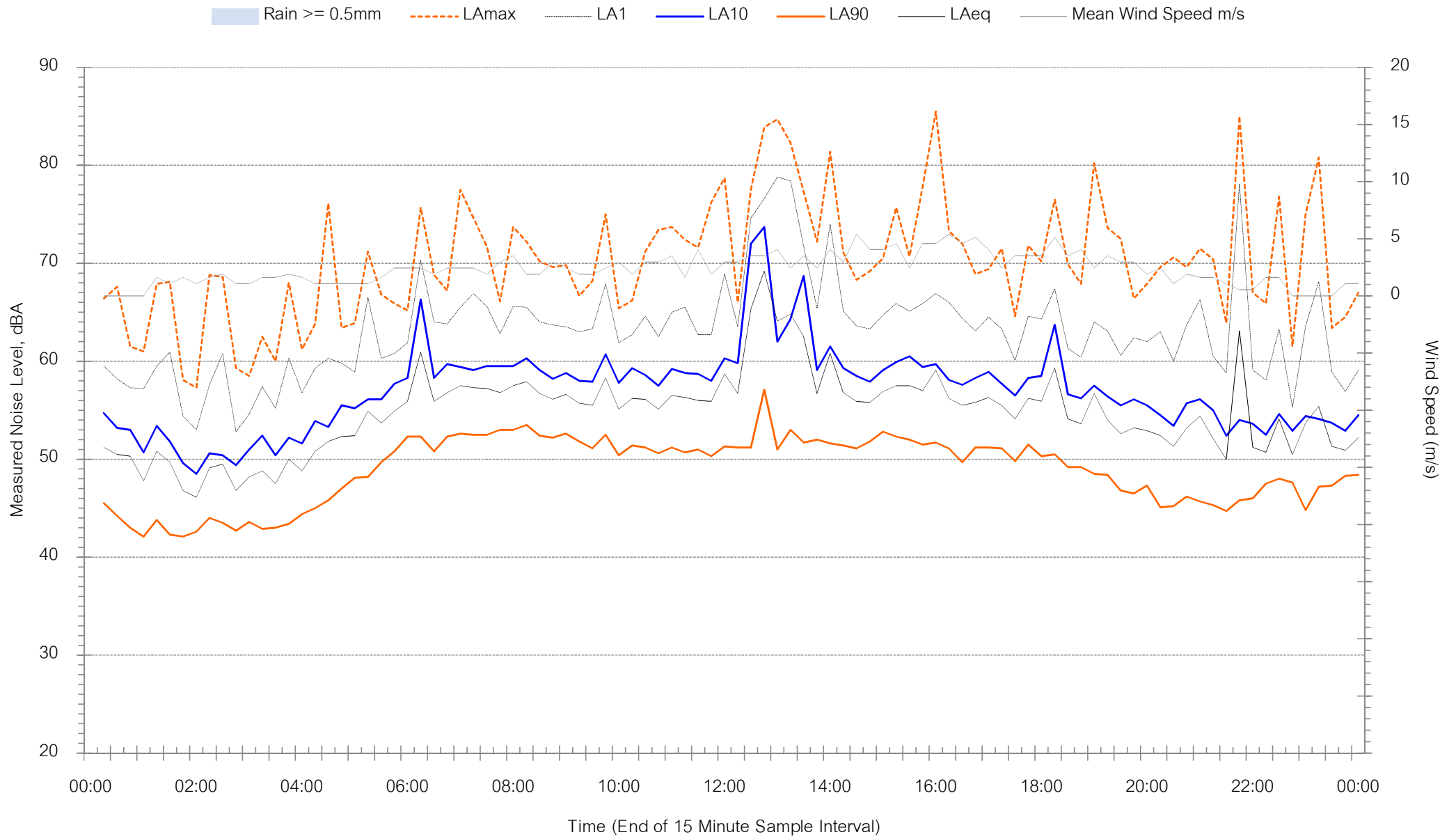
Location - N1 - Wednesday 20 March 2019





Background Noise Levels

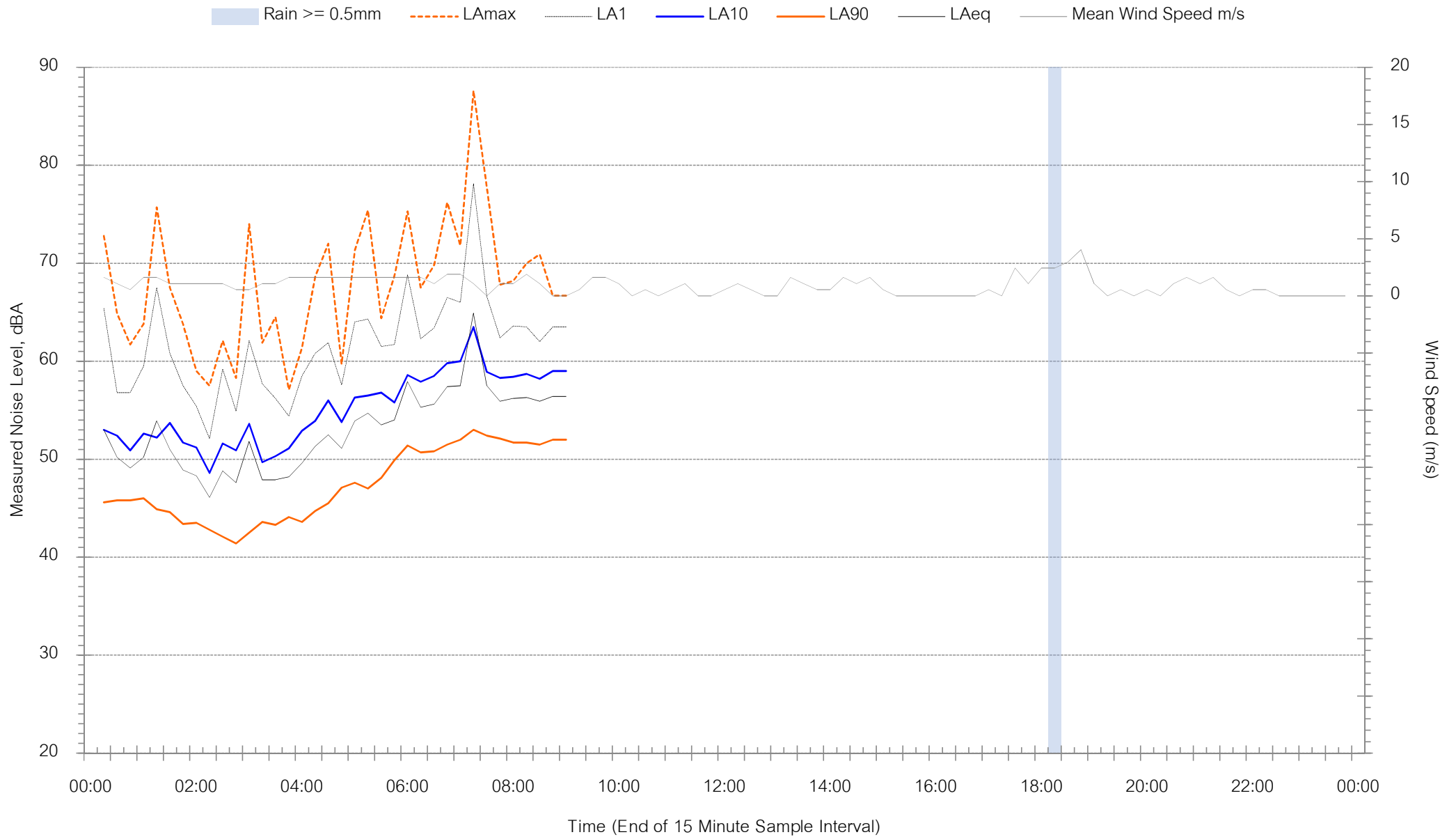
Location - N1 - Thursday 21 March 2019





Background Noise Levels

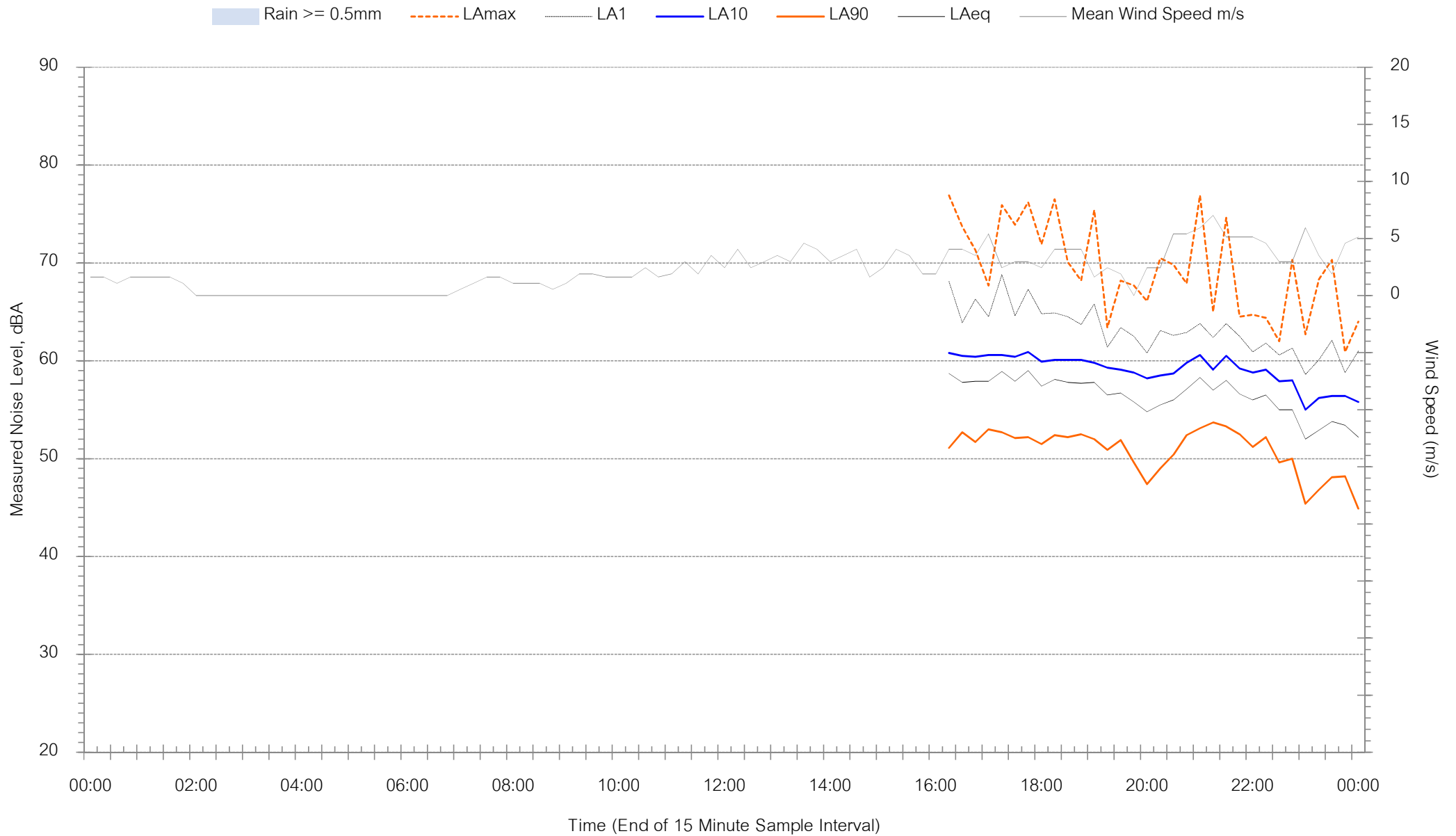
Location - N1 - Friday 22 March 2019





Background Noise Levels

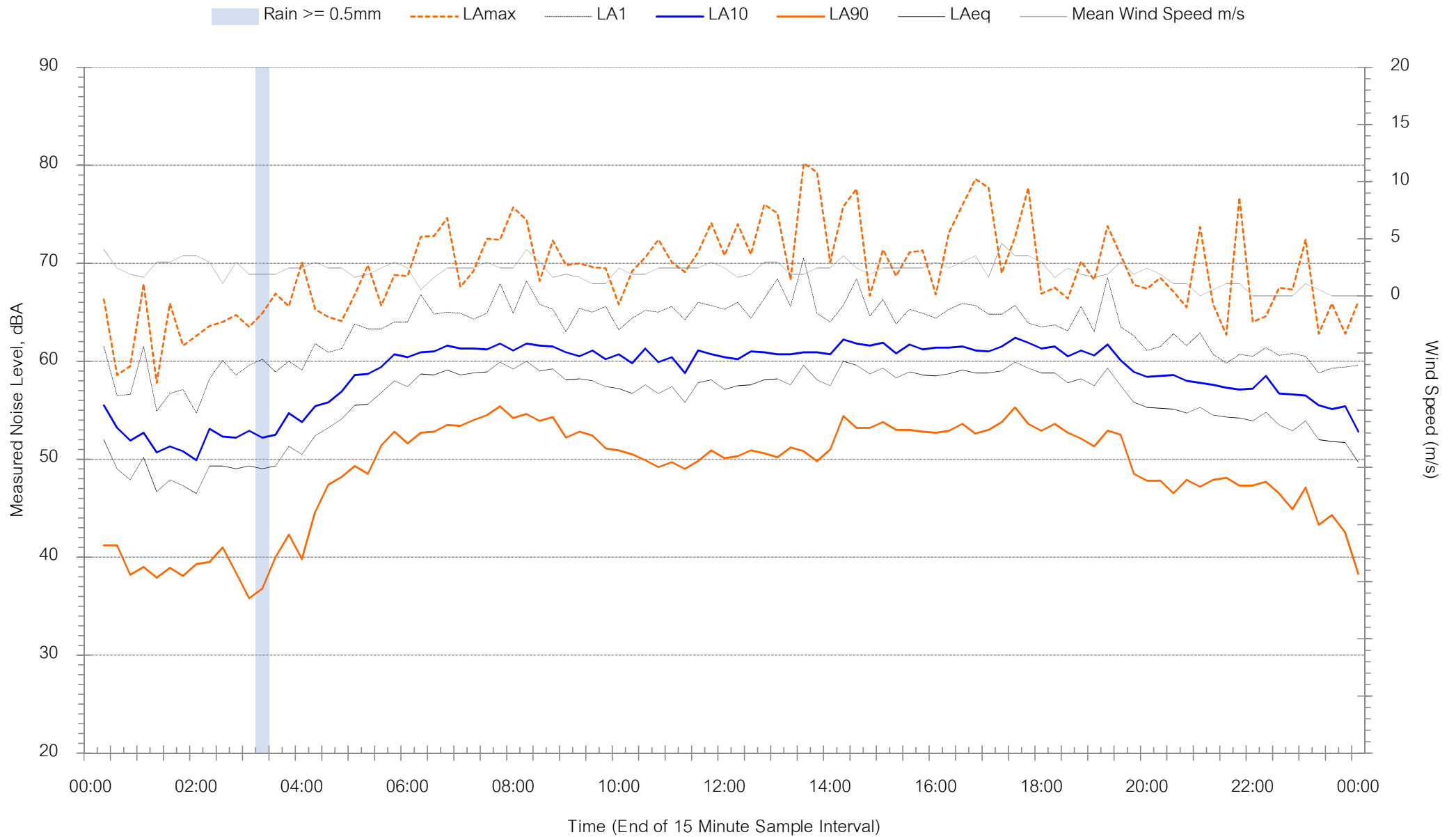
Location - N2 - Tuesday 12 March 2019





Background Noise Levels

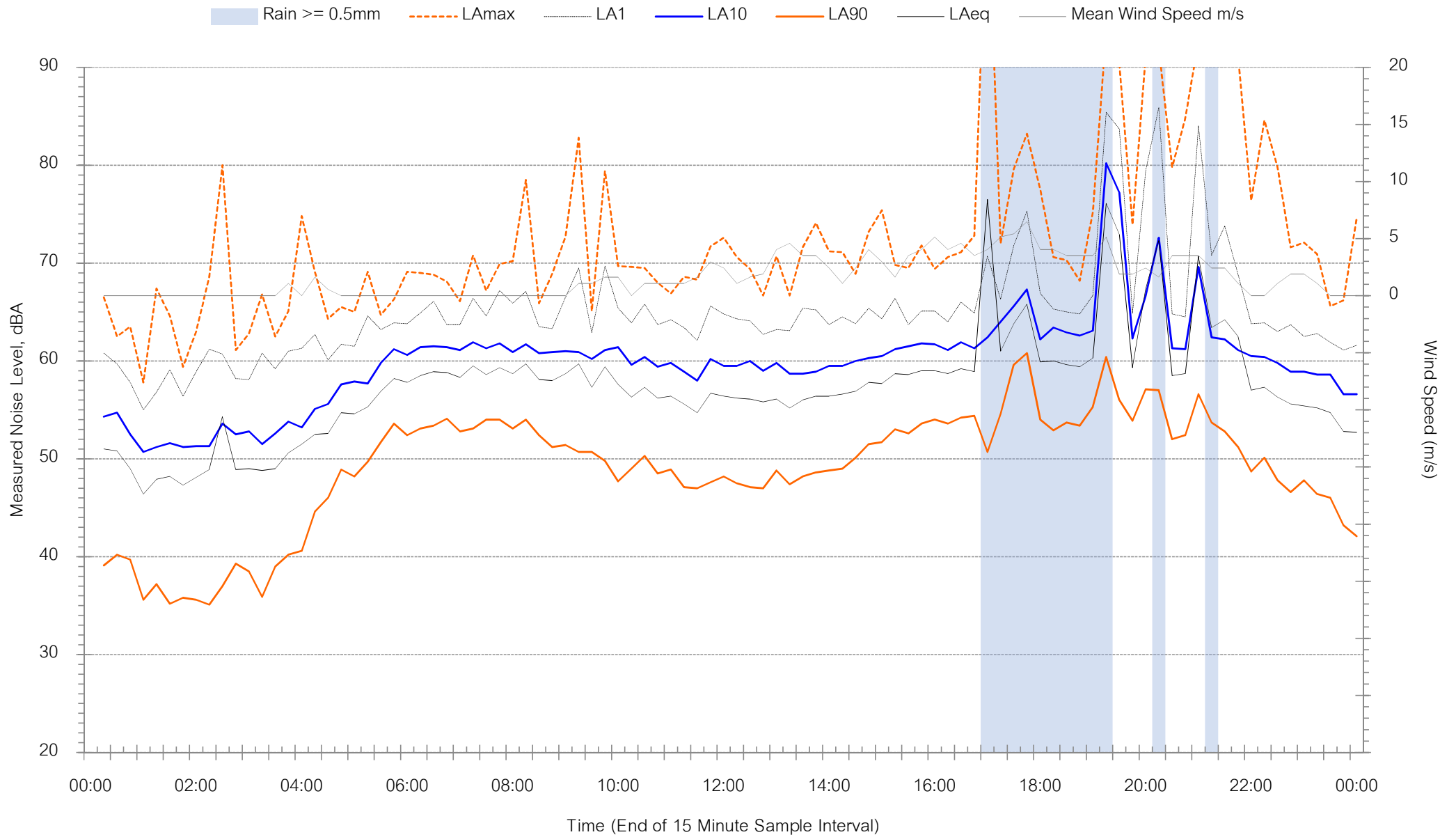
Location - N2 - Wednesday 13 March 2019





Background Noise Levels

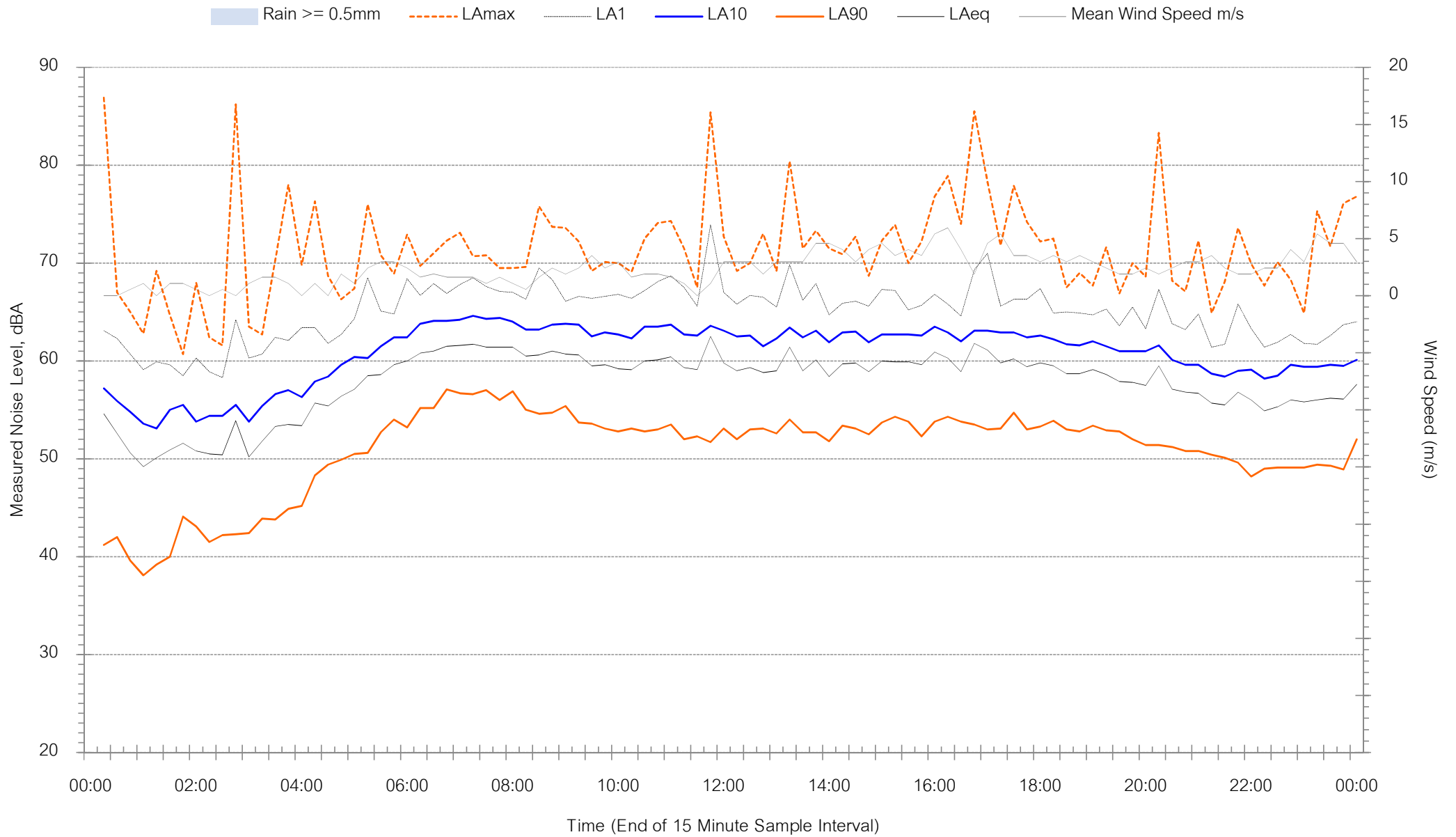
Location - N2 - Thursday 14 March 2019





Background Noise Levels

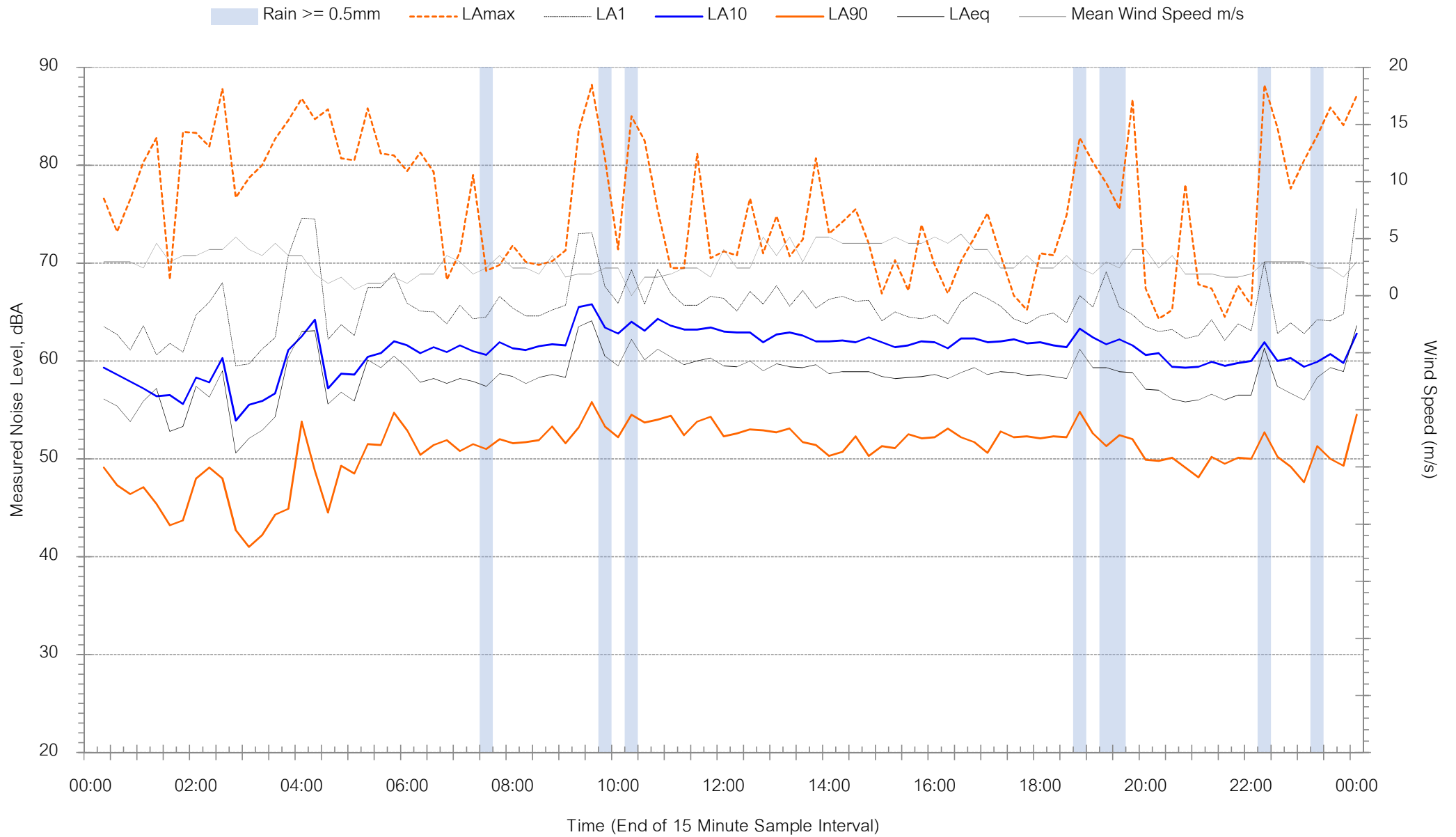
Location - N2 - Friday 15 March 2019





Background Noise Levels

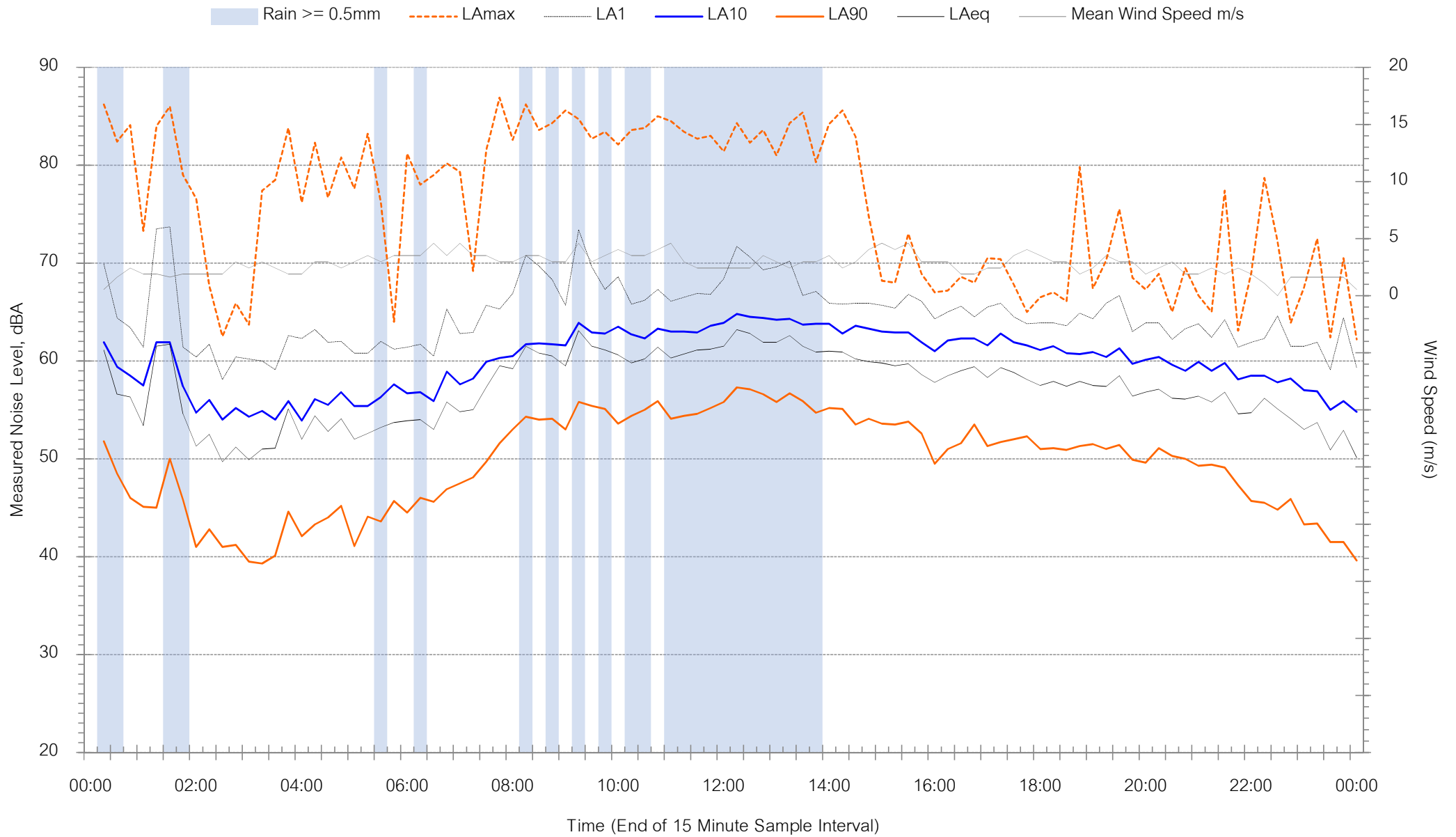
Location - N2 - Saturday 16 March 2019





Background Noise Levels

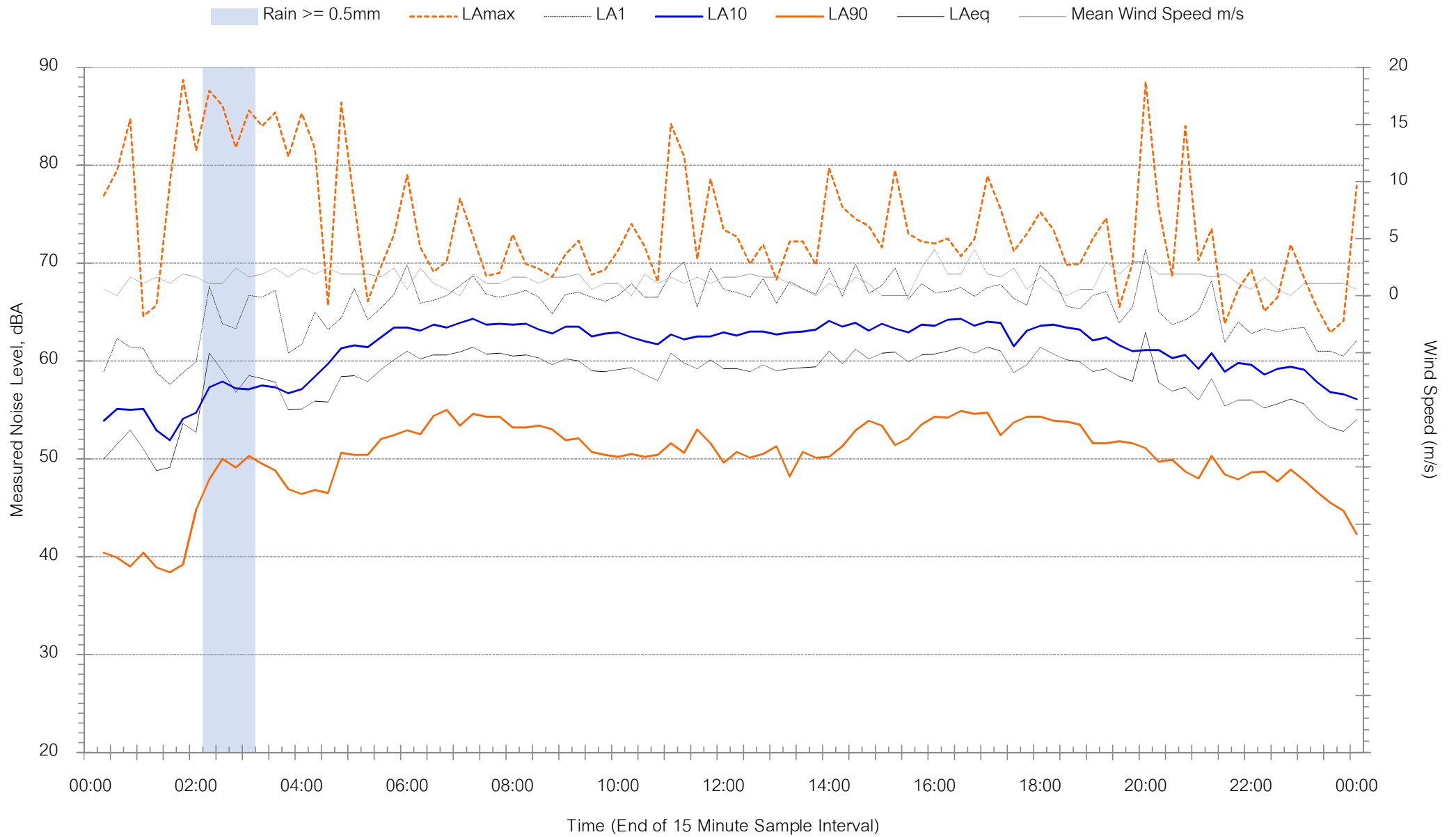
Location - N2 - Sunday 17 March 2019





Background Noise Levels

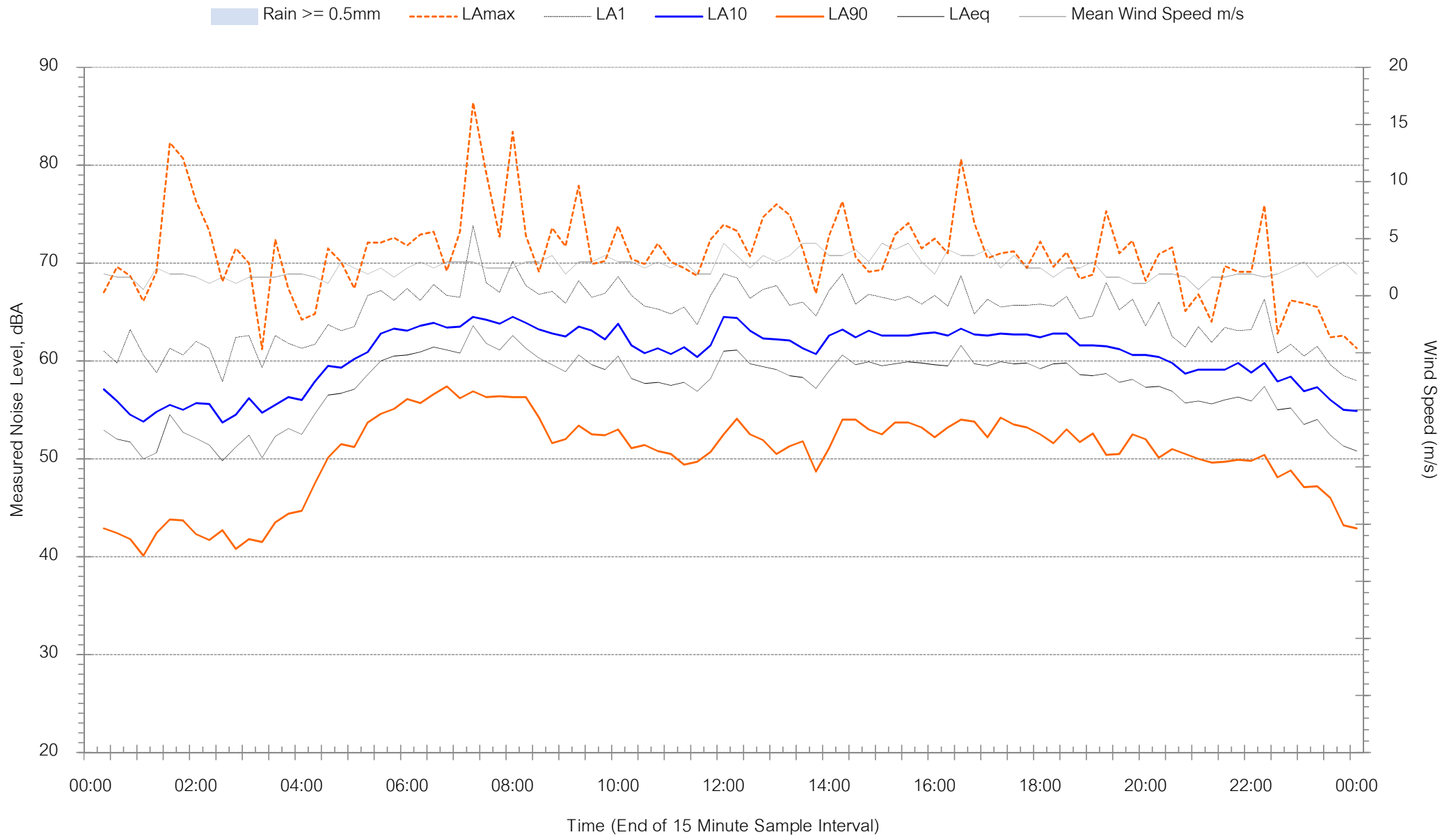
Location - N2 - Monday 18 March 2019





Background Noise Levels

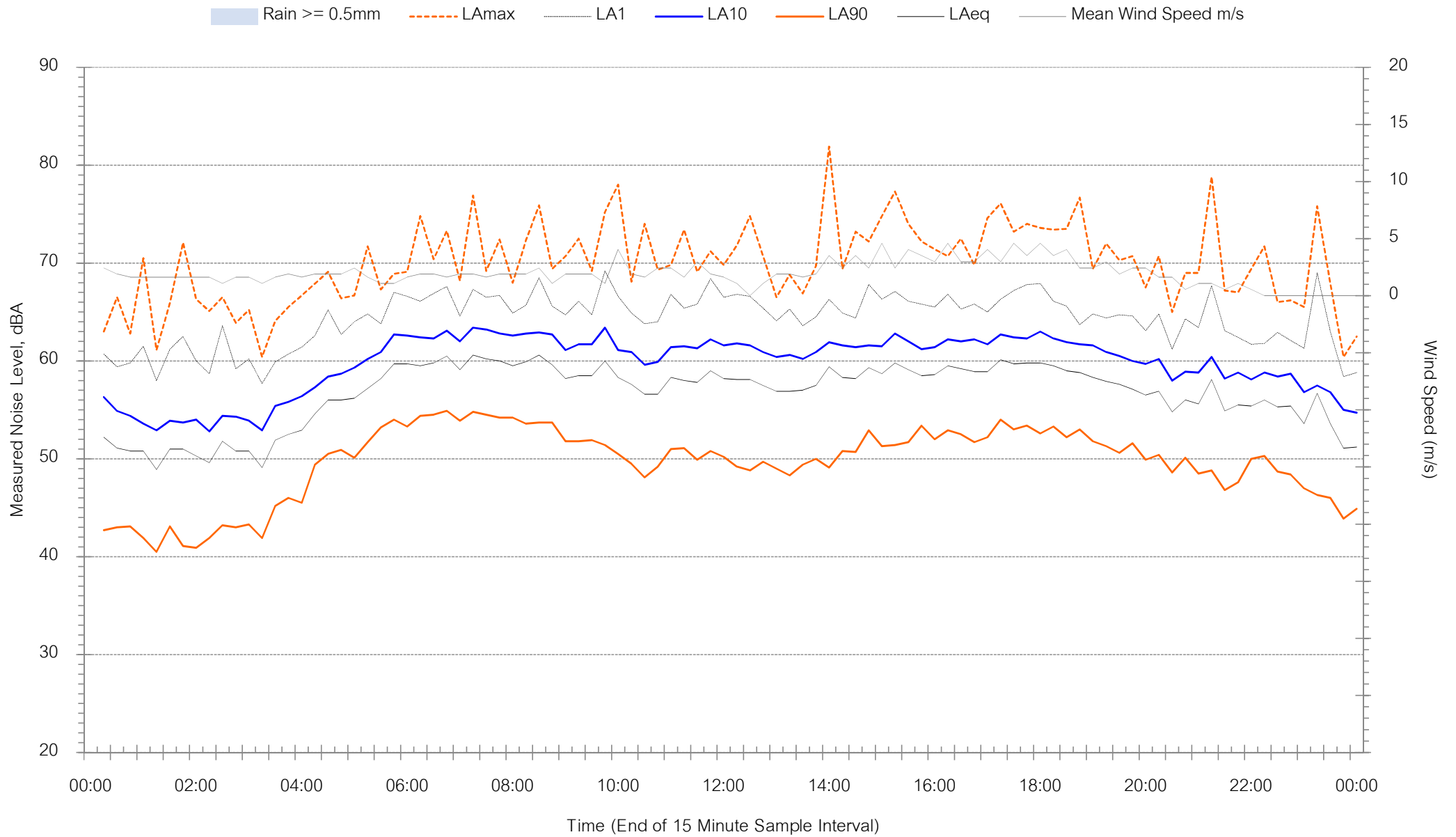
Location - N2 - Tuesday 19 March 2019





Background Noise Levels

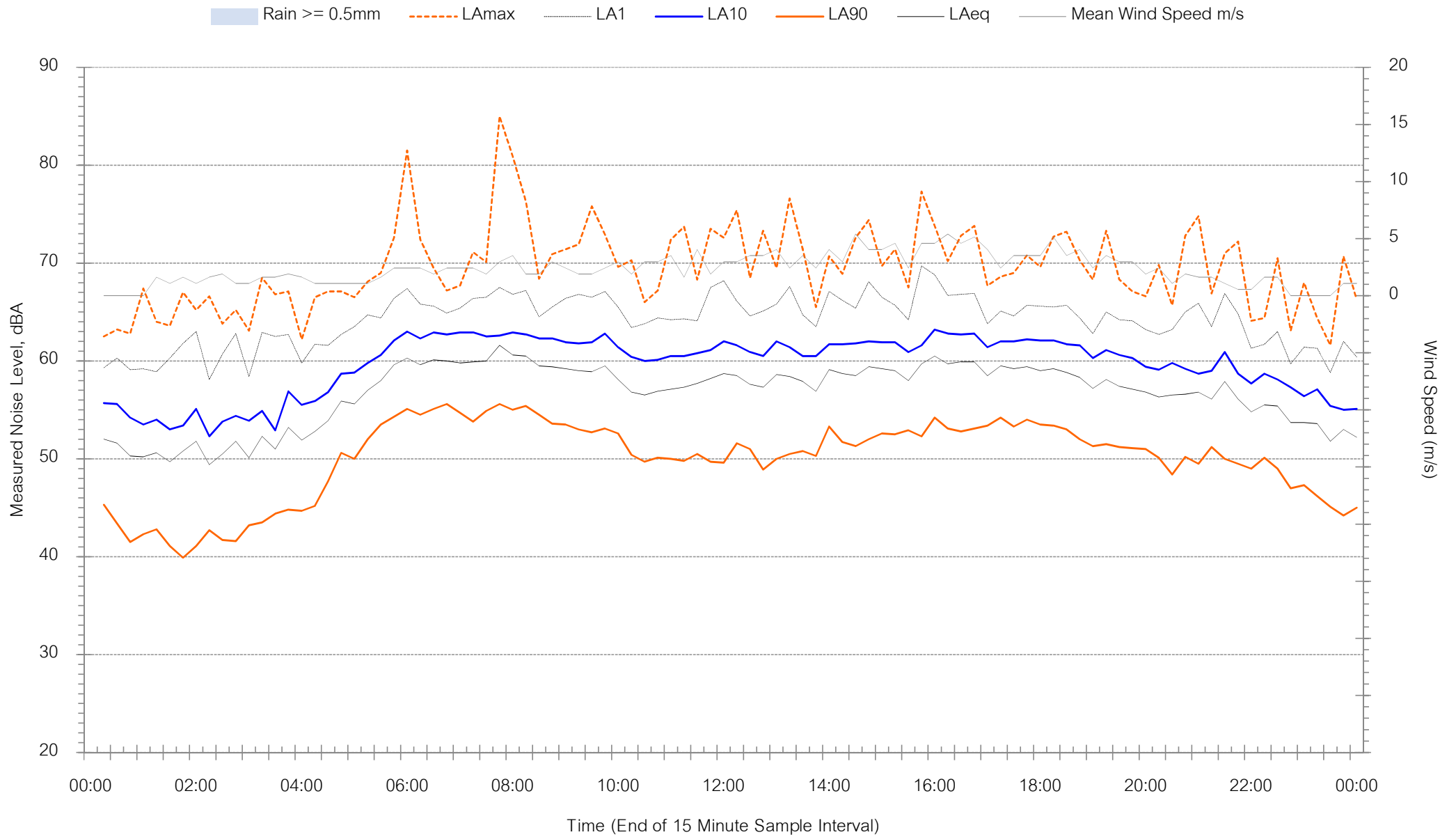
Location - N2 - Wednesday 20 March 2019





Background Noise Levels

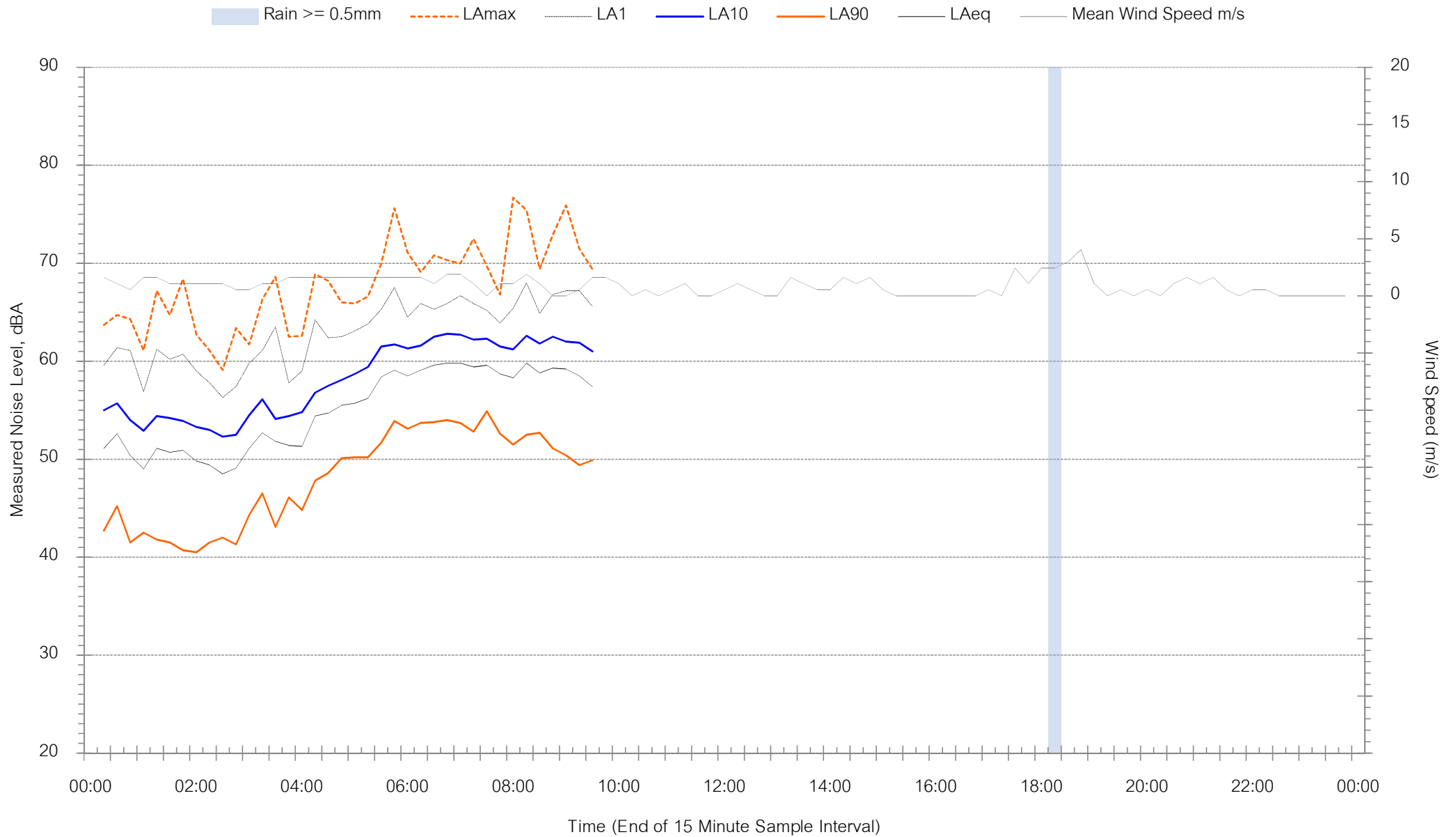
Location - N2 - Thursday 21 March 2019





Background Noise Levels

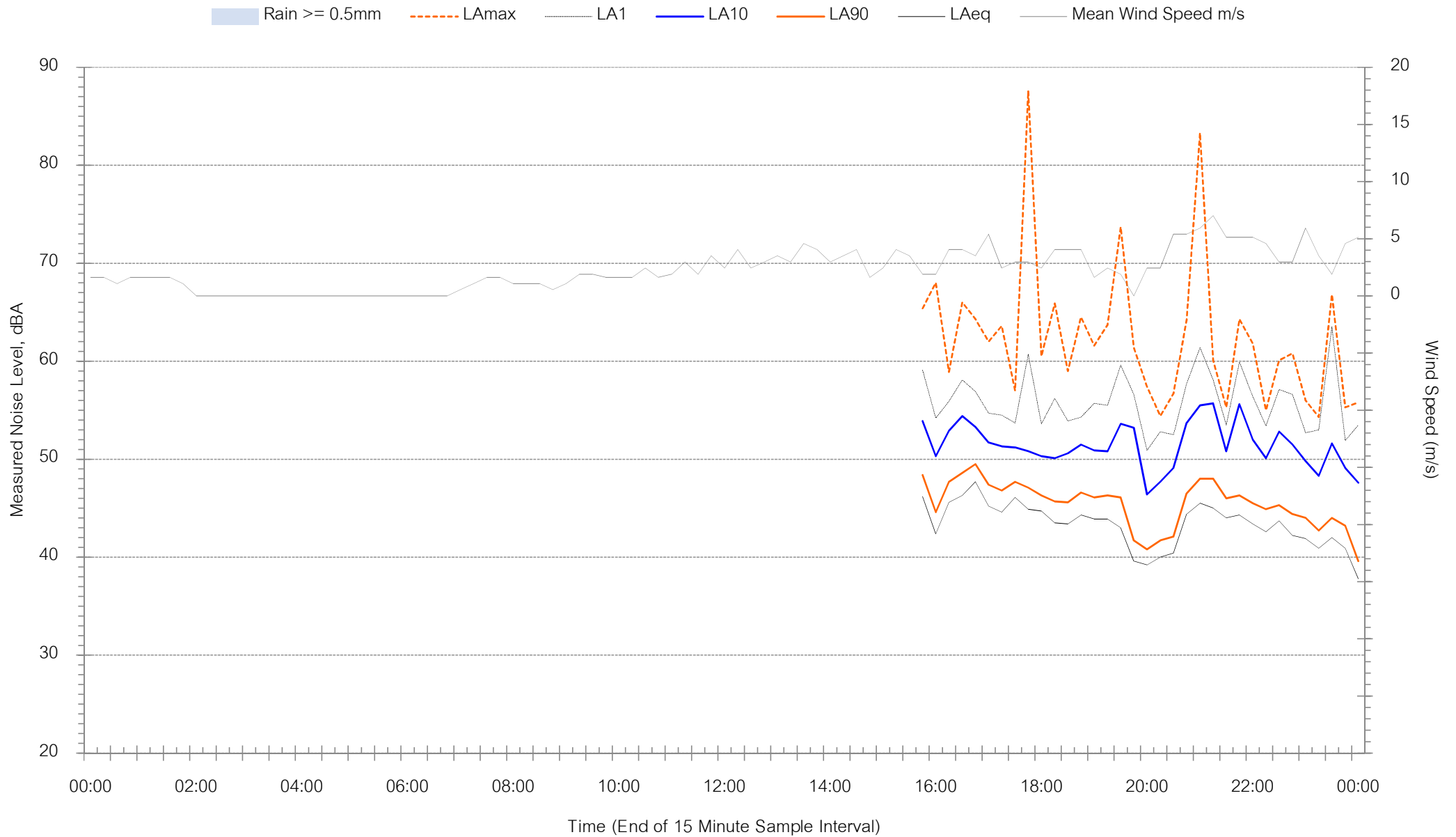
Location - N2 - Friday 22 March 2019





Background Noise Levels

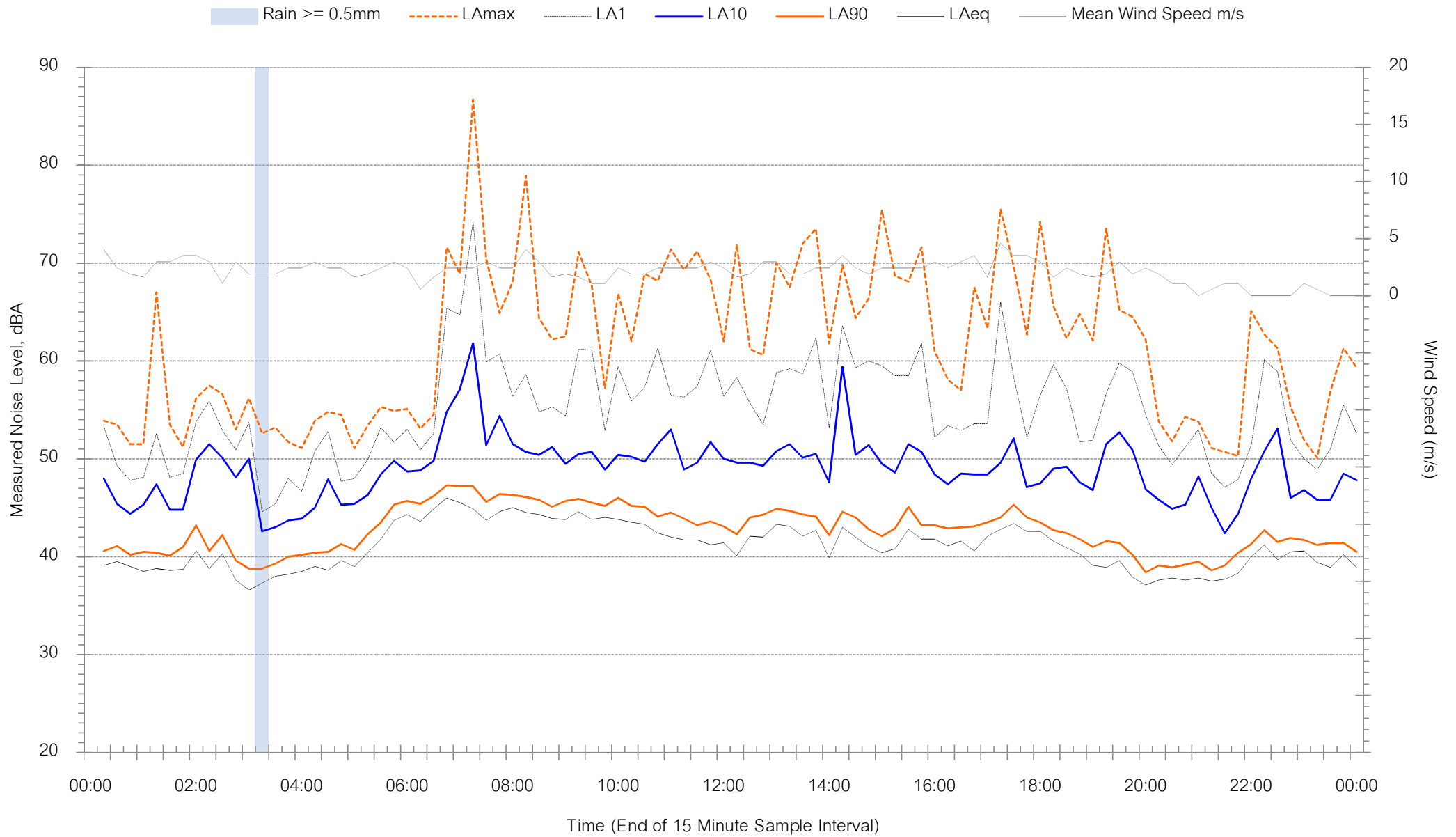
Location - N3 - Tuesday 12 March 2019





Background Noise Levels

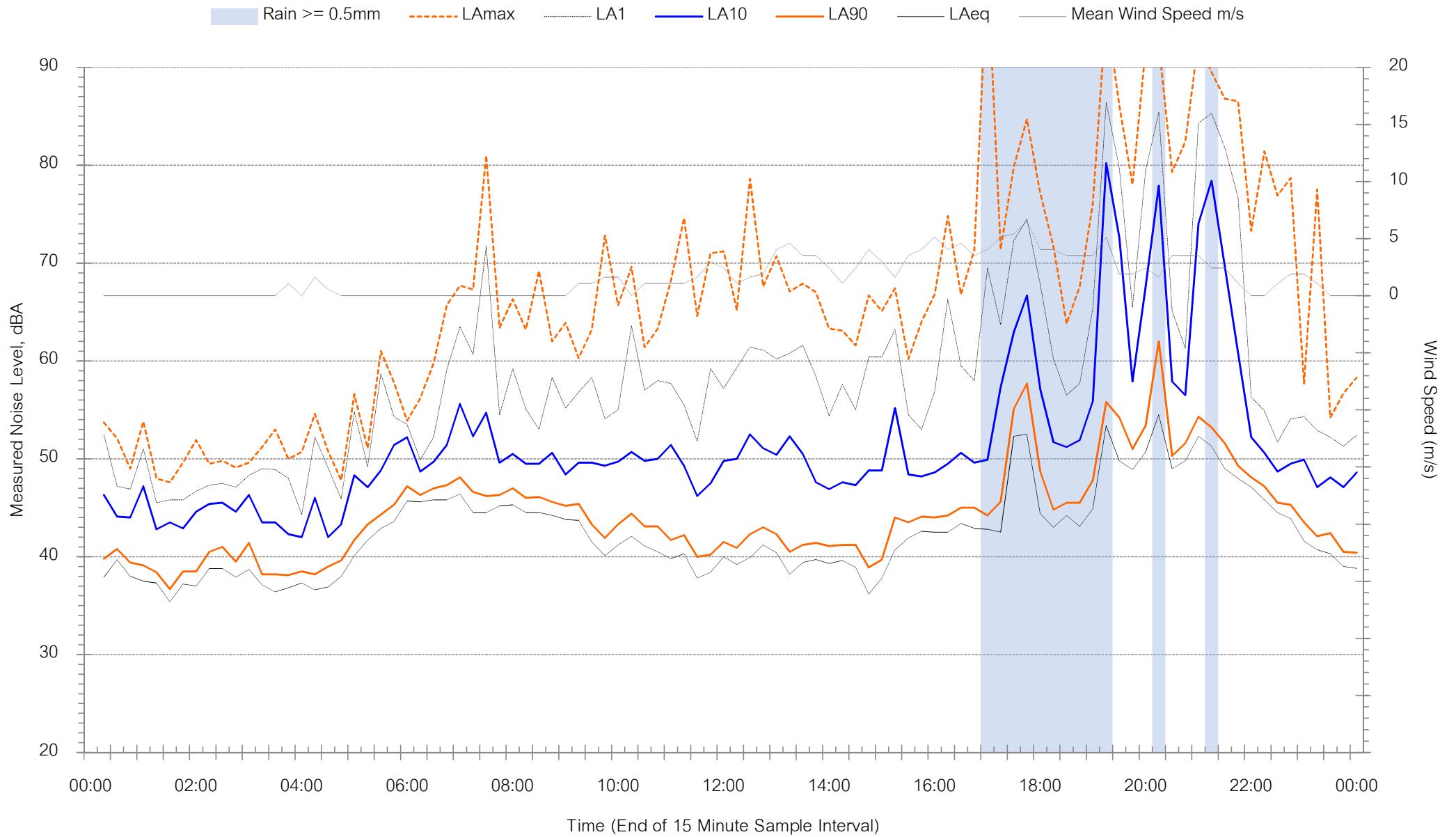
Location - N3 - Wednesday 13 March 2019





Background Noise Levels

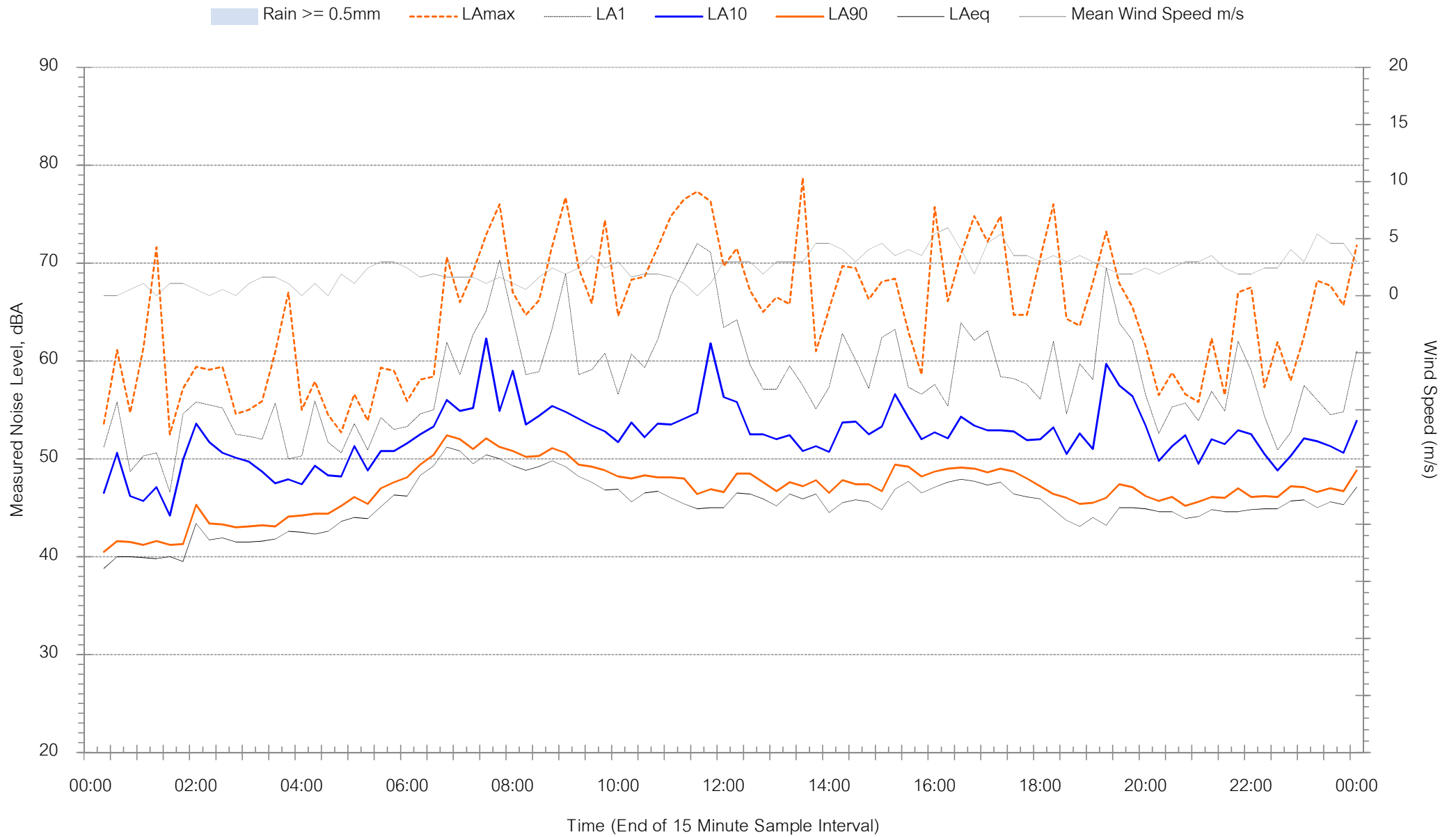
Location - N3 - Thursday 14 March 2019





Background Noise Levels

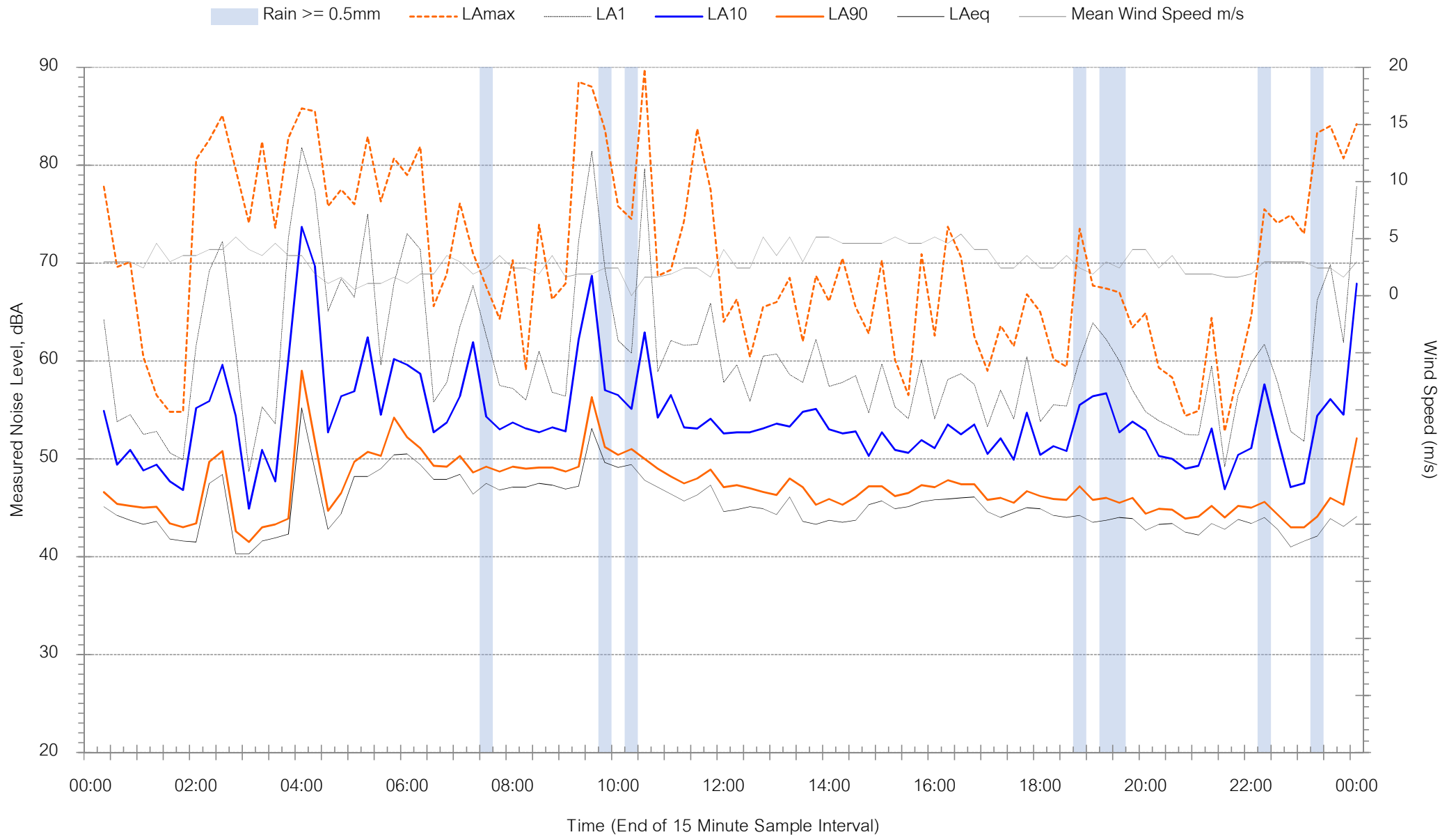
Location - N3 - Friday 15 March 2019





Background Noise Levels

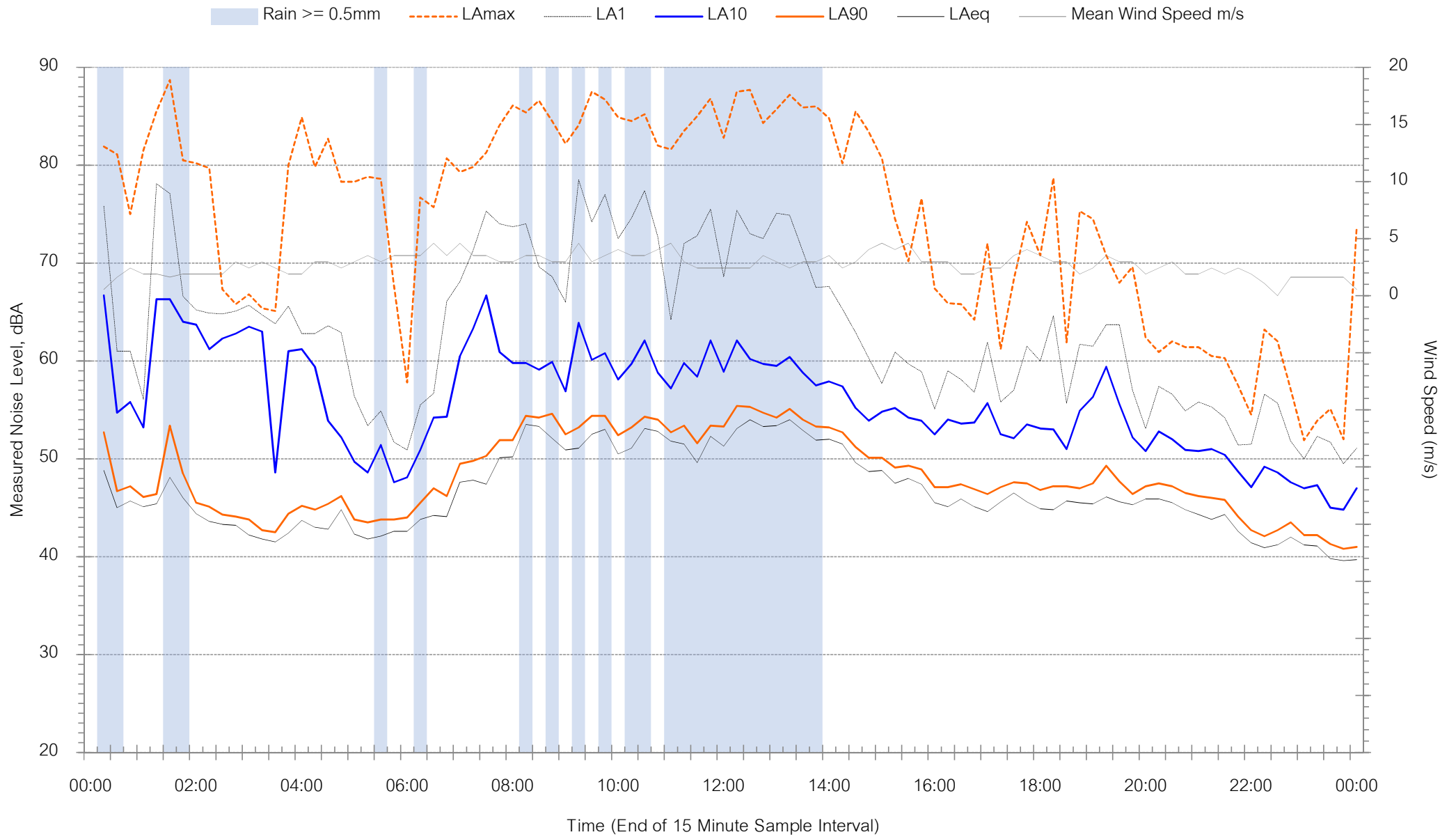
Location - N3 - Saturday 16 March 2019





Background Noise Levels

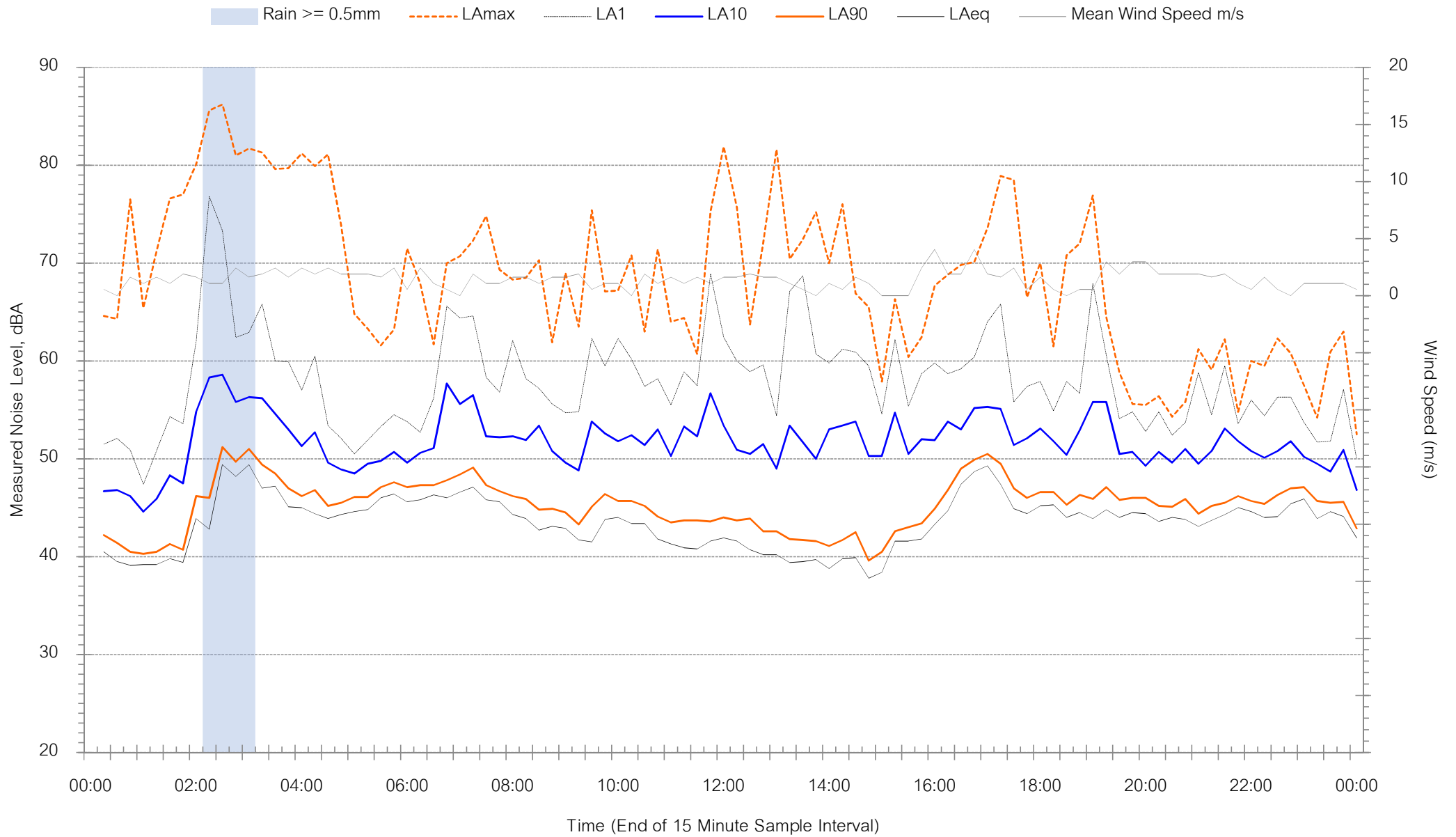
Location - N3 - Sunday 17 March 2019





Background Noise Levels

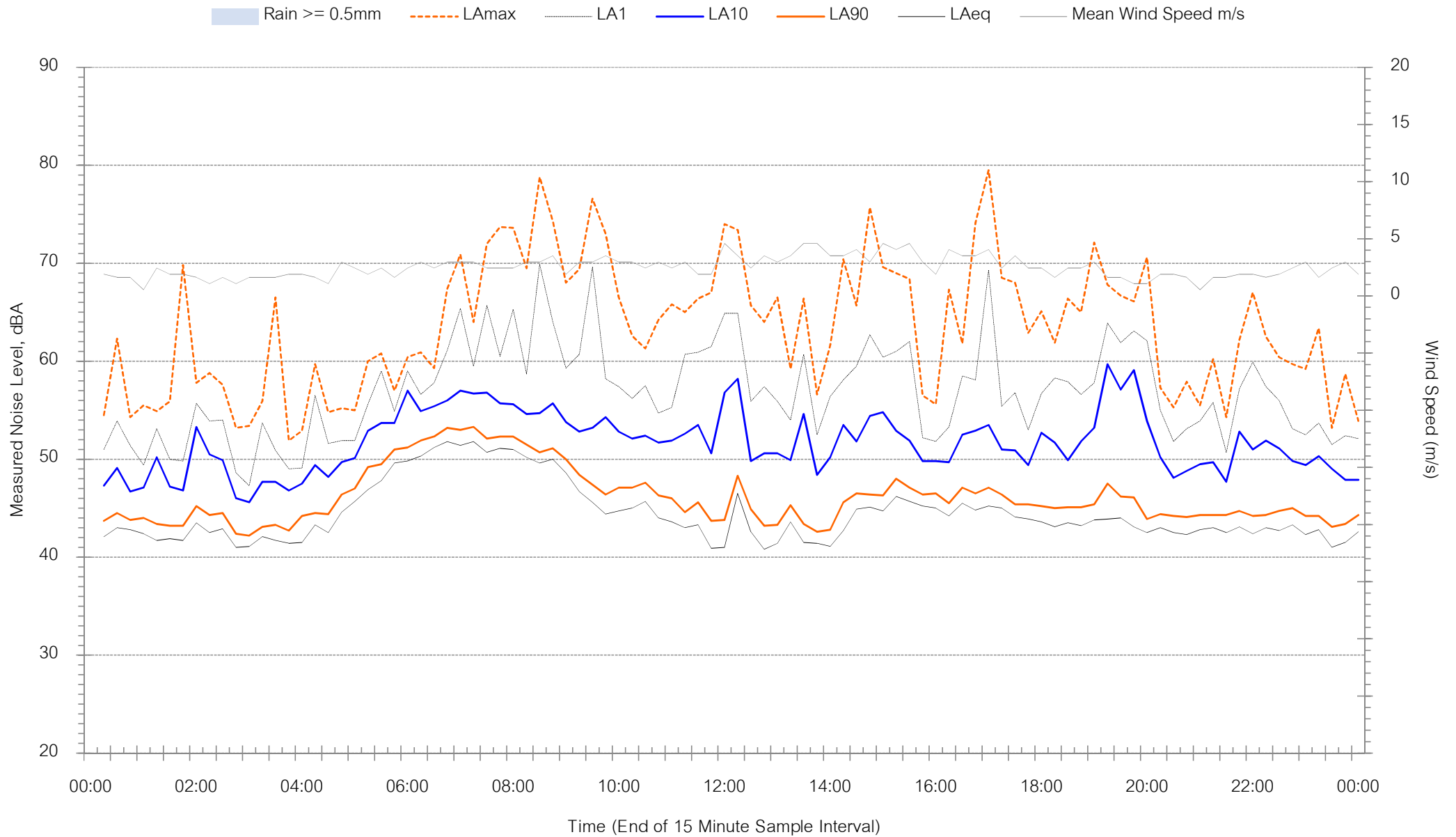
Location - N3 - Monday 18 March 2019





Background Noise Levels

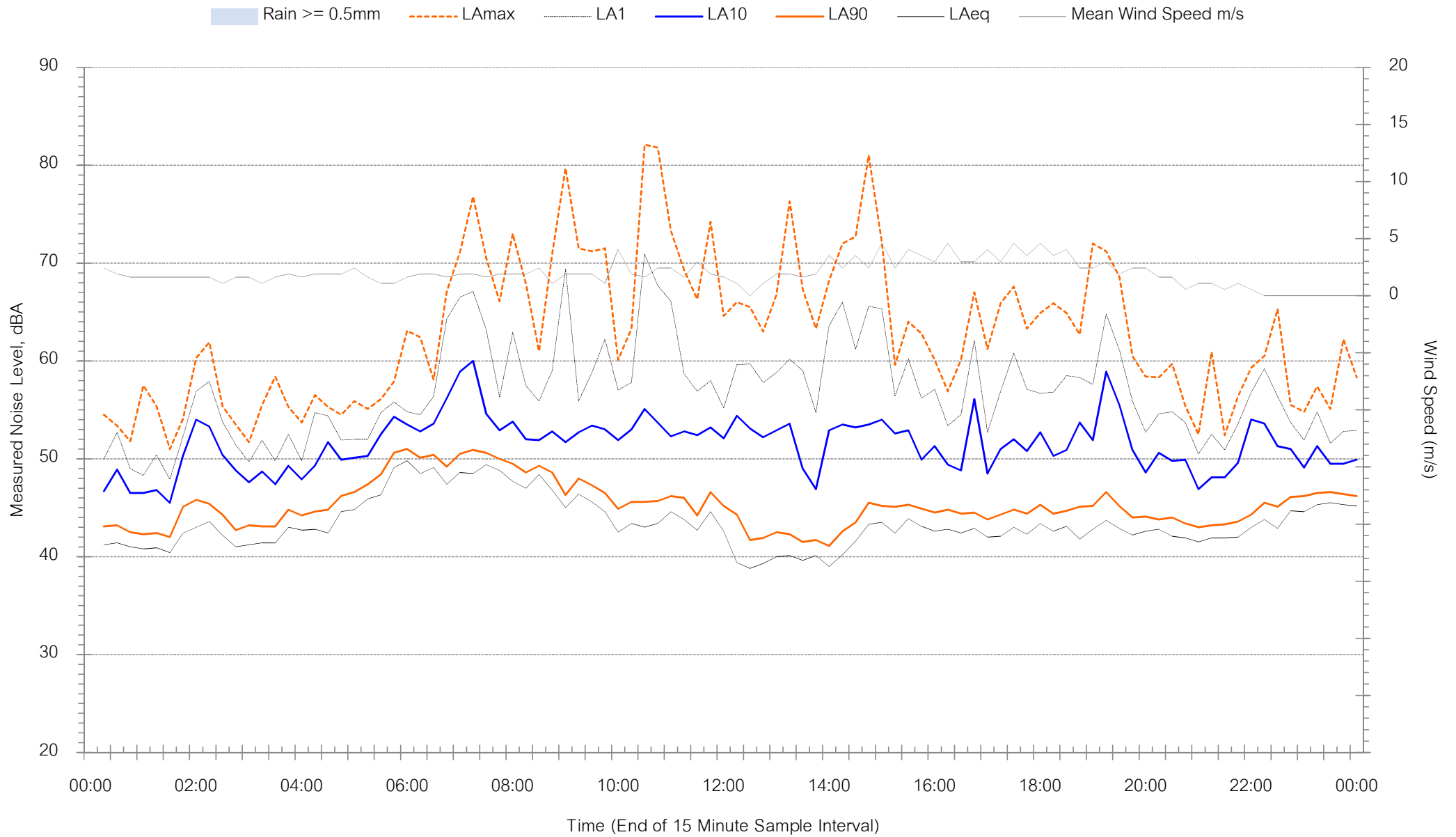
Location - N3 - Tuesday 19 March 2019





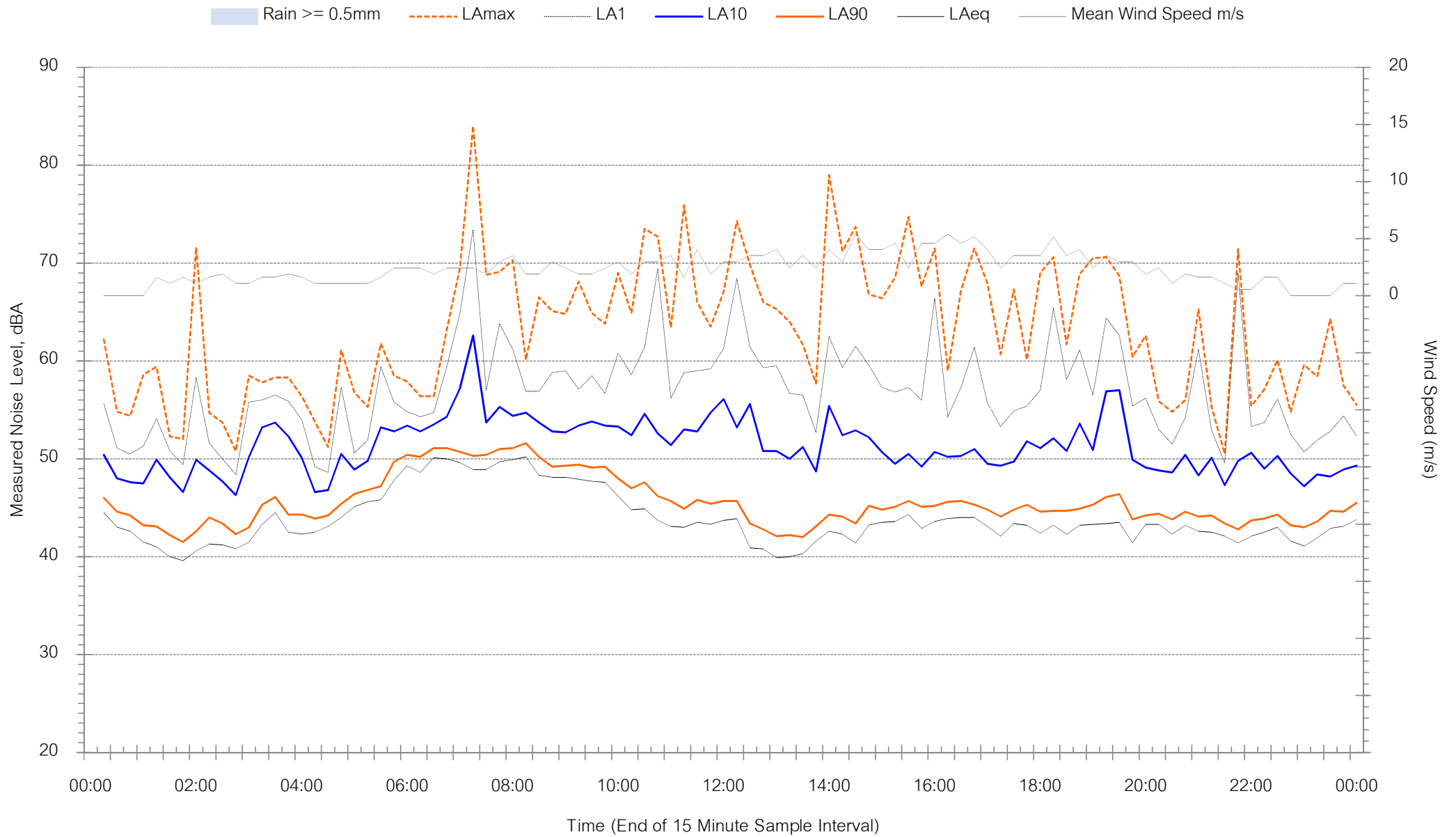
Background Noise Levels

Location - N3 - Wednesday 20 March 2019





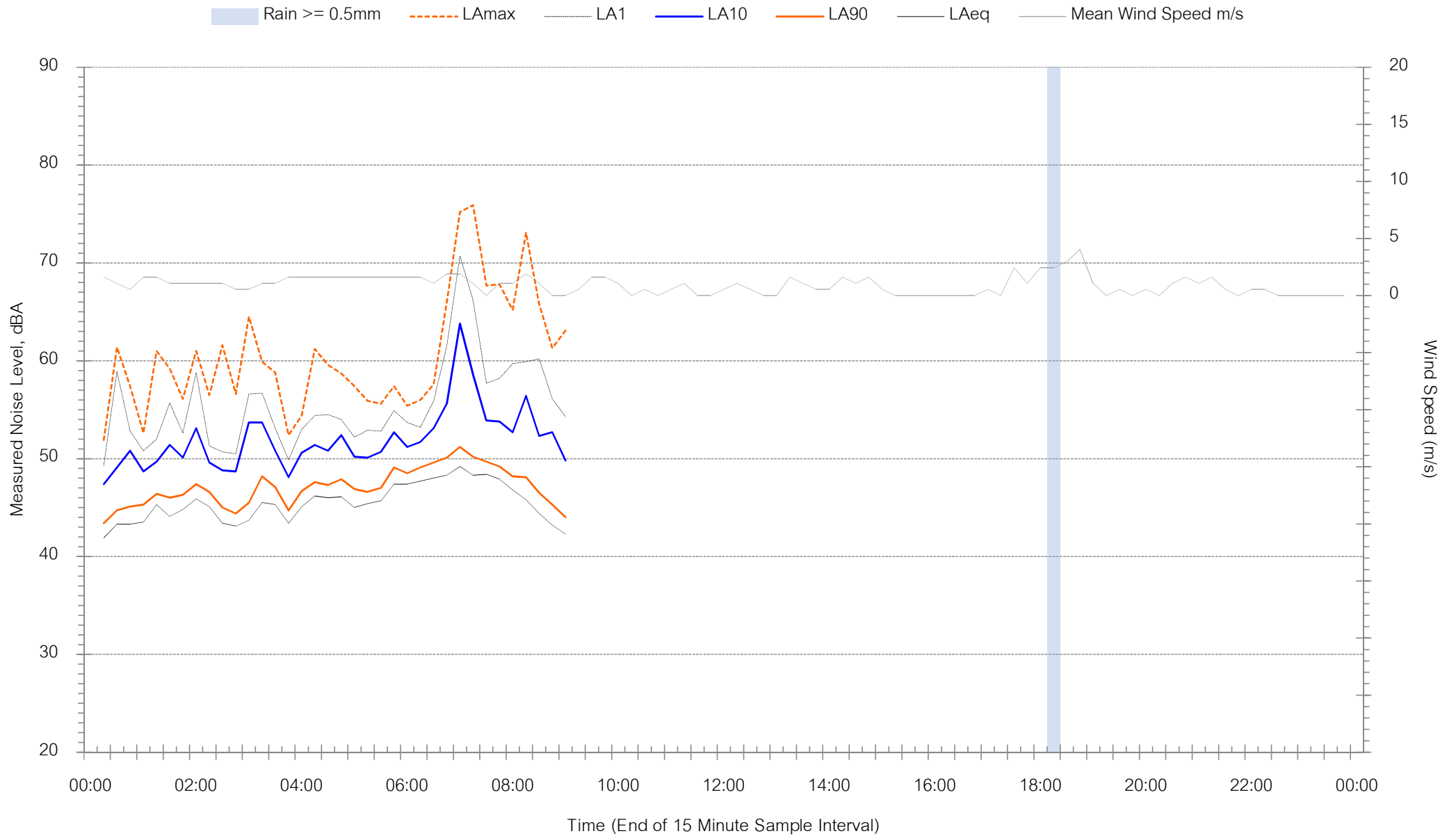
Background Noise Levels
Location - N3 - Thursday 21 March 2019





Background Noise Levels

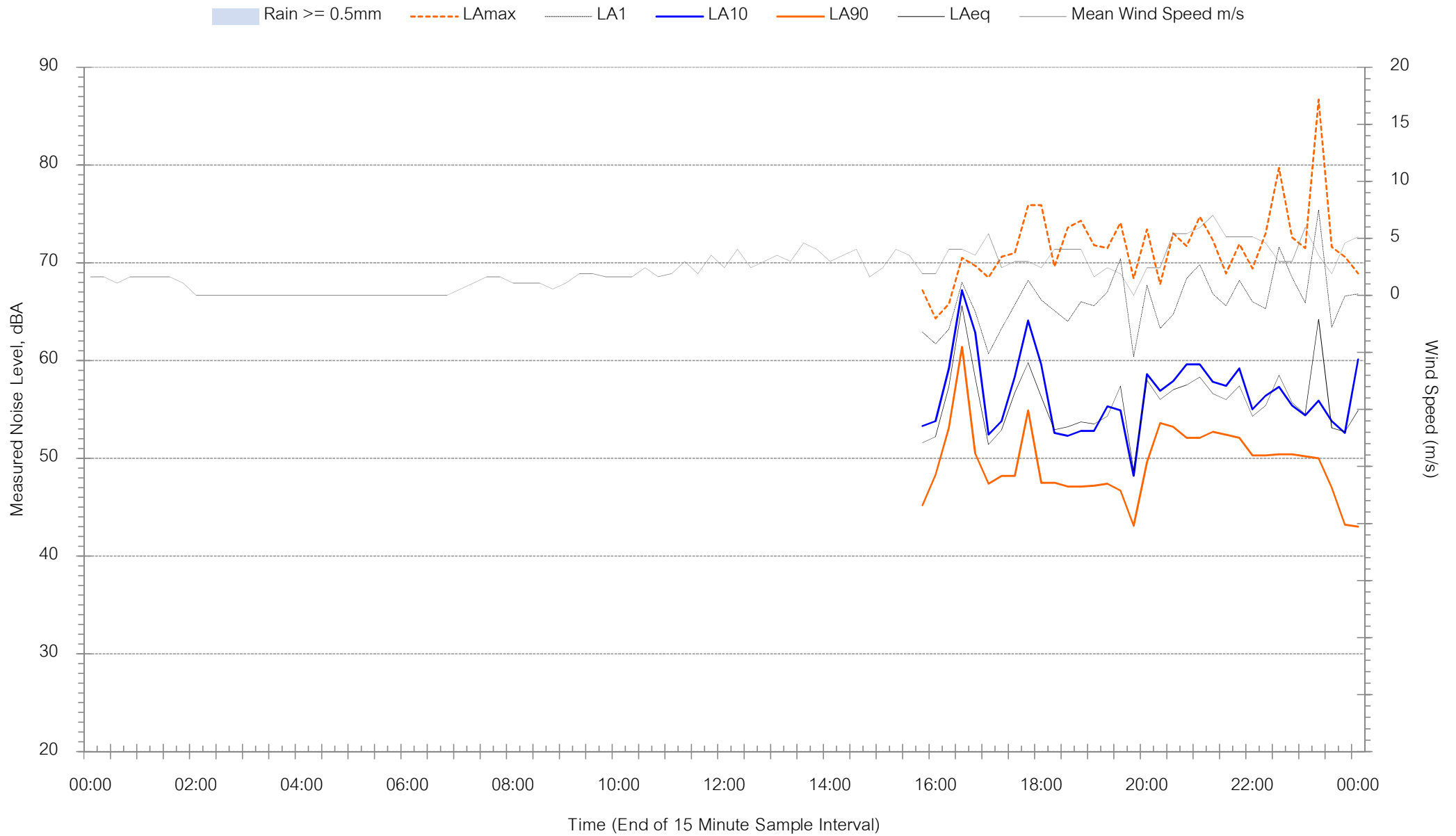
Location - N3 - Friday 22 March 2019





Background Noise Levels

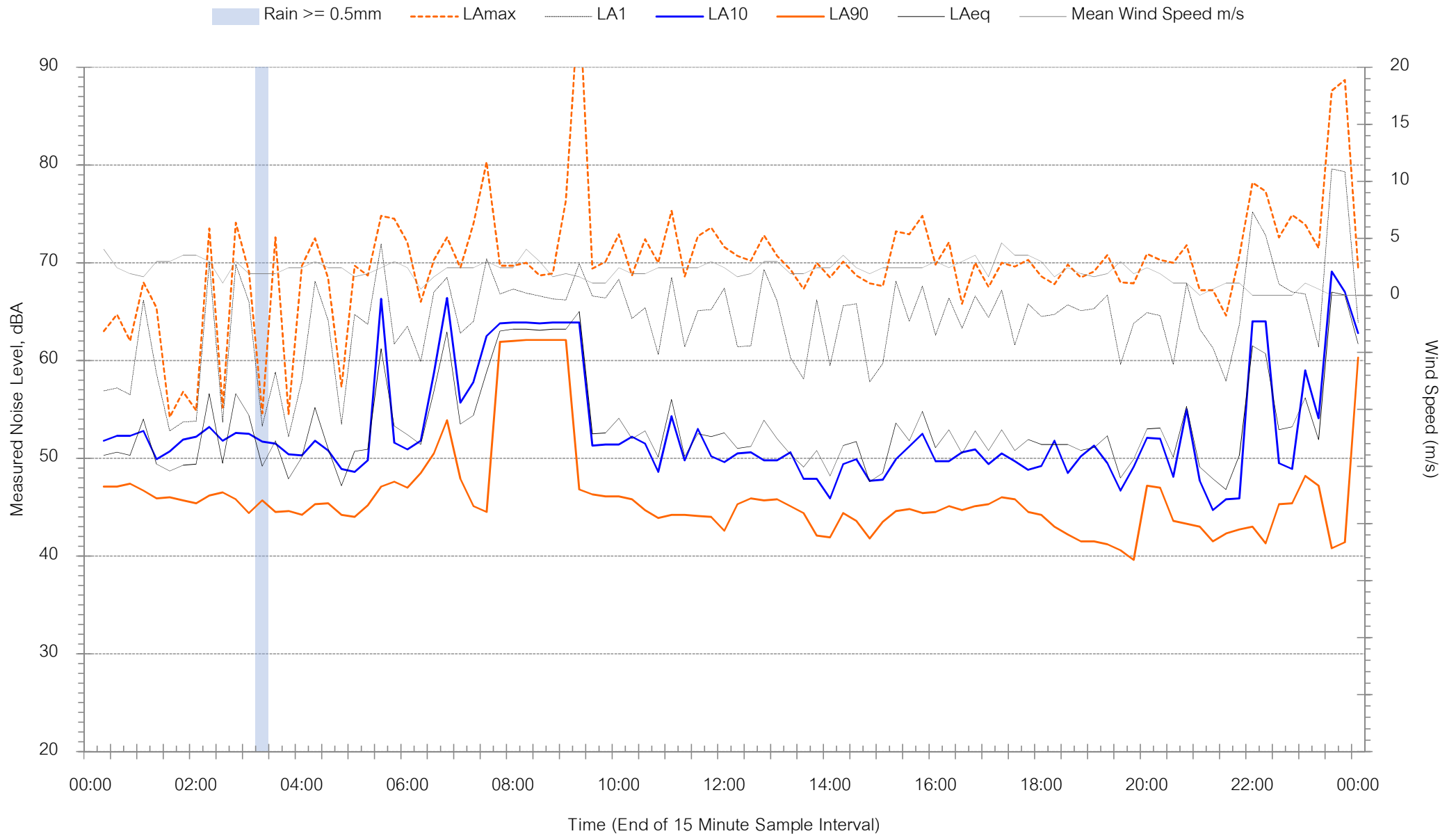
Location - N4 - Tuesday 12 March 2019





Background Noise Levels

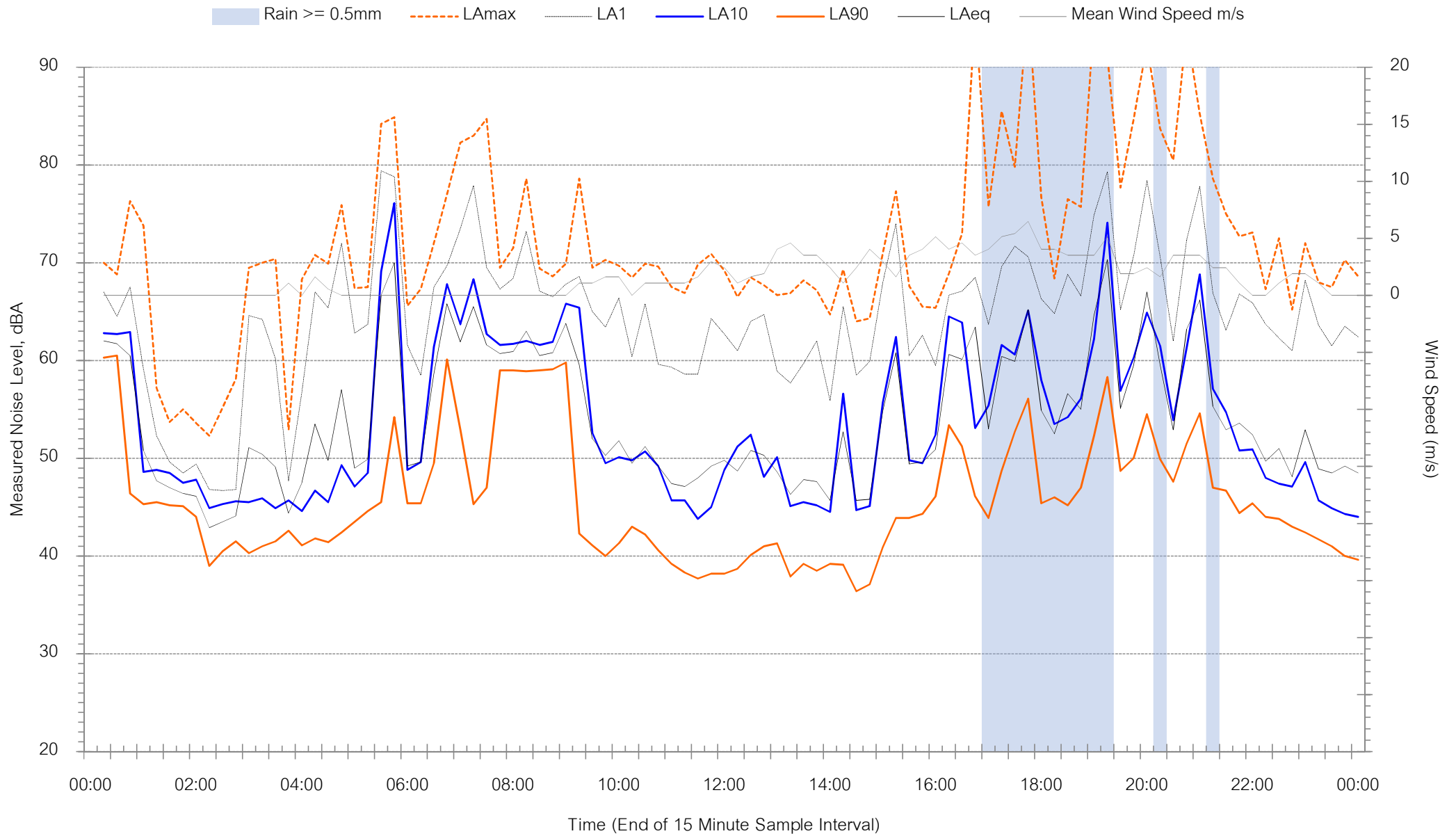
Location - N4 - Wednesday 13 March 2019





Background Noise Levels

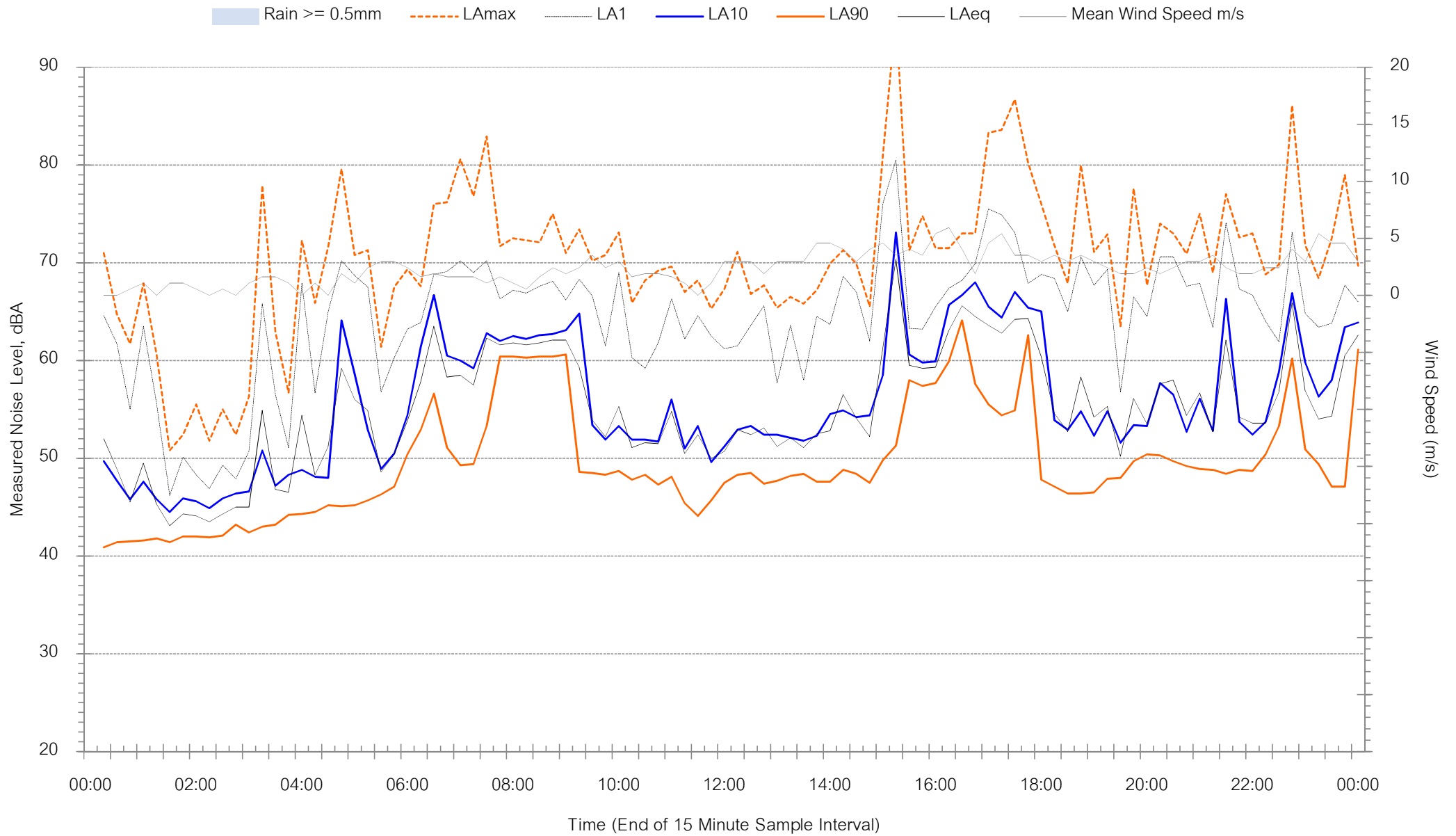
Location - N4 - Thursday 14 March 2019





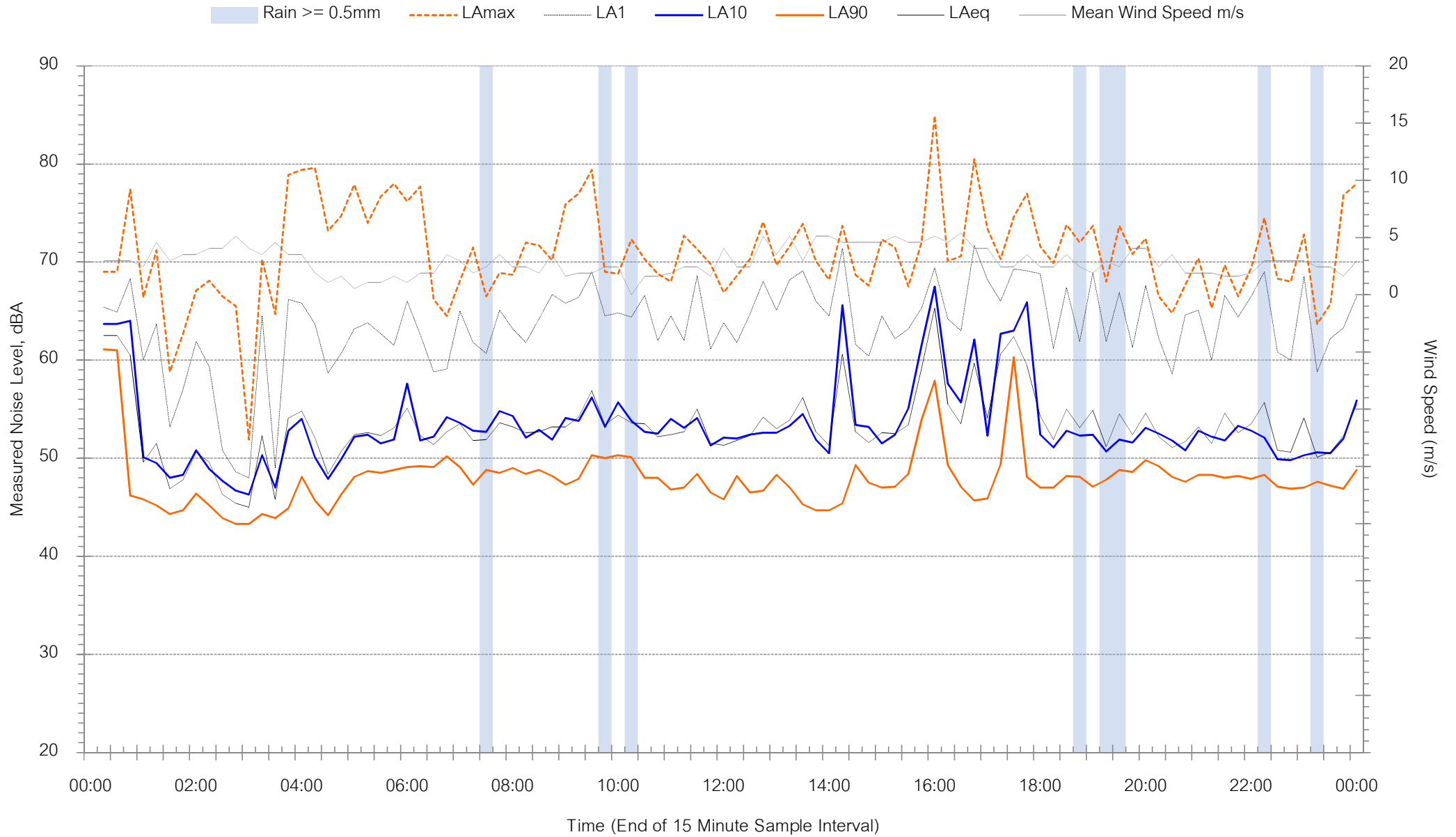
Background Noise Levels

Location - N4 - Friday 15 March 2019





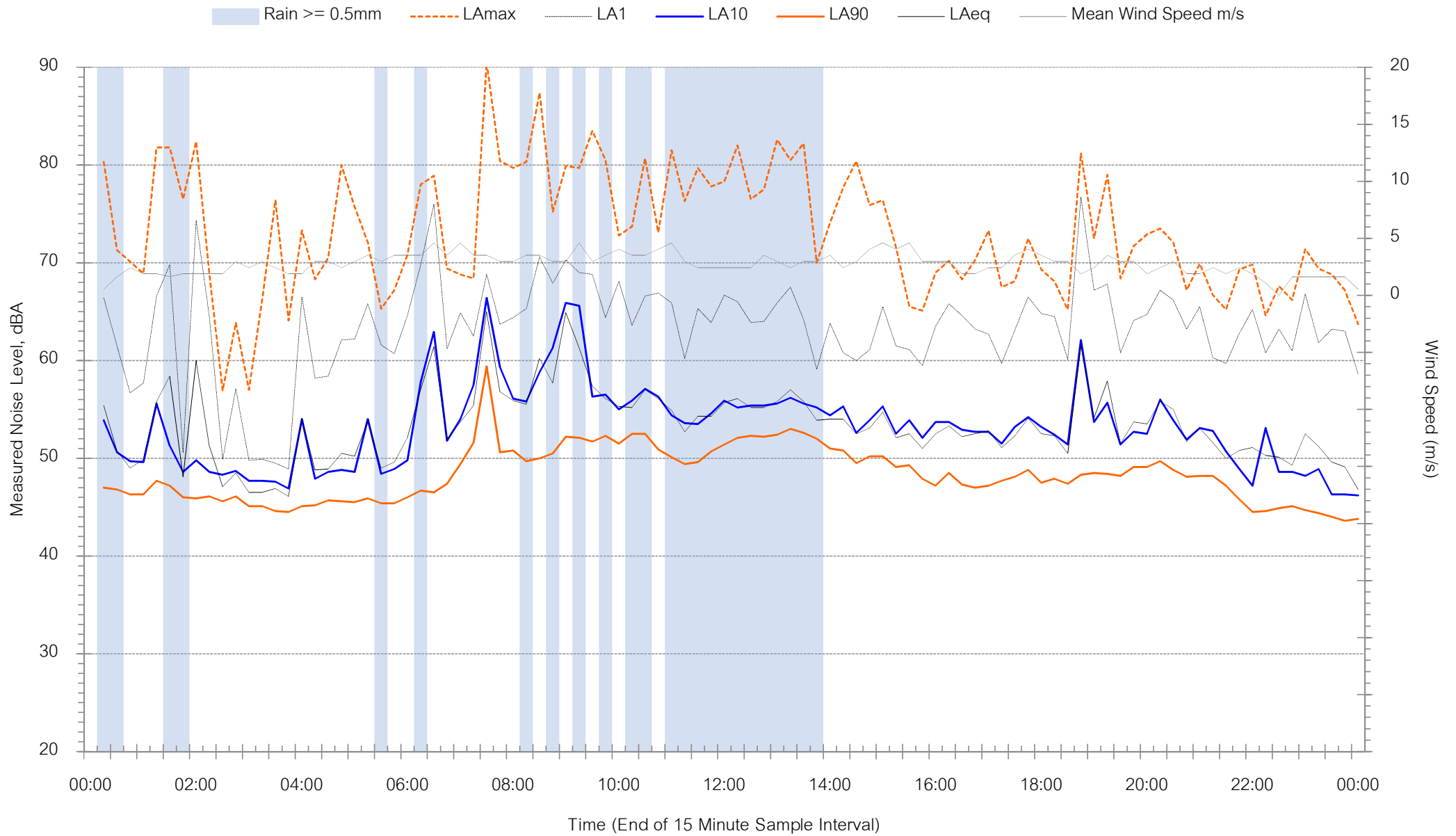
Background Noise Levels
Location - N4 - Saturday 16 March 2019





Background Noise Levels

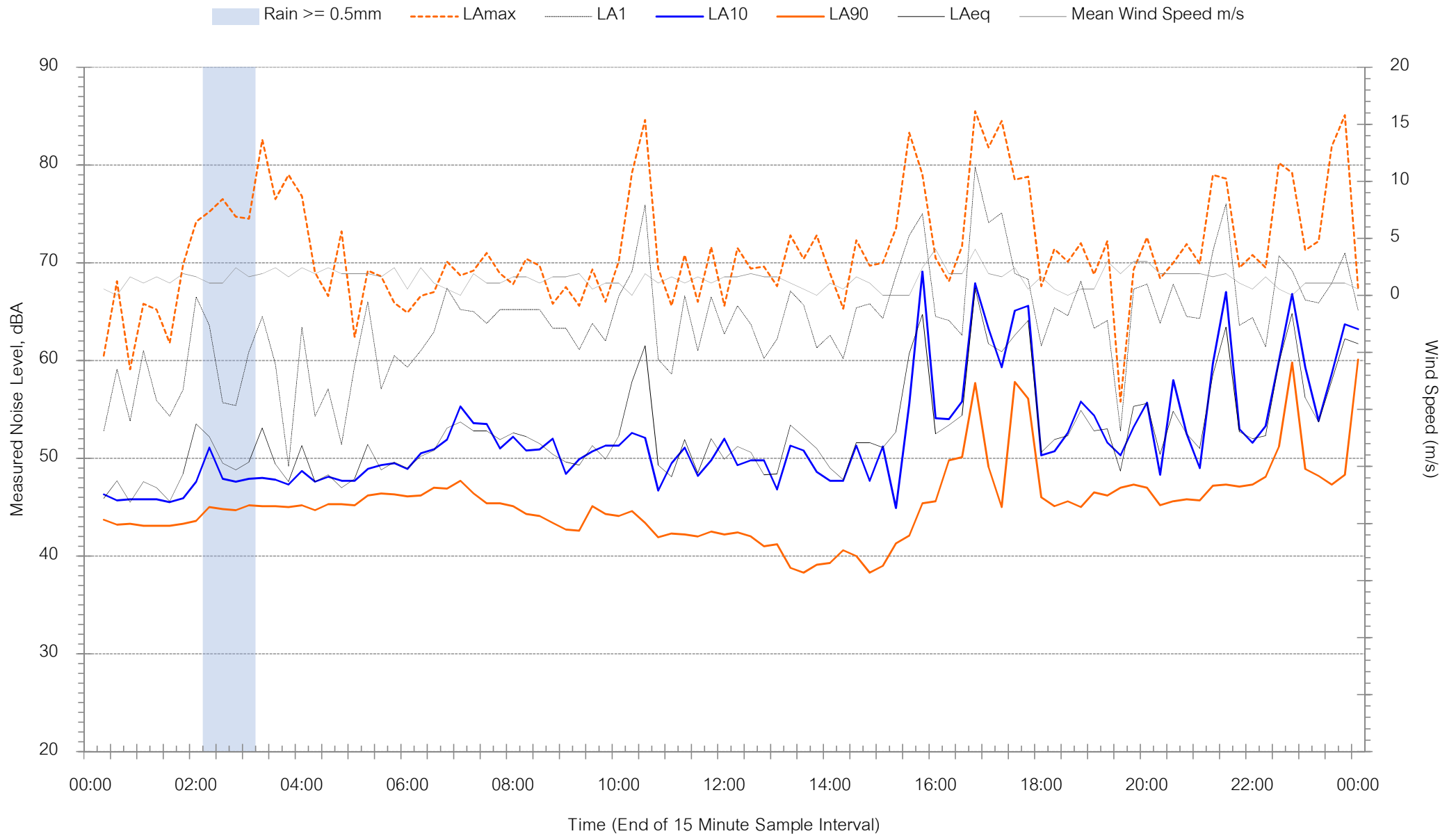
Location - N4 - Sunday 17 March 2019





Background Noise Levels

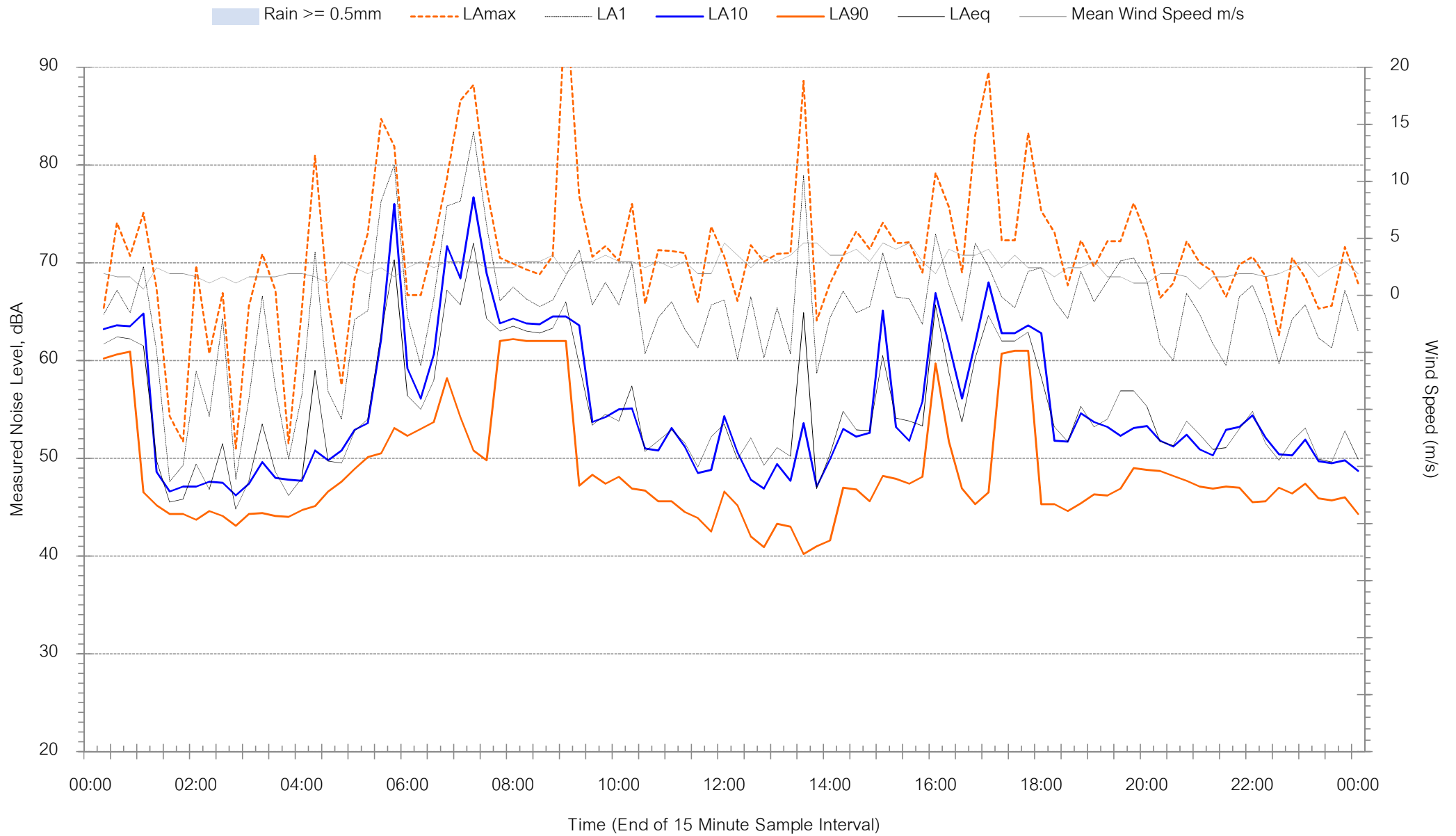
Location - N4 - Monday 18 March 2019





Background Noise Levels

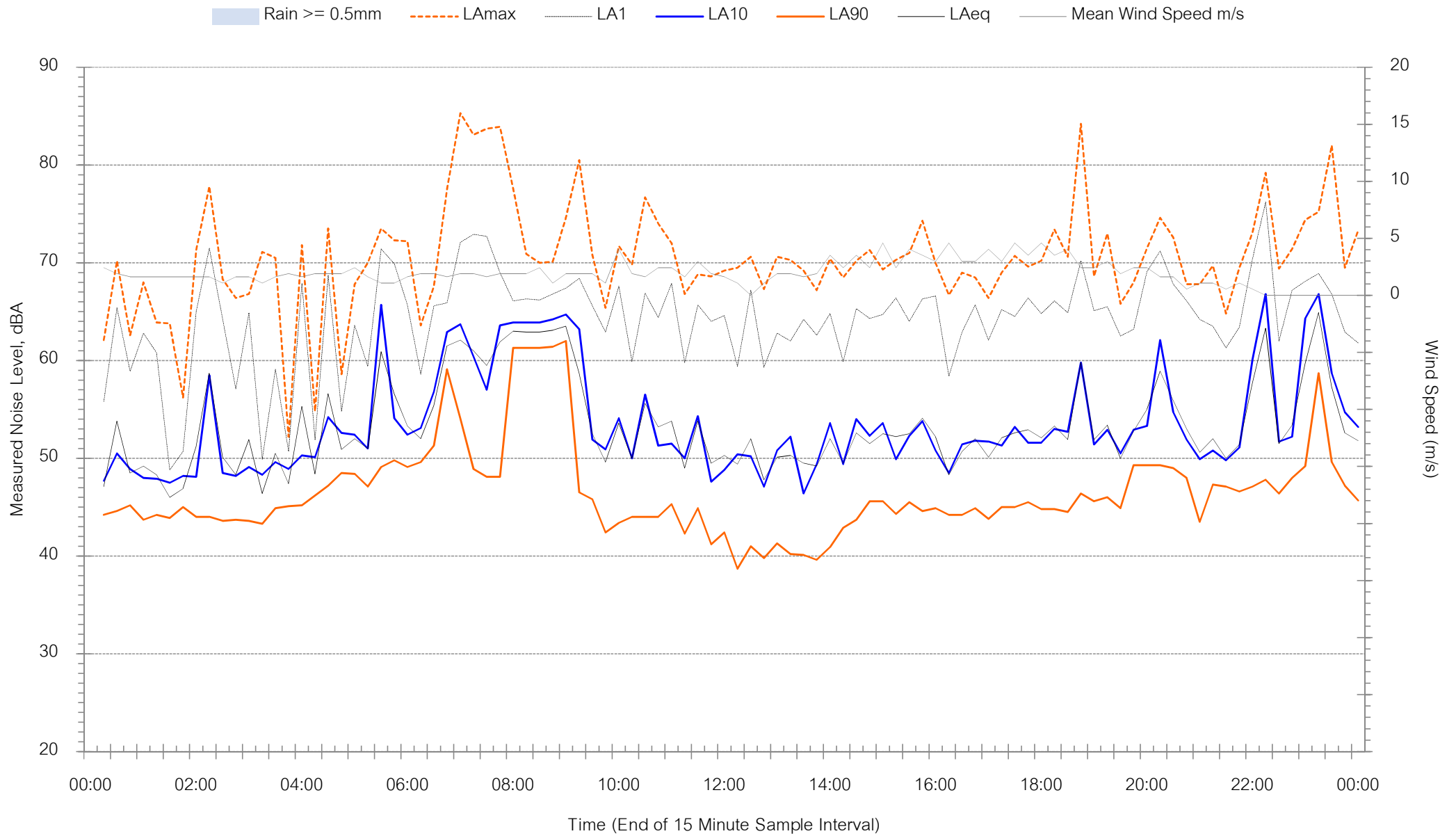
Location - N4 - Tuesday 19 March 2019





Background Noise Levels

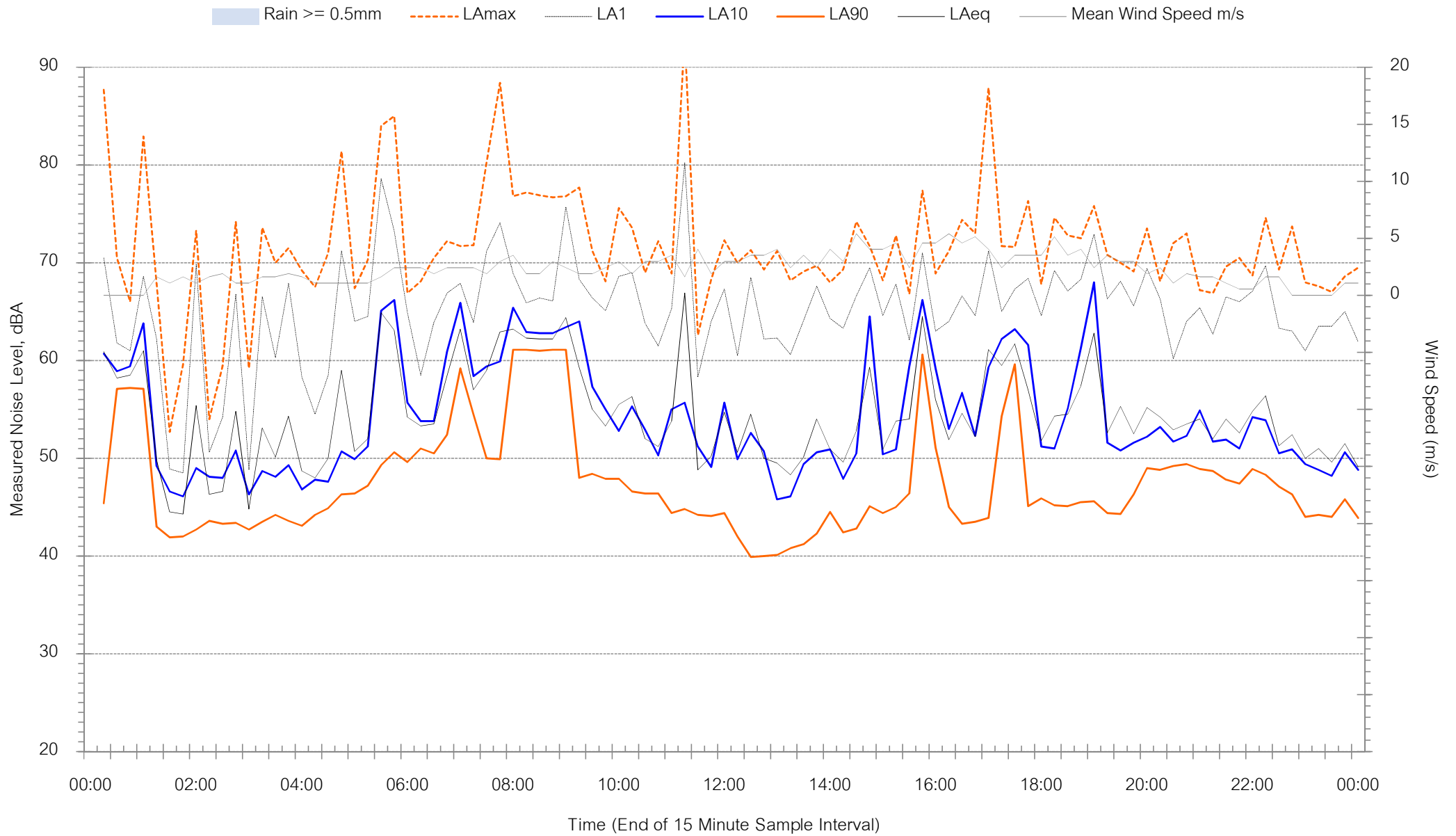
Location - N4 - Wednesday 20 March 2019





Background Noise Levels

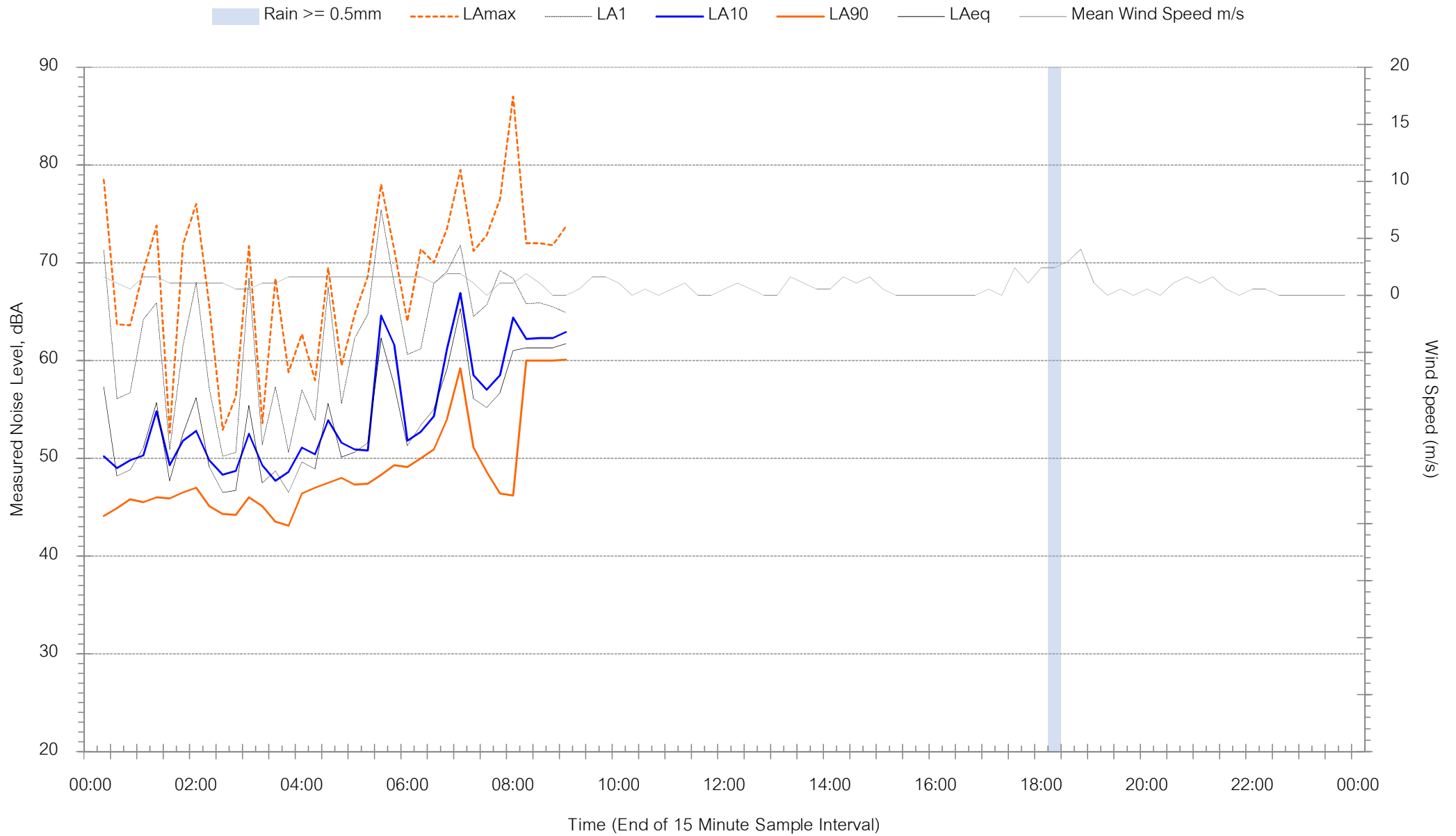
Location - N4 - Thursday 21 March 2019





Background Noise Levels

Location - N4 - Friday 22 March 2019



Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

