

Noise Monitoring Assessment

Rooty Hill Distribution Centre, Rooty Hill, NSW
Quarter 2 Ending June 2020.

Document Information

Noise Monitoring Assessment

Rooty Hill Distribution Centre, Rooty Hill, NSW

Quarter 2 Ending June 2020

Prepared for: Holcim (Australia) Pty Ltd



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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 June 2020 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/NZS IEC 61672.1:2019 (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**.

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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.

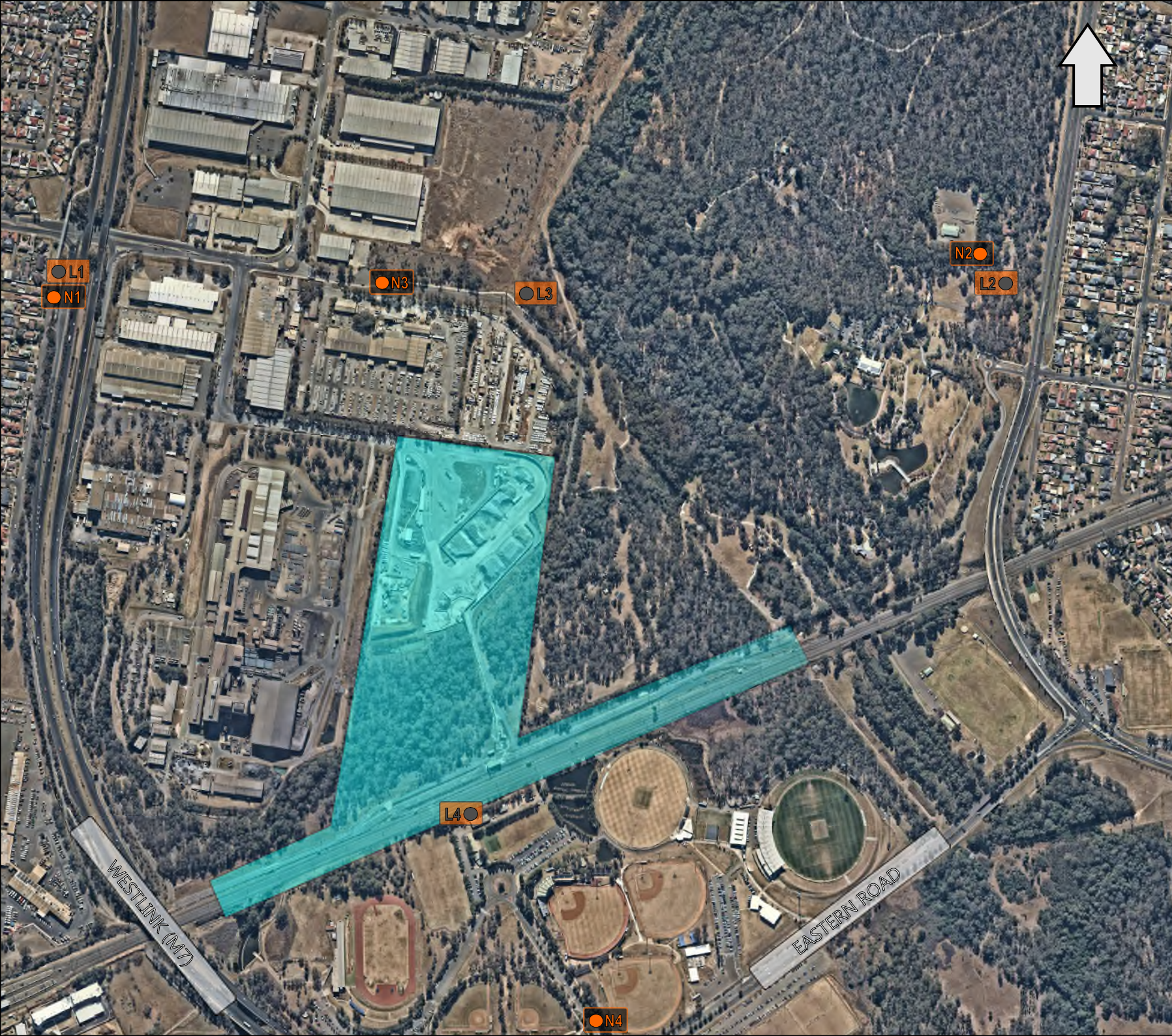


FIGURE 1

LOCALITY PLAN
REF: MAC180611-01



KEY

- MONITORING LOCATION
- LOGGER LOCATION
- SITE LOCATION



*Imagery Source: nearmaps

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 1055:2018 and the RDC Consolidated Consent. The measurements were carried out using a Svantek Type 1, 971 noise analyser on Tuesday 14 April 2020 and Wednesday 15 April 2020. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1:2019 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 a minimum of seven days in general accordance with the procedures described AS 1055:2018 and the RDC Consolidated Consent. Noise measurements were carried out using Type 1 Svantek 977 and Svantek 957 noise analysers from Tuesday 14 April 2020 to Wednesday 22 April 2020. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1:2019. 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.

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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}		
15/04/2020	09:13 (Day)	70	56	50	WD: N	Traffic 40-70
					WS: 0.5m/s	Birds 40-68
					Rain: Nil	People 43-54
						Residential noise 45-52
RDC Inaudible						
RDC L _{Aeq} (15min) Contribution						<40
14/04/2020	19:48 (Evening)	78	50	44	WD: SE	Insects <40
					WS: 0.5m/s	Traffic 40-60
					Rain: Nil	People 40-78
						RDC Inaudible
RDC L _{Aeq} (15min) Contribution						<35
14/04/2020	22:01 (Night)	68	51	43	WD: NE	Traffic 37-68
					WS: <0.1m/s	Roadworks 37-48
					Rain: Nil	Insects <35
						Residential Noise 39-53
RDC Inaudible						
RDC L _{Aeq} (15min) Contribution						<35
RDC L _{A1} (1min) Contribution						<50

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 μ Pa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
15/04/2020	10:22 (Day)	70	56	48	WD: N WS: 0.5m/s Rain: Nil	Traffic 37-70
						Residential Noise 38-46
						Birds 37-54
						Distant Construction 37-45
						RDC Inaudible
RDC L _{Aeq} (15min) Contribution						<38
14/04/2020	21:02 (Evening)	66	54	45	WD: E WS: <0.1m/s Rain: Nil	Traffic 35-62
						Aircraft 35-63
						Train 43-66
						Insects <30
						RDC Inaudible
RDC L _{Aeq} (15min) Contribution						<35
14/04/2020	23:10 (Night)	61	51	44	WD: E WS: <0.1m/s Rain: Nil	Traffic 35-61
						Train 38-45
						Insects <35
						Industrial noise <38
						RDC Inaudible
RDC L _{Aeq} (15min) Contribution						<35
RDC L _{A1} (1min) Contribution						<50

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 μ Pa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
15/04/2020	09:34 (Day)	75	59	55	WD: NW	Industrial Noise 49-75
					WS: 0.5m/s	Traffic 49-64
					Rain: Nil	RDC Inaudible
					RDC L _{Aeq} (15min) Contribution	
14/04/2020	20:13 (Evening)	61	53	50	WD: NE	Industrial Noise 46-61
					WS: <0.1m/s	Traffic 46-56
					Rain: Nil	Aircraft <46
					RDC L _{Aeq} (15min) Contribution	
14/04/2020	22:24 (Night)	65	50	46	WD: E	Traffic 42-65
					WS: <0.1m/s	Industrial Noise 42-56
					Rain: Nil	Aircraft 42-50
					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.

4.1.4 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}		
15/04/2020	10:00 (Day)	77	61	52	WD: NW	Ground Maintenance 50-67
					WS: 0.5m/s	Train 50-66
					Rain: Nil	Birds 44-56
						Traffic 44-77
RDC Inaudible						
RDC L _{Aeq} (15min) Contribution						<45
14/04/2020	20:40 (Evening)	79	65	52	WD: E	Traffic 47-79
					WS: <0.1m/s	Aircraft <44-47
					Rain: Nil	RDC Inaudible
					RDC L _{Aeq} (15min) Contribution	
14/04/2020	22:49 (Night)	82	63	50	WD: E	Traffic 41-75
					WS: <0.1m/s	Trains 35-50
					Rain: Nil	Security Patrol 45-82
					RDC Inaudible	
RDC L _{Aeq} (15min) Contribution						<45

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	56	49
	Evening	54	42
	Night	52	38
L2 (N2 Knox Road)	Day	57	48
	Evening	54	46
	Night	54	40
L3 (N3 Nurragingy Reserve)	Day	49	42
	Evening	47	44
	Night	49	42
L4 (N4 Olympic Park)	Day	60	44
	Evening	60	45
	Night	61	45

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).

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5 Discussion

5.1 Discussion of Results - Location N1

RDC noise emissions were inaudible during all attended measurements conducted on Tuesday 14 April 2020 and Wednesday 15 April 2020. RDC noise contributions were estimated to satisfy the relevant noise criteria for all periods. Extraneous noise sources included birds, local residential noise, insects, roadworks and people passing with ambient noise levels dominated by traffic noise.

5.2 Discussion of Results - Location N2

RDC noise emissions were inaudible during all attended measurements conducted on Tuesday 14 April 2020 and Wednesday 15 April 2020. RDC noise contributions were estimated to satisfy the relevant noise criteria for all periods. Extraneous sources measured include traffic, birds, industrial noise, construction noise, residential noise, aircraft, trains and insects.

5.3 Discussion of Results - Location N3

Due to park closure by government regulations for COVID-19, attended measurements for this quarter were conducted at an alternative location, at the park gates end of Woodstock Avenue. RDC noise emissions were inaudible during all measurements conducted on Tuesday 14 April 2020 and Wednesday 15 April 2020. RDC noise contributions were estimated to satisfy the relevant noise criteria for all periods. Extraneous sources audible during the attended surveys included traffic, aircraft, insects and industrial noise which generally masked RDC noise. It is noted the receiver was not in use at the time of the measurements and hence criteria are referenced for completeness.

5.4 Discussion of Results - Location N4

RDC noise emissions were inaudible during all measurements on Tuesday 14 April 2020 and Wednesday 15 April 2020. RDC noise contributions were estimated to satisfy the relevant noise criteria for all periods. It is noted that the sports centre was not in use during the evening or night periods and criteria are referenced for completeness. Extraneous noise sources included ground maintenance, lawn mowing, security patrols, birds, traffic and trains.

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6 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 2, ending June 2020.

Unattended noise monitoring was completed between Tuesday 14 April 2020 and Wednesday 22 April 2020 at four representative monitoring locations.

Attended noise monitoring was conducted on Tuesday 14 April 2020 and Wednesday 15 April 2020. The assessment has identified that noise emissions generated by RDC were inaudible at the nearest residential receivers during the attended monitoring, with all measurements satisfying the relevant noise criteria at all assessed residential receivers.

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Appendix A – Glossary of Terms

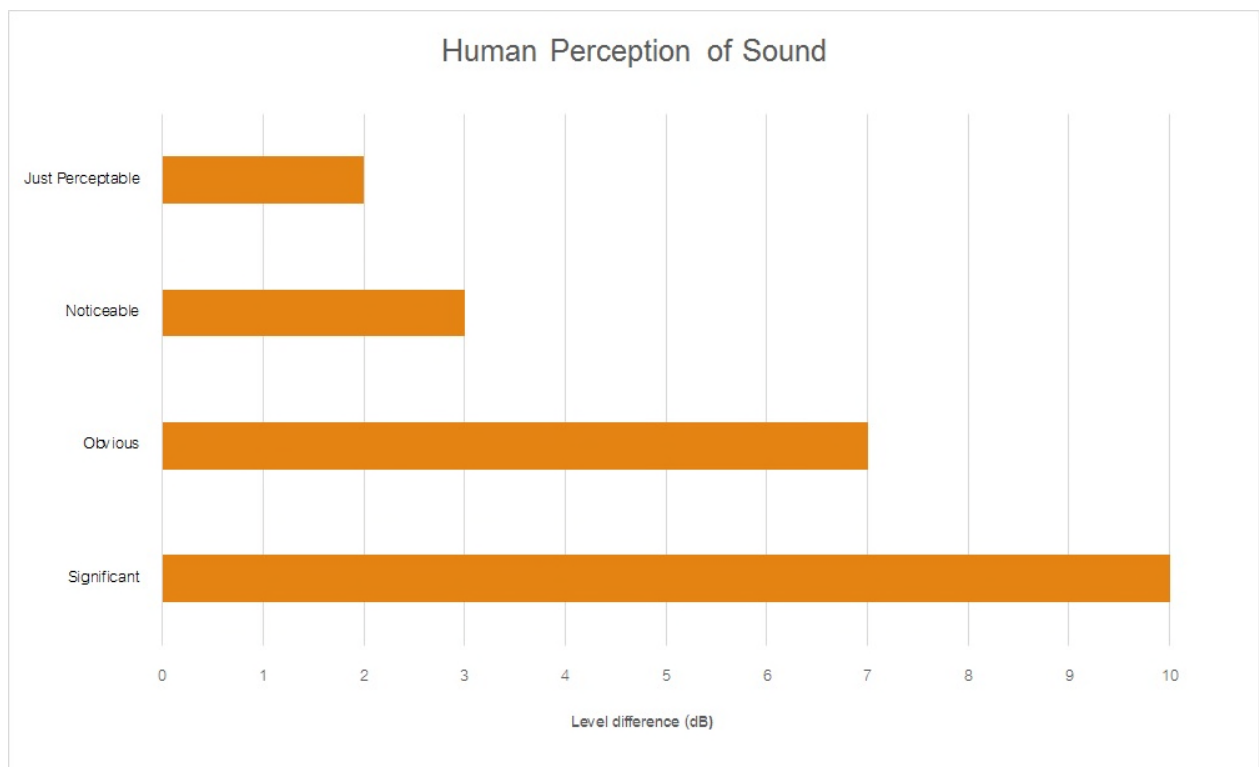
Table A1 provides a number of technical terms have been used in this report.

Table A1 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



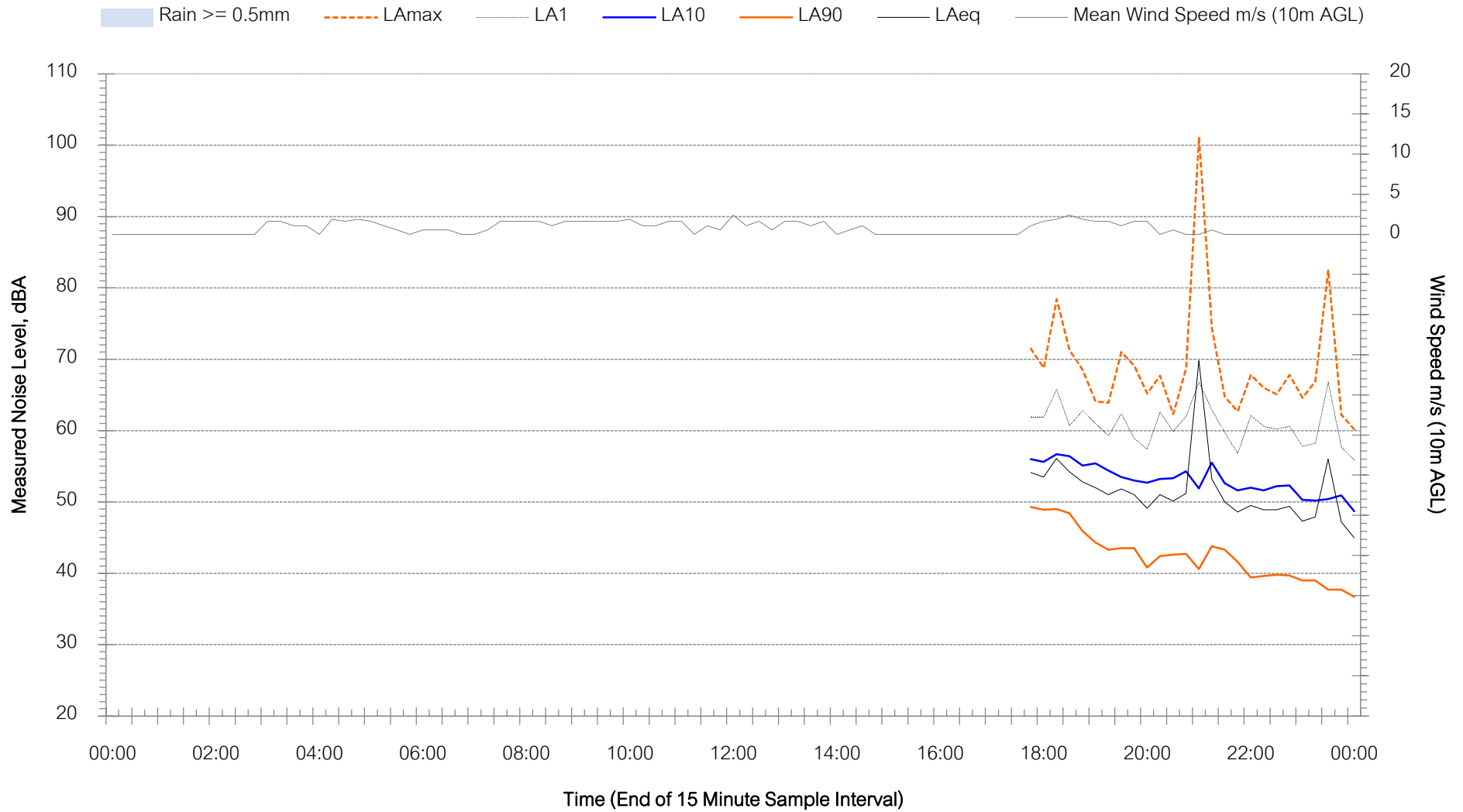
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Appendix B – Unattended Noise Monitoring Charts



Background Noise Levels

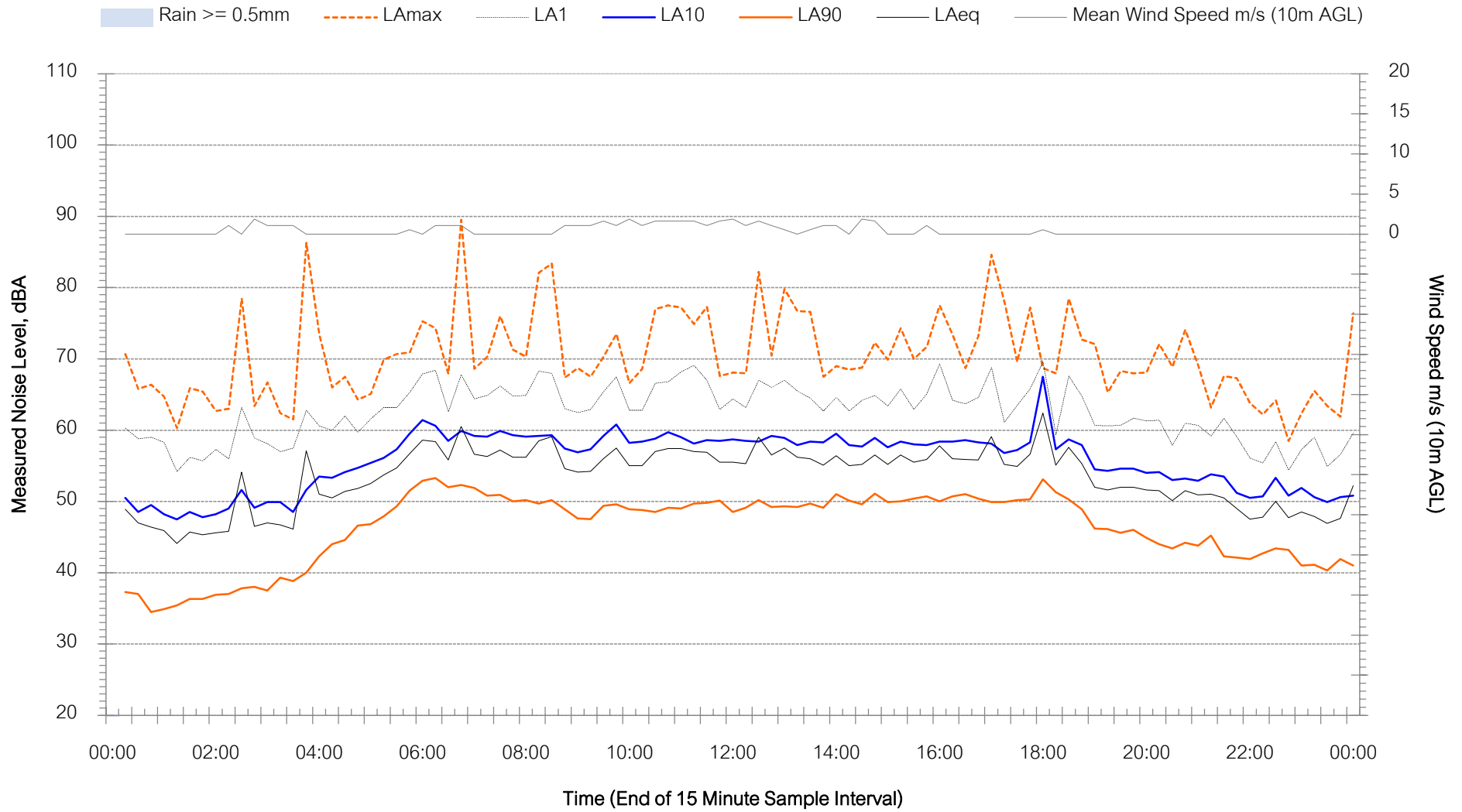
N1 - Tuesday 14 April 2020





Background Noise Levels

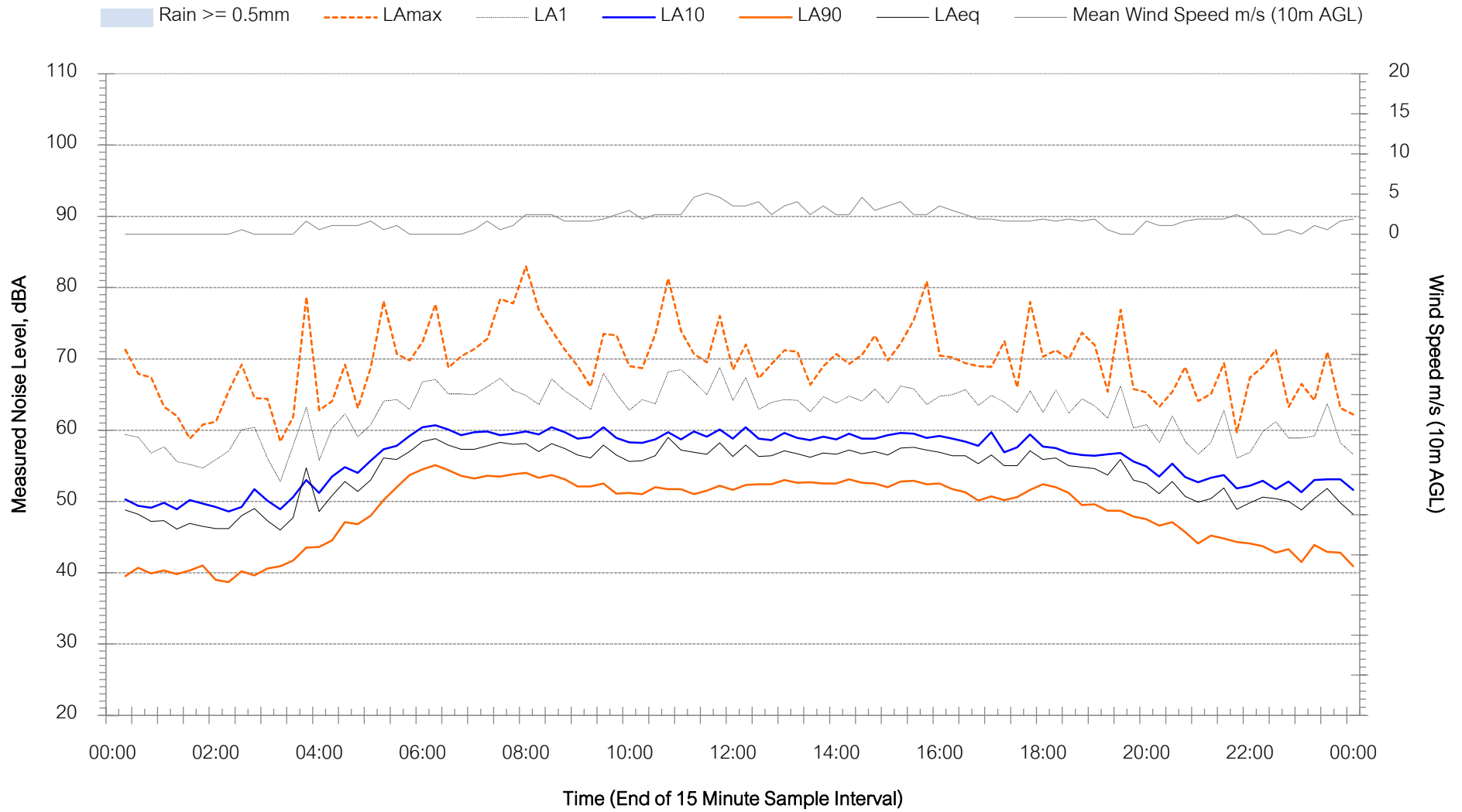
N1 - Wednesday 15 April 2020





Background Noise Levels

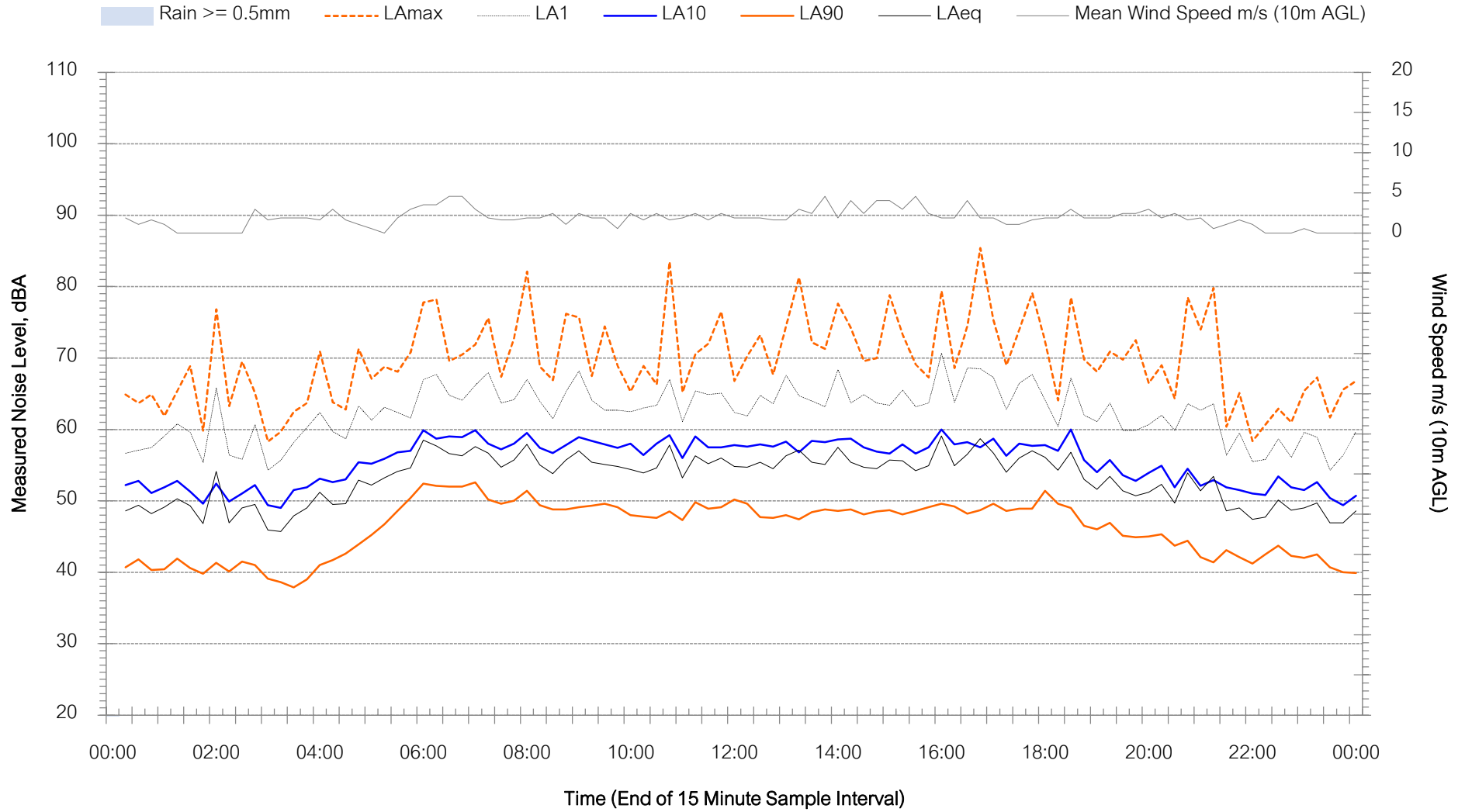
N1 - Thursday 16 April 2020





Background Noise Levels

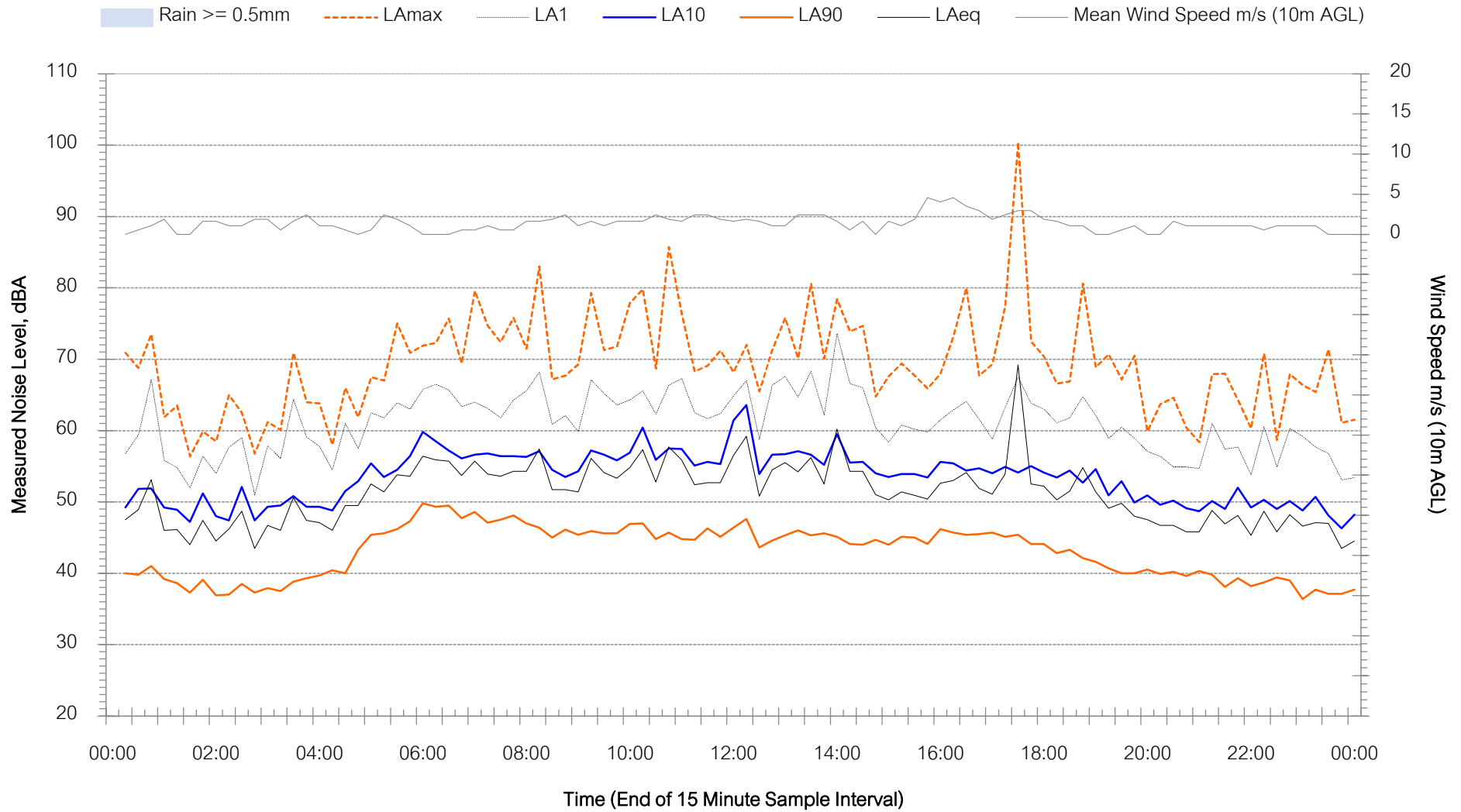
N1 - Friday 17 April 2020





Background Noise Levels

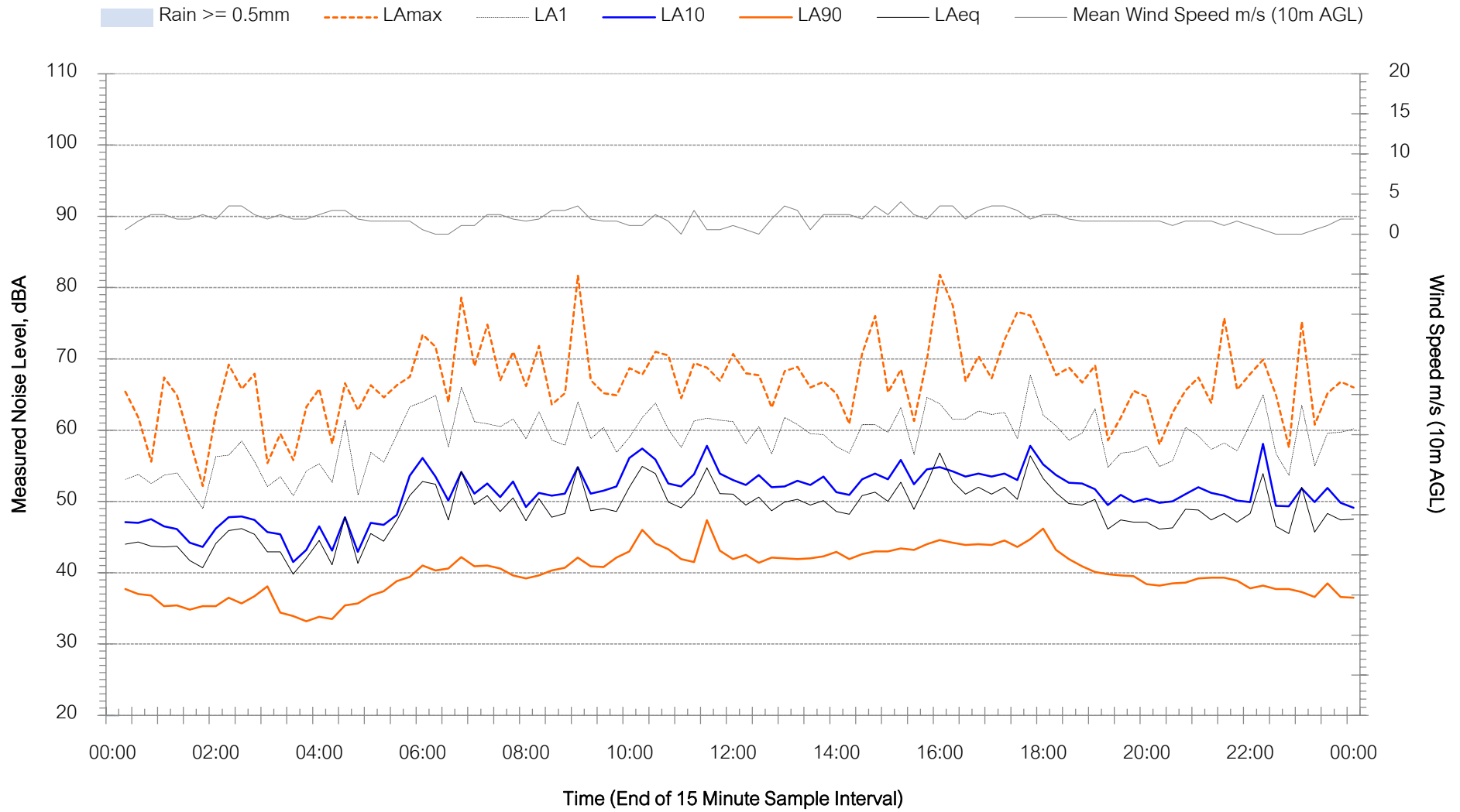
N1 - Saturday 18 April 2020





Background Noise Levels

N1 - Sunday 19 April 2020





Background Noise Levels

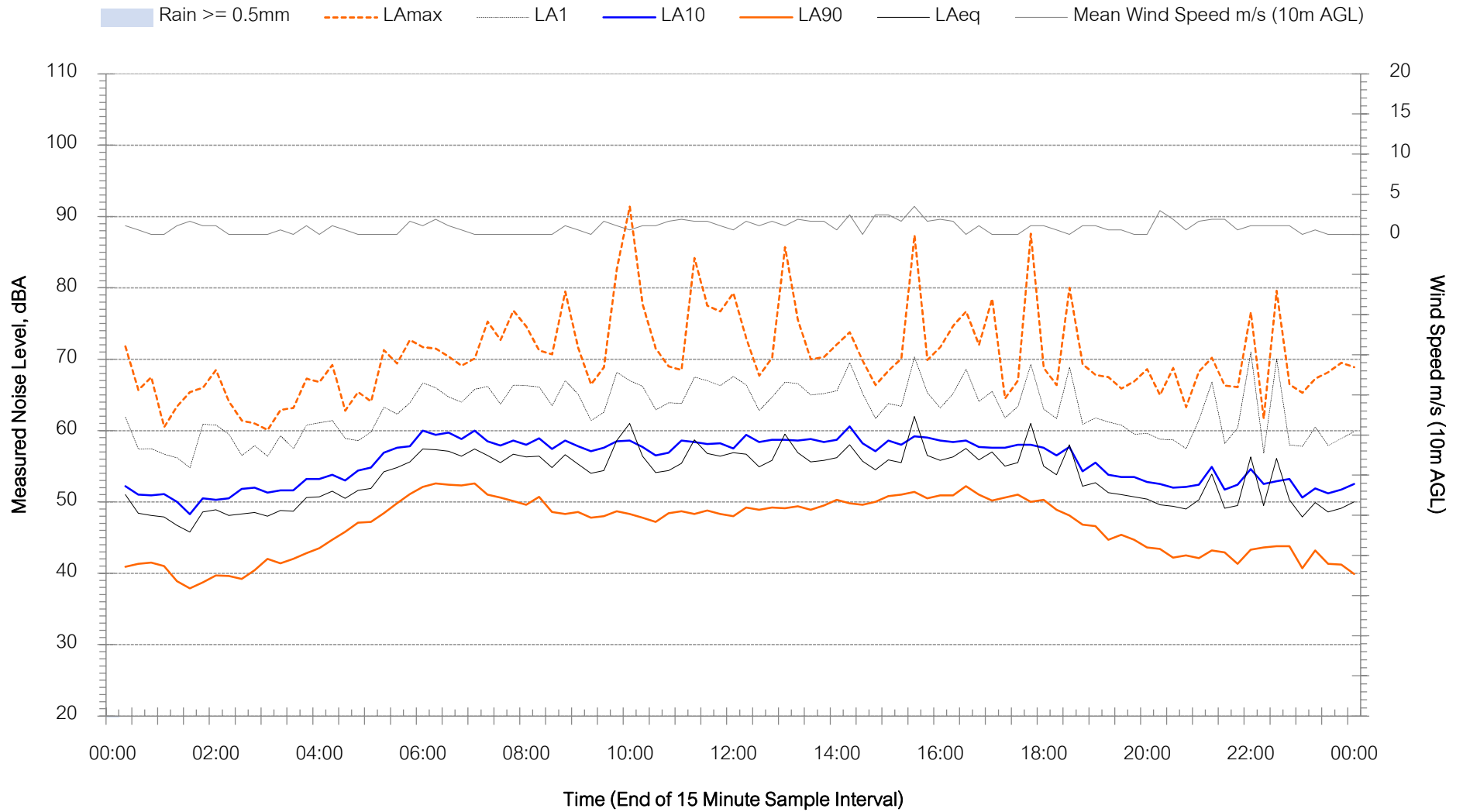
N1 - Monday 20 April 2020





Background Noise Levels

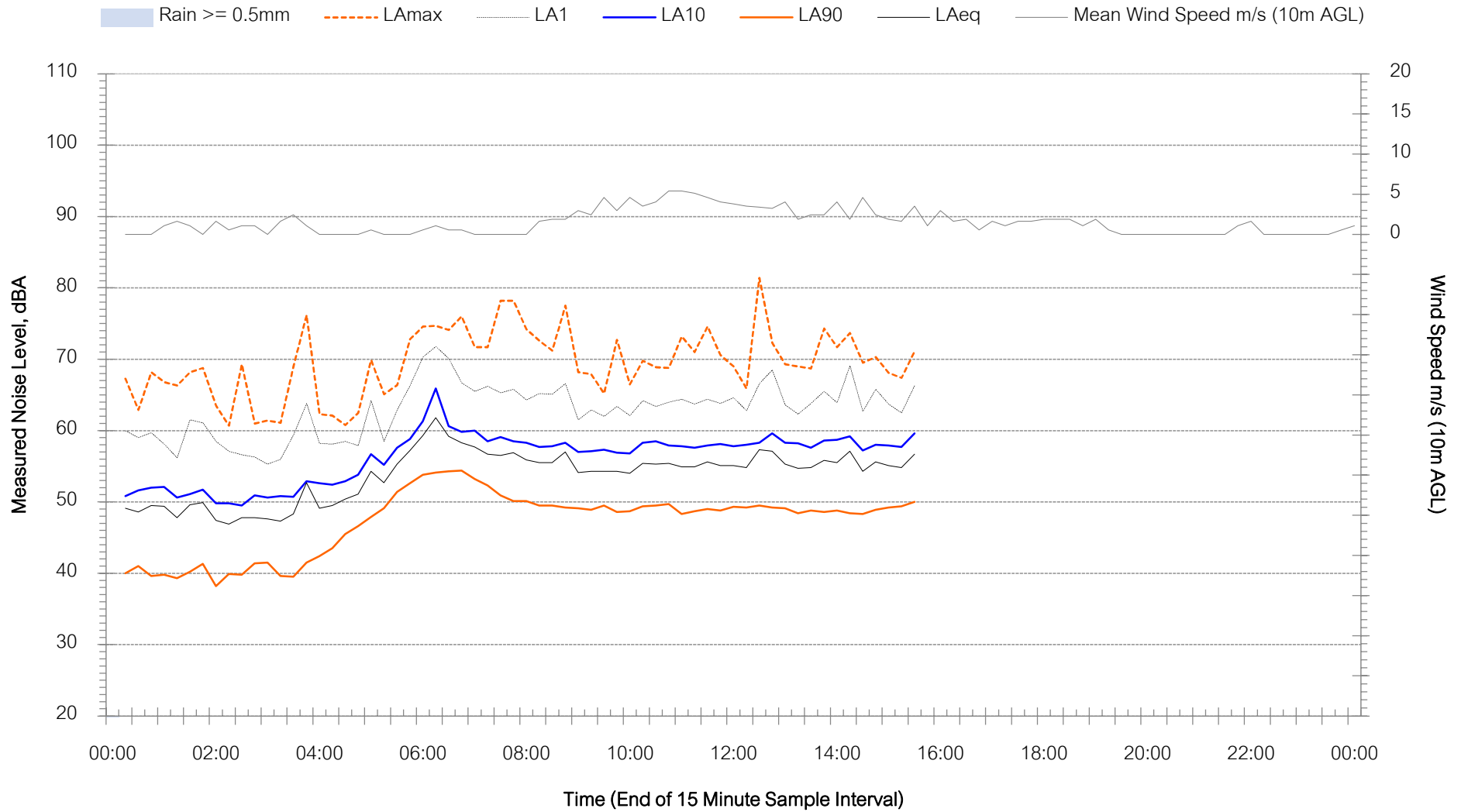
N1 - Tuesday 21 April 2020





Background Noise Levels

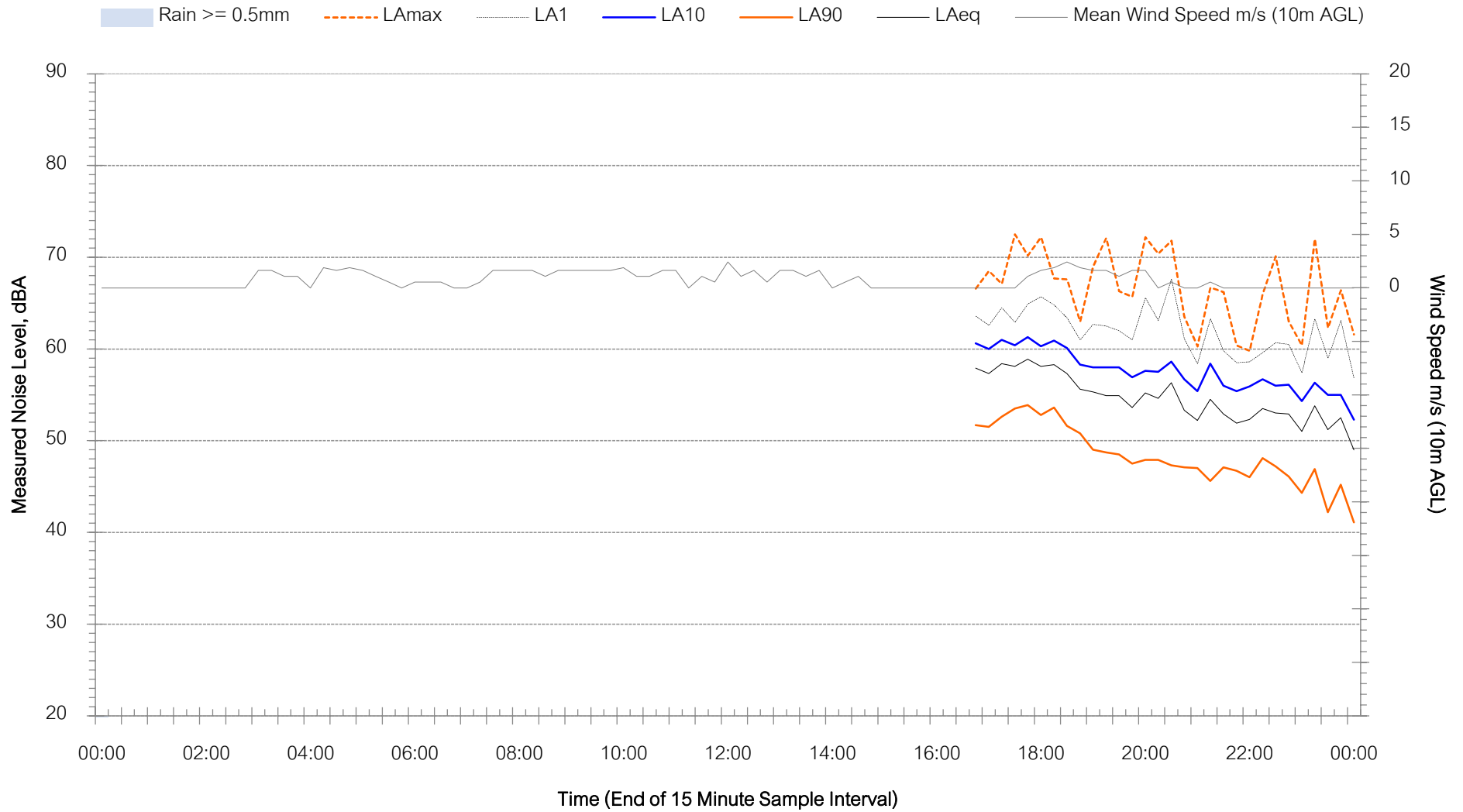
N1 - Wednesday 22 April 2020





Background Noise Levels

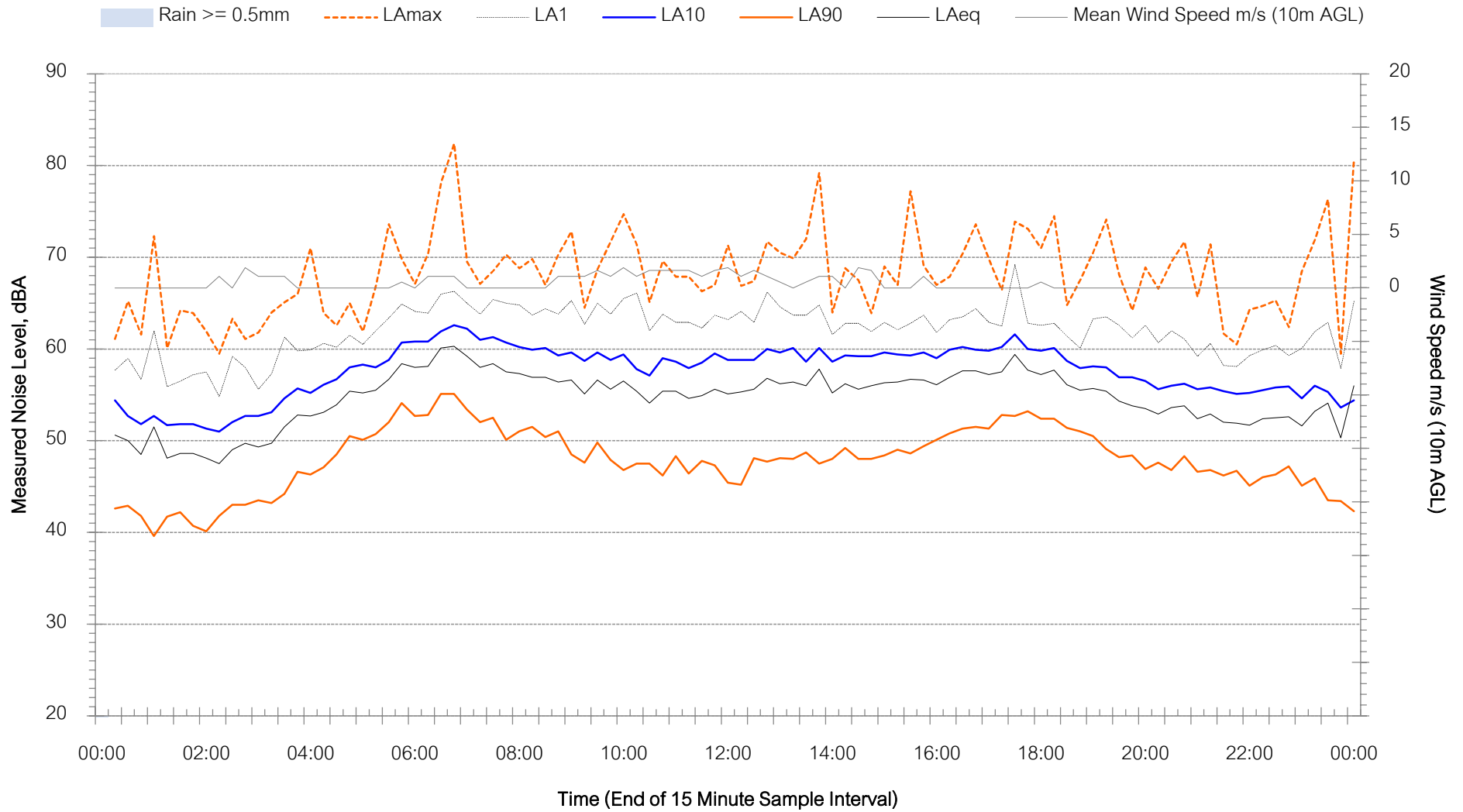
N2 - Tuesday 14 April 2020





Background Noise Levels

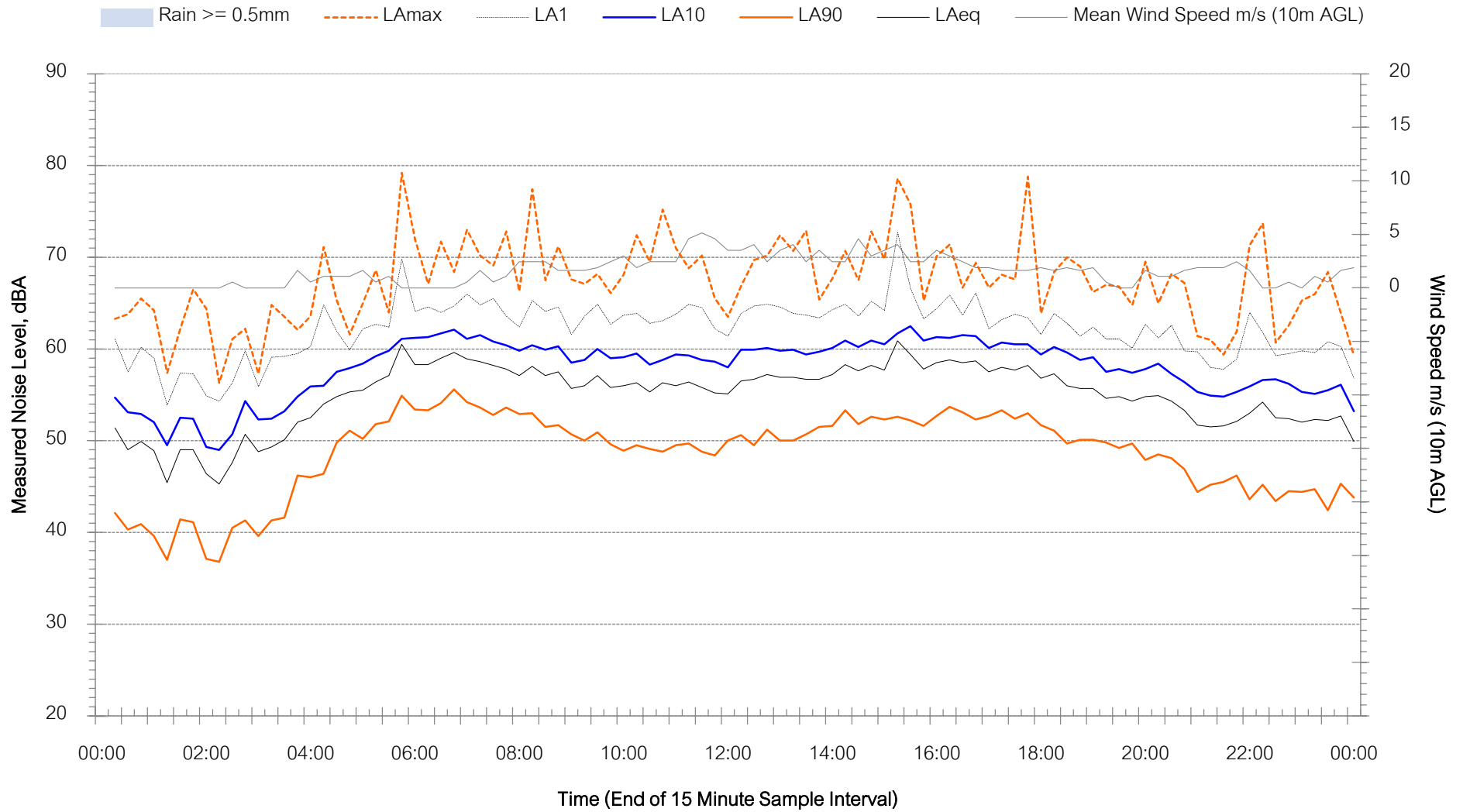
N2 - Wednesday 15 April 2020





Background Noise Levels

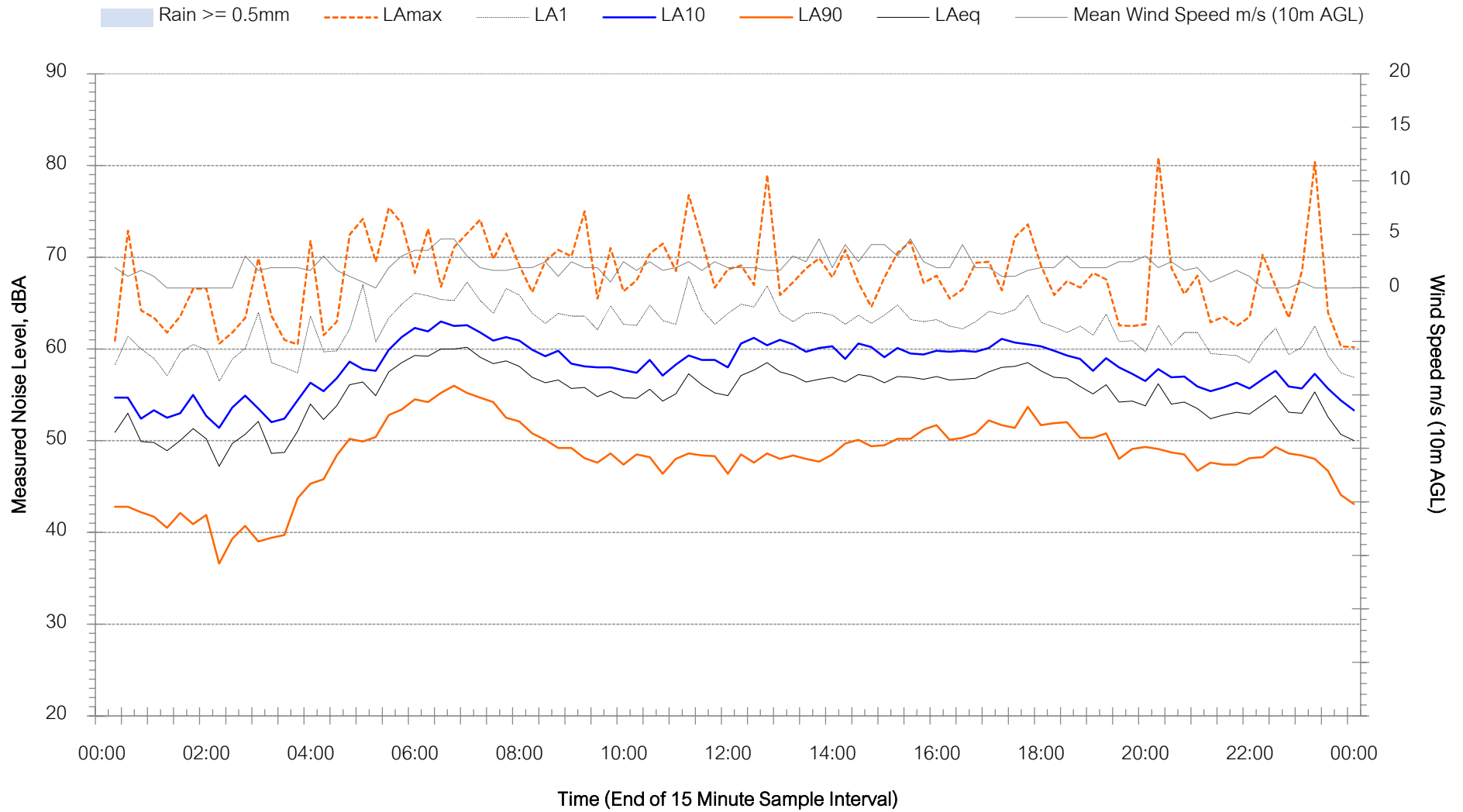
N2 - Thursday 16 April 2020





Background Noise Levels

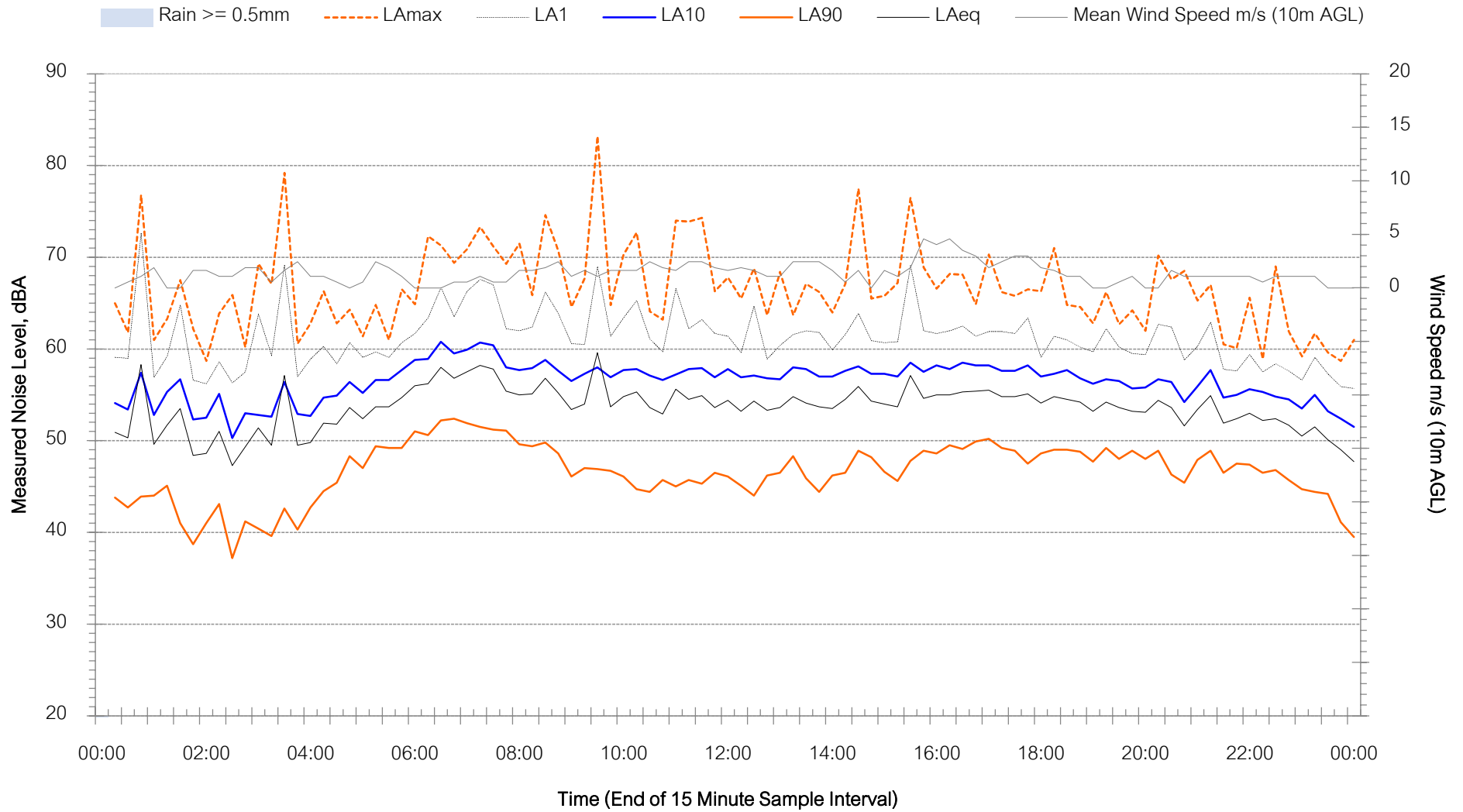
N2 - Friday 17 April 2020





Background Noise Levels

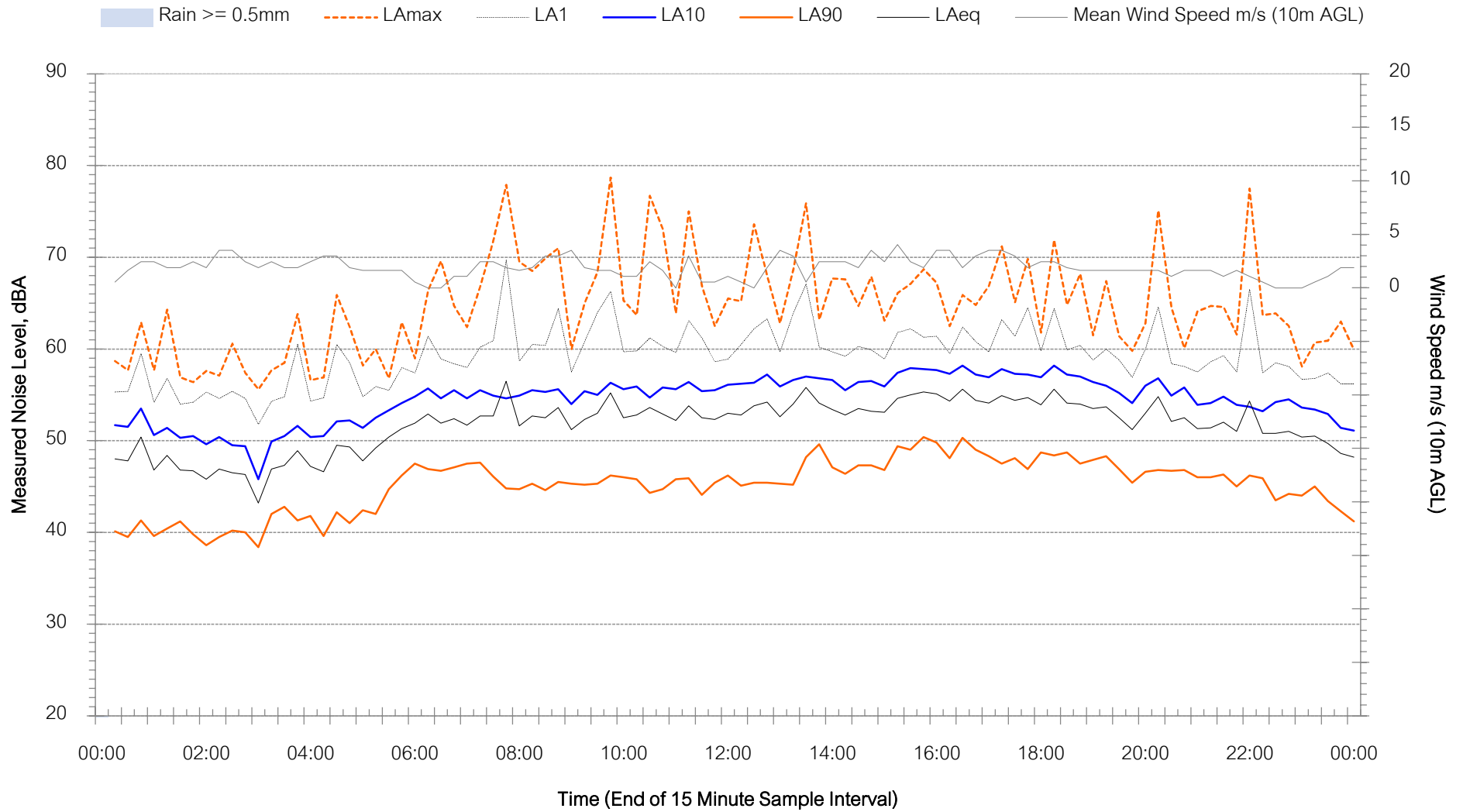
N2 - Saturday 18 April 2020





Background Noise Levels

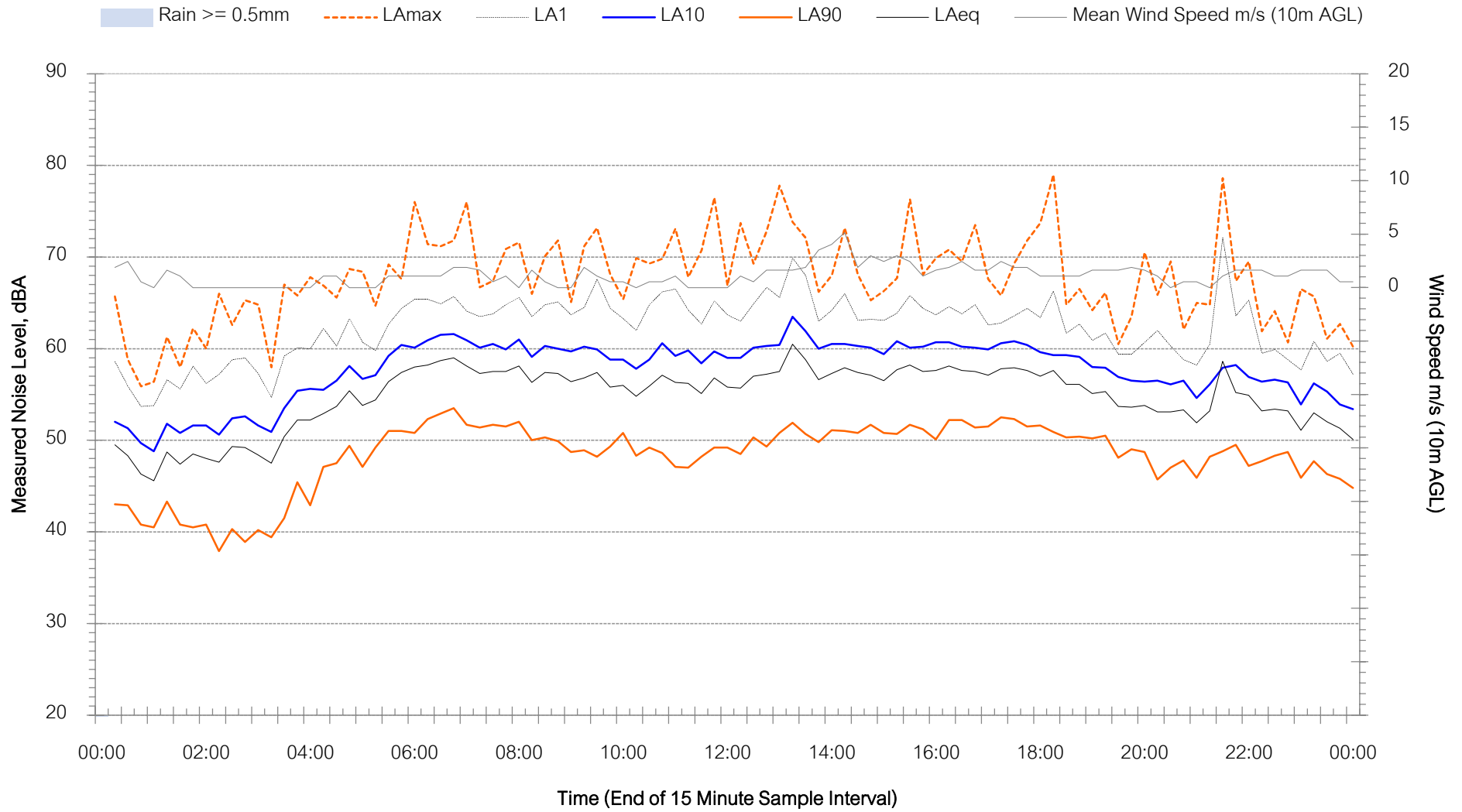
N2 - Sunday 19 April 2020





Background Noise Levels

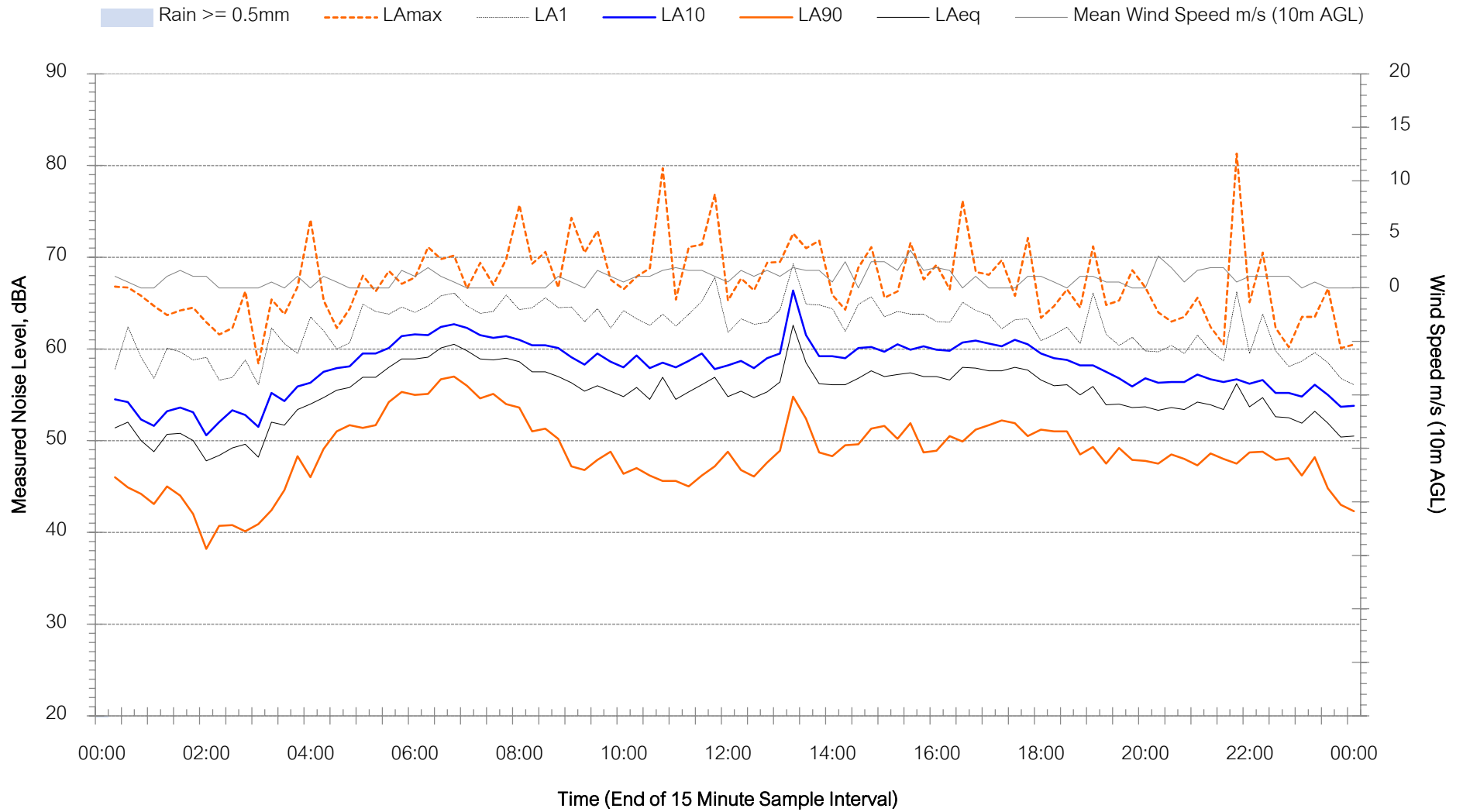
N2 - Monday 20 April 2020





Background Noise Levels

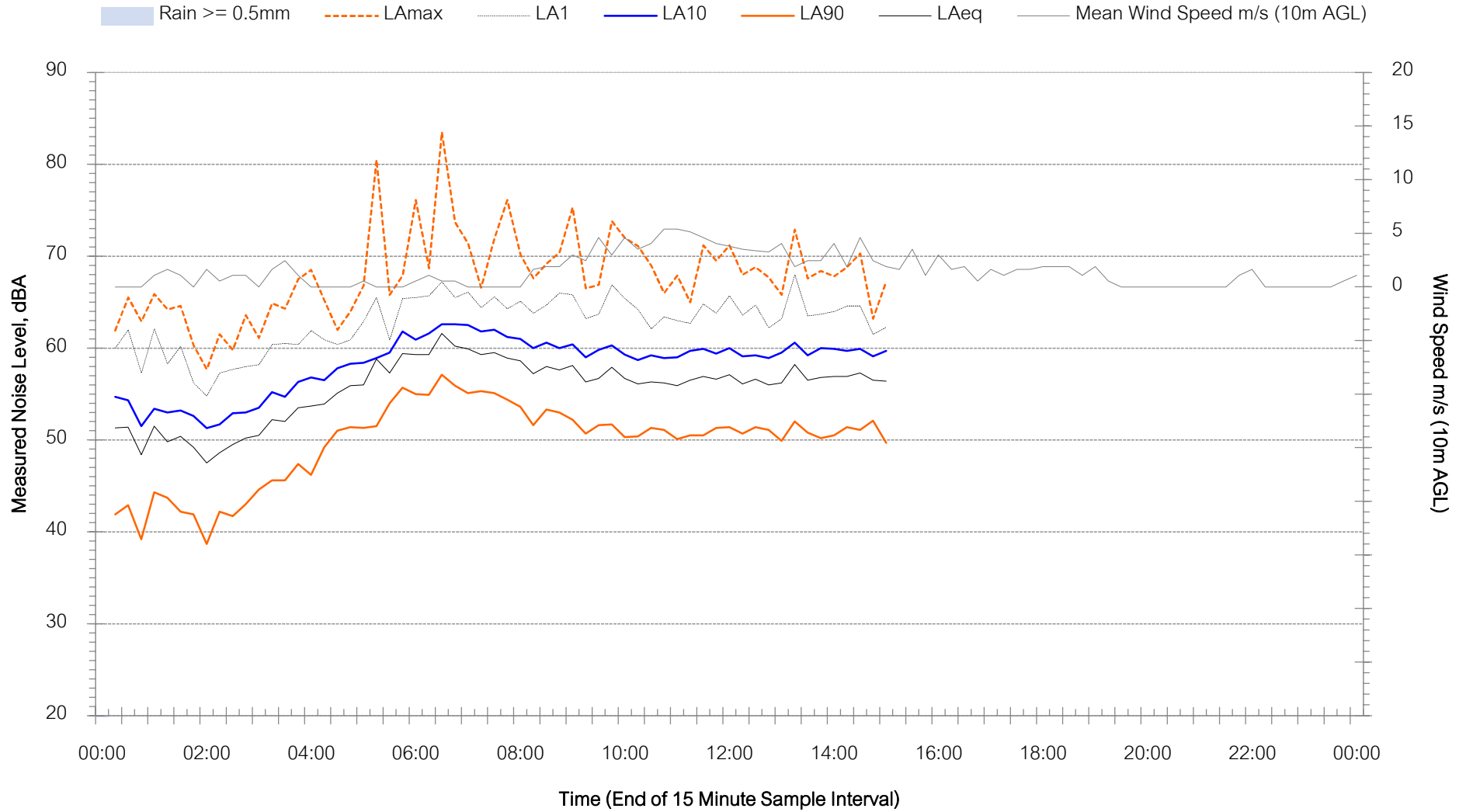
N2 - Tuesday 21 April 2020





Background Noise Levels

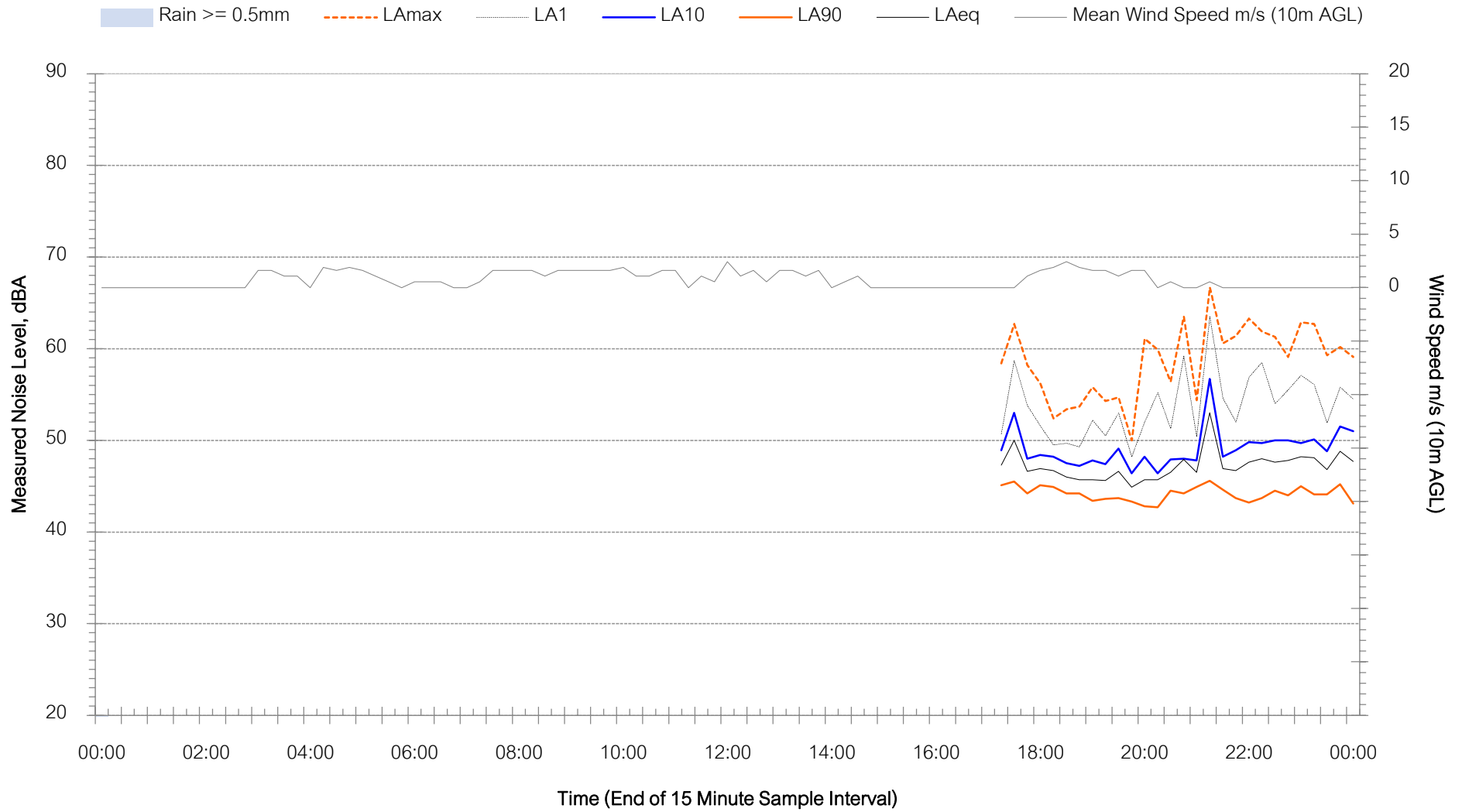
N2 - Wednesday 22 April 2020





Background Noise Levels

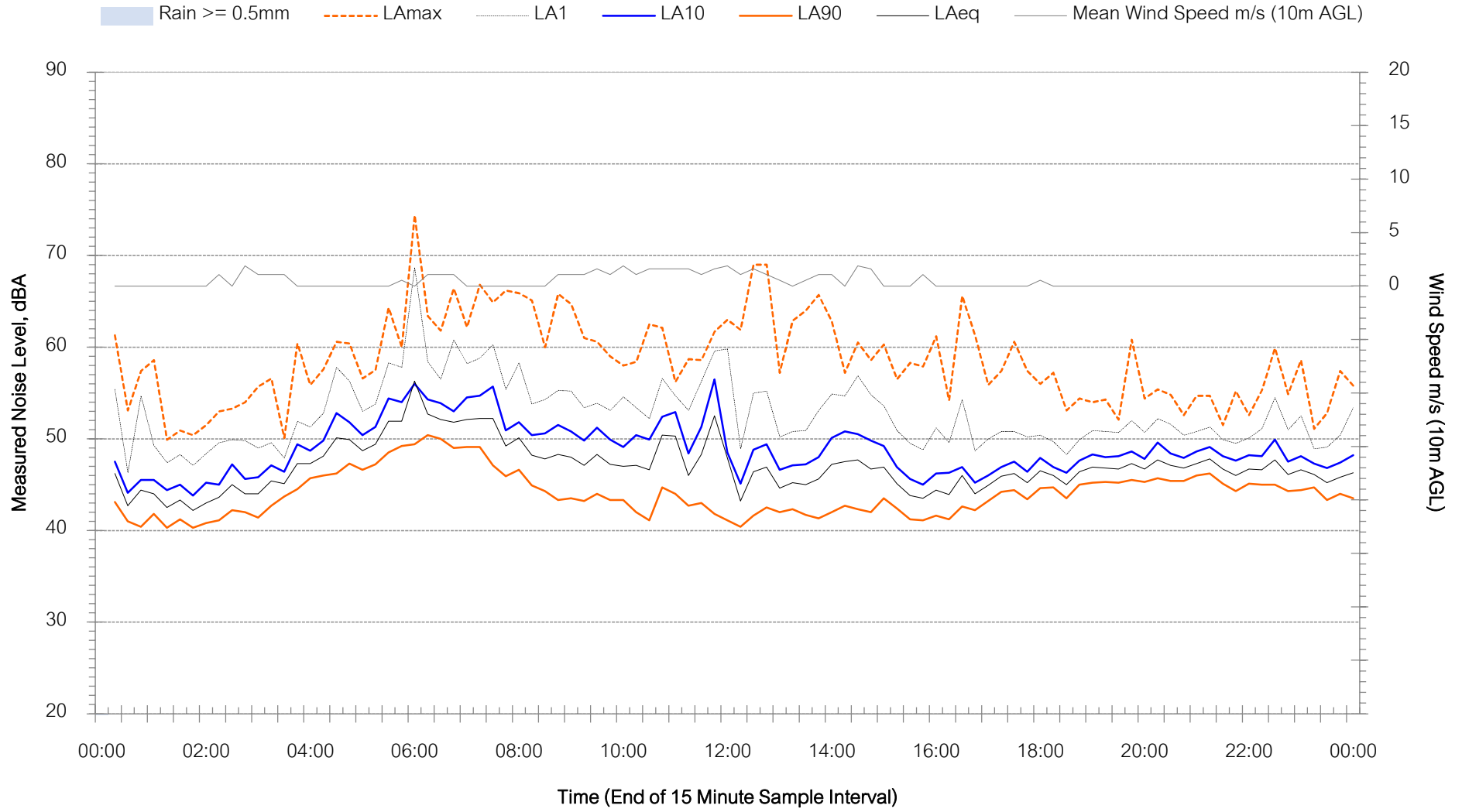
N3 - Tuesday 14 April 2020





Background Noise Levels

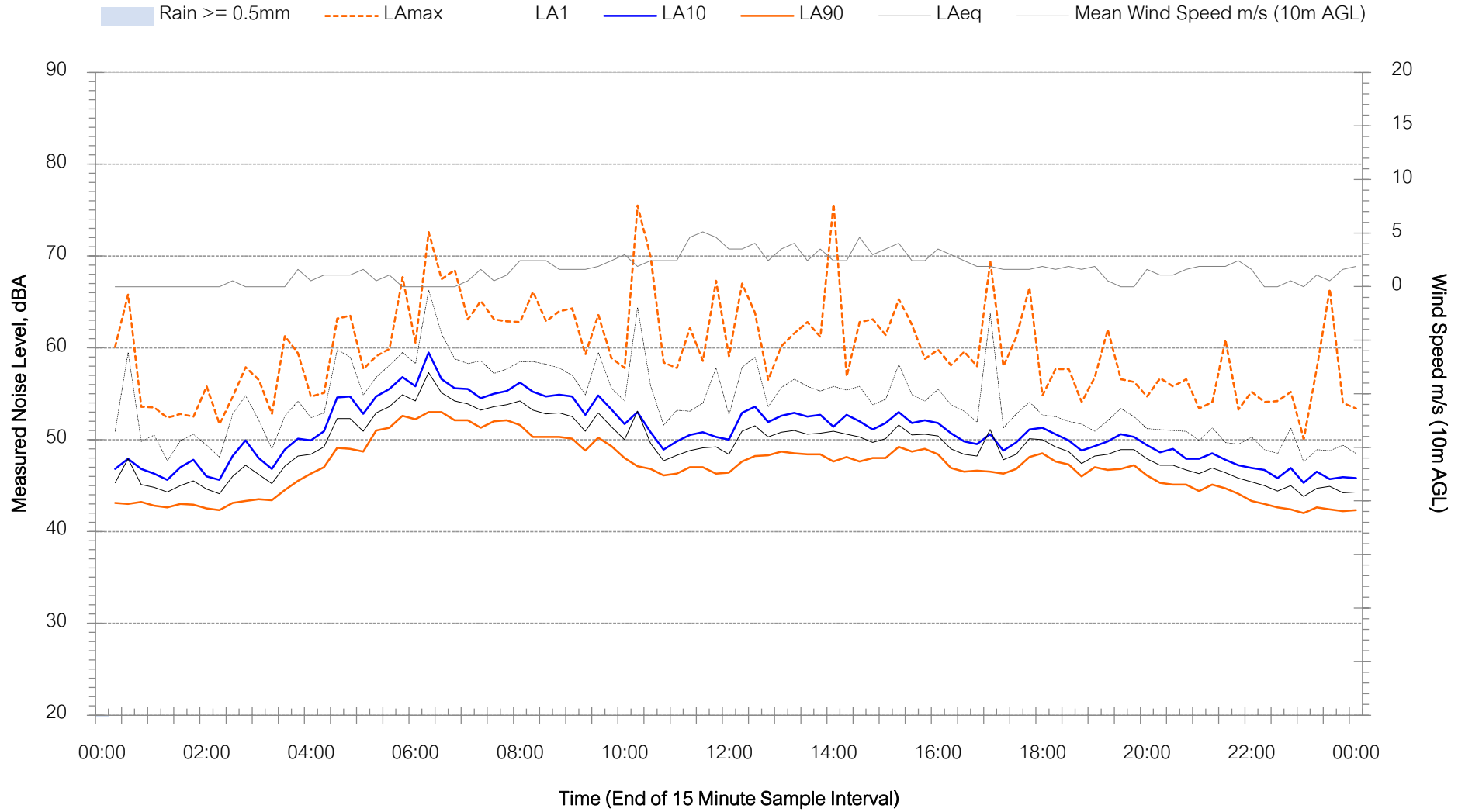
N3 - Wednesday 15 April 2020





Background Noise Levels

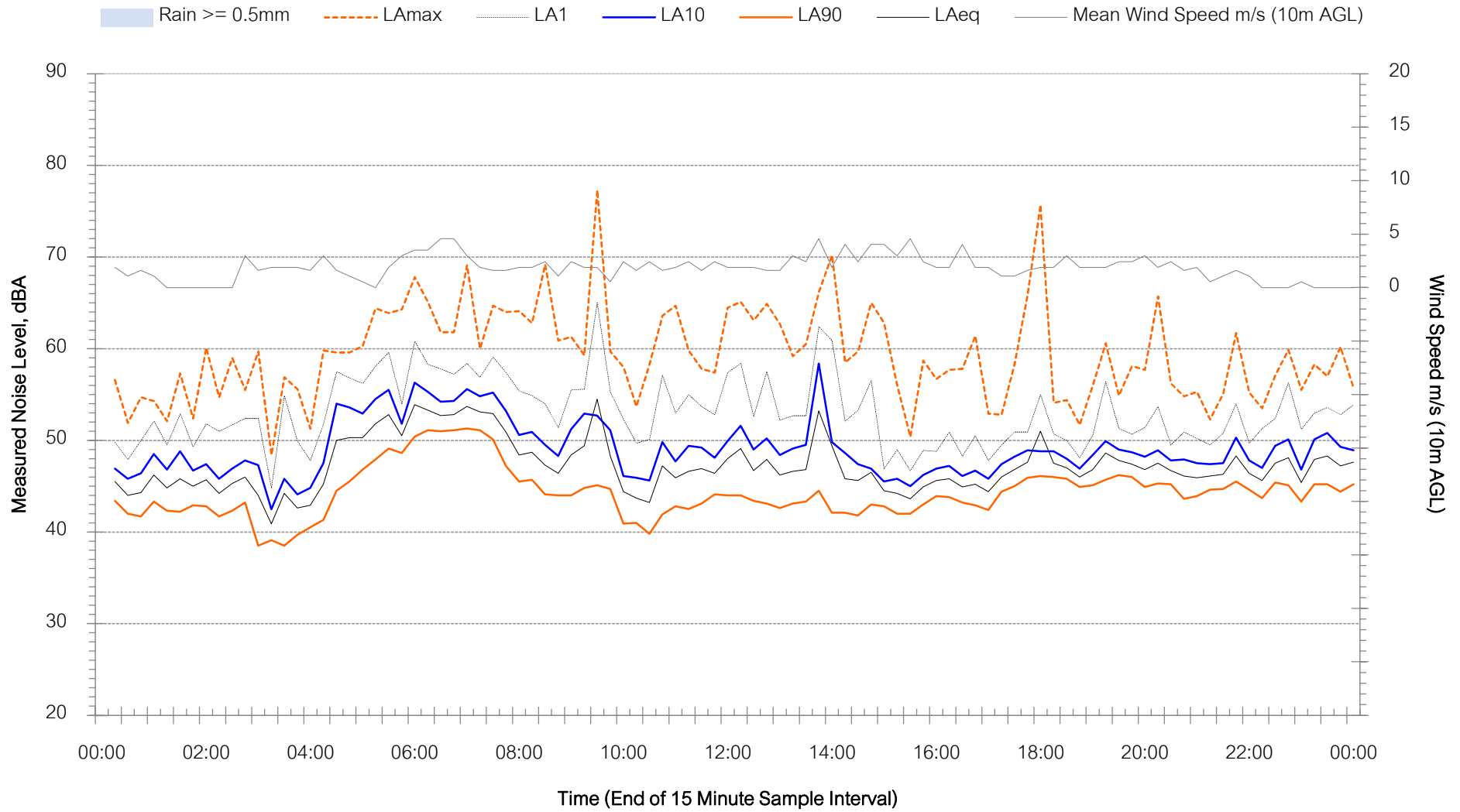
N3 - Thursday 16 April 2020





Background Noise Levels

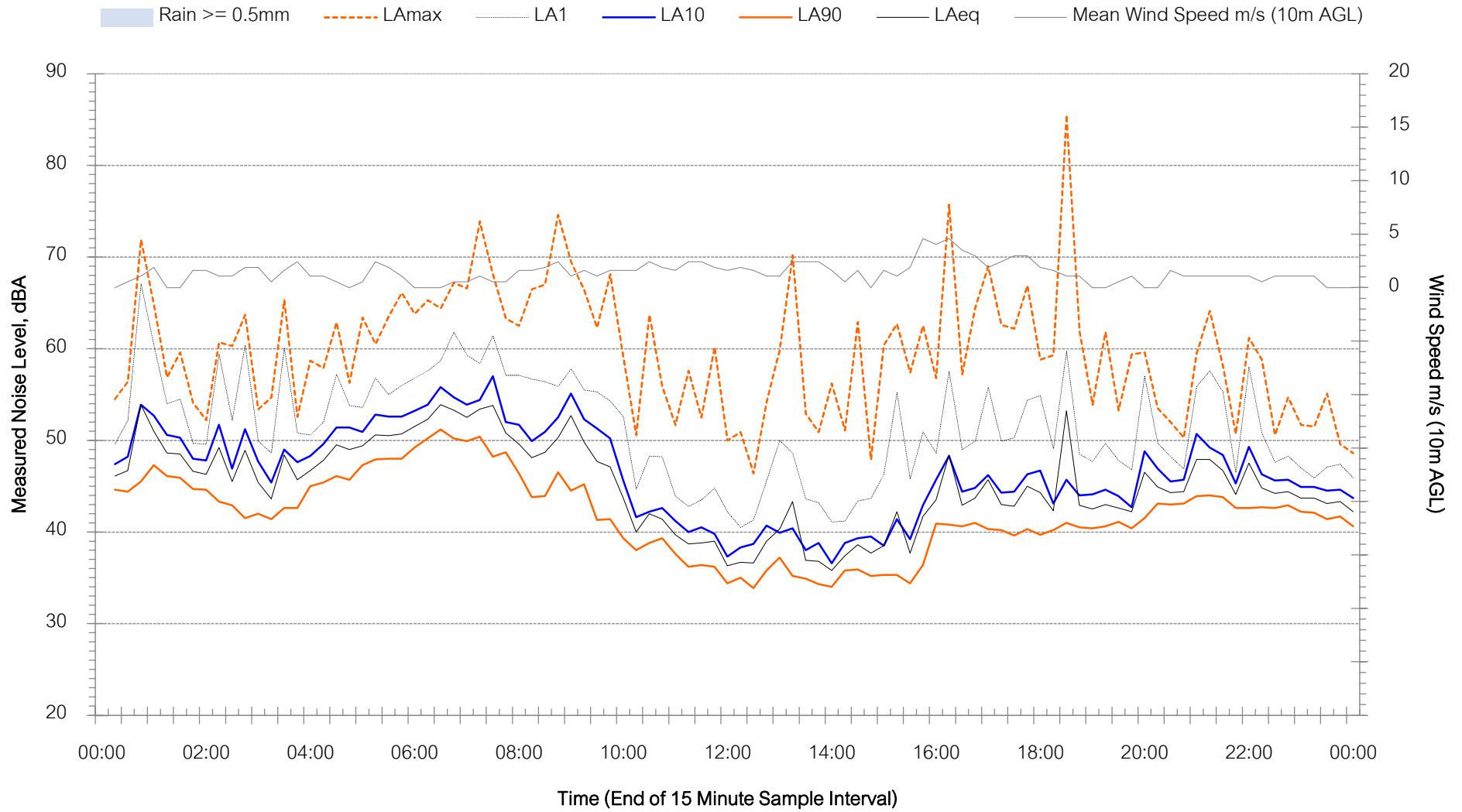
N3 - Friday 17 April 2020





Background Noise Levels

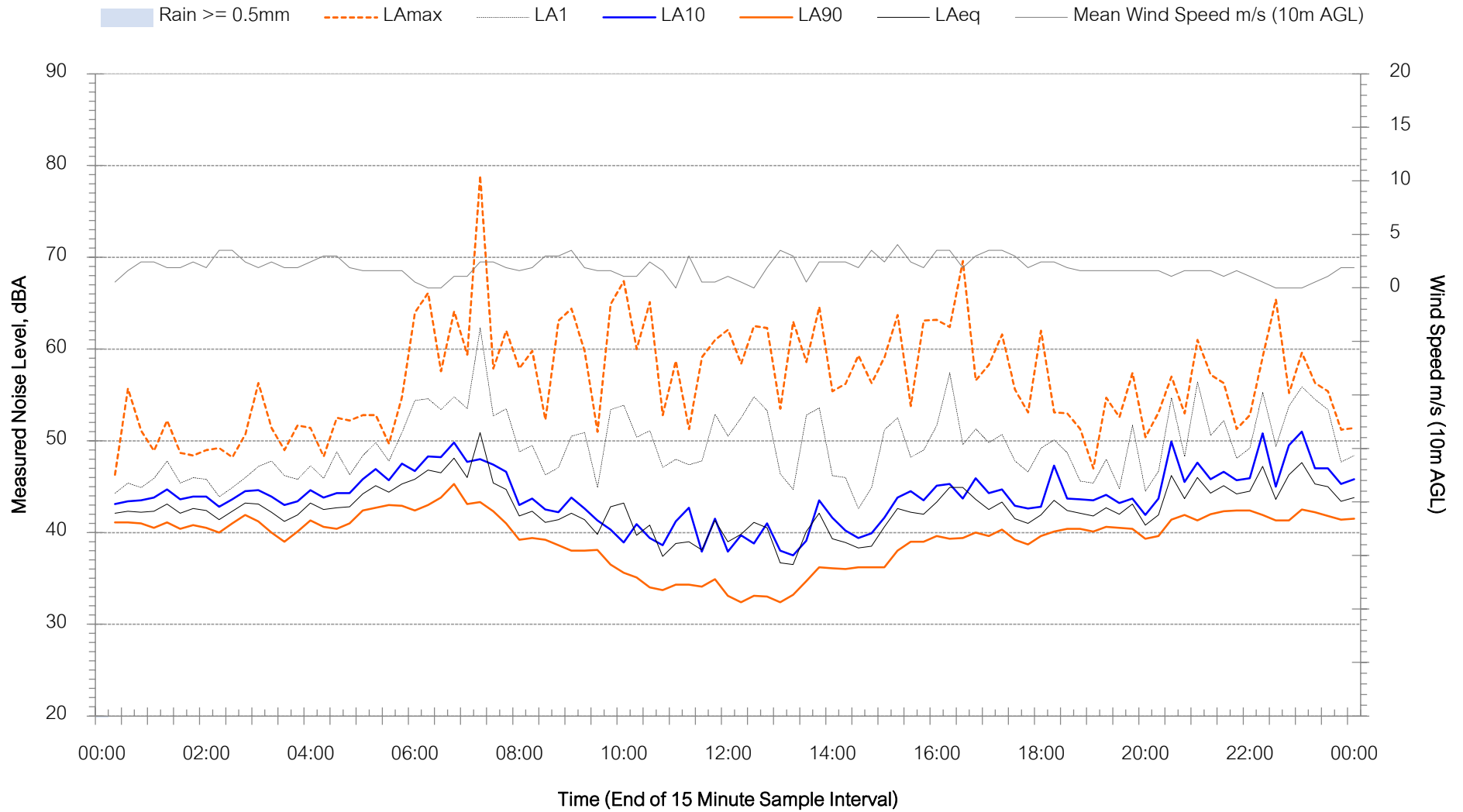
N3 - Saturday 18 April 2020





Background Noise Levels

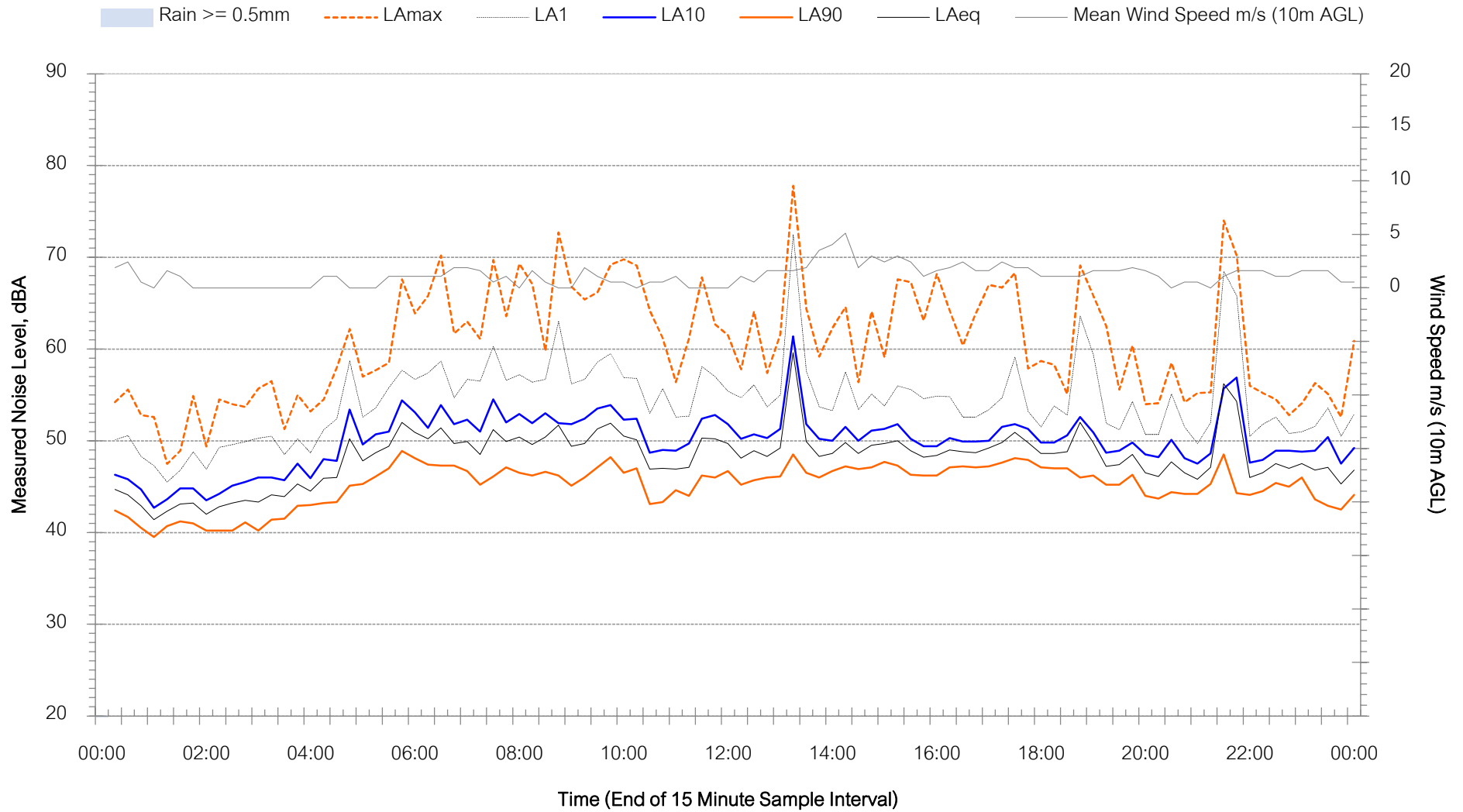
N3 - Sunday 19 April 2020





Background Noise Levels

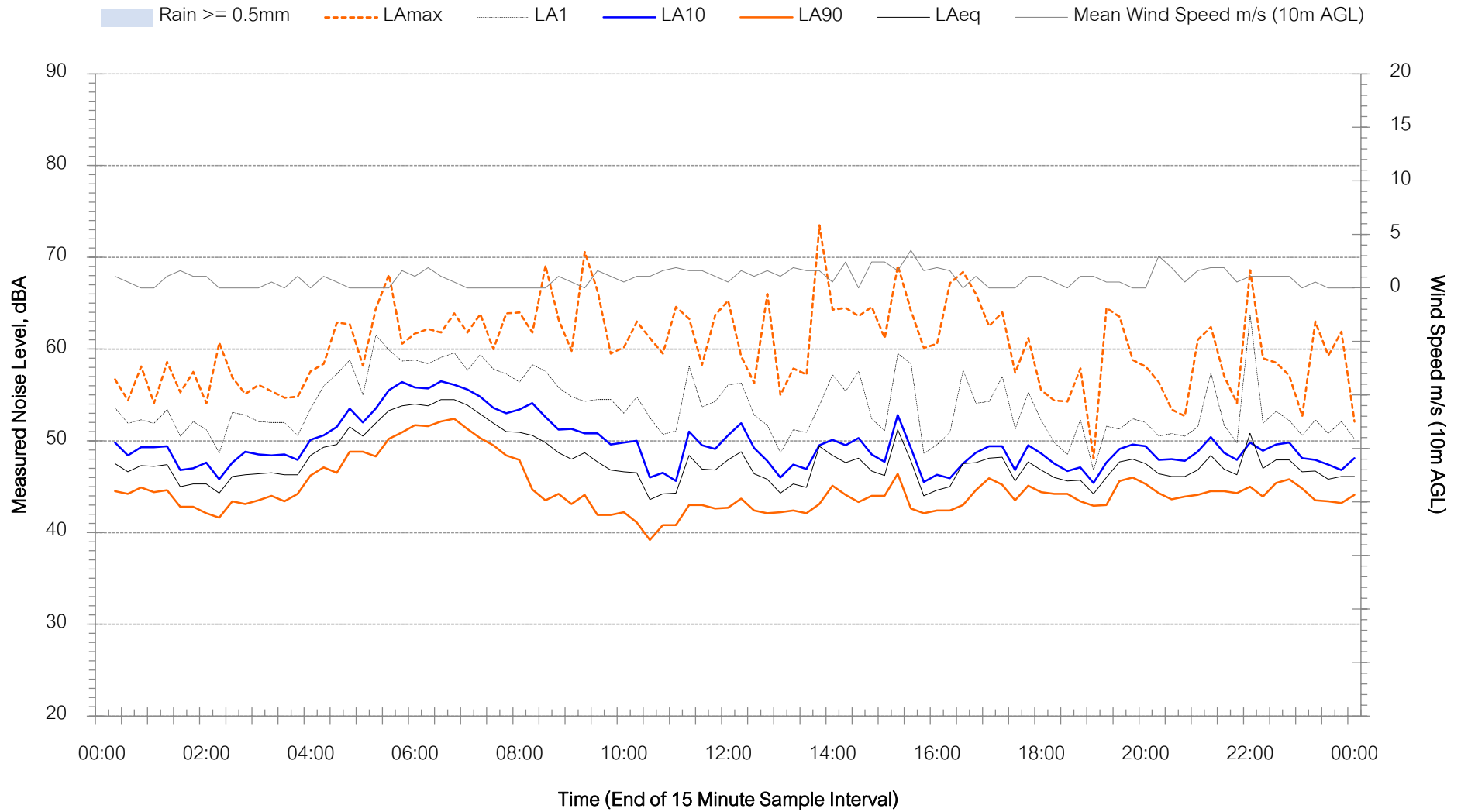
N3 - Monday 20 April 2020





Background Noise Levels

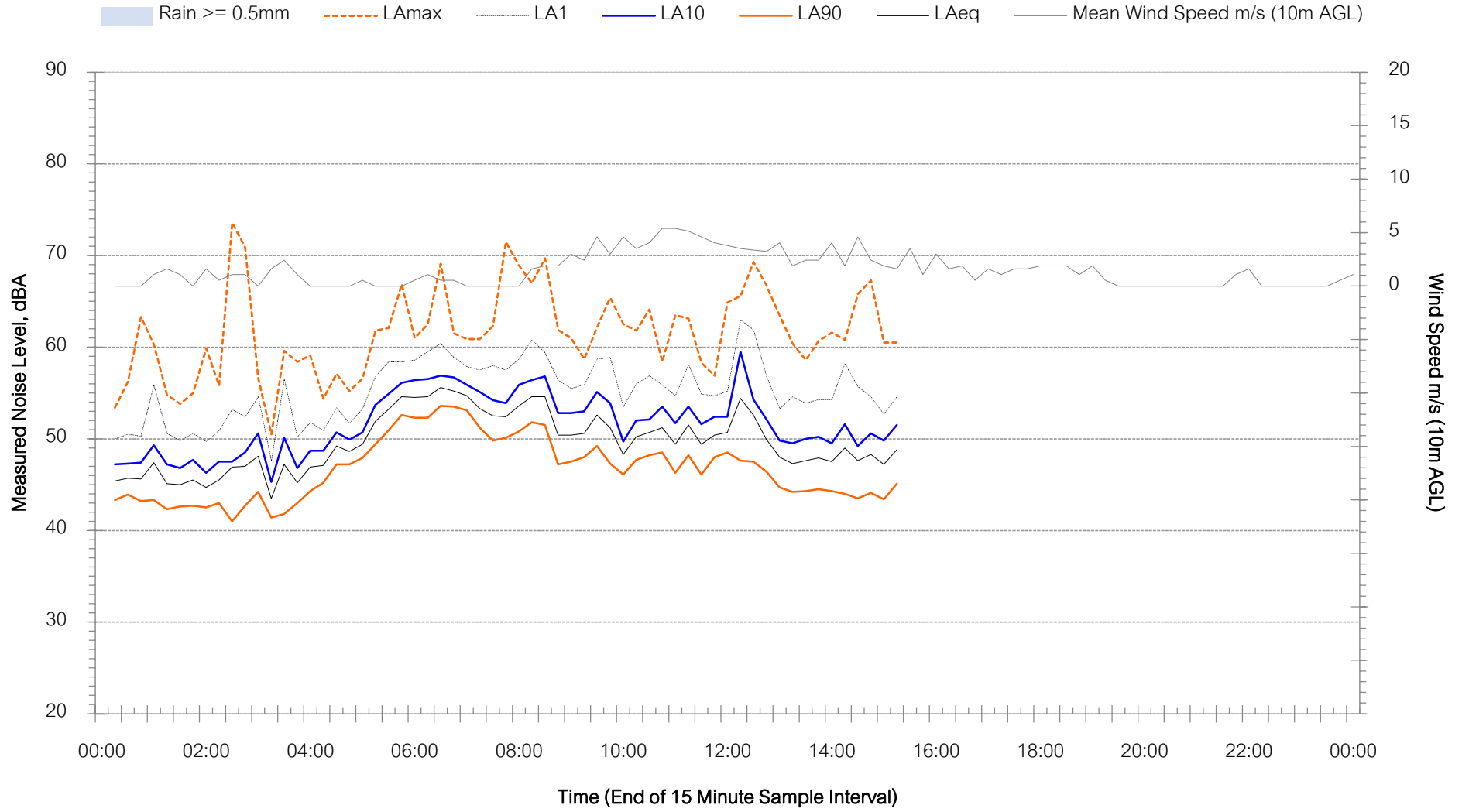
N3 - Tuesday 21 April 2020





Background Noise Levels

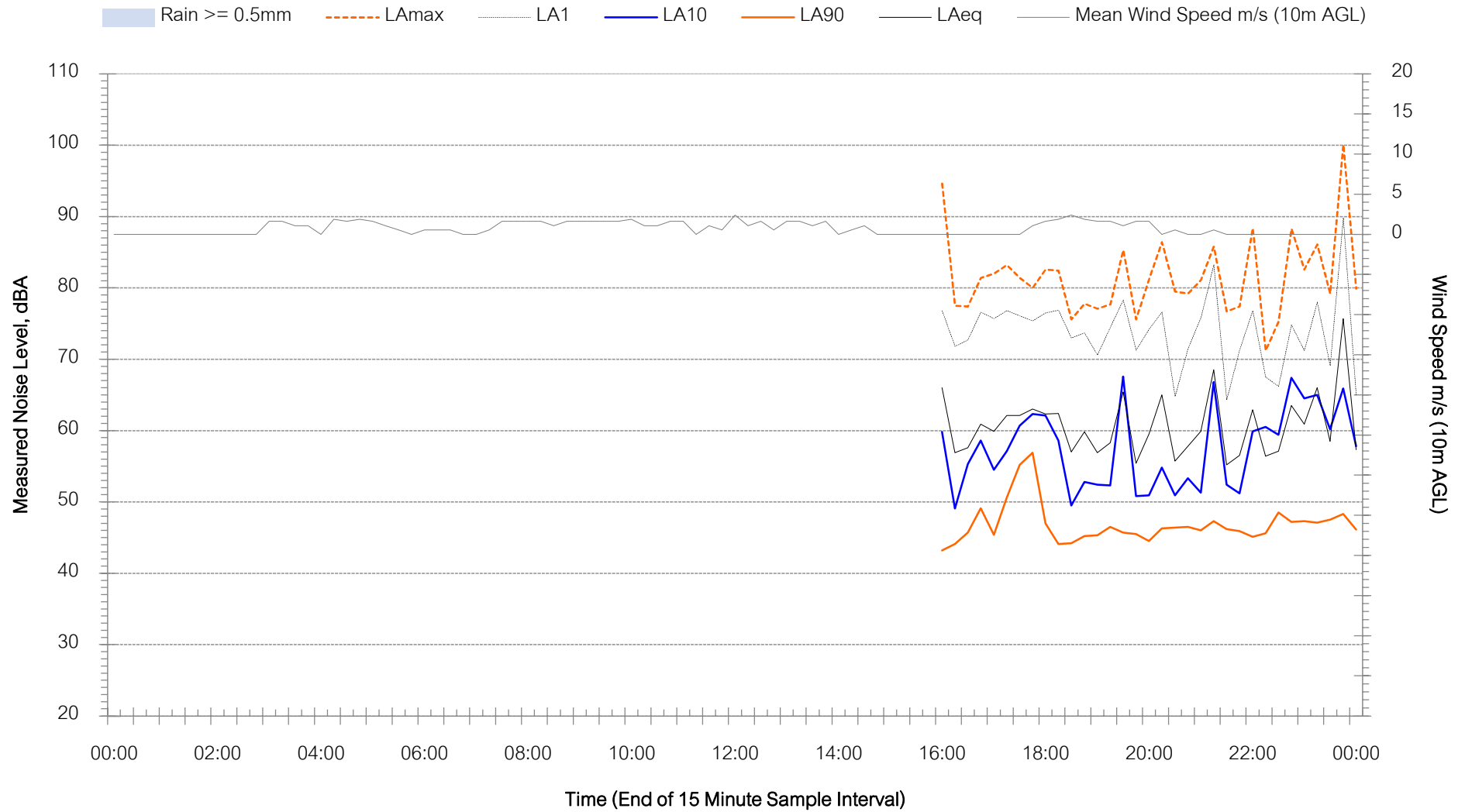
N3 - Wednesday 22 April 2020





Background Noise Levels

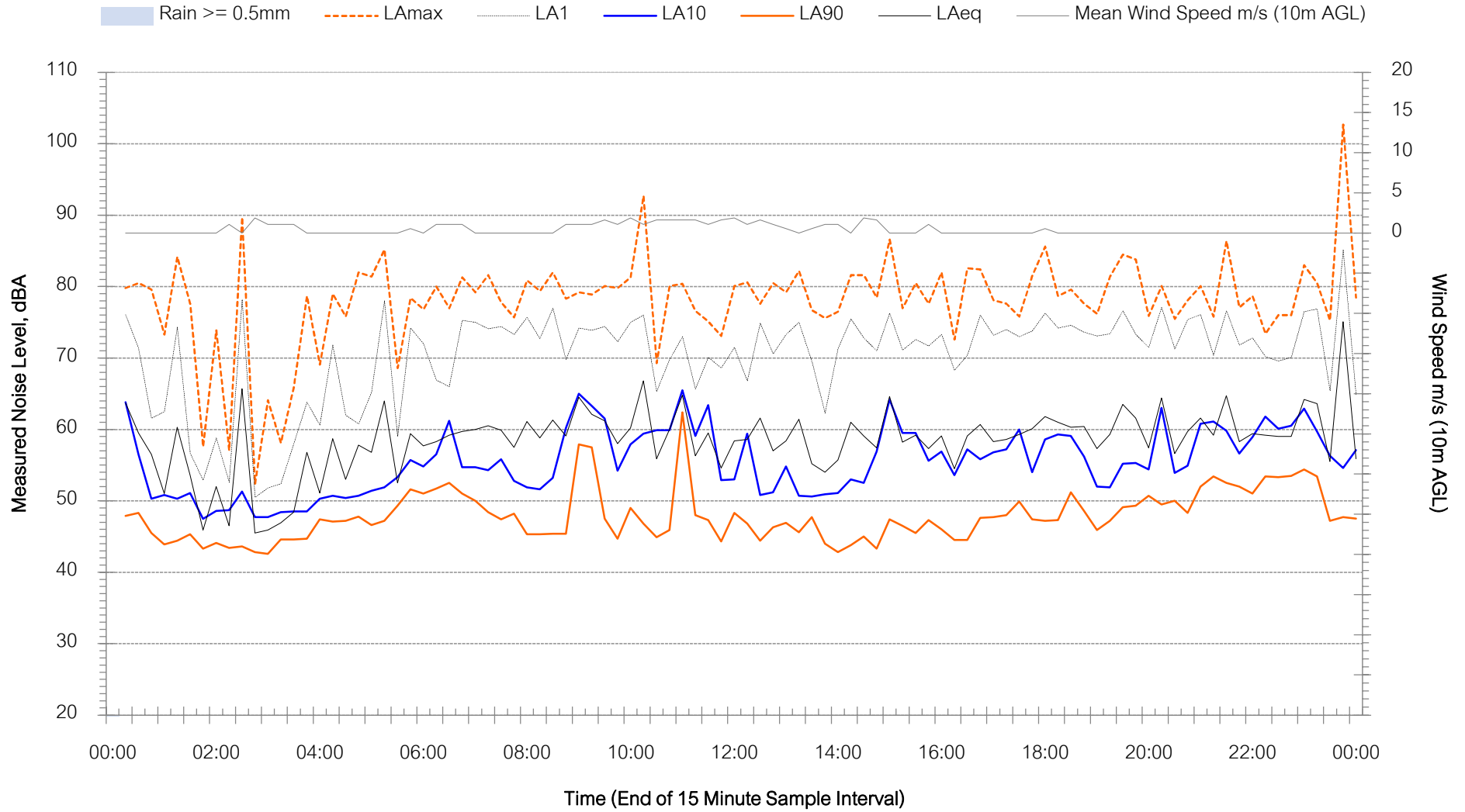
N4 - Tuesday 14 April 2020





Background Noise Levels

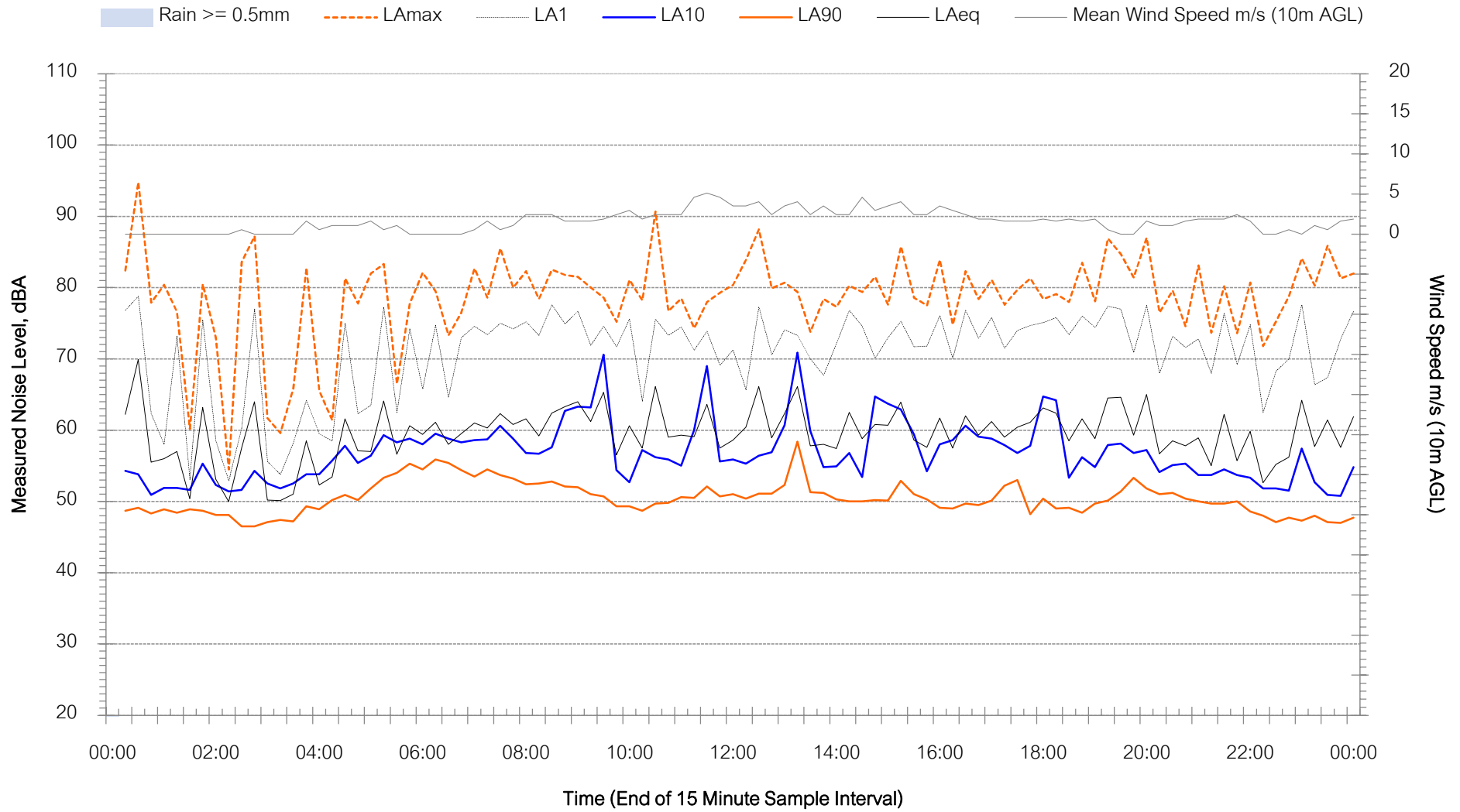
N4 - Wednesday 15 April 2020





Background Noise Levels

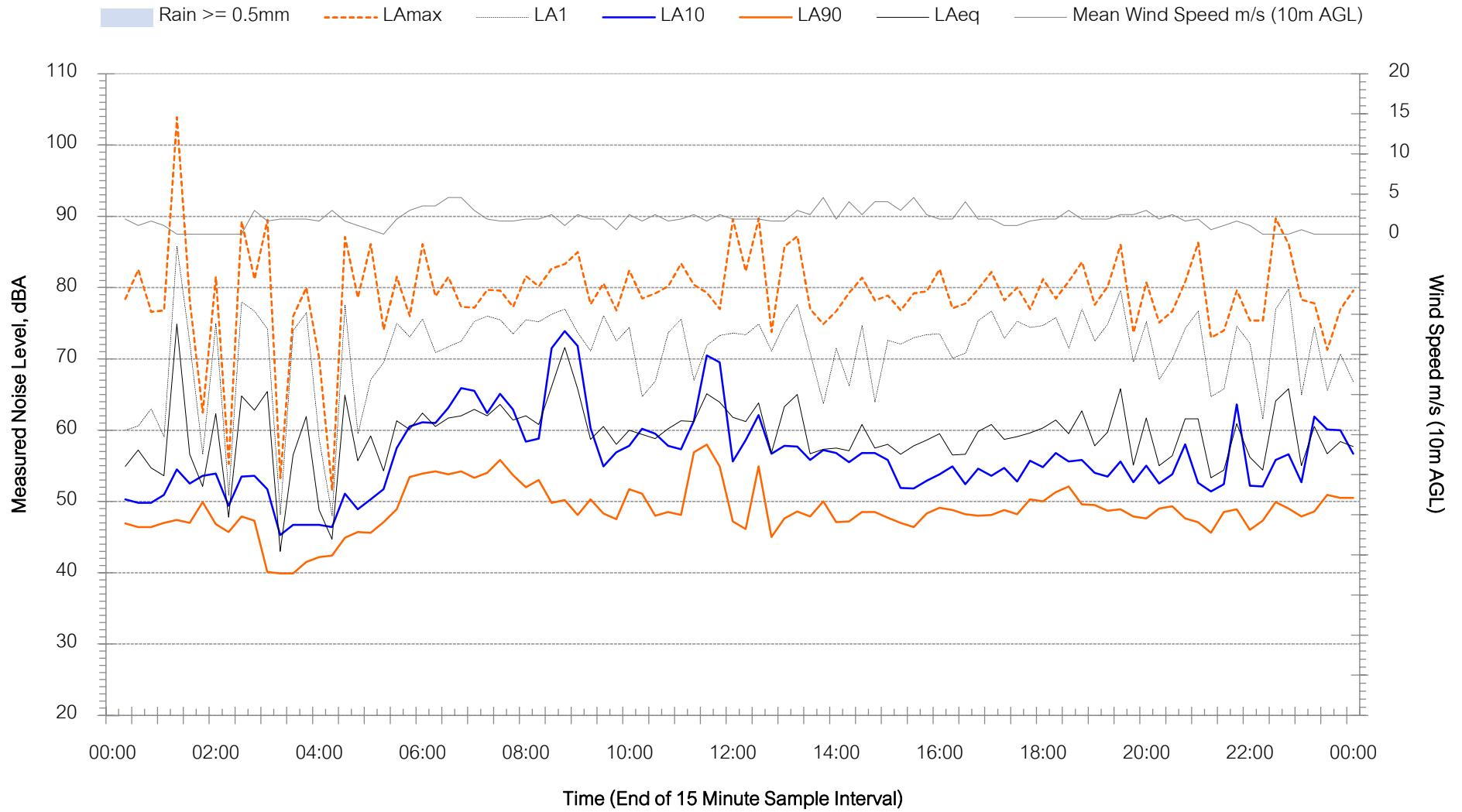
N4 - Thursday 16 April 2020





Background Noise Levels

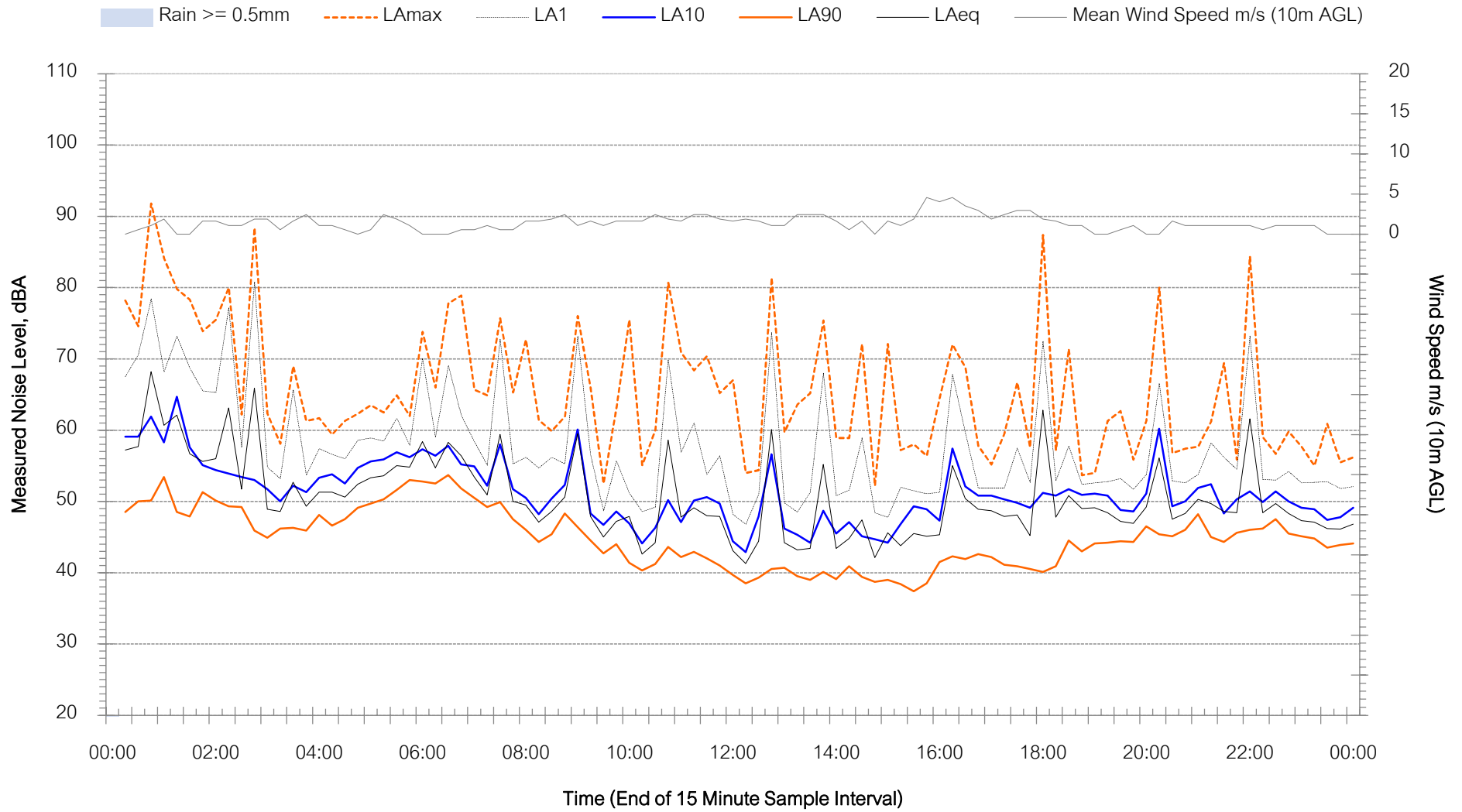
N4 - Friday 17 April 2020





Background Noise Levels

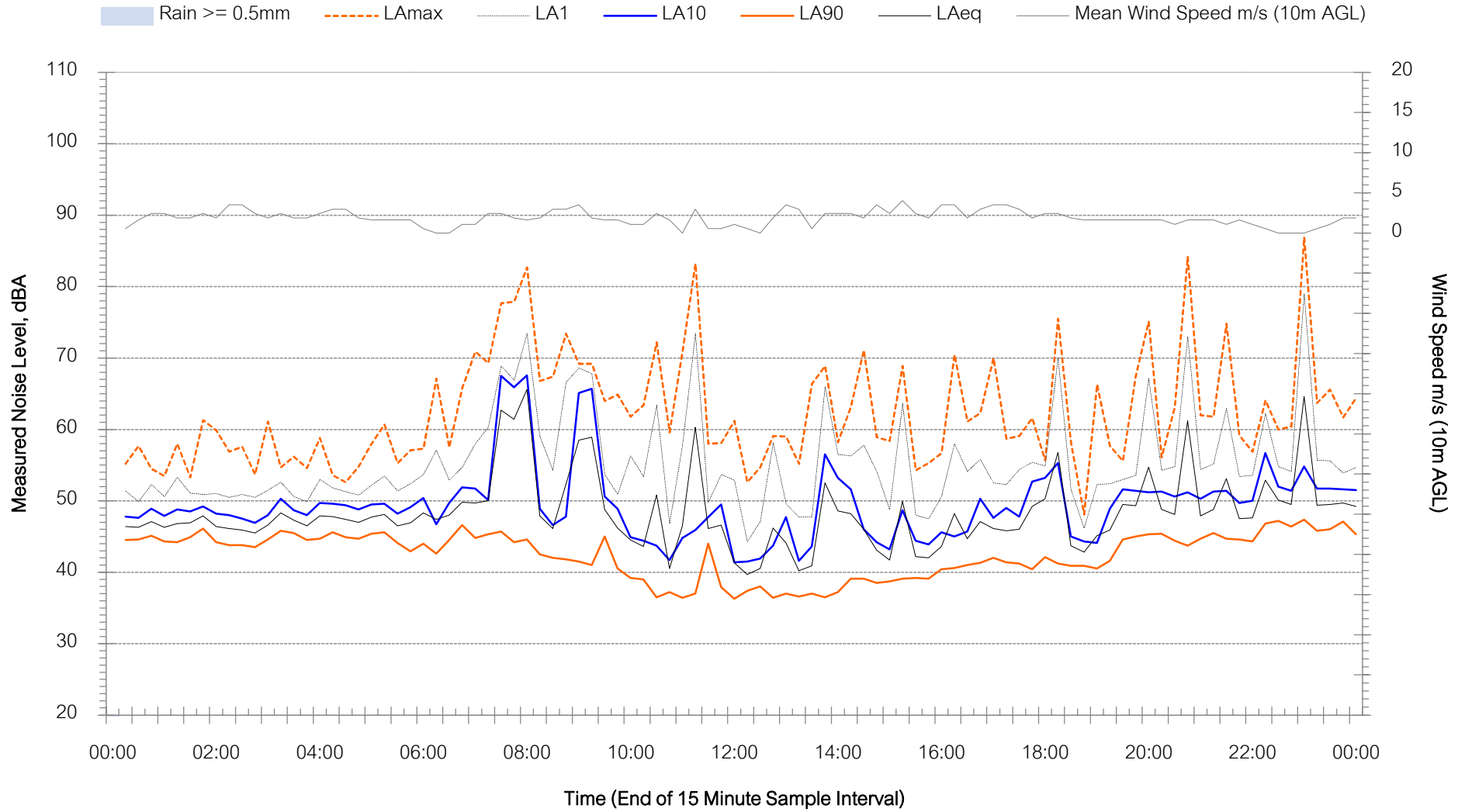
N4 - Saturday 18 April 2020





Background Noise Levels

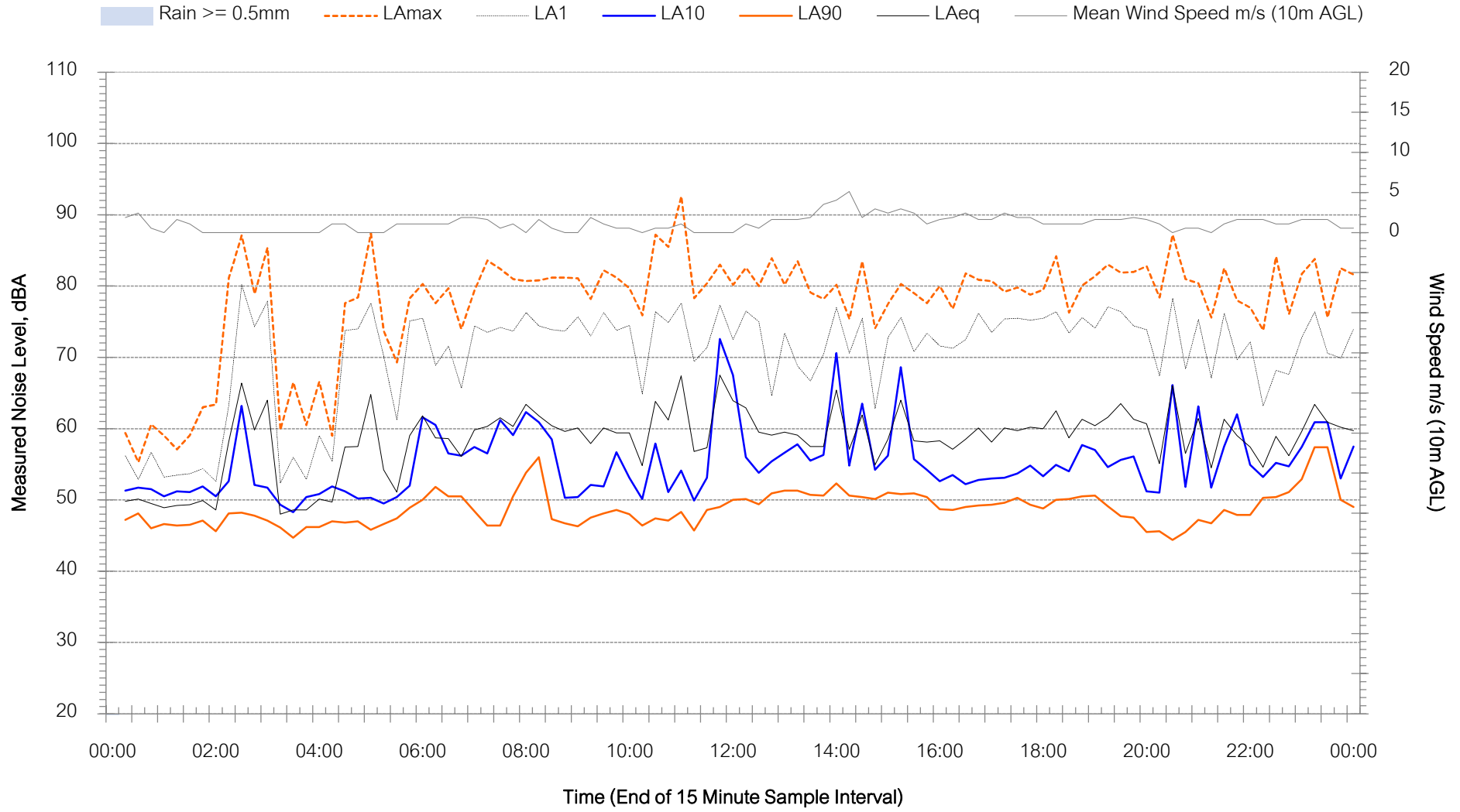
N4 - Sunday 19 April 2020





Background Noise Levels

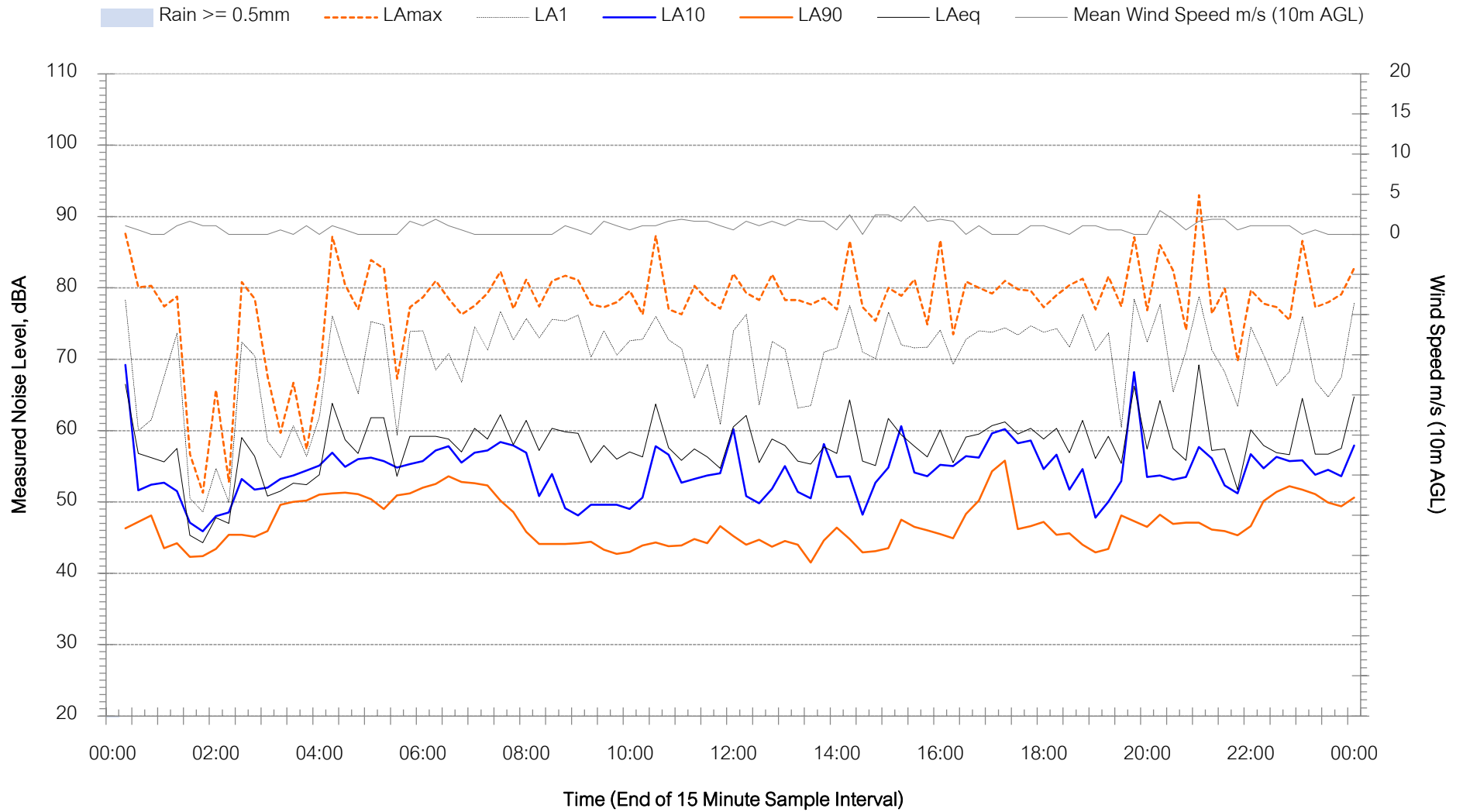
N4 - Monday 20 April 2020





Background Noise Levels

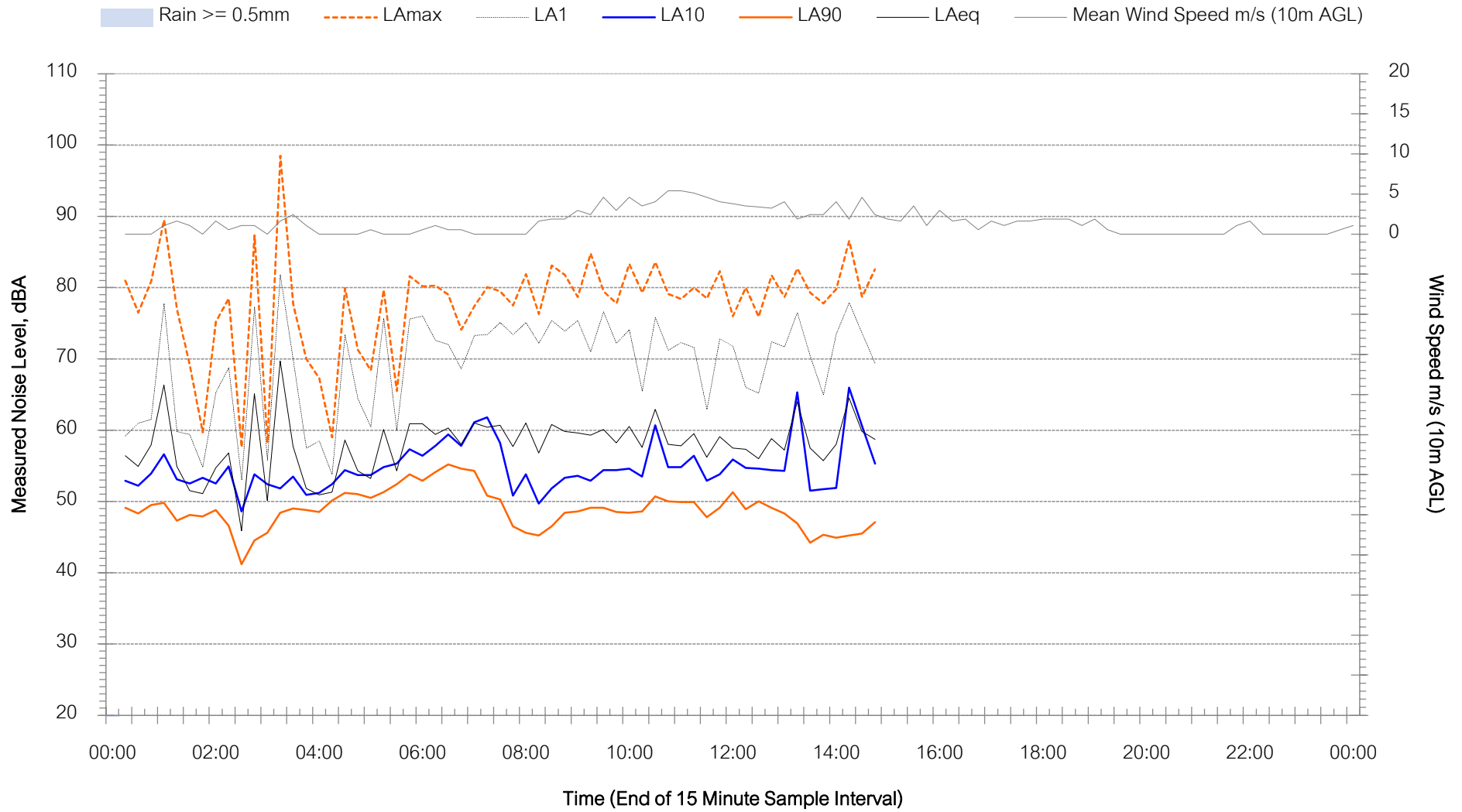
N4 - Tuesday 21 April 2020





Background Noise Levels

N4 - Wednesday 22 April 2020



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