Noise Monitoring Assessment Report | March 2023

771 Cudgen Road, Cudgen NSW

Prepared for: Lendlease Building Pty Ltd

Job Number: A101021.0286.00 ENM44.Rev0 | **Date:** 01/06/2023

ADE CONSULTING GROUP

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For and on behalf of

ADE Consulting Group Pty Ltd

Prepared by:	Reviewed by:	Issued by:
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
Senior Noise and Vibration Consultant	Principal Environmental Consultant	Project Manager

T. 1300 796 922| E. info@ade.group
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Executive Summary

ADE Consulting Group Pty Ltd (ADE) was engaged by Lendlease Group (Lendlease) to assess the levels of construction related noise generated during active works on the Tweed Valley Hospital Project. The project site is located at 771 Cudgen Road, Cudgen in New South Wales (hereinafter referred to as 'the Site'). This noise assessment for the March survey period is not only limited to the ongoing construction works across the hospital site, but also includes associated roadworks that form part of the Tweed Valley Hospital development.

This report summarises ambient noise data collected at three (3) locations during the monitoring period of March 2023, for each device positioned along the southern alignment of Cudgen Road and located close to or adjacent to sensitive receptors. These noise monitoring locations are targeting the active roadworks within the road corridor being undertaken by CD Civil with support and direction from Lendlease.

Current road improvement and widening works on Cudgen Road observed to be undertaken during March are predominantly further working of the road base, trimming of the shoulder and side drains as well as work conducted on the inlets and outlets of the culverts. Drainage works around the culvert areas included additional backfill with compaction in behind the wing walls and around foundations. Given the lateral extent of these works, much of the reported activity was observed to be in close proximity to the SVANTEK Noise and Vibration loggers located at each of the monitoring locations. During the March survey period, the plant and equipment used in the road carriage way included but not limited to generators, vibratory/multi-tyre rollers, road graders, excavators, and trench compactors.

Noise impacts generated from these activities and associated plant/equipment have been correlated with vibration levels at each of locations for greater verification and validation of collected data. The strength of the relationship between the measured vibration data set and the measured noise data and the extent to which these two variables are linearly related is primarily due to the proximity of works to the sensors and microphones of the data loggers which are positioned near or on residential properties.

Primary findings of the report for this survey period show that there are measurable impacts during works to residential and commercial noise sensitive receivers located along Cudgen Road. At two monitoring locations there were seven (7) days of measurable noise levels exceeding the Highly Noise Affected Criteria. From review of the programming of works and field observations, it has been determined that trenching and drainage activities, as well as profiling and grading works conducted in the road corridor close to the monitoring points are influencing high noise levels that may impact these receivers.

With proposed nightworks programmed for the months of May and June, the following recommendations and requirements should be fulfilled:

- Letterbox drops to all surrounding sensitive land uses (including the TAFE); and
- Operator Attended Noise Monitoring at the boundary of the most impacted residential receiver.

Contents

1 Introduction

1.1 Introduction

ADE Consulting Group Pty Ltd (ADE) was engaged by the Lendlease Group (Lendlease) to assess the levels of construction related noise during the construction of the Tweed Valley Hospital Project. The project site is located at 771 Cudgen Road, Cudgen in New South Wales (hereinafter referred to as 'the Site'). This assessment for the March survey period is not only limited to construction works currently being completed on site, but also includes associated roadworks that form part of the Tweed Valley Hospital development.

No one section or part of a section of this report should be taken as giving an overall idea of this report. Each section must be read in conjunction with the entire report, including its appendices and attachments.

At the time of noise monitoring, Lendlease superstructure works were continuing on the Site which includes the construction of columns and suspended slabs. During the previous reporting period in February and continuing during this survey period CD Civil are intrusive works within the road corridor along Cudgen Road in close proximity to identified sensitive receivers. Much of this work within the road corridor includes construction of permanent footpaths, stormwater drainage and placement of culverts, placement and trimming of road base layer as well as widening the road alignment. The type of plant used by CD Civil to conduct the forementioned works include 10T vibratory rollers, excavators (8 tonne to 12 tonne), multi-tyred rollers, graders and asphalt machines.

The purpose of environmental monitoring through the month of March is to:

- Assess construction related airborne noise levels against regulatory requirements, development consent conditions, Australian guidelines, and international standards for construction noise management and control on construction sites that are applied to the Tweed Valley Hospital project.
- Mitigate potentially excessive noise generation through site planning and the adoption of appropriate work methods and practices where feasible and reasonable.
- Monitor and assess construction impacts likely to cause annoyance to the amenity on surrounding sensitive receivers and provide feasible and reasonable recommendations to manage the impacts identified.
- Proactively establish and maintain positive relationships with project stakeholders.

The purpose of the Environmental Noise Monitoring Assessment (ENM) report is to assess the potential impacts that construction activities from the Tweed Valley Hospital Project have on ambient noise levels on the Site and assess compliance against the conditions and criteria stated in the Tweed Valley Hospital Management Plan – Noise and Vibration.

This assessment allows feasible and reasonable mitigation and management measures as far as practicable to be adopted for works aligned with the conditions **C4** – **C7, C12** – **C17** and **B16** from the *Development Consent* described in **Table 2** (**Section 1.2.1**) below, as well as the relevant guideline values and noise goals from the *Interim Construction Noise Guideline (DECC, 2009)* detailed in **Section 2**.

This report uses specific terminology, and a general acoustic glossary is provided in **Appendix I – Glossary**.

1.2 Project background

On 13 June 2017, the NSW Government announced an allocation of approximately $534M for the development of a new hospital on a greenfield site in the Tweed Valley area. The site of the new Tweed Valley Hospital (the Project) is located at 771 Cudgen Road, Cudgen in New South Wales. An overview of the project specific information is provided in **Table 1** below.

An Environmental Impact Statement (EIS) was prepared to accompany a State Significant Development Application for the Project which was assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The EIS outlined the project activities, identifying potential environmental noise impacts, and proposed mitigation measures to manage those impacts. Derived from the EIS, consent conditions were developed to manage and mitigate potential noise impact during construction and commissioning of the hospital. These are set out below in Table 2 (refer to Section 1.2.1) for the purposes of assessment and compliance for this noise survey.

Table 1 Project Specific Information

Site Details	
Client Name:	Lendlease
ADE Project Number:	A101021.0286.00
Site Address:	771 Cudgen Road, Cudgen NSW (Lot 11 DP 1246853)
Date of Report:	01/06/2023
Development Consent	SSD-10353, Health Administration Corporation. Authorised by the Minister for Planning and Public Spaces on 9 March 2020. Consent approved on 12 June 2020.
Objectives:	• comply with relevant guidelines and conditions **C4** – **C7**, **C12** – **C14** and **B16** of the SSD-10353 consent • manage potential airborne construction noise impacts from construction activities which have the potential to affect the nearby noise sensitive receivers (Kingscliff TAFE and residential properties) • establish and maintain good relationships with the neighbours and wider community.
Key Legislation:	Protection of the Environment Operations Act 1997 (NSW) (POEO Act). The POEO Act is a key piece of environmental protection legislation and regulates activities via: • environmental protection licensing, as per schedule 1 • regulation of scheduled and non-scheduled activities • environmental protection offences and penalties • establishment of a general duty of care to notify environment harm.

1.2.1 Development consent SSD-10353

The consent of approval conditions regarding noise are summarised below in **Table 2.**

Table 2 Development consent conditions

Conditions of Approval Number		Condition requirements
Construction Hours	**C4**	Construction, including the delivery of materials to and from the site, may only be carried out between the following hours: (a) Between 7 am and 6 pm, Mondays to Fridays inclusive; and (b) Between 8 am and 1 pm, Saturdays No work may be carried out on Sundays or public holidays.
	C5	Construction activities may be undertaken outside of the hours in condition **C4** if required: (a) By the Police or a public authority for the delivery of vehicles, plant or materials; or (b) In an emergency to avoid the loss of life, damage to property or to prevent environmental harm; or (c) Where the works are inaudible at the nearest sensitive receivers; (d) Where a variation is approved in advance in writing by the Planning Secretary or his nominee if appropriate justification is provided for the works; or (e) For the delivery, set-up and removal of construction cranes, where notice of the crane related works is provided to the Planning Secretary and affected residents at least seven days prior to the works.
	C6	Notification of such construction activities as referenced in condition **C5** must be given to affected residents before undertaking the activities or as soon as is practical afterwards.
	C7	The construction hours must include respite periods and specific times for activities during the day (outside the sensitive times), as required by condition **B16** of this consent, for the high noise generating construction activities (such as activities that would reach or exceed the Highly Affected Noise Level as defined in the ICNG).
Construction Noise Limits	**C12**	The development (including roadworks) must be constructed to achieve the project specific construction NMLs detailed in the Noise and Vibration Impact Assessment for SSDA Tweed Valley Hospital Stage 2' by JHA dated 19/09/2019. Additional mitigation measures must be implemented and any activities that are likely to exceed the NMLs or the high affected noise level of 75dB(A) in accordance with the management and mitigation measures in Appendix 3 and the approved CNVMSP required by condition **B16**.
	C13	Any noise generated during construction of the development must not be offensive noise within the meaning of the Protection of the Environment Operations Act 1997 or exceed approved noise limits for the site.
	C14	Unattended long-term construction noise monitoring must be undertaken during the duration of the Stage 2 works, consistent with the Stage 1 works in SSD-9575. The location of the loggers and the details of the monitoring methods including the reporting methods should be consistent with the CNVMSP in condition **B16** and the Stage 1 works in SSD-9575.
	C15	The intra-day respite periods required to be provided in the CNVMSP in condition **B16** of this development consent must be reviewed on a monthly basis, after the commencement of Stage 2 construction works, in consultation with Kingscliff TAFE and Kingscliff High School. The respite periods are to be maintained / or amended, as agreed with the identified noise receivers. The details of any amendments to the intra-day respite periods due to agreement with the Kingscliff TAFE and Kingscliff High School, must be provided to the Department for information.
	C16	The Applicant must ensure construction vehicles (including concrete agitator trucks) do not arrive at the site or surrounding streets outside of the construction hours of work outlined under condition **C4**.
	C17	The Applicant must implement, where practicable and without compromising the safety of construction staff or members of the public, the use of 'quackers' to ensure noise impacts on surrounding noise sensitive receivers are minimised.

Note: CoA **B16** refers to the Lendlease's Construction Noise and Vibration Management Sub-Plan (CNVMSP)

1.2.2 Monitoring Locations

Prior to the commencement of roadworks, and in response to the program of works at that time, unattended noise monitoring equipment was relocated on 17 November 2022 along the southern alignment of Cudgen Road at three designated locations (i.e. Monitoring Location 005, 006 & 007). Refer to Table 7 in Section 3.1 below for further detail.

These monitoring locations were established to assess the potential noise impacts to the nearest sensitive receivers within respect to the current active works and to ensure the roadworks are compliant with the requirements and conditions set out in the Tweed Valley Hospital Management Plan – Noise and Vibration.

All monitoring locations are within close proximity to the boundary of the nearest sensitive receivers (residential and commercial) that may be impacted by noise generated from the current roadworks program and associated plant.

Aerial imaging and monitoring locations overview is presented in **Appendix II – Aerial** .

2 Noise criteria

2.1 NSW Interim Construction Noise Guideline

The standard construction hours are defined in the *Interim Construction Noise Guideline* (ICNG, DECC 2009) as:

- Monday to Friday 07:00 hrs to 18:00 hrs
- Saturday 08:00 hrs to 13:00 hrs
- No works undertaken on Sundays or Public Holidays.

Table 3 below provides guidance noise management levels (NML) for residential premises for airborne construction noise, reproduced from the ICNG.

Table 3 Guideline noise levels for residential premises, airborne construction noise (ICNG)

Time of Day	Noise Management Level dBA $L_{eq,15min}$	How to apply
Standard hours Monday to Friday 7:00 am to 6:00 pm Saturday 8:00 am to 1:00 pm No work on Sundays or Public Holidays	Noise Affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise • where the predicted (or measured $L_{Aeq(15\ minute)}$ is greater than the noise affect level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level • the proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details
	Highly Noise Affected >75 dBA	The highly noise affected level represents the point above which there may be a strong community reaction to noise • where noise is above the level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: ▪ times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences ▪ If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times
Outside recommended standard hours	Noise affected RBL + 5 dB	• a strong justification would typically be required for works outside the recommended standard hours • the proponent should apply all feasible and reasonable work practices to meet the noise affected level • where all feasible and reasonable practices have been applied and noise is more than 5 dBA above the noise affected level, the proponent should negotiate with the community

Note: RBL refers to Rating Background Level, as defined in the Noise Policy for Industry (EPA, 2017) and outlined in the Management Plan

2.2 Other sensitive land uses and commercial receivers

There are several sensitive land uses including residential properties and commercial receivers identified within the chainage of Cudgen Road where roadworks is currently being undertaken. These include:

- Mate and Matt's Farm Fresh Fruit and Vegetable (approximately 10 m south/south-east)
- Hardy Electrical and Solar (approximately 10 m south/south-east)
- Kingscliff TAFE (an educational facility approximately 10 m south/south-east)
- Kingscliff Library (approximately 380 m north-east)
- Tweed Regional Aquatic Centre (approximately 130 m east)
- Kingscliff High School (approximately 500 m south/south-east)
- Jack Julius Park - passive recreational area (approximately 650 m south-east).

Table 4 below outlines the noise management levels for non-residential land use.

Table 4 Noise at sensitive land uses (other than residences)

Land use	Management Level $L_{Aeq,15\ minute}$ (applicable when properties are in use)
Industrial premises	External noise level 75 dBA
Office, retail outlets and other commercial properties	External noise level 70 dBA
Classrooms at school and other educational institutions	Internal noise level 45 dBA
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level 65 dBA
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level 60 dBA
Community centres	Refer to the recommended 'maximum' internal levels outlined in AS2107 for specific uses

Note: The internal noise level criteria shown above is adjusted by +10 dB to conservatively assume internal to external noise level differences. This is representative of windows being opened to provide ventilation

Note: Office, retail and other commercial properties external noise level applies to all local business premises along Cudgen Road including Mate and Matts, and Hardy Electrical and Solar.

Other sensitive receptors not defined in the ICNG require noise level criteria to be derived from Australian Standard AS2107:2016.

The AS2107 noise level criteria are generally provided as internal levels, and an internal-to-external correction of +10 dB has been applied to assume a conservative noise level with a setting of an open window for ventilation to discern potential impact to a sensitive receiver.

The public library to the north-east would have an external noise management level of 55 dBA, this is provided in **Table 5** below.

Table 5 NMLs for 'Other Sensitive Receivers' based on AS2107

Land use	Noise Management Level $L_{Aeq,15min}$	
	Internal	External
Public Library	45 dBA	55 dBA

Note: The Noise and Vibration Impact Statement was prepared under AS2107:2000. This standard has been superseded by AS2107:2018

2.3 Residential noise criteria summary

The measured background noise levels are used to determine the noise management level (NML) for the Project.

These NMLs are summarised below in **Table 6**.

Table 6 Noise Management Level (dB $L_{Aeq,15min}$) for residential receivers

NCA	Logger ID[1]	Standard hours (RBL +10)	Out of hours (RBL +5)			Sleep Disturbance (RBL +15) dB L_{AMax}
		Day	Day	Evening	Night	
NCA-A/1	n/a	55	50	48	43	53
NCA-B/2	005, 006, 007	57	52	44	41	52
NCA-C/3	n/a	59	54	48	39	52

Note: Cudgen Road Upgrade Works currently operate within OOH periods
Note: All loggers are currently positioned within NCA-B/2
Note 1: Logger ID based on Acoustic Studio Report. ADE CNVIS naming convention reverts to numerical, NCA corresponds to NCA definitions outlined in both the Management Plan and the ADE CNVIS

3 Results overview

3.1 Survey instrumentation and methodology

This monitoring report covers the monitoring period of the whole calendar month of March 2023. Unattended noise monitoring was operated at three (3) locations using Class 1 four-channel Svantek SVAN 958A Sound & Vibration Analysers.

The monitors are enclosed in a weather resistant environmental case which is placed on the ground and covered with a tarp to aid in keeping temperatures below 60°C preventing temperature related failures, and moisture intrusion. Images relating to the installation of the loggers is provided in **Appendix II – Aerial** and **Appendix IV – Site Photographs.**

A summary of the noise and vibration monitoring equipment utilized on-site is provided in **Table 7** below.

Table 7 Noise and Vibration equipment deployed

Make	Model	Location	Serial Number	Calibrated on	Calibration Due
Svantek	SVAN958A	005	92832	01/02/2022	1/02/2024
Svantek	SVAN958A	006	92835	18/02/2022	18/02/2024
Svantek	SVAN958A	007	92834	09/03/2022	9/03/2024
Svantek	SV-33B	Calibrator	104340	13/02/2023	13/02/2024

Note: Monthly field calibrations per AS1055:2018 are carried out, no calibration drift exceeding ± 1 dB has been recorded at 114 dB at 1 kHz

The noise monitoring equipment continuously measures the ambient noise environment's A-weighted Sound Pressure Level in 15-minute increments during the daytime, evening, and night-time periods throughout the monitoring period. All equipment carries current National Association of Testing Authorities (NATA) calibration certificates, and the calibration is checked once per month to ensure calibration drift does not exceed ± 1 dB.

The height of the microphone is no less than 1.2 m, and no greater than 1.5 m above ground level. A wind shield was placed on each microphone to reduce any wind interference during the measurements.

Lendlease has established a daily checklist on site to ensure all monitors are operating in the field correctly, have adequate sunlight to power the units and that they are reporting consistently. ADE personnel attend site to ensure that all monitoring noise loggers are functioning and within calibration during the survey period. To date Lendlease has reported any observed issues arising from the daily site inspections immediately to ADE and ensured that ADE has responded to address technical faults as soon as possible.

In addition to daily site checks and on-site confirmation, ADE conducts regular checks throughout the week via telemetry to ensure the monitors are operating and recording correctly. If an issue is identified ADE personnel contact Lendlease to confirm observed discrepancies in recording prior to ADE personnel mobilizing to site to address any technical issues. In accordance with the approved Noise and Vibration plan, if identified as being necessary (i.e. intrusive site works encroaching monitoring location) the Noise Monitors will not be removed or relocated unless consultation with Lendlease, TSA and HI has occurred and alternative locations are agreed upon.

3.1.1 Analysis methodology

The three environmental noise and vibration loggers are in relatively close proximity to each other. Legitimate construction noise impacts (such as loud bangs, dropping of heavy machinery, jack hammering, compaction of soil and gravels, alarms etc.) would see impact at all three loggers with varying noise levels, correlated through graphical analysis.

When an event is recorded to exceed the background levels and upon further verification (i.e. that is, could be observed within the data at all three locations and/or an observed work activity) it cannot be demonstrated that the event occurred as a result of activities conducted on the Site or within the road corridor where roadworks are occurring, it is removed from the data set. An event which is detected at each of the three locations can be reasonably assumed to have occurred on the Site (or externally such as an emergency vehicle) and is then investigated further to determine the cause and implement mitigation measures, if required and practical.

Vibration impacts that are also recorded at these locations can be correlated with measured noise impacts particularly where large/heavy plant equipment are in use near the logging devices. Higher than anticipated noise levels and increased vibration energy provides correlative data where plant such as rollers, heavy loaded trucks, graders, piling, excavating, or other vibration intensive plant equipment are within perceptible distances from the devices or sensitive receivers.

These impacts are less likely to occur at greater distances where vibration energy dissipates through the earth, whereas noise would dissipate at approximately 6 dB per doubling of distance in nominal conditions.

The correlation strengthens the confidence in monitoring works impacting the devices and nearby receivers, decreasing erroneous reporting of traffic noise/extraneous noise as site impact.

Weather data is collected from the Australian Weather Station located in Coolangatta (ID 040717) and the measured noise data is correlated with recorded weather conditions (i.e. wind speed, rain, etc.) and processed in accordance with the NPfI.

3.2 Results

Processed noise monitoring data demonstrates that the ambient noise environment is dominated by fauna, insects and existing road traffic noise. The data has shown that construction activities during all phases of the roadworks have had the potential to exceed the lower noise limit at the adjacent sensitive receiver as these works have moved closer to the logger locations.

Table 8 Unattended noise monitoring results (overall)

Logger ID	Measured noise levels, dBA												
	Average noise level (Leq)			$L_{10,ave}$ noise level			Background noise levels (RBL)			RNP defined noise level (Leq) [1]			
										Day		Night	
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night	15 hr	1 hr	9 hr	1 hr
L.005	61	53	50	64	56	52	46	43	42	60	61	50	52
L.006	60	52	49	63	55	52	46	41	37	59	59	49	53
L.007	62	53	50	65	56	53	45	40	36	61	59	50	54

Note: The EPA document Road Noise Policy (RNP, 2011) is used to provide road traffic noise levels for the 15-hour day and 9 hour night-time period, and the busiest daytime/night-time 1-hour. These levels are for historical correlation purposes

The results of the unattended monitoring in March show an increase in potential noise impacts recorded at the loggers' locations primarily due to the road improvement works along Cudgen Road.

Following on from the previous months progammable works, construction activity in March has recorded correlated noise impacts arising from construction traffic and plant utilised on-site as sumarised below:

- Excavation works to full depth of pavement on Cudgen Road. Plant used in this activity include 8T and 12T excavators, Grader, 9T smooth drum Roller, 9T pad-foot Roller and a Bobcat. The majority of the roadworks activity was approximately 20 m from the noise monitoring locations and on a very few occasions was observed to be within 10 metres of a single monitoring point.
- Portable generators were used throughout the day for various activities. The closest generator was observed to be located approximately 60 m from the noise monitoring locations.
- Haulage/transportation associated with the delivery and placement of construction road base material within the road corridor was identified as a noise impact. The majority of the trucks involved were identified as semi-trailers and body trucks (ie 6-wheelers). Noise Monitoring locations were within 30 m of identified truck movements and haul routes.
- Installation of stormwater and drainage infrastructure along the southern alignment of Cudgen Road. The dominant plant equipment identified in this works activity includes an 8T excavator and plate compactors. This construction activity was conducted in close proximity to noise monitoring equipment (approximately 5 m) identified as Monitoring Location L.005 and Monitoring Location L.007.
- Continuation of work associated with a new watermain along the southern alignment of Cudgen Road was recorded as potential noise impacts. Observed plant equipment associated with these works included an 8T excavator, and plate compactors. These works were undertaken within 15 m of the noise monitoring locations.

The following graphs display measured L_{eq} noise levels exceeding 57 dBA (to filter out low ambient noise), and are inclusive of all road traffic noise along Cudgen Road. The weather affected noise data has been removed.

Only the correlation between noise and vibration is used for conservative assessment purposes to establish the potential impact from road works near the loggers position at each monitoring location and to separate out extraneous noise to increase confidence that the noise measurement analysis is focused only on the impact from the construction works.

Figure 1 shows correlation with work activities where vibration levels are increased at Monitoring Location L.005. Correlative impacts are noted on March 10, 13 – 14, 21 – 24, and 27 – 31.

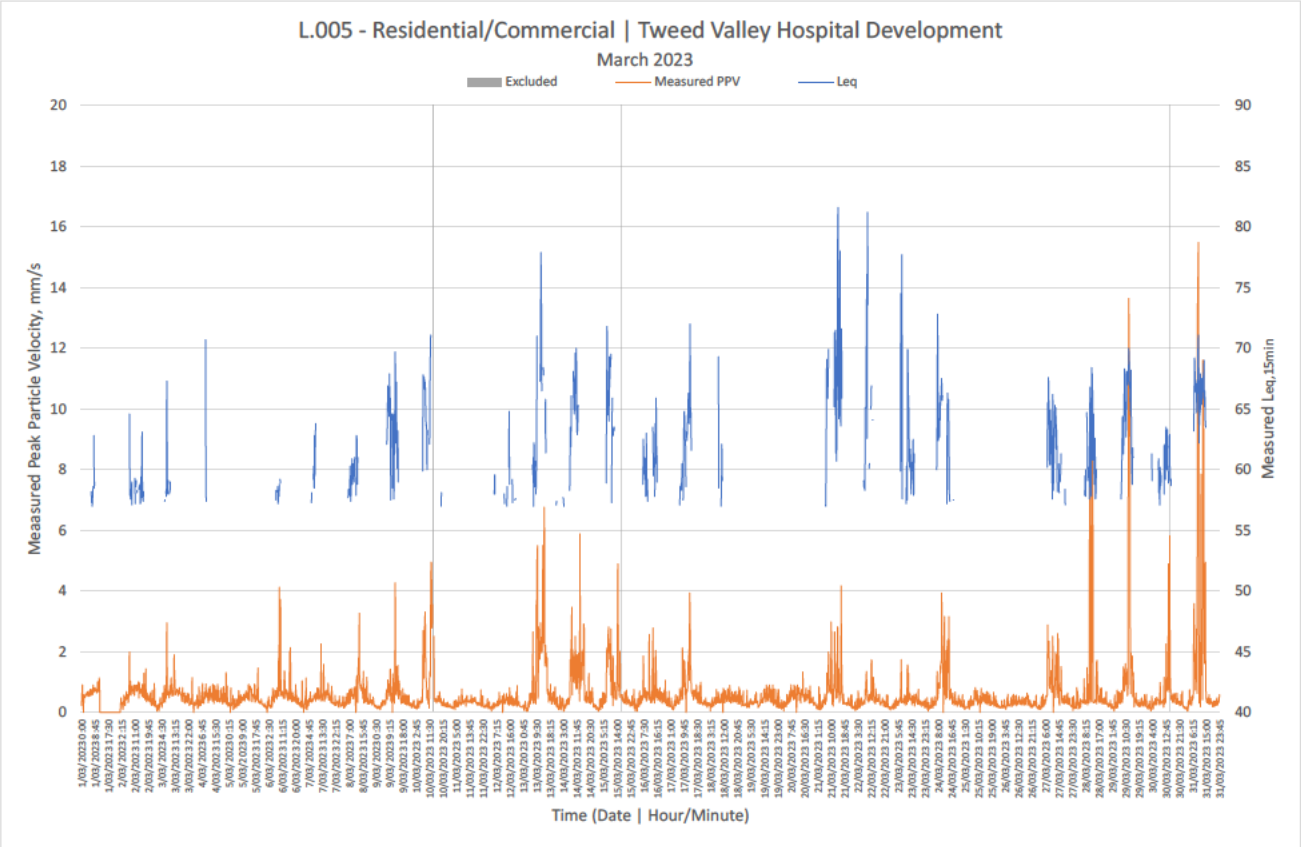


Figure 1 Measured PPV Vibration and L_{eq} noise levels – Location 005

Activities close to identified sensitive receivers measured noise levels five separate events exceeding 75 dBA L_{eq} ranging from 78 dBA L_{eq} (recorded on 13 March and 23 March), up to 82 dBA L_{eq} (21 March) and 81 dBA L_{eq} (22 March)- respectively.

Figure 2 below presents correlation data at Monitoring Location L.006. It was observed that during this survey period the monitoring equipment's ground sensor and microphone is located near to trenching activities. As a result Noise levels recorded at this location are elevated on the following dates March 13 – 14, March 21 – 24, and March 27 – 31.

An increase in vibration levels at Monitoring Location L.006 correlate with an increase in measured noise and these events are attributed to the operation of excavators, large trucks, a grader, vibratory rollers, and bobcats operating near the microphone and ground sensor location. It was also observed that for extended periods of time some of this plant was parked near the monitoring location (ranging from 3 minutes up to 10 minutes) whilst preparatory works of roadbase was undertaken before the plant was utilized again.

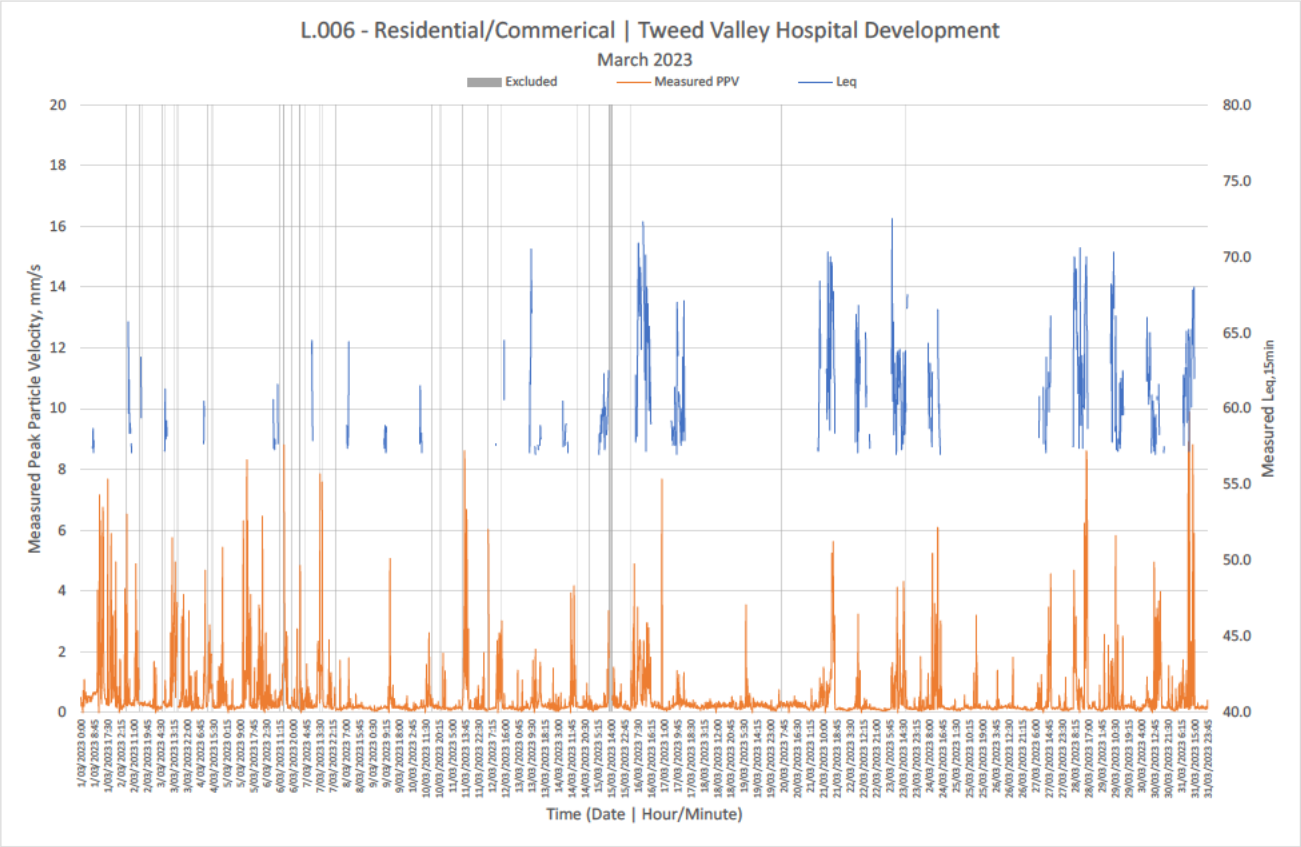


Figure 2 Measured PPV Vibration and Leq noise levels – Location 006

Measured noise levels up to 73 dBA Leq were recorded on 23 March and on other days where works were reported to be near to the sensitive receiver, the recorded noise levels were measured to be in the region of 70 – 71 dBA Leq.

Figure 3 presents correlation data collected to assess potential noise impacts or nuisance to the residential properties located in the south west of the works area. Analysis of the correlated noise and vibration data is logged for short periods of activity on March 1-3, March 6-10, March 14-15, March 21, March 22, and March 31.

Recorded Noise levels at this location exceeded the nominated 75 dBA Leq criteria stated in the *Tweed Valley Hospital Management Plan – Noise and Vibration* four times during the March monitoring period on the following days with three of these exceedances being maginal:

- March 9: 77 dBA Leq
- March 10: 76 dBA Leq
- March 13: 77 dBA Leq
- March 14: 84 dBA Leq.

Given that the nature of the works identified around and near this monitoring location is associated with drainage and stormwater works, assessment of the data is cautiously attributed to impulse noise commonly characterised with this type of open trenching works. Impulse noise can be defined as having a high peak of short duration or a sequence of such peaks (bangs, clicks, clatters, or thumps).

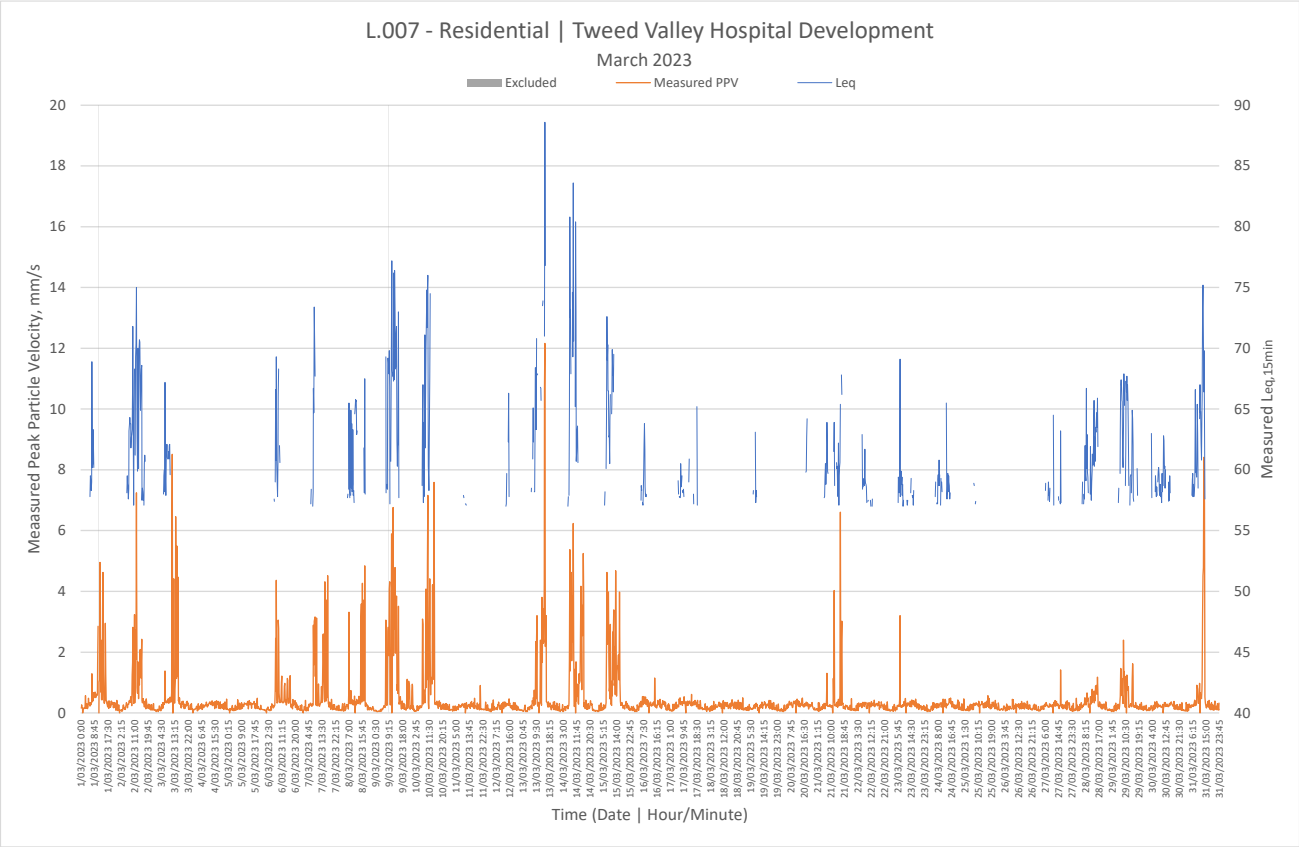


Figure 3 Measured PPV Vibration and L_{eq} noise levels – Location 007\

3.3 Discussion

During the calendar month of March 2023, the meteorological conditions exhibited average wind conditions and precipitation events that influenced the collected noise data detrimentally resulting in 2 whole days and 13 partial days removed from analysis. This is in line with acceptable analysis and reporting exclusion requirements as set out in the NPfI.

Noise contribution to and above the ambient noise profile from roadworks has shown increases in noise levels (ie identified ambient noise and construction noise from the Site) within the work area as primarily sourced from excavation works and plant usage across the site as work activity increases.

The measured noise levels are comparative to the predicted noise levels outlined in the CNVIS for the anticipated works as the loggers in each monitoring location are positioned closer to the active work fronts than the facade of the impacted receivers. Noise graphs for each of the noise monitoring locations are presented in **Appendix V – Noise Graphs**.

Noise levels were consistent with the previous monitoring periods in 2023 (January - February 2023), as vibration intensive and noise intensive (such as rolling works) activities were undertaken with increased frequency. Traffic levels from construction are judged to not have increased by any significant level as the measurement analysis covered in this report is less than the predicted level (57 dBA $L_{eq,9hr}$) outlined in the CNVIS.

The noise management practices outlined in both the Management Plan and the CNVIS prepared for CD Civil are to be employed at all times. Where any valid complaint is received, a range of recommended management

and mitigation measures should be employed to minimise the identified noise impacts where feasible and reasonable.

3.3.1 Noise Management Level (NML) exceedances

Construction activities and roadworks occurring in close proximity to the noise logging devices at each monitoring location recorded noise levels exceeding the noise management levels at the device's location.

The NML exceedances and measured noise levels recorded during the March survey period are within the predicted noise results of the CNVIS (**Section 5.2.4**). However, review and verification of the recorded data across some days report measured noise levels exceeding the maximum worst-case L_{eq} noise levels despite the actual facades of noise sensitive receivers being positioned further away from the source than the loggers. It was observed in the March monitoring period that works were occurring in a relatively close position to the noise monitoring devices, recording higher noise levels than what would be anticipated at the facades of the impacted receivers. The position of these loggers was limited to permission granted from the landowners to be on their property and consideration for how intrusive the monitoring equipment was for the sensitive receivers with respect to egress, etc.

Review of the collected data and subsequent analysis showed that the Highly Noise Affected (HNA) criteria was exceeded at least once over seven (7) days identified within the monitoring period:

- Thursday March 9:
  - 77 dBA L_{eq} – Location L.007
- Friday March 10:
  - 76 dBA L_{eq} – Location L.007
- Monday March 13:
  - 78 dBA L_{eq} – Location L.005
  - 77 dBA L_{eq} – Location L.007
- Tuesday March 14:
  - 84 dBA L_{eq} – Location L.007
- Tuesday March 21:
  - 82 dBA L_{eq} – Location L.005
- Wednesday March 22:
  - 81 dBA L_{eq} – Location L.005
- Thursday March 23:
  - 78 dBA L_{eq} – Location L.005

A total of eight (8) exceedances were recorded of which five were marginally above the stated criteria of 75 dBA L_{eq} ranging from 76 dBA L_{eq} (March 10) to 78 dBA L_{eq} (March 13 & March 23). Upon further examination and confirmationon-site, the other three exceedances reported ranging from 18 dBA L_{eq} (March 22) to 84 dBA L_{eq} (March 14) were attributed to the use of plate compacters and a small 8T excavator used in culvert works condcuuted near the monitoring locations.

Though it was confirmed by personnel onsite that no one (sensitive receivers) were at home at the time of these high noise activities were recorded as exceeding the approved criteria, the mitigation measures and management practices outlined in the CNVIS are recommended to be adhered to at all times where feasible and reasonable. When identified through the project's community/stakeholder complaint process, applicable additional measures where feasible should be applied.

3.3.2 Recommendations

Upon review of the data collected and the subsequent analysis, additional mitigation measures are required including further engagement and communication with sensitive receivers during trenching activities required for the installation of stormwater and drainage infrastructure within the road corridor based on the data collected and analysed throughout this report.

In accordance with the Additional Mitigation Measures outlined by Health Infrastructures' Out of Hours Protocol (which includes standard hours mitigation), Letterbox Drops and Attended Noise Monitoring is required to address concerns of sensitive receivers nearby of potentially high noise activity during periods outside "normal" work hours.

In accordance with the monitoring requirements outlined in the CNVIS, operator attended monitoring location(s) are to be assigned to the most impacted property boundary during high noise intensive activities such as trenching works (if not complete) during standard hours and during out of hours, where applicable. When it is stated as being when applicable, this may be in response to a complaint to determine and ascertain the mitigation measures required where feasible and reasonable, or to determine in a proactive enquiry during periods of work such as night works where noise impacts may be perceptively enhanced corrective measures.

Upon review of the analysed data with respect to the Monitoring Program outlined in the CNVIS, and the CNVMP prepared by LendLease, and with further consideration of the upcoming works program to include night works during the months of May and June, the following recommendations are summarised below:

- Operator Attended Noise Monitoring per the NPfI and Australian Standard AS1055:2018 should be implemented:
  - Modifications per the NPfI (**Table C1**) are applicable;
  - Where programmed works is undertaken during the most sensitive period where construction activity is occurring in order to provide a rapid and proactive response by the contractor;
  - Where works undertaken during the same activity at the same intensity and location (if appliable and able) as historical noise exceedances have been recorded.
- Where noise measurement exceeds 75 dBA Leq,15min, the contractor is to hold works until reasonable and feasible mitigation measures are implemented and confirmed. In adherence to the current site-specific noise and vibration plan management measures, the following actions are also recommended to demonstrate the effectiveness of the strategies applied:
  - Noise measurements conducted post-implementation to compare noise levels;
  - Appraisal and adjustment of mitigation measures during works as necessary and appropriate.
- All extraneous data such as adverse weather will be removed from analysis where applicable. If external noise sources (ie farming or commercial activities) have been identified to contribute to measured noise levels, the L_{eq} contribution would be estimated to calculate the impact of the construction works at the boundary locations or other monitoring locations
  - Where the boundary of sensitive land use is not available and alternate locations are selected in consultation or in response to construction needs, justification must be provided to validate the new location and to ensure the integrity of the data collected moving forward.
  - Weather affected data is removed as per standard industry practice, and/or, identified contributing noise sources outside the work zone are to be considered or removed dependent of identifying the activity and noise source.

4 Conclusion

ADE Consulting Group Pty Ltd (ADE) was commissioned by Lendlease Group (Lendlease) to assess the levels of construction related noise during active works associated with the Tweed Valley Hospital Development Project, located at 771 Cudgen Road, Cudgen in New South Wales.

This report summarises the analysed ambient noise data collected at three locations, positioned along the south and southwest alignment of Cudgen Road. At the time of preparing this report and the monitoring period in which it covers (March 2023), CD Civil are on-site undertaking approved road work activities within the Cudgen Road corridor.

Noise Management Level exceedances (exclusive of existing traffic noise) have been identified with works associated with plant used in construction activity for the Cudgen Road and intersection upgrade.

- Some intermittent noise impacts up to 84 dBA Leq,15min were identified and upon review of the works program with on-site observations are determined to be associated predominantly with trenching and drainage works with much of this work being done near Monitoring Location L.007 on Tuesday, 14 March 2023.
- It was recorded that during standard work hours for seven (7) days during the monitoring period, noise levels ranging from 76 dBA Leq (10/03/23) to 84 dBA Leq (14/03/23) exceeded the Highly Noise Affected noise criteria of 75 dBA L_{eq}. Further examination and verification for the recorded data was undertaken and correlated with known works and recorded ground vibration levels. Review of the programmable works and on-site observation determined that these noise levels were primarily due to grading and trenching activity being conducted as close as 2-5 m from Monitoring Location L.005 and Monitoring Location L.007.
- Examination of the noise levels measured at each of the three locations in the road corridor exhibit a typical ambient noise environment dominated by road traffic noise along Cudgen Road, as well asthe sounds of local fauna (such as birds and insects).

The CNVIS presents mitigations and management practices which are to be implemented (where feasible and reasonable) in anticipation to lower the noise impact of the current works. Upon review and analysis, the noise levels (and vibration where correlation exists) presented in this report (**NMA44**) demonstrate effective noise management practice has been implemented by CD Civil and Lendlease where identified.

The following recommendations and requirements outlined below are strongly encouraged for future works within the road corridor:

- As part of continued community consultation, particularly leading into works with potential high noise output or leading into nightworks, community consultation via Letterbox drops to all surrounding sensitive land uses (including the TAFE) is recommended.
- To fully ascertain the potential impacts from upcoming night works, Operator Attended Noise Monitoring is required at the boundary of the most impacted residential receiver,
- Detail relating to these, and other previously mentioned recommendations has been provided in **Section 3.3.2**.

Appendix I – Glossary

1 Sound Pressure Level

Defined as:

$$L_p = 10log_{10}\left(\frac{p^2}{p_{ref}^2}\right)dB$$

In the above equation, p is the sound pressure fluctuation relative to atmospheric pressure, and *pref* is 20 microPascals (2 x 10-5 Pa), the approximate threshold of hearing.

Sound or noise is the sensation produced at the ear by small fluctuations in atmospheric pressure. Human ears are sensitive to changes to sound pressure over a wide range, from 20 microPascals to 60 Pascals, in lieu of using a linear scale to represent this range, a logarithmic scale is adopted to better handle

2 Sound Power Level

Sound power level cannot be directly measured using a microphone, it does not change with distance and is not influenced by atmospheric conditions. The sound power level refers to the total energy of the sound, and is reference to 1 Pico Watt.

3 Weighting and Loudness

The overall level of a sound is usually expressed as dB(A) and not dB. Weighting refers to the human ear's frequency response to sound. Typically, sound is measured with an A-weighted filter which reduces the significance of lower frequencies and very high frequencies, increasing the importance of mid-frequencies (500 Hz to 4 kHz), and being a good measure of the "loudness" of a sound.

A change of 1 to 2 dB(A) is difficult to detect, whilst a change of 3 to 5 dB(A) corresponds to a small but noticeable change. A 10 dB(A) change corresponds to a doubling or halving in apparent loudness.

4 Noise Metrics and Statistical Noise Levels

i) L_{Aeq} - The time averaged A-weighted sound pressure level for the interval, as defined in AS1055.1. It is generally described as the equivalent continuous A-weighted sound pressure level that has the same mean square pressure level as a sound that varies over time. It can be considered as the average sound pressure level over the measurement period.

ii) L_{Amin}/L_{Amax} - Minimum or Maximum A-weighted noise level detected during the measuring period. It refers to the minimum background noise detected or the maximum L*p* measured.

iii) L_{A90} - A-weighted noise level which is exceeded for 90% of the measuring period. It is usually used as the descriptor for background noise level during the measurement period.

iv) L_{A1} - Noise level which is exceeded for 1% of the measurement period.

v) L_{A10} - Noise level which is exceeded for 10% of the measurement period. The L_{A10} is often referred to as the average *maximum* noise level.

5 Background Noise

The underlying level of noise present in the ambient noise, excluding the noise source which is under investigation, when extraneous noise is removed.

6 Ambient Noise

Ambient noise of an environment: the all-encompassing sound associated with that environment, being a composite of sounds from many sources.

7 Vibration

The mechanical oscillations occurring about an equilibrium point. The oscillations may be periodic such as the motion of a pendulum or random. Vibration is most commonly expressed in terms of displacement, velocity, acceleration and frequency, all of which are related

8 Displacement

The change in position of an object, is a vector quantity. (Stress indicator).

9 Velocity

The rate of change of displacement, is a vector quantity. (Fatigue indicator).

10 Acceleration

The rate of change of velocity, is a vector quantity. (Indicator of force).

11 Frequency

The number of times a periodic function or vibration occurs or repeats itself in a specified time, often 1 second – cycles per second. Frequency is measured in Hertz.

12 Hertz

The unit of frequency or pitch of a sound. One hertz equals one cycle per second.

13 Peak Particle Velocity (PPV)

The greatest instantaneous particle velocity during a given time interval if measurements are made in 3-axis. The resultant Peak Particle Velocity (PPV) is the vector sum i.e. the square root of the summed squares of the maximum velocities, regardless of when in the time history those occur.

14 Root Mean Square rms

The rms value of a set of numbers is the square root of the average of their squares. Best used when assessing building damage.

15 Vibration Dose Value VDV

The Vibration Dose Value (VDV) is used for assessing intermittent vibration. A cumulative measurement of the vibration level received over an 8-hour or 16-hour period. Best used when the structure is occupied.

16 Peak

The peak is the maximum amplitude during a measurement period.

17 Peak to Peak P-P

The peak-to-peak (P-P) is the difference between the maximum positive and maximum negative amplitudes of a waveform.

18 Logarithmic Scale

Comparing frequency with large amplitude differences be accomplished using a logarithmic scale. Critical vibration components usually occur at low amplitudes compared to the rotational frequency vibration. These components are not revealed on a linear amplitude scale because low amplitudes are compressed at the bottom of the scale, however a logarithmic scale shows prominent vibration components equally well at any amplitude.

19 Zero Crossing Frequency

Determining the apparent dominate frequency of a given sample can be achieved by using the Zero Crossing Frequency.

20 Primary Waves P Waves

Alternating compressions ('pushes') and dilations ('pulls') in the same direction as the wave is propagating. P waves are the first arriving energy, smaller and higher frequency than S waves.

21 Secondary Waves S Waves

Alternating transverse motions perpendicular to the direction of propagation. Slower than P waves.

22 Rayleigh Waves R Waves

Motion is both in the direction of propagation and perpendicular (in a vertical plane). R waves are also dispersive, and amplitudes decrease with depth.

23 Accelerometer

A vibration sensor whose electrical output is directly proportional to the acceleration component of the vibration. The two most common accelerometer types are the traditional charge type and the IEPE, integrated electronic piezoelectric type with a built-in line-drive amplifier to enable the output signal to be transmitted over 'longer cable runs'.

24 Geophone

Geophones measure velocity by means of a magnetic core surrounded by an electrical coil. When the surface vibrates, the geophone housing moves however the coil stays stationary, thus the movement of the magnet in the coil causes an electrical current which is calibrated to velocity of vibration.

25 Filter

A device for separating components of a signal on the basis of their frequency. It allows components in one or more frequency bands to pass relatively unattenuated, and it attenuates components in other frequency bands. Modifies the frequency spectrum of a signal usually while it is in electrical form.

26 Short-term vibration

Vibration which does not occur often enough to cause structural fatigue, and which does not produce resonance in the structure being evaluated.

27 Long-term vibration

All types of vibration not covered by the definition of 'short-term vibration

28 Impulsive vibration

Rapid build-up to a peak followed by a damped decay that may or may not involve several cycles of vibration. It can also consist of a sudden application of several cycles at approximately the same amplitude, providing that the duration is short (typically <2 seconds). Impulsive vibration (no more than 3 occurrences) in an assessment period is assessed on the basis of weighted rms acceleration, and peak particle velocity.

29 Continuous vibration

Continuous vibration continues uninterrupted for a defined period (usually throughout daytime and/or night-time). This type of vibration is assessed on the basis of weighted rms acceleration.

30 Intermittent vibration

Defined as interrupted periods of continuous (e.g., a drill) or repeated periods of impulsive vibration (e.g., a pile driver), or continuous vibration that varies significantly in magnitude. It may originate from impulse sources (e.g., pile drivers and forging presses) or repetitive sources (e.g. pavement breakers), or sources which operate intermittently, but which would produce Continuous vibration if operated continuously (for example, intermittent machinery, railway trains and traffic passing by). This type of vibration is assessed on the basis of vibration dose value.

Appendix II – Aerial Imaging

ADE Monitoring locations, site location (including CD Civil's Cudgen Road Upgrade works) are presented below.


555200
555600
556000
N
Tweed Valley Hospital Development Project
Northern Location
005 - SVAN 92832 | DustTrack 8533 181 801
Stockpile Locations
006 - SVAN 92835 | DustTrack 8533 184 203
Southern Works
007 - SVAN 92834 | DustTrack 8533 184 203
0
100
200 m
Tweed Valley Hospital Development Project
Environmental Noise, Vibration, and Dust Monitoring
Location Overview
Image: Nearmaps | Scale 1:4500 | GDA 1994 Zone 56
Legend
Roads
Loggers
Cudgen Road Uprade Works Locations
Tweed Valley Hospital Development Project
ADE GROUP
SOLUTIONS THROUGH INNOVATION

Appendix III – References

Standards, policies, and guidelines used for the assessment of noise are as follows:

- ADE Group Consulting Pty Ltd – Cudgen Road Upgrade Construction Noise and Vibration Impact Statement, Prepared for CD Civil, Version 1.0, 6 September 2022 (ADE Reference A103022.1044.00)
- AS 1055:2018 Acoustics – Description and measurement of environmental noise
- AS 2107:2000 Acoustics – Recommended design sound levels and reverberation times for building interiors
- AS 2659.1-1998 Guide to the use of sound measuring equipment – Portable sound level meters
- Development Consent SSD-10353, Department of Planning, Industry and Environment – Tweed Valley Hospital Stage 2 – 12 July 2020 (approval)
- Interim Construction Noise Guideline (ICNG, NSW Department of Environment and Climate Change DECC, 2009)
- Noise Policy for Industry (NPfI, EPA 2017)
- Transport for New South Wales Construction Noise and Vibration Strategy (TfNSW, 2019)
- Tweed Valley Hospital Management Plan – Noise and Vibration, Revision 7.0, Lendlease Building Pty Ltd
    - Tweed Valley Hospital – Noise and Vibration Impact Assessment for State Significant Development (SSD), SVM-2370, Revision: Issue 2, 17 October 2018 – Acoustic Studio

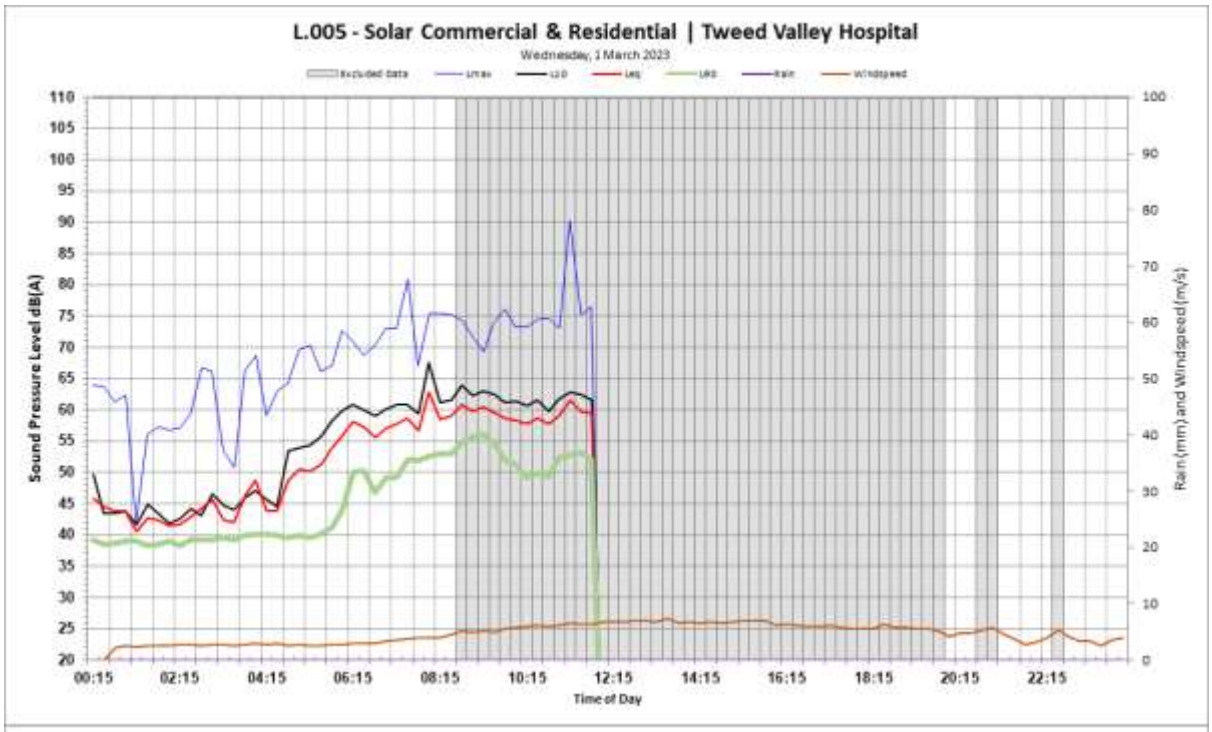
Appendix IV – Site Photographs

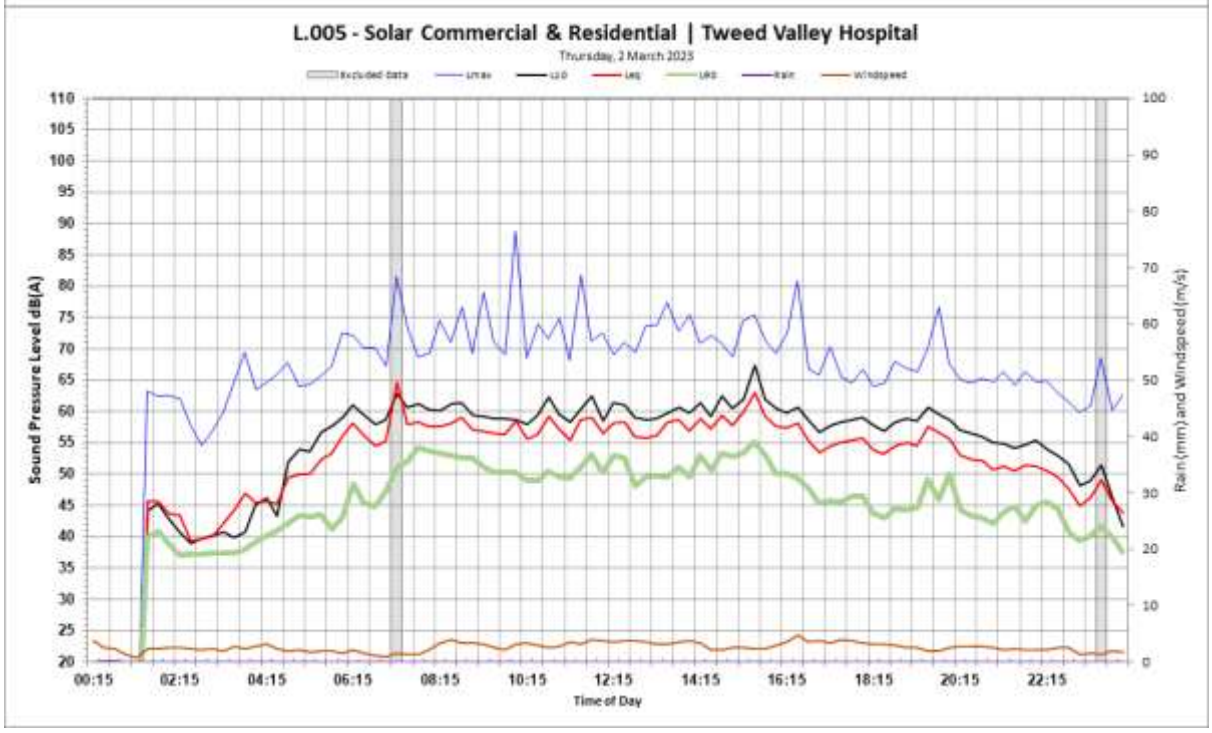
Photograph 1 Representative photograph of monitoring location 007 – Residential, as observed 13/03/2023

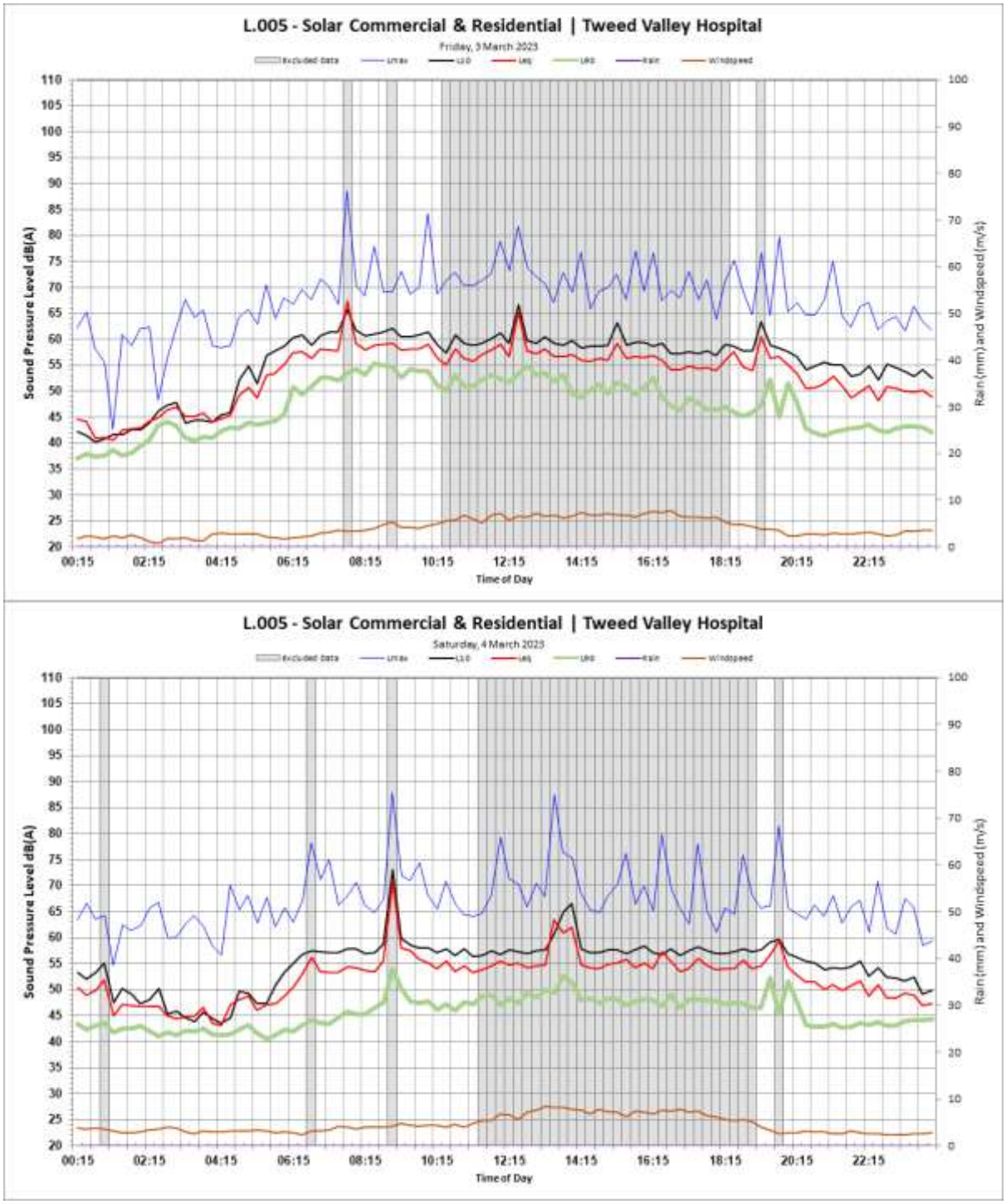
Photograph 2 Representative photograph of monitoring location 005 – Solar Industry, as observed 13/03/2023

Photograph 3 Representative photograph of monitoring location 006 – Mate and Matts, as observed 13/03/2023

Appendix V – Noise Graphs



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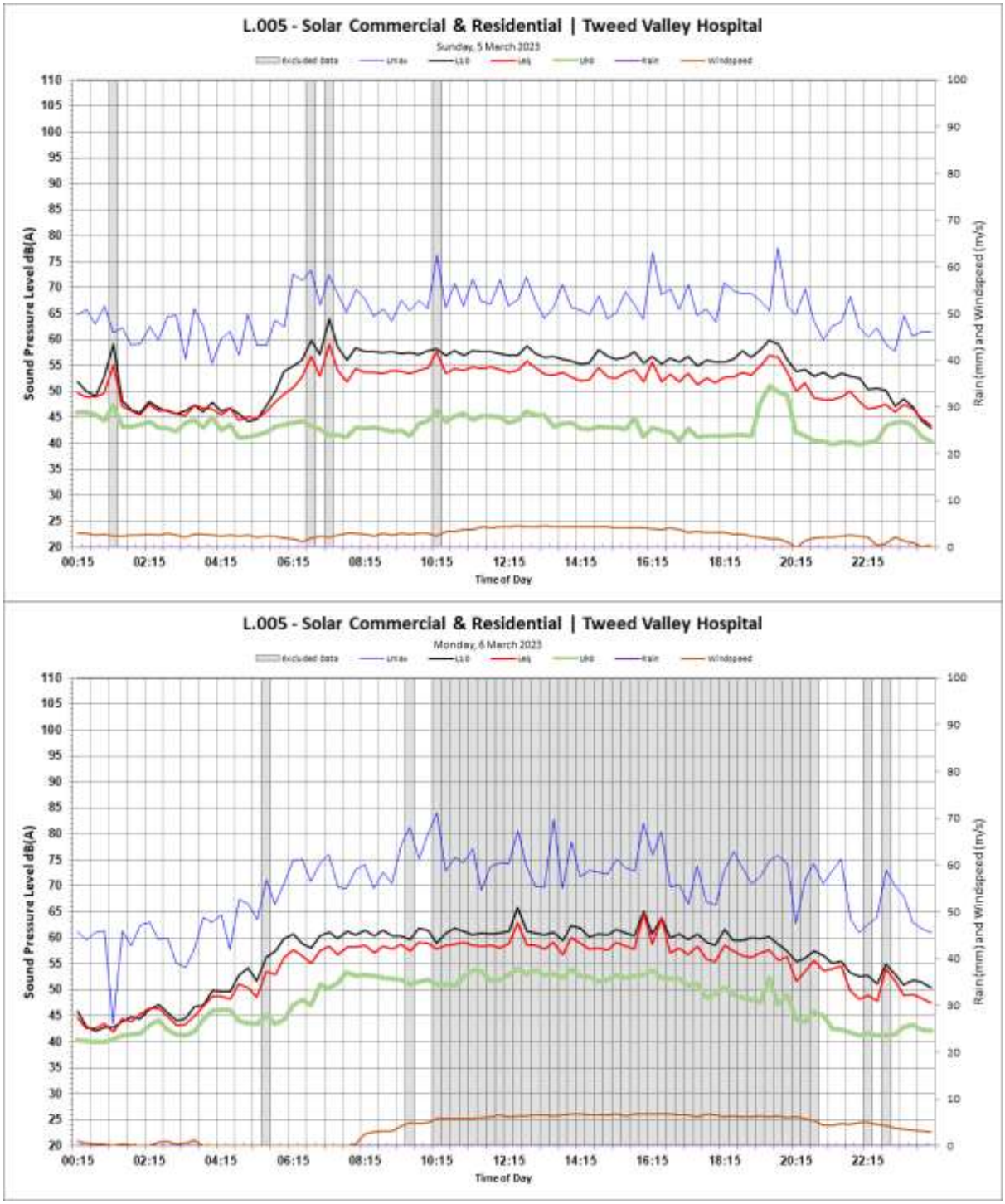
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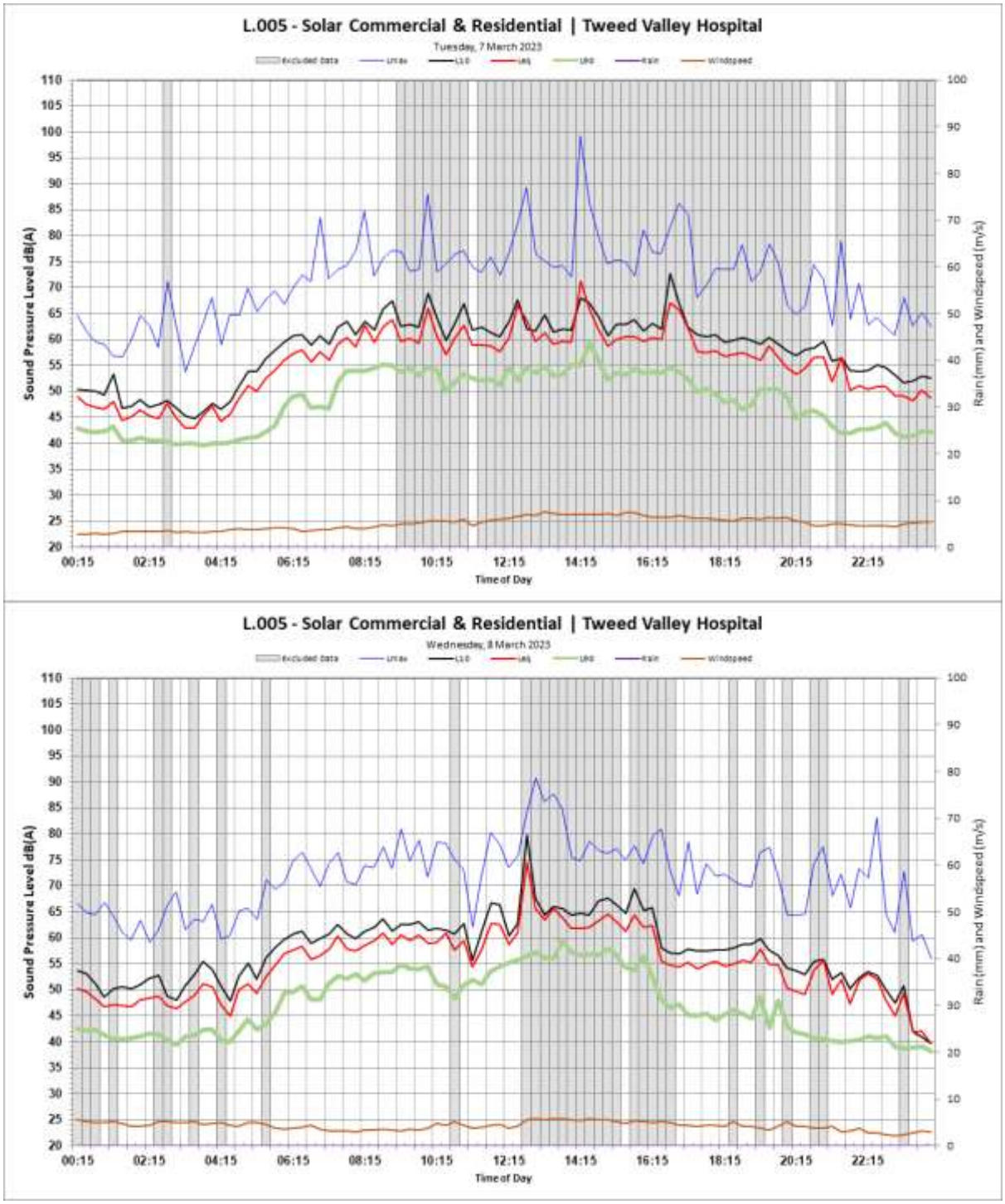
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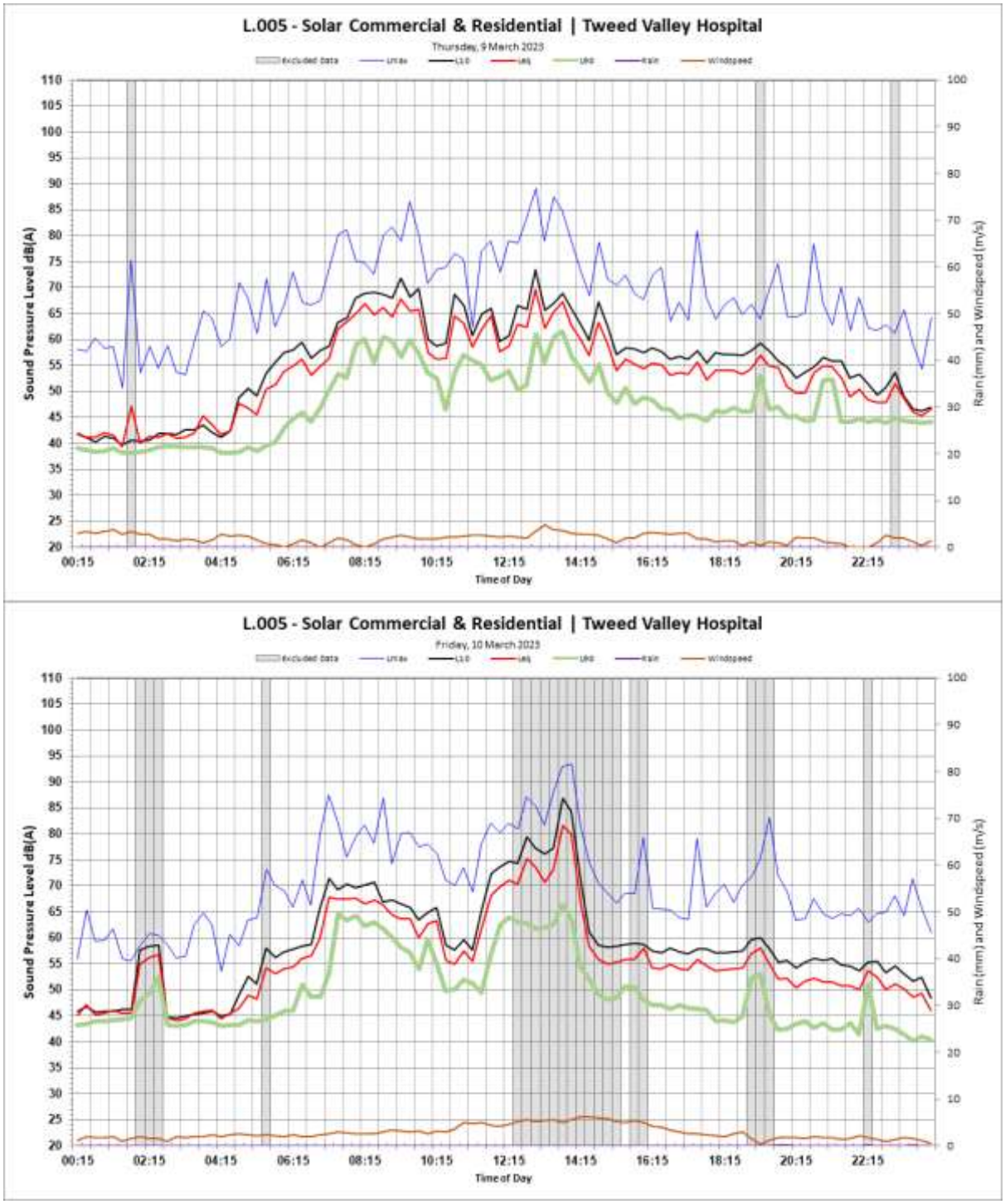
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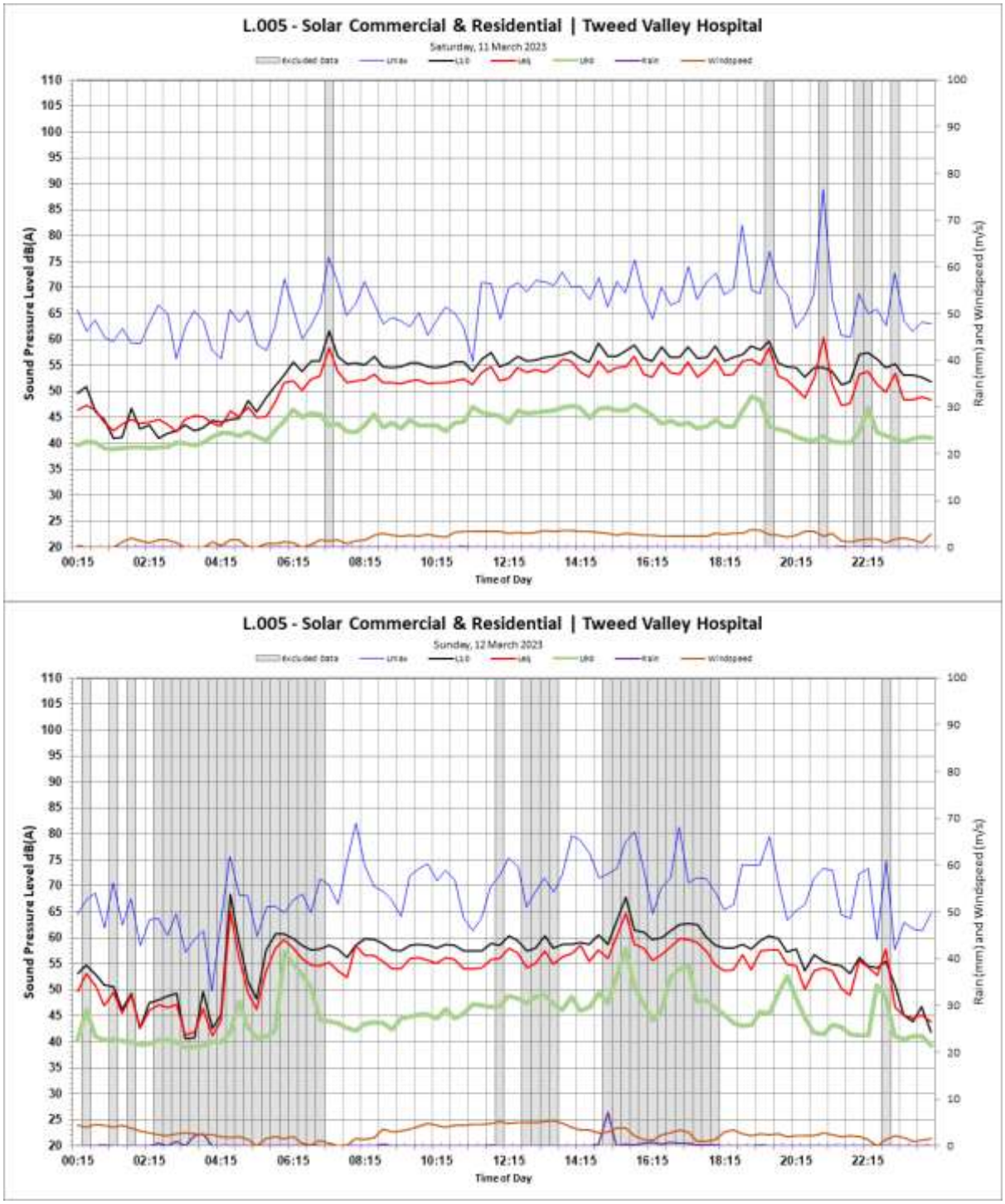
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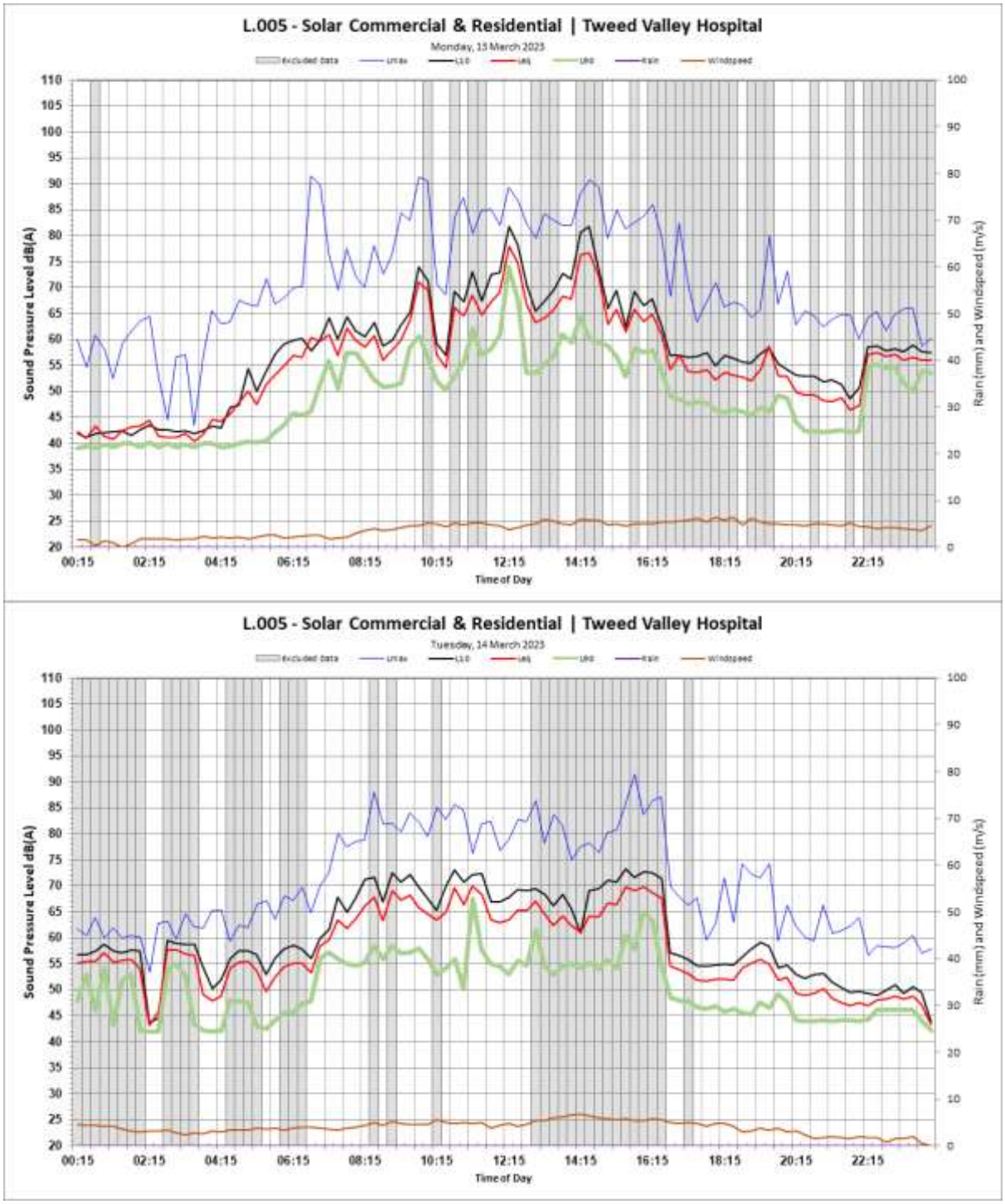
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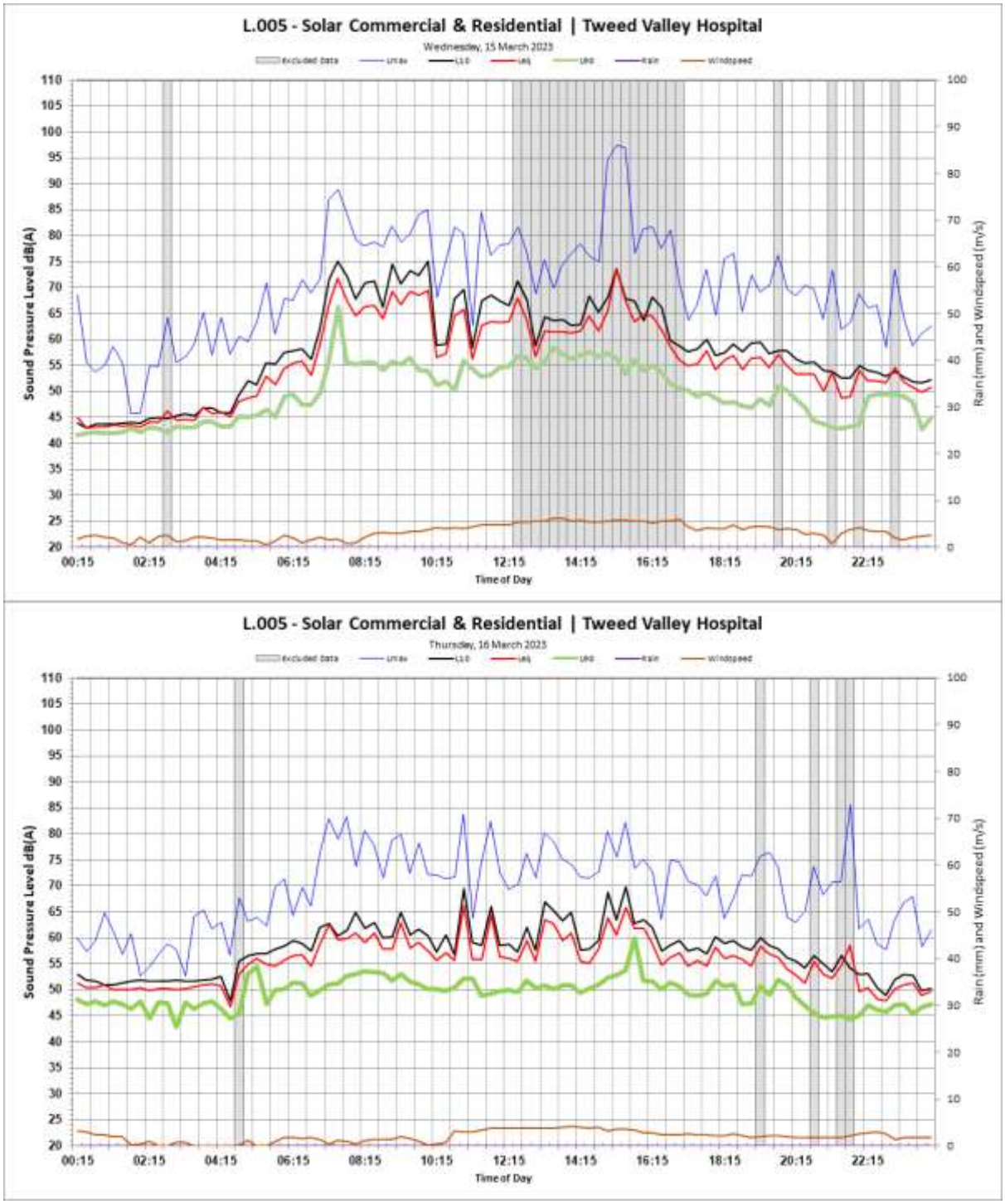
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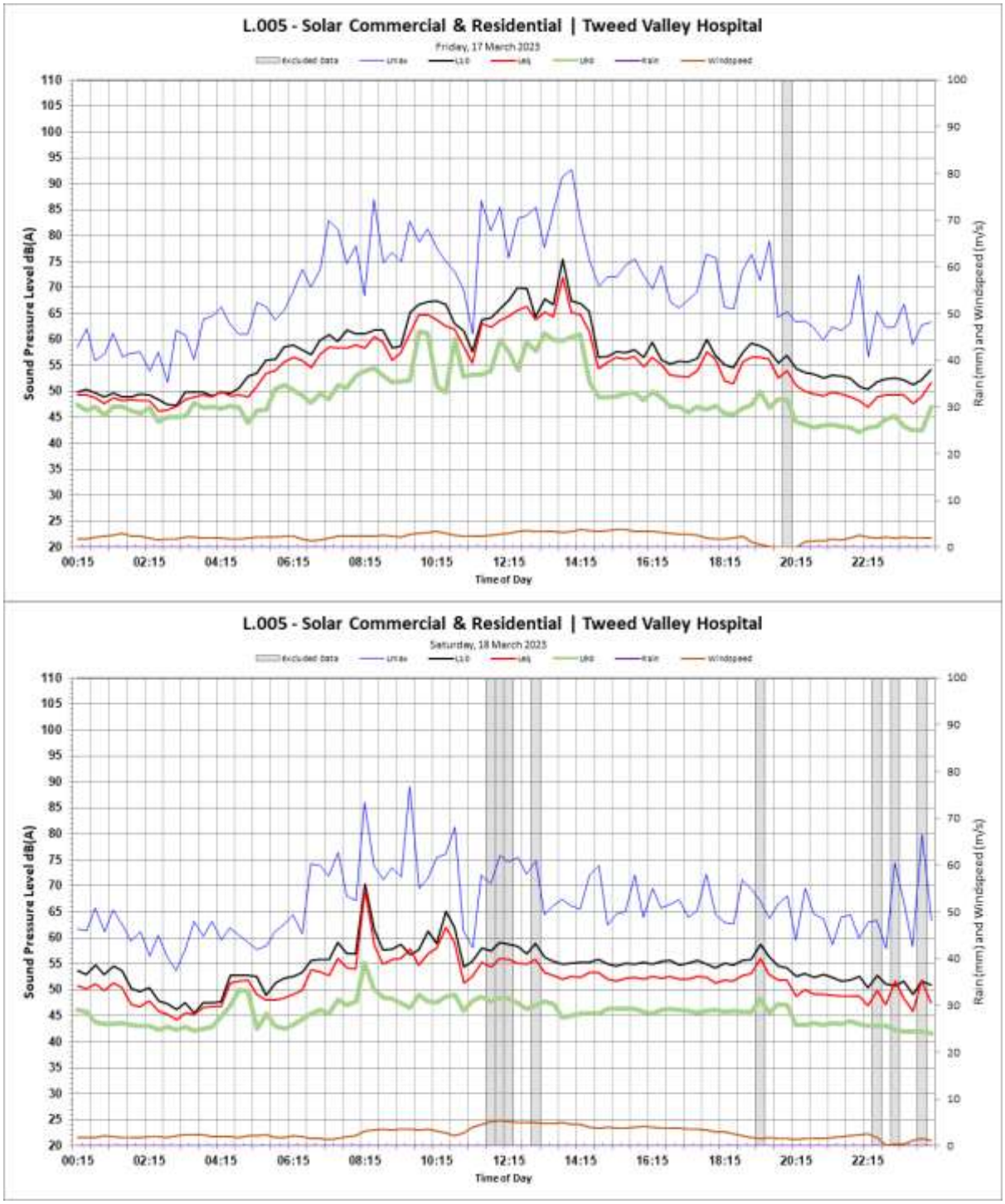
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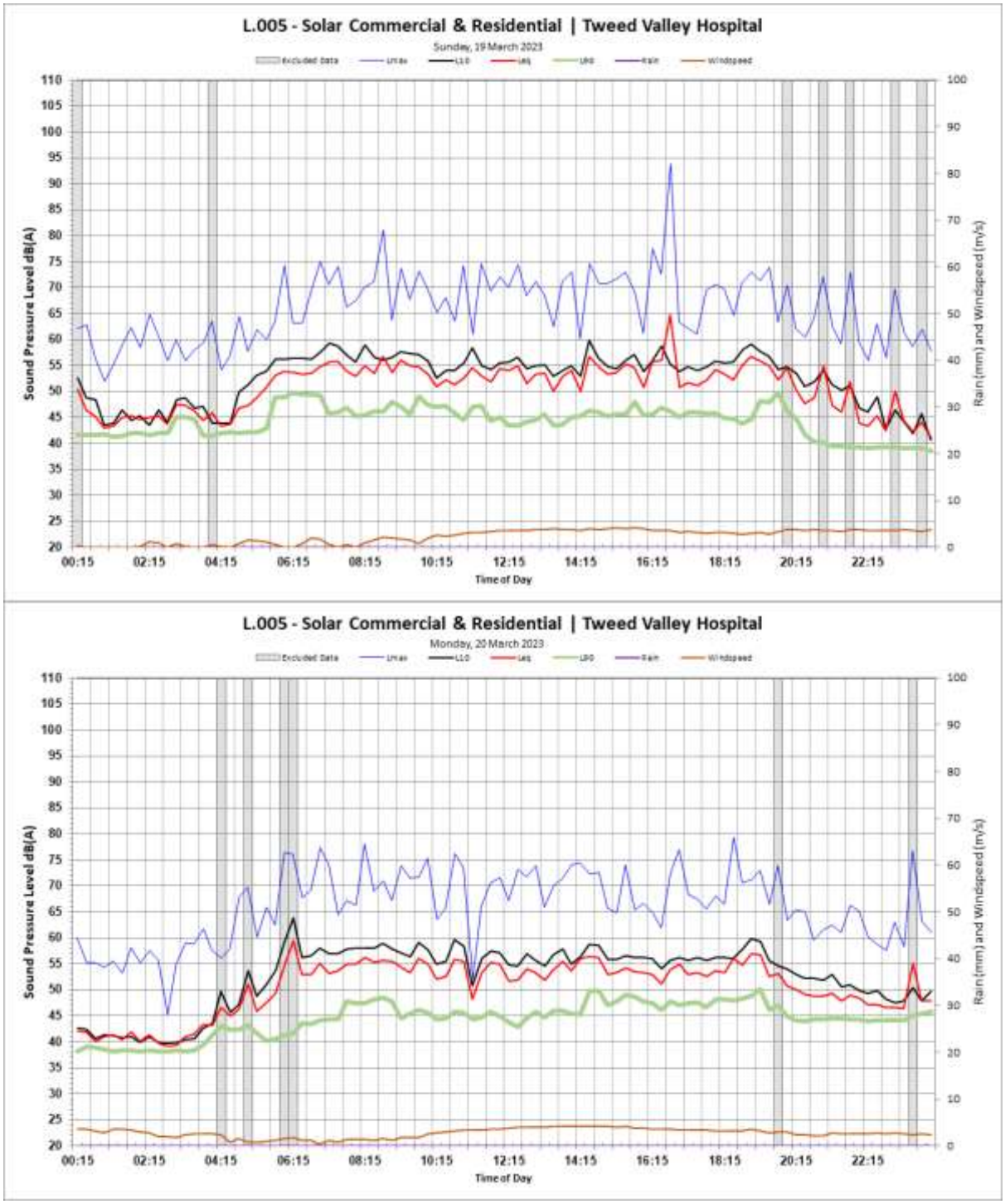
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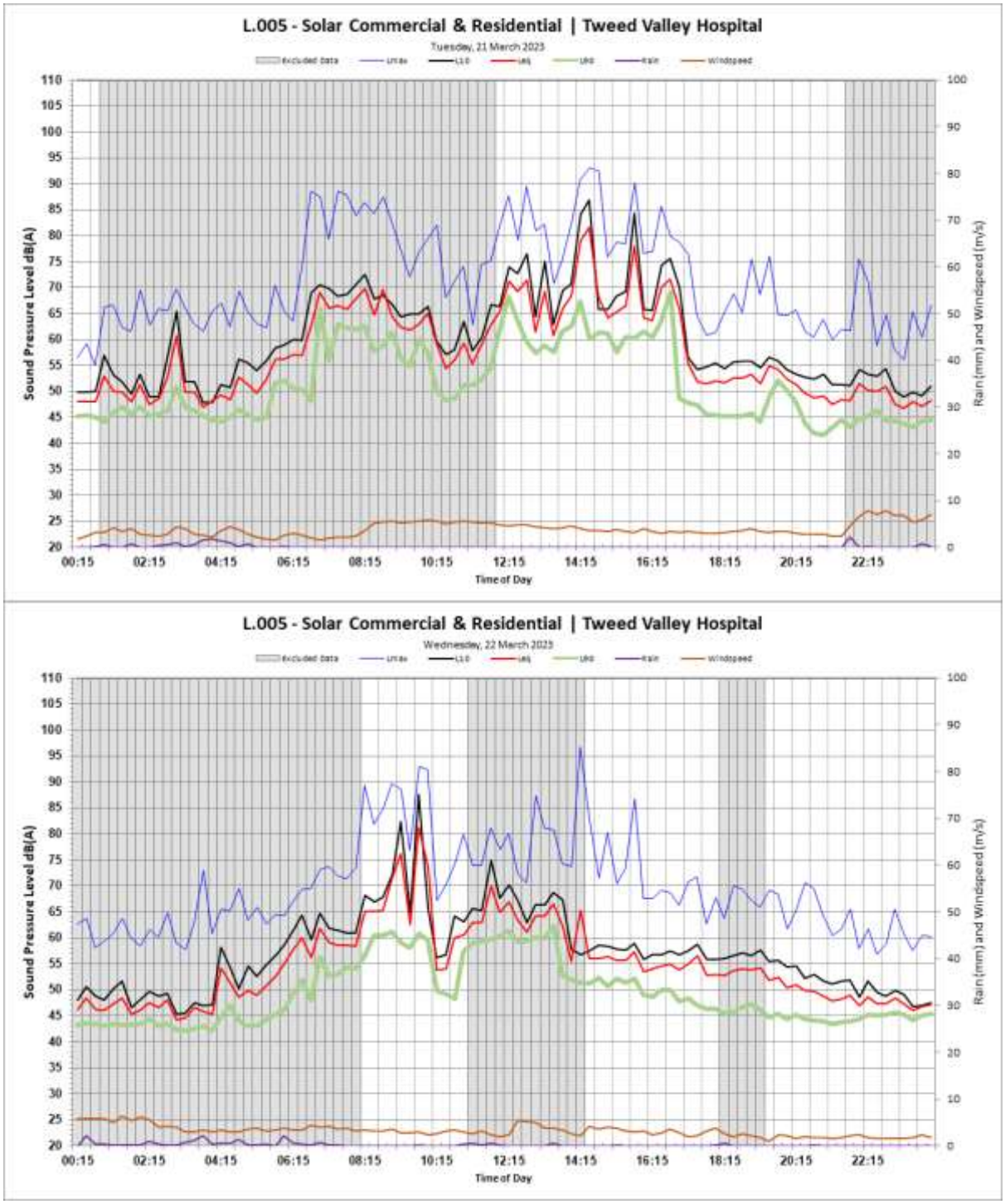
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Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
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14:15
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22:15
L.005 - Solar Commercial & Residential | Tweed Valley Hospital
Wednesday, 22 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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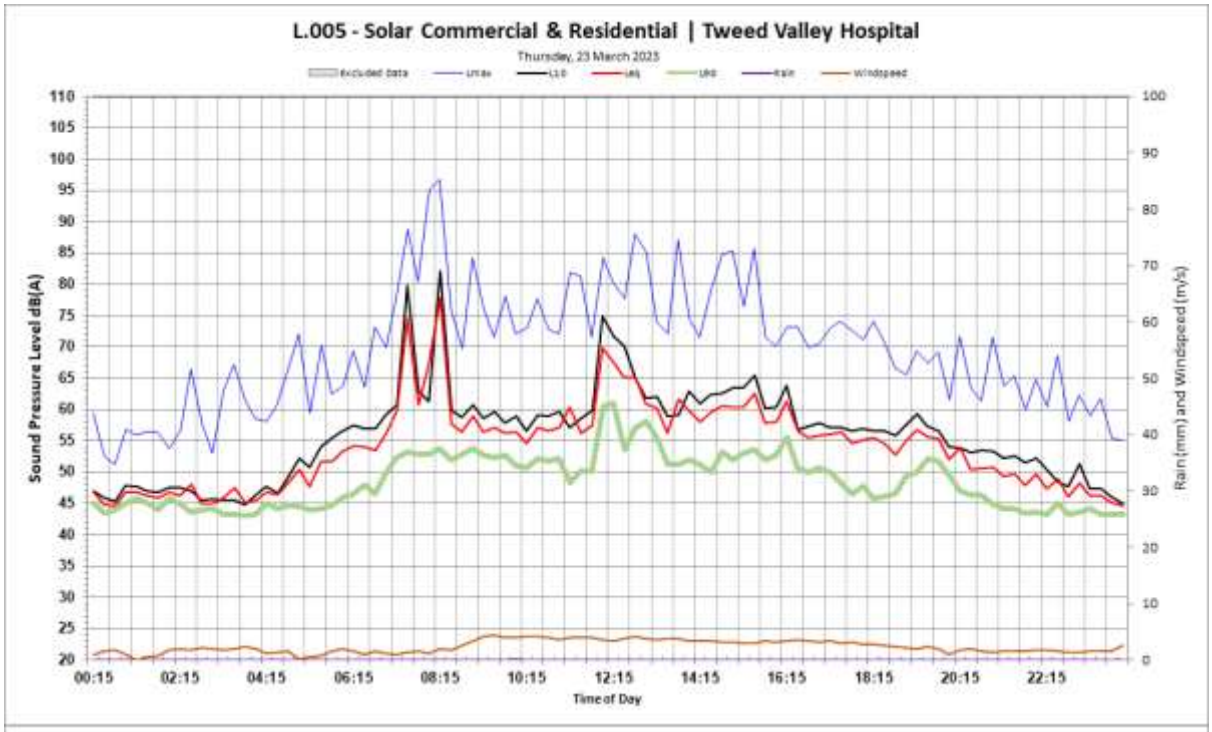
L.005 - Solar Commercial & Residential | Tweed Valley Hospital
Thursday, 23 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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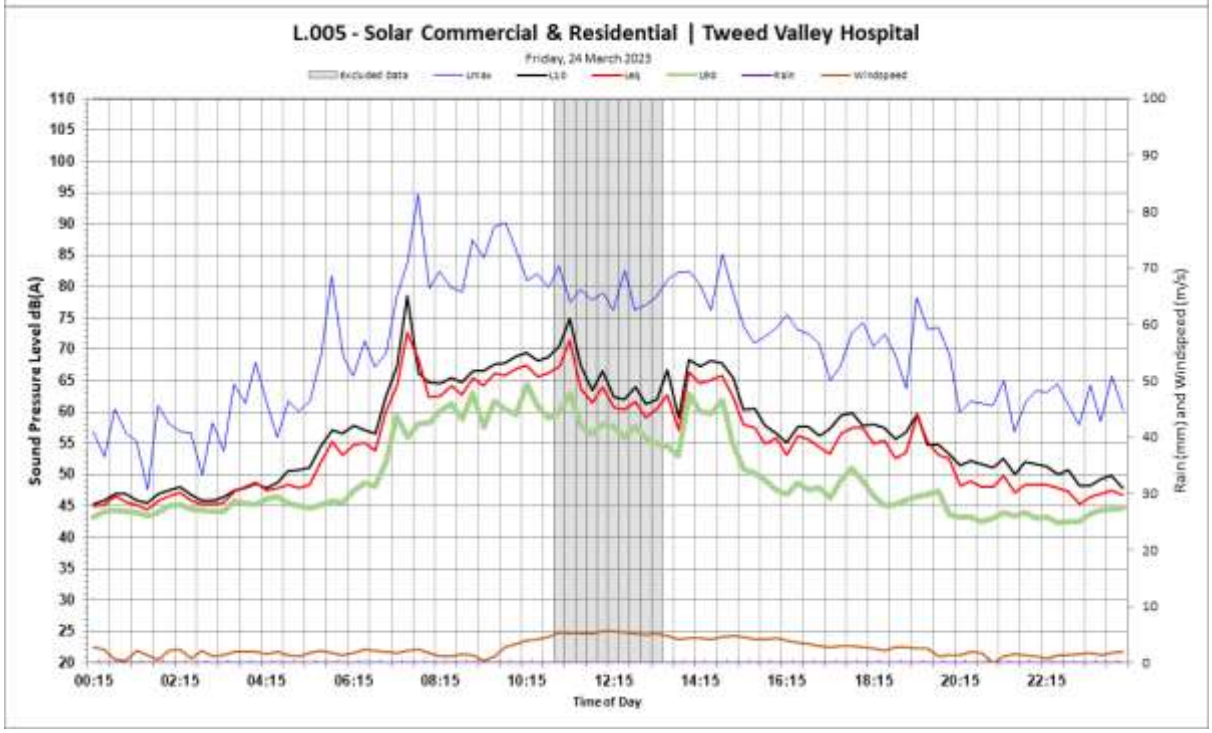
L.005 - Solar Commercial & Residential | Tweed Valley Hospital
Friday, 24 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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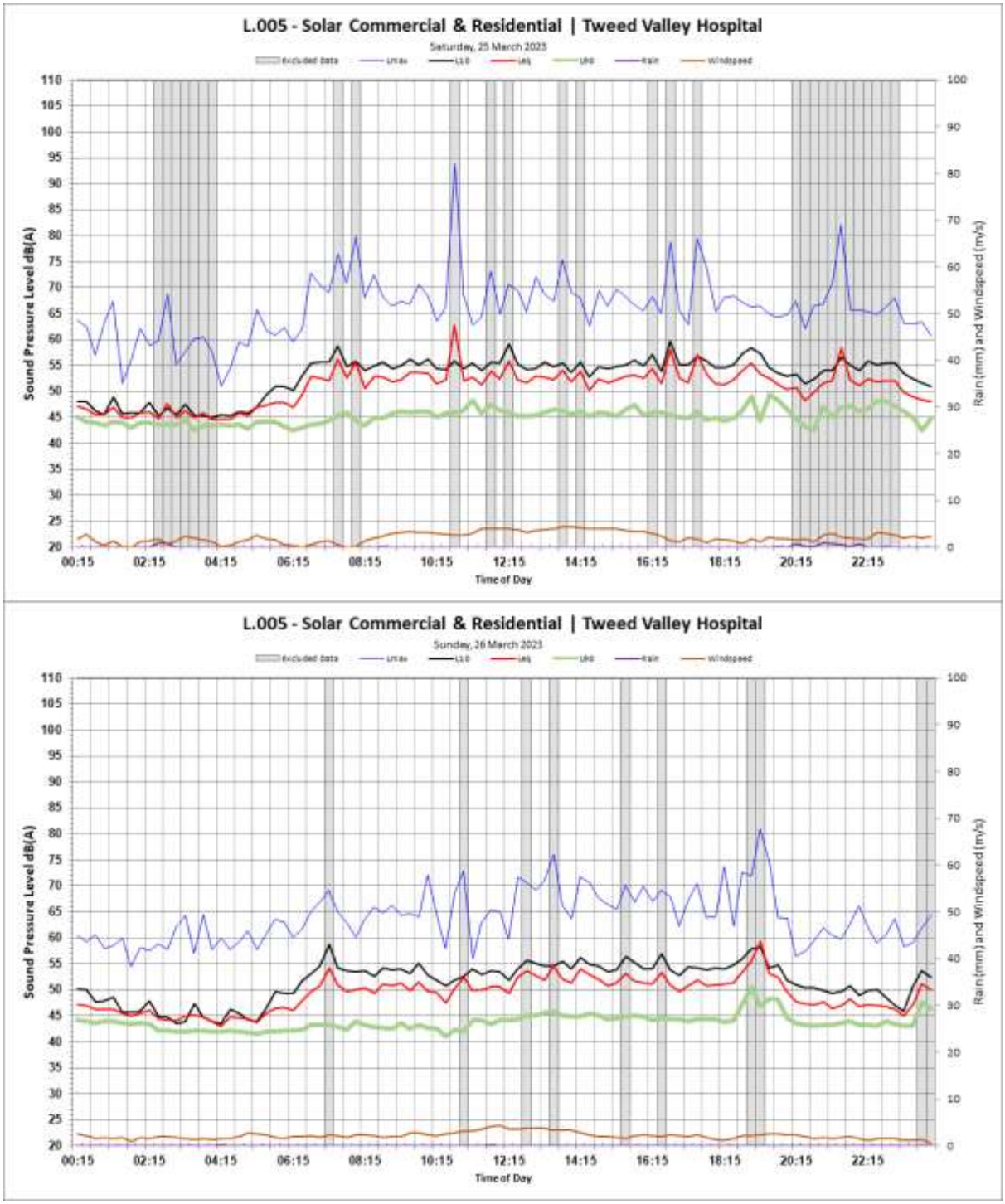
L.005 - Solar Commercial & Residential | Tweed Valley Hospital
Saturday, 25 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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02:15
04:15
06:15
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L.005 - Solar Commercial & Residential | Tweed Valley Hospital
Sunday, 26 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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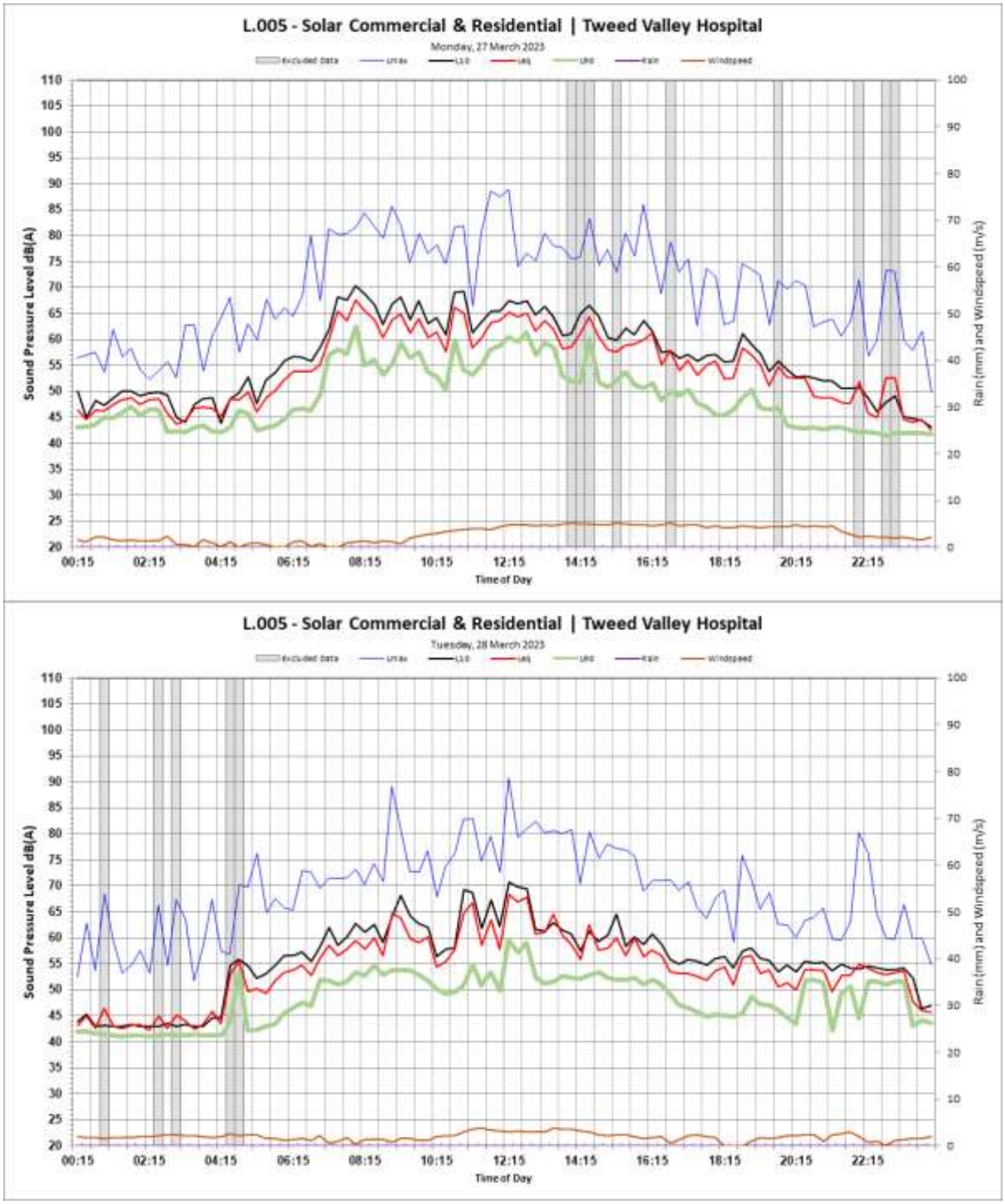
L.005 - Solar Commercial & Residential | Tweed Valley Hospital
Monday, 27 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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02:15
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06:15
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L.005 - Solar Commercial & Residential | Tweed Valley Hospital
Tuesday, 28 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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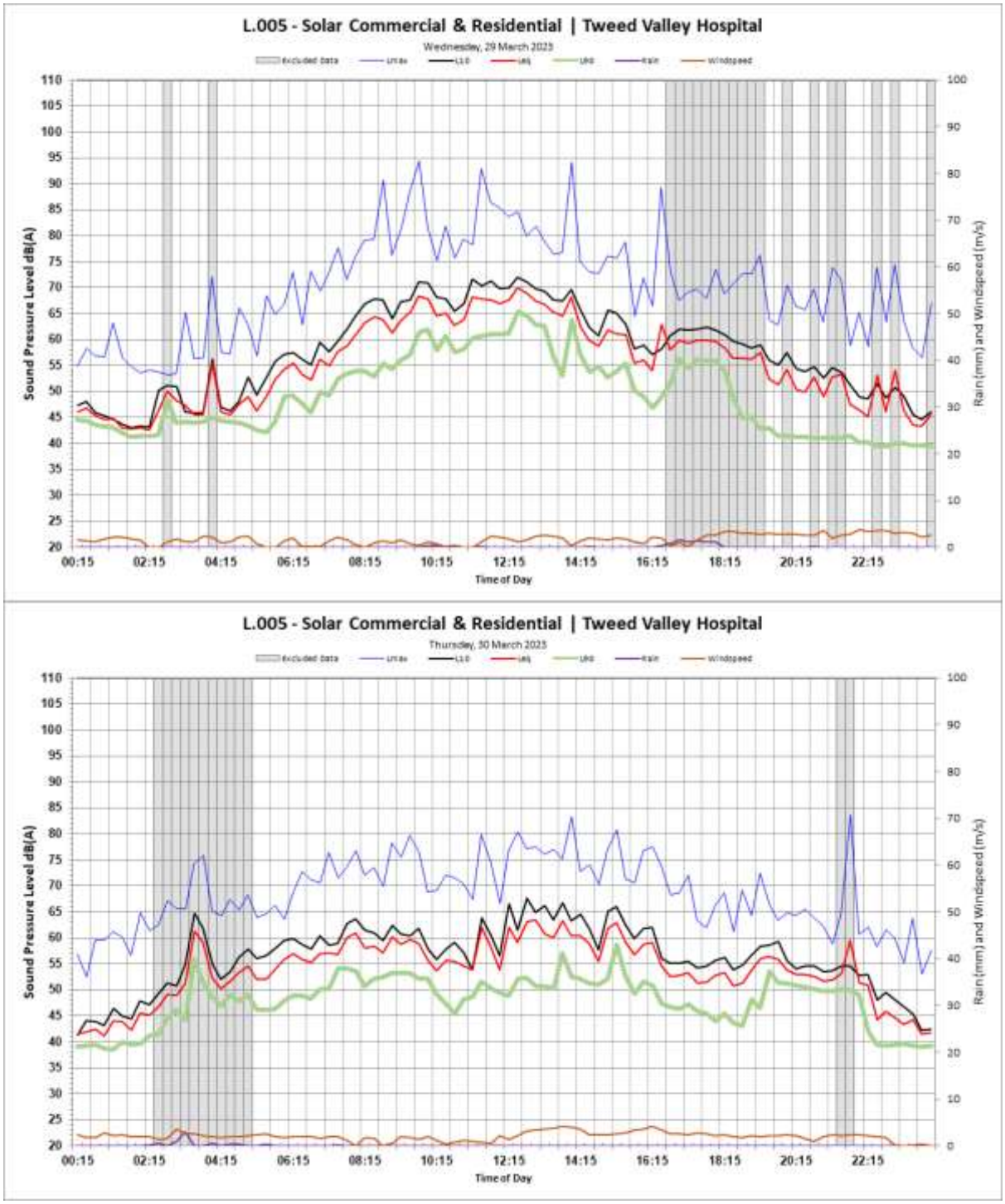
L.005 - Solar Commercial & Residential | Tweed Valley Hospital
Wednesday, 29 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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06:15
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L.005 - Solar Commercial & Residential | Tweed Valley Hospital
Thursday, 30 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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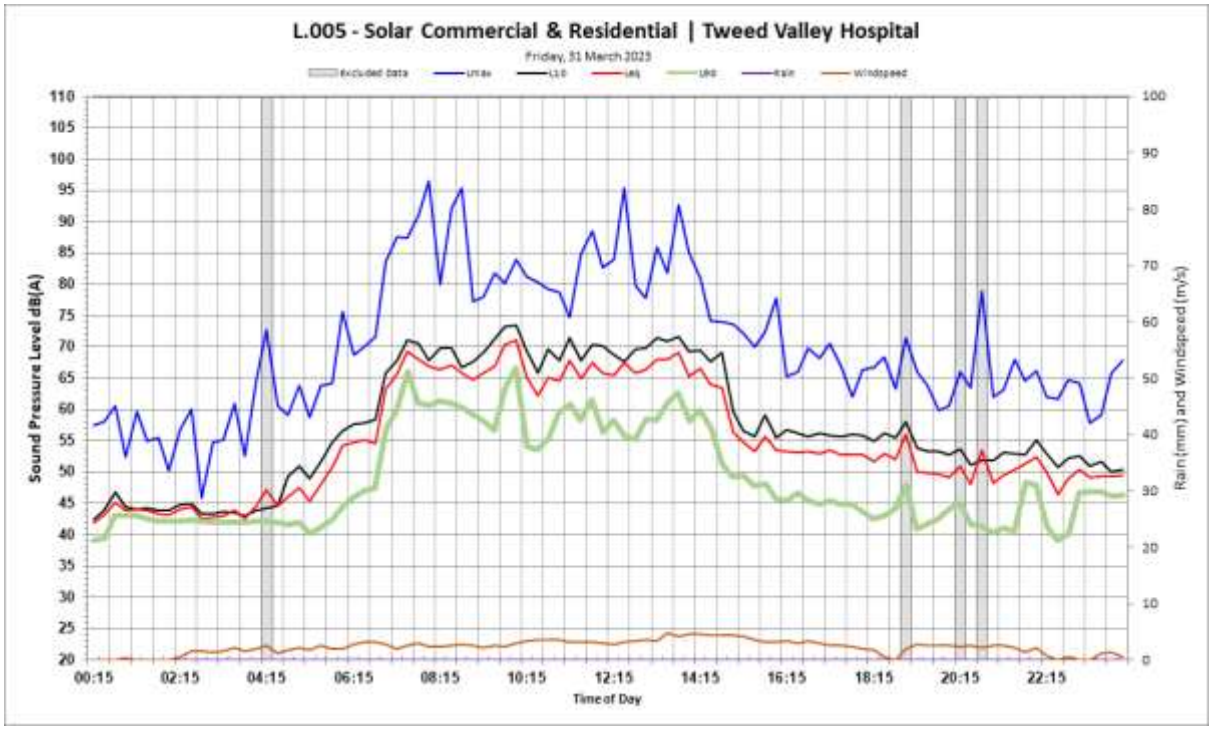
L.005 - Solar Commercial & Residential | Tweed Valley Hospital
Friday, 31 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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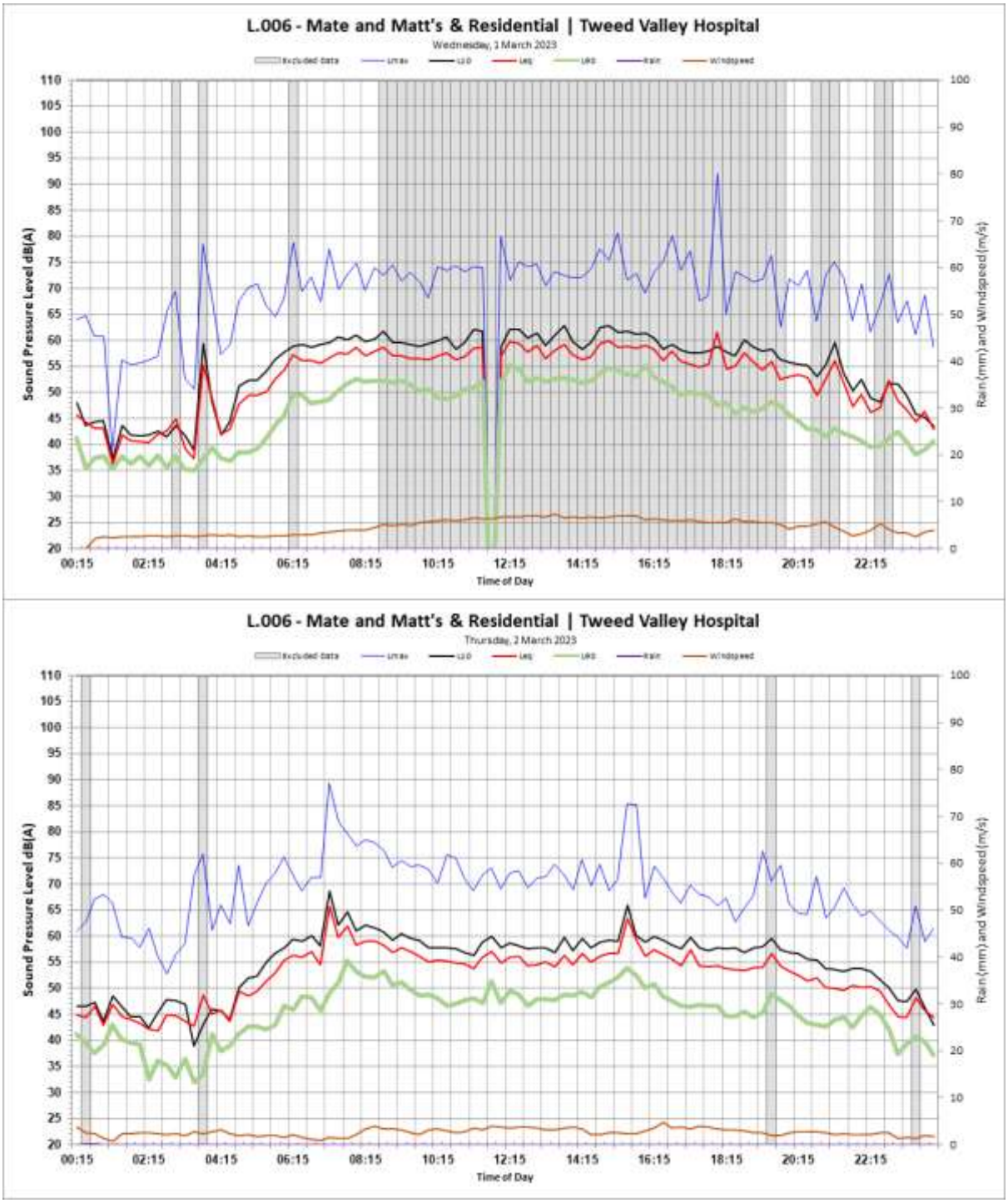
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Wednesday, 1 March 2023
Excluded Data
L1 max
L10
Leq
L90
Rain
Windspeed
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
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12:15
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16:15
18:15
20:15
22:15
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Thursday, 2 March 2023
Excluded Data
L1 max
L10
Leq
L90
Rain
Windspeed
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
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06:15
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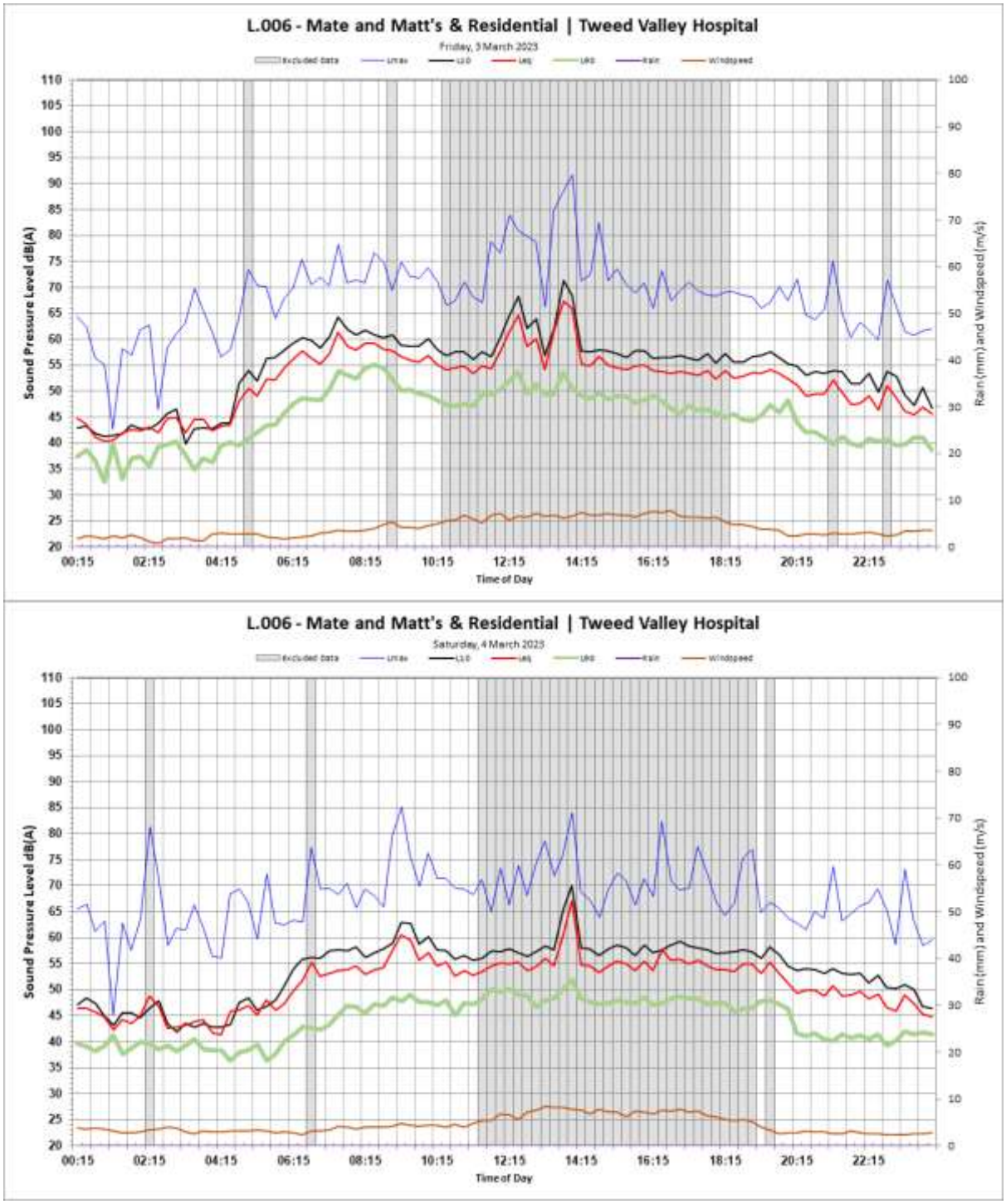
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Friday, 3 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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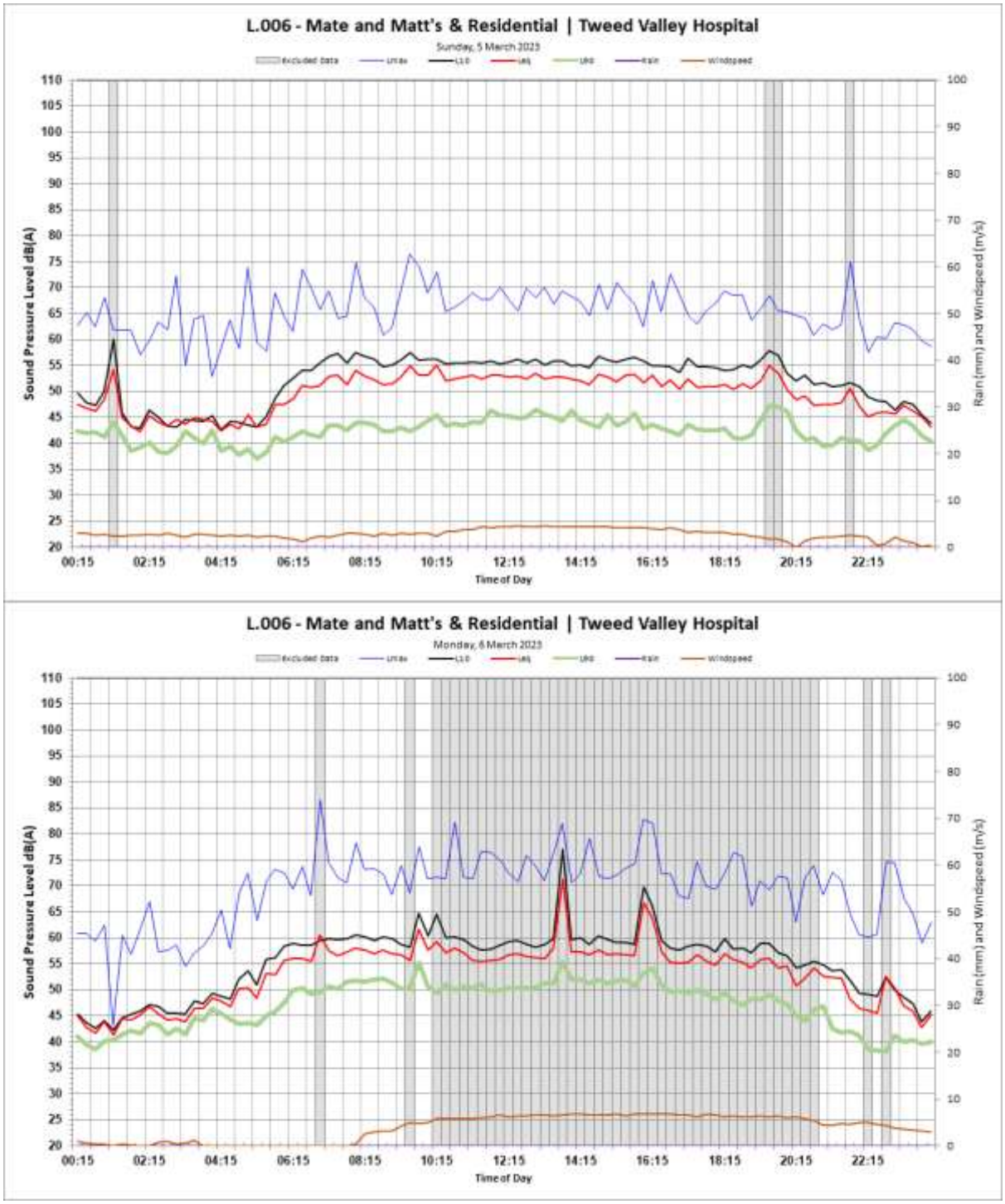
02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Saturday, 4 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day


L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Sunday, 5 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Monday, 6 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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04:15
06:15
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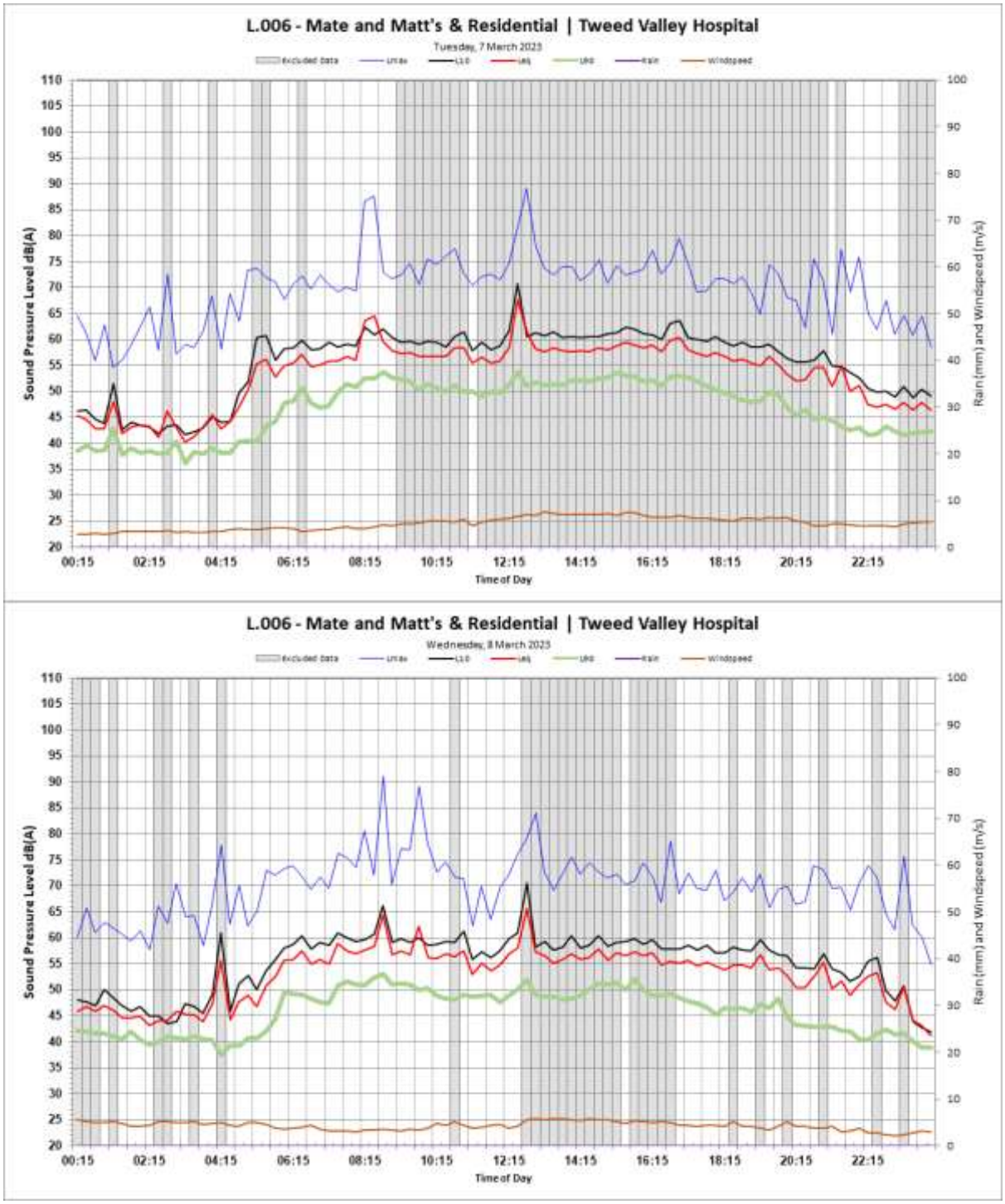
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Tuesday, 7 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Wednesday, 8 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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04:15
06:15
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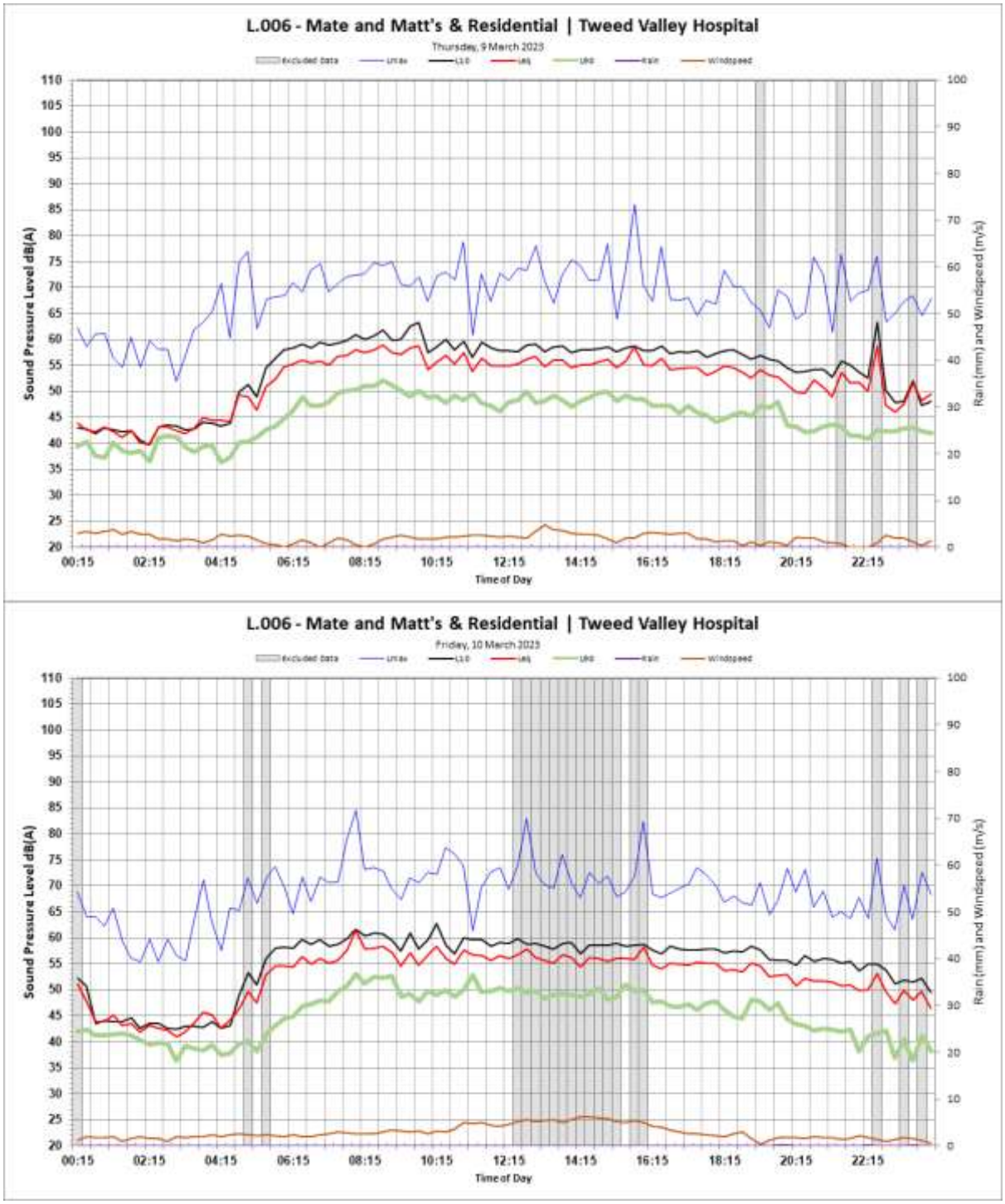
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Thursday, 9 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
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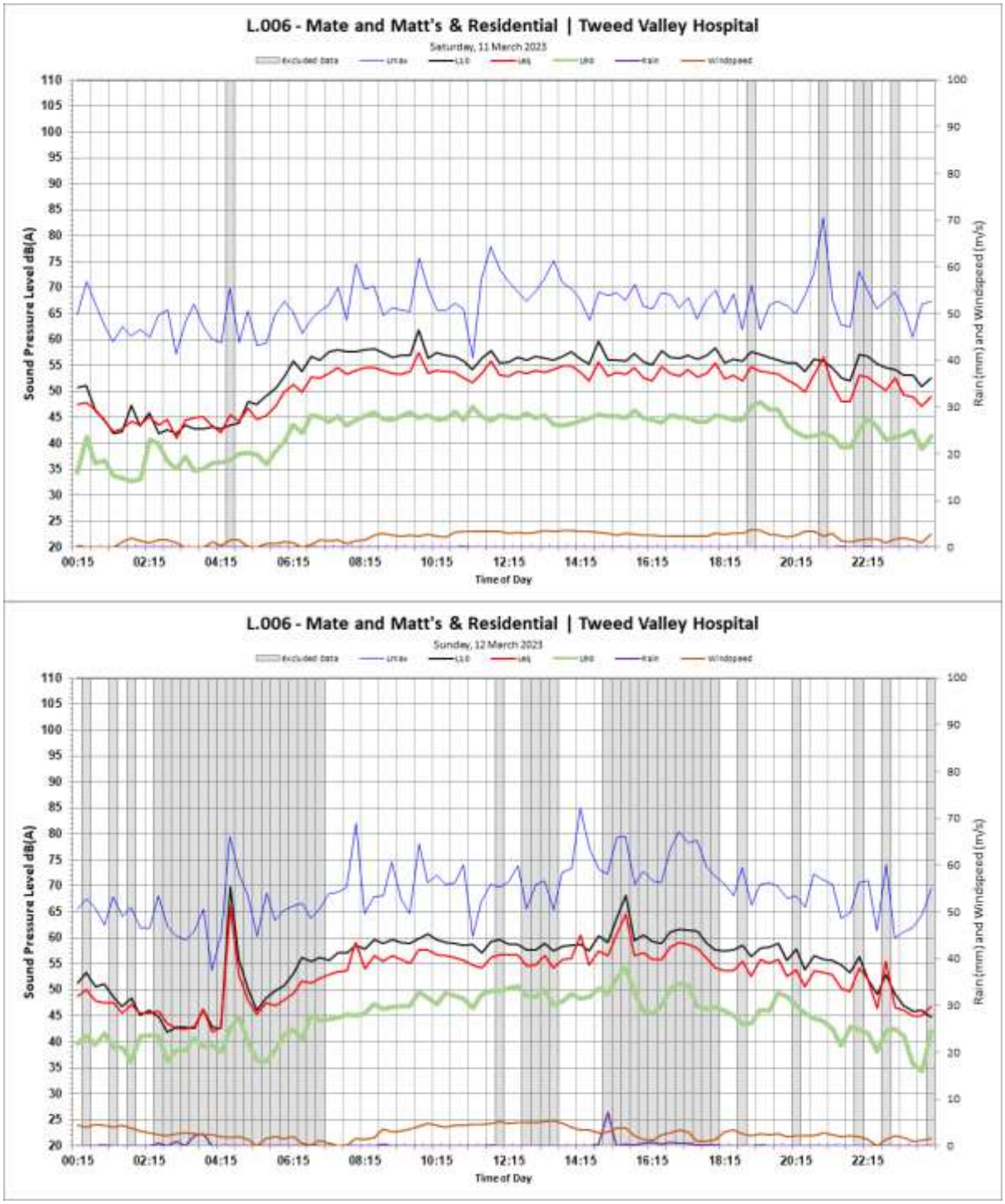
22:15
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Friday, 10 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day


L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Saturday, 11 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Sunday, 12 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
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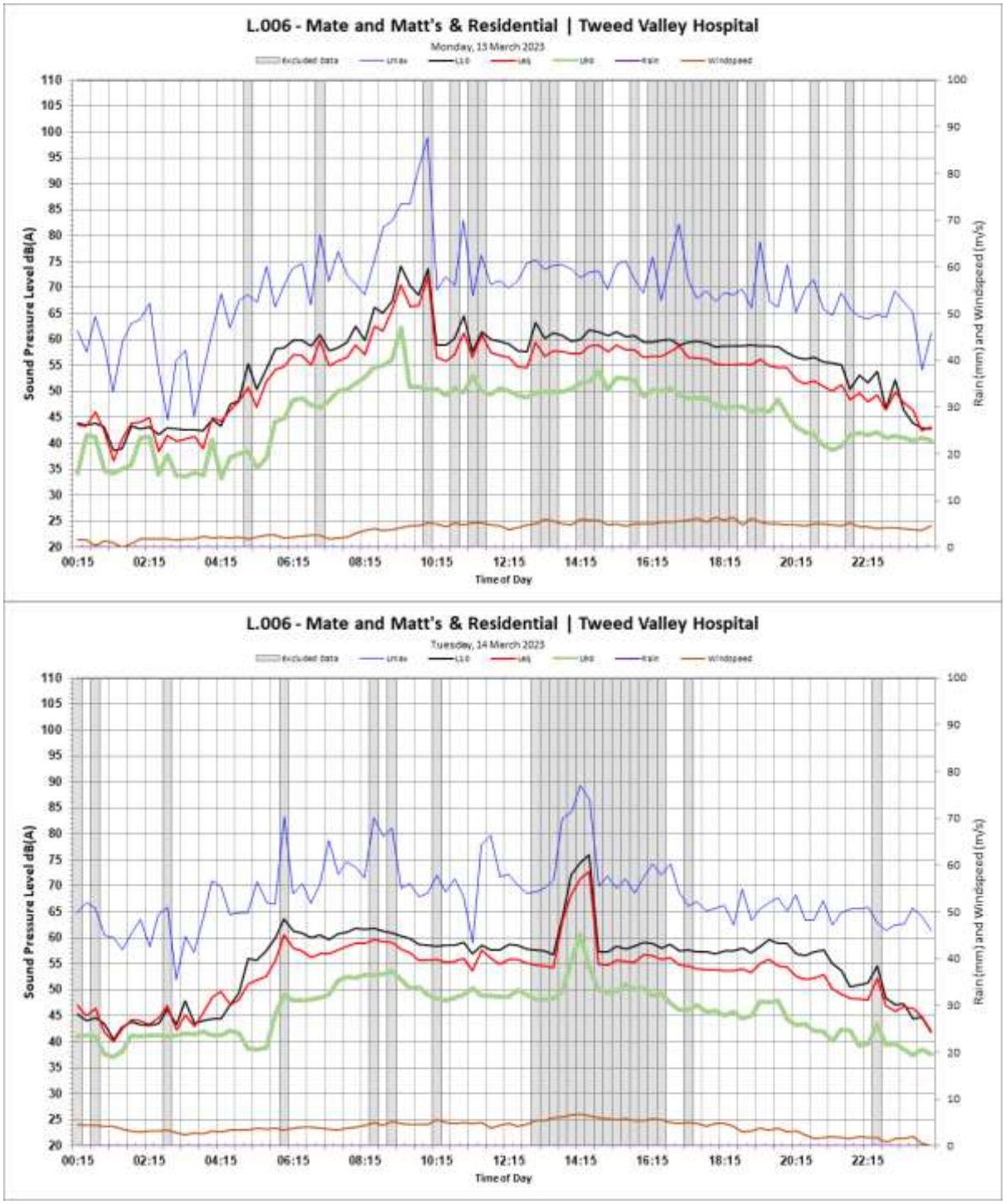
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Monday, 13 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
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10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Tuesday, 14 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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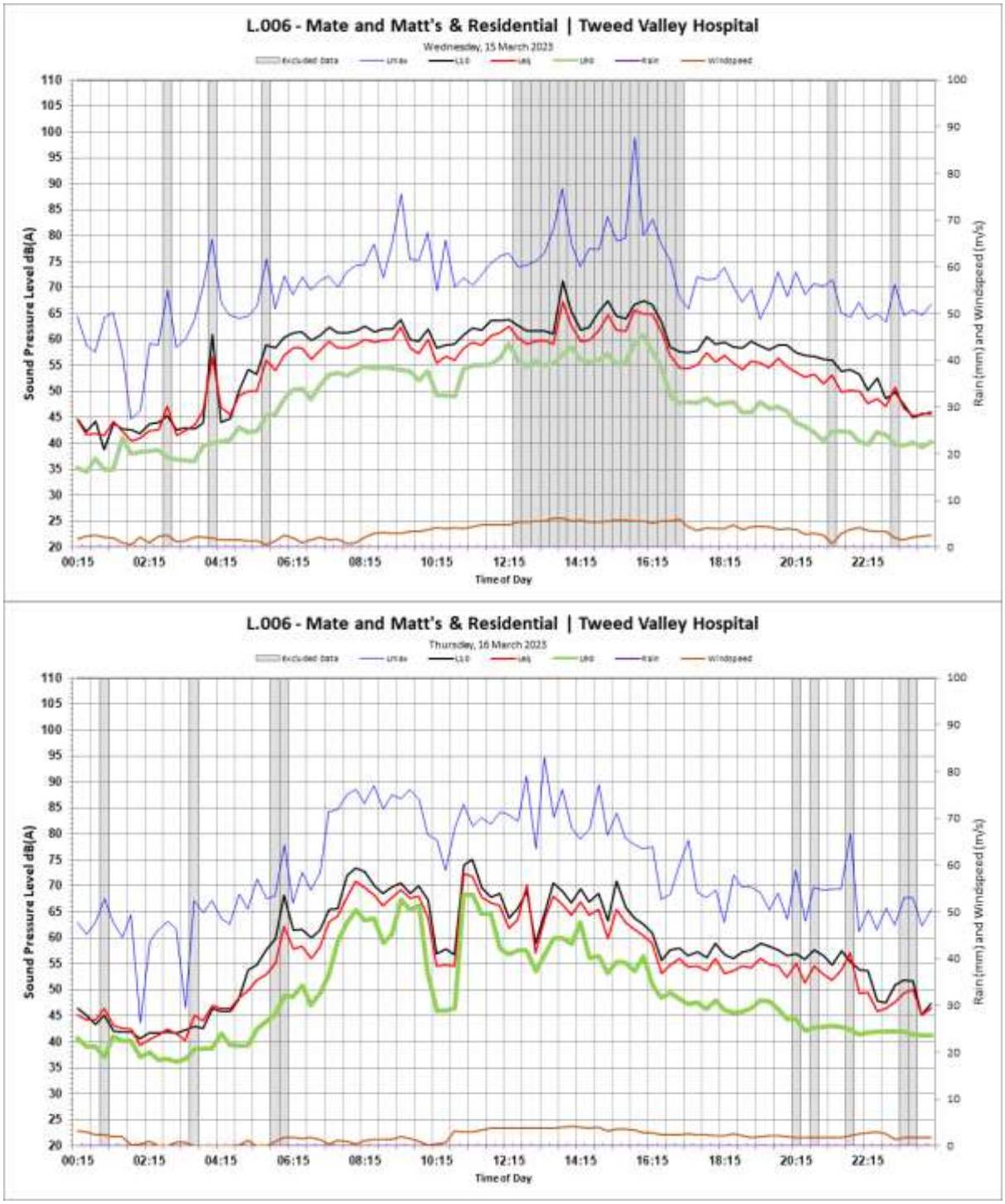
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Wednesday, 15 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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02:15
04:15
06:15
08:15
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12:15
14:15
16:15
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20:15
22:15
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Thursday, 16 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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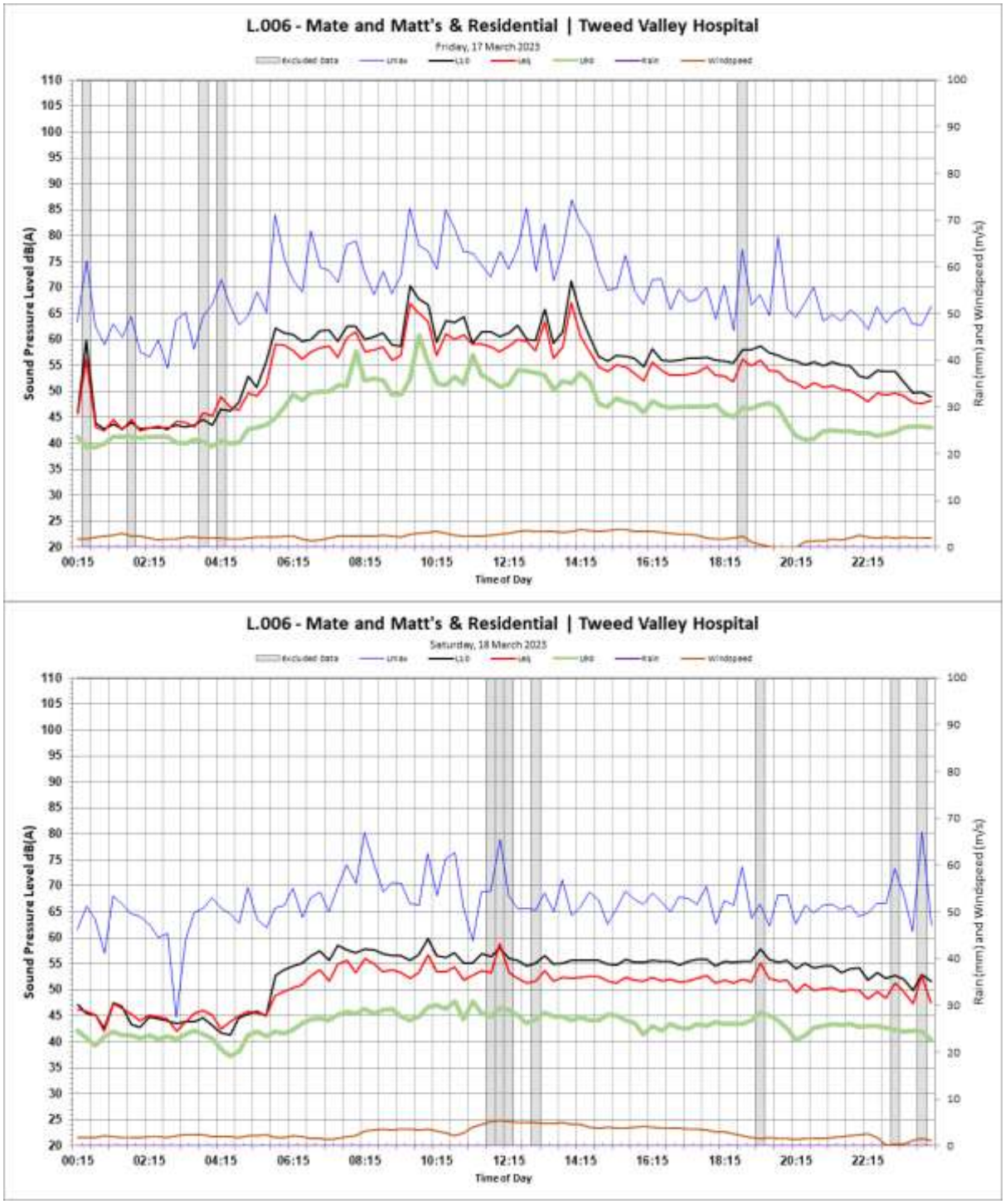
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Friday, 17 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Saturday, 18 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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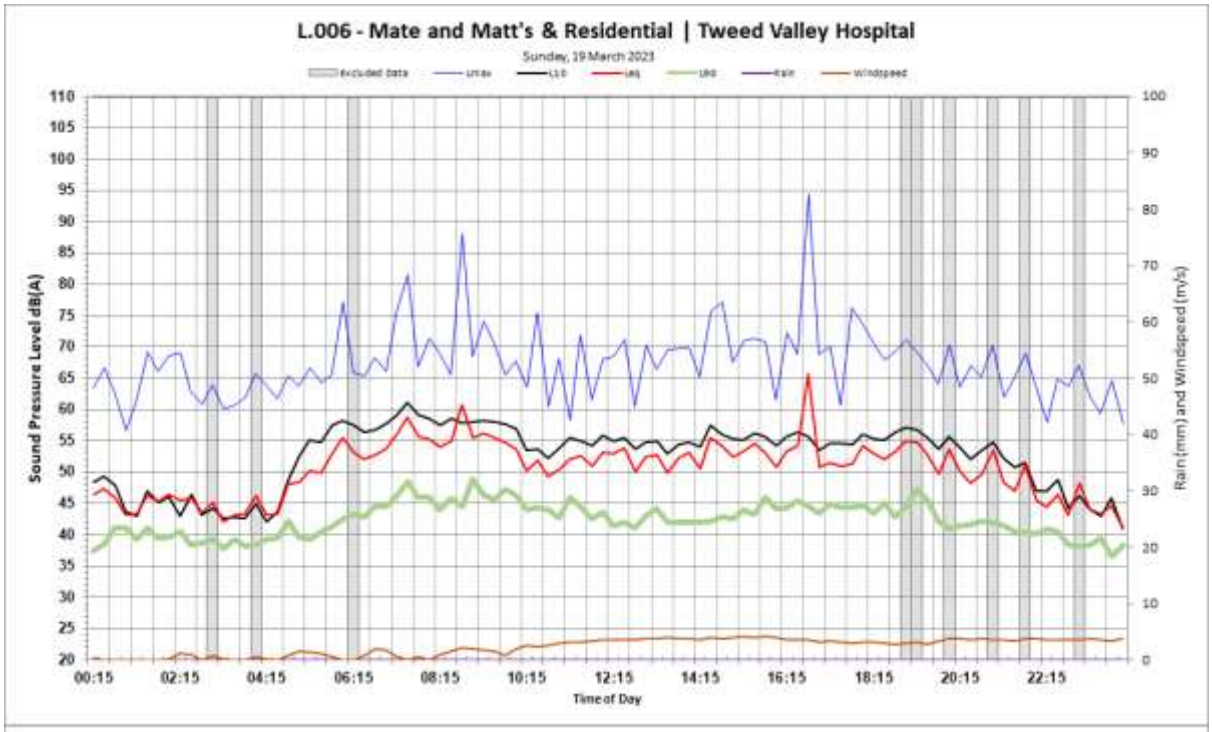
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Sunday, 19 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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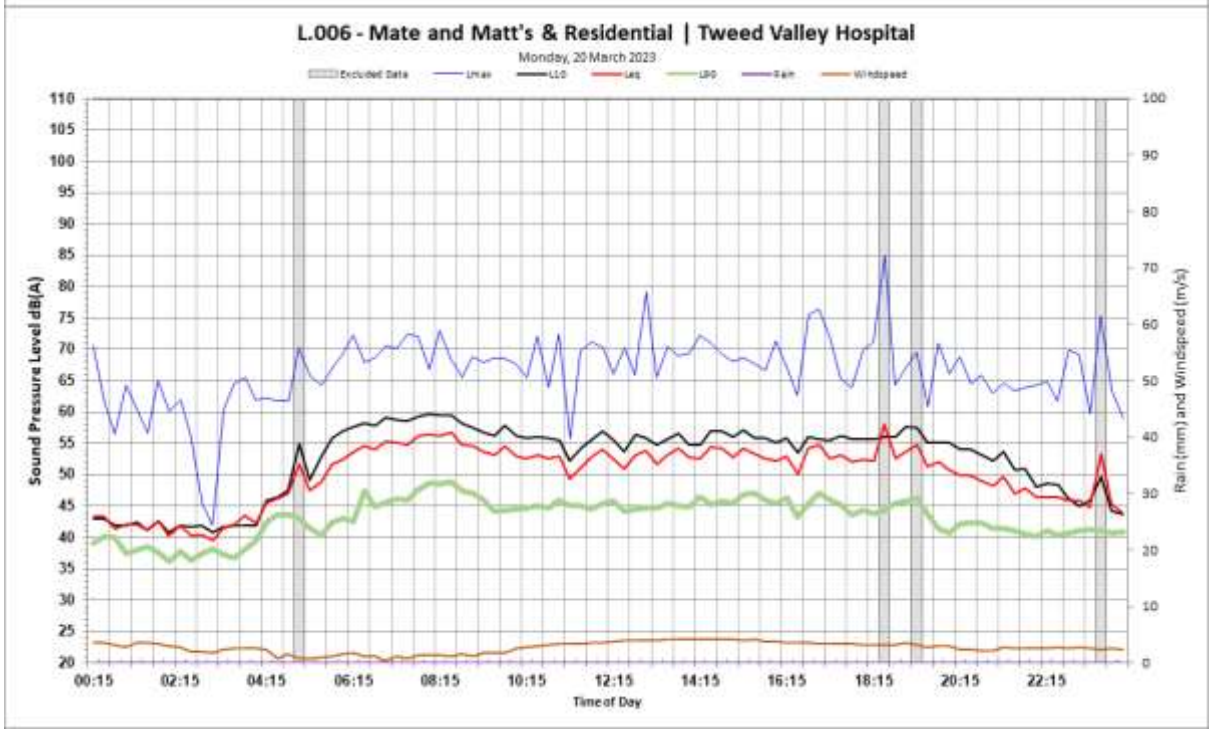
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Monday, 20 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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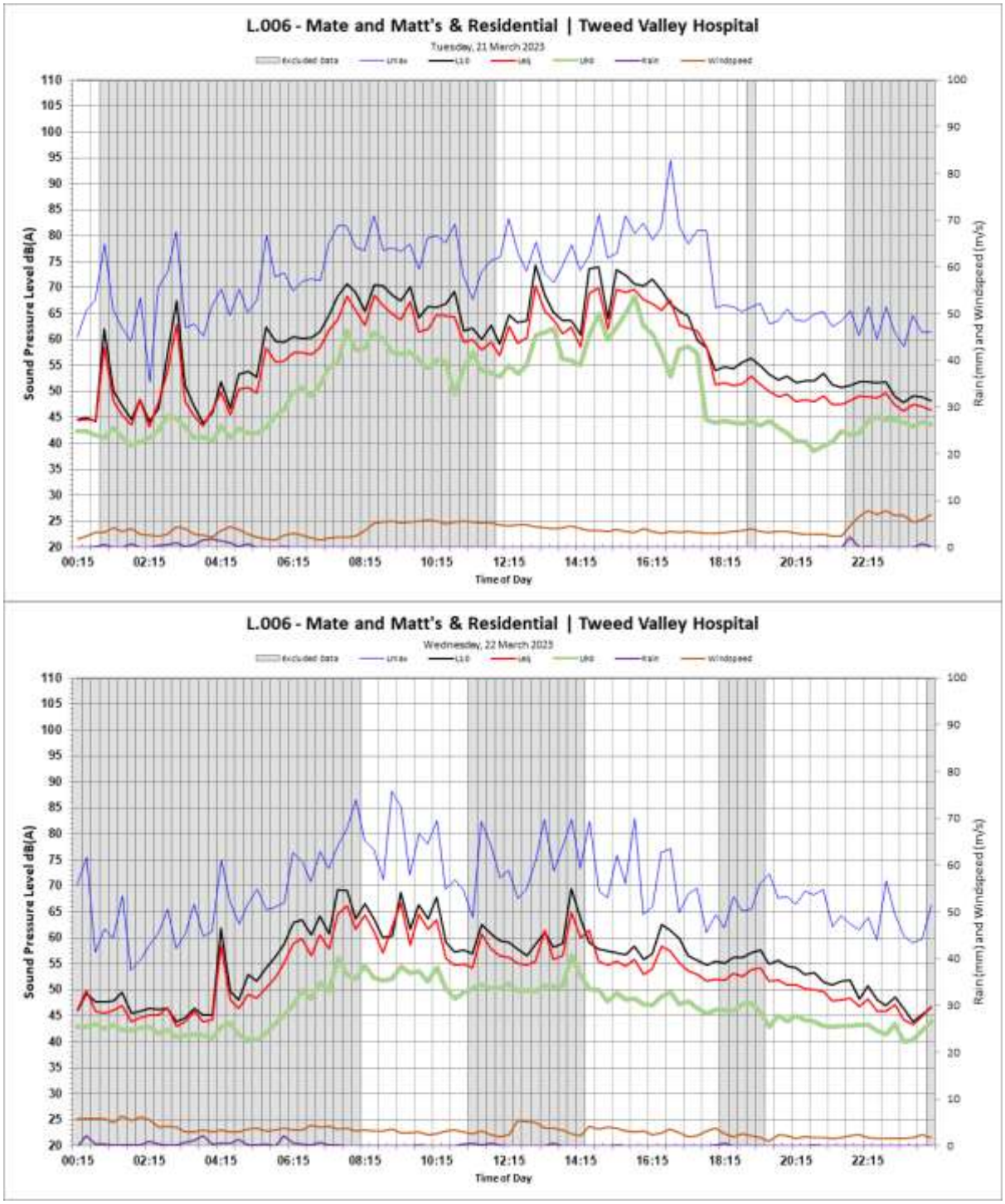
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Tuesday, 21 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
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22:15
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Wednesday, 22 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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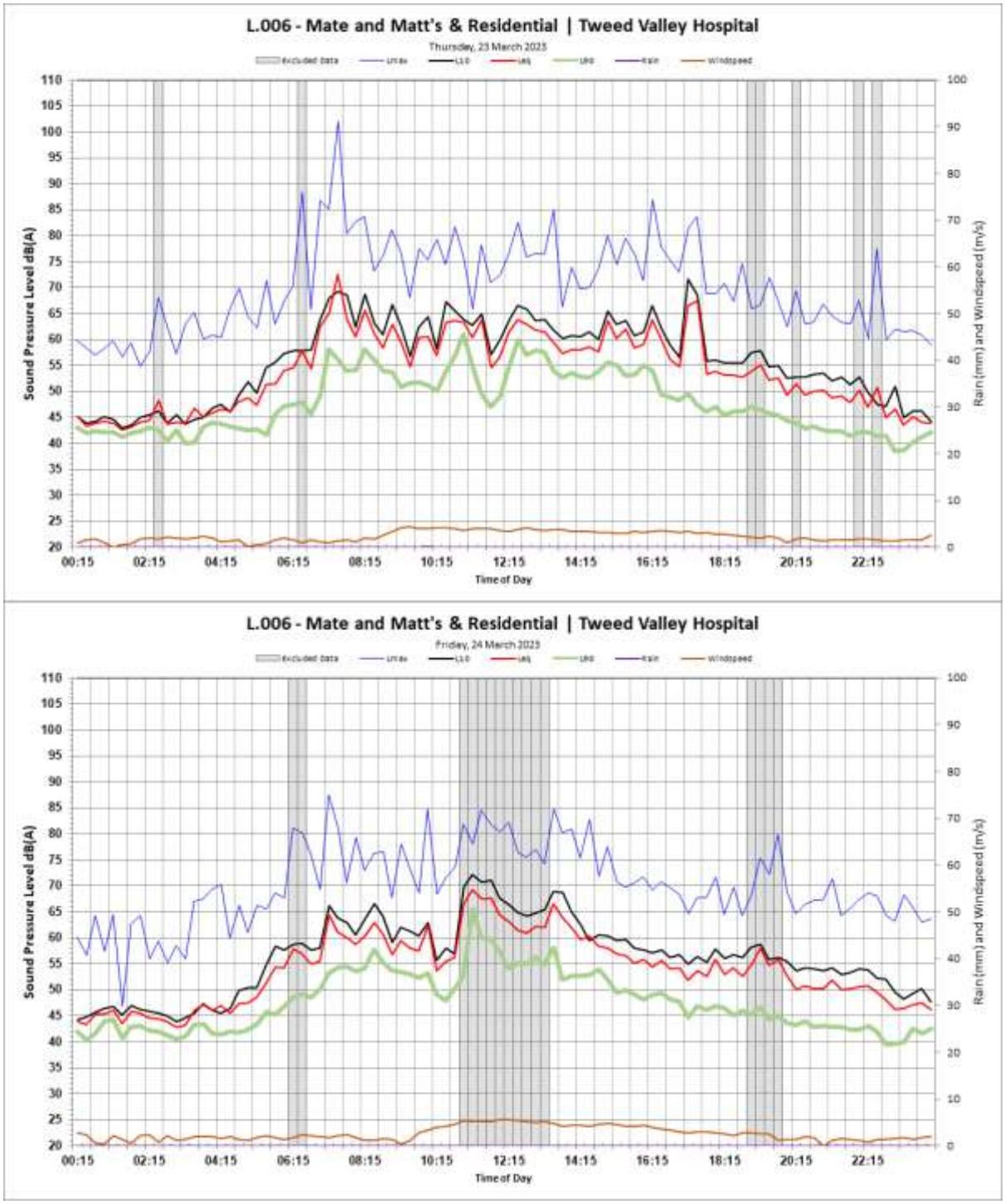
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Thursday, 23 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Friday, 24 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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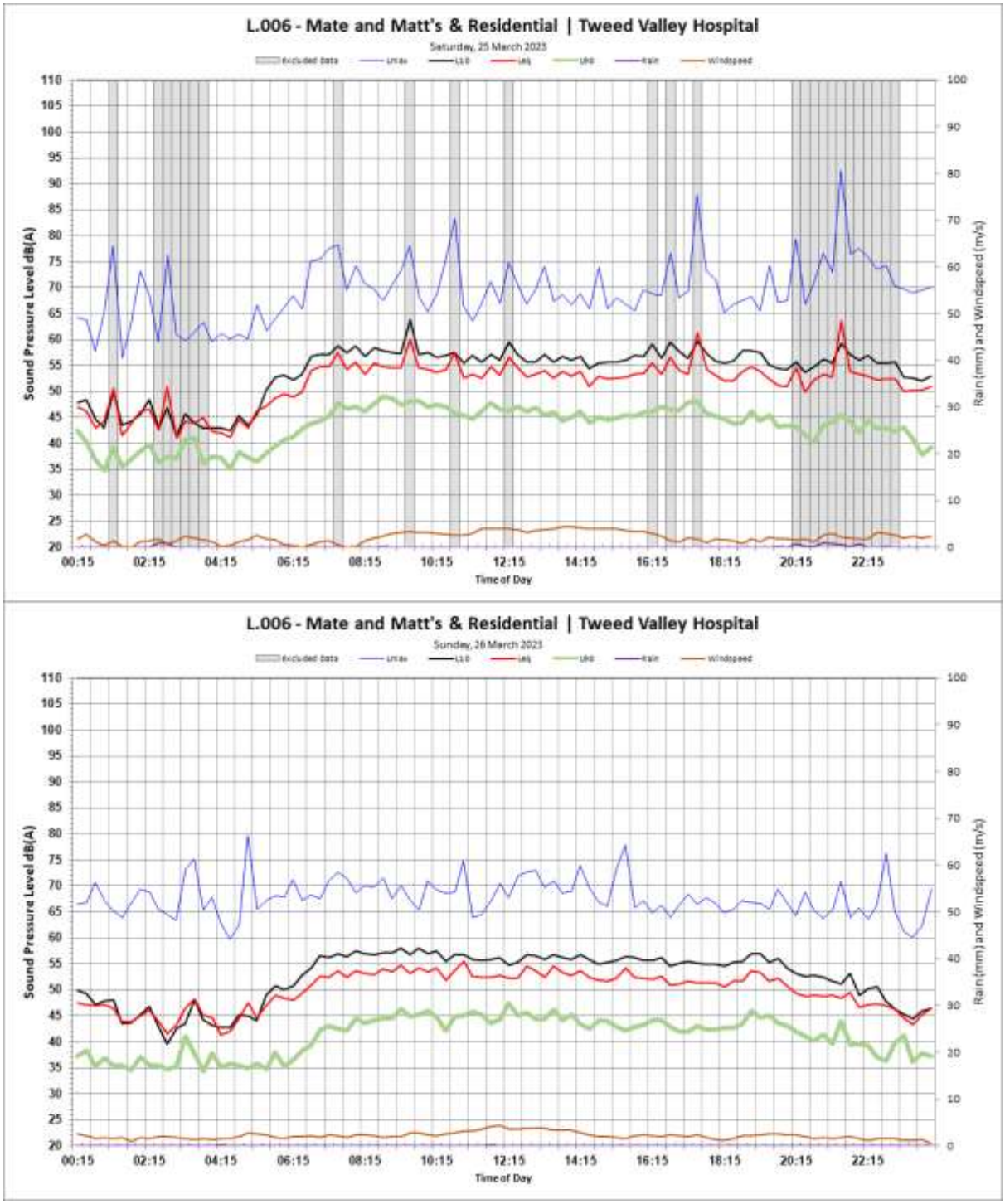
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Saturday, 25 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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08:15
10:15
12:15
14:15
16:15
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L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Sunday, 26 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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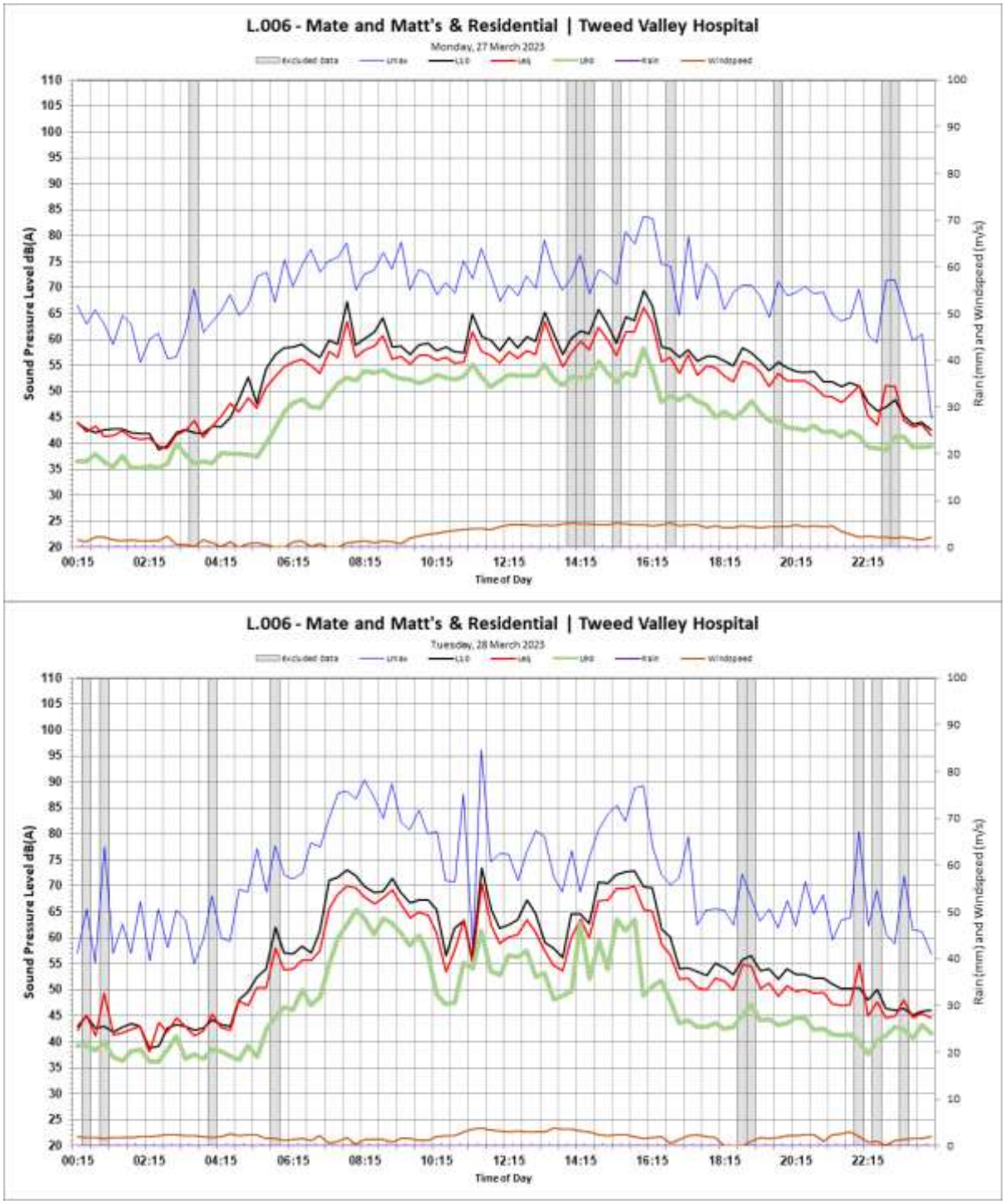
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Monday, 27 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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02:15
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06:15
08:15
10:15
12:15
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22:15
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Tuesday, 28 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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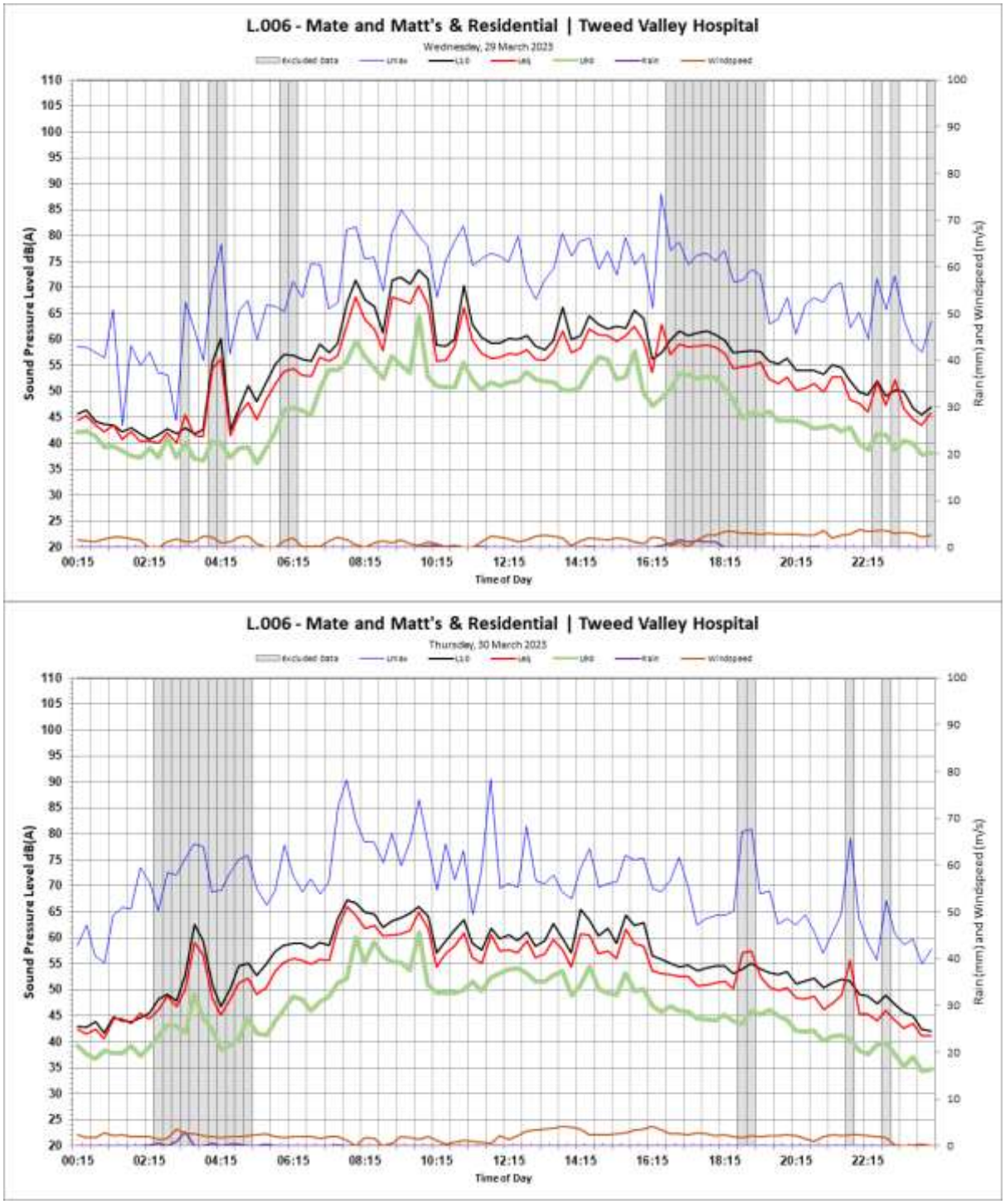
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Wednesday, 29 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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02:15
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08:15
10:15
12:15
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22:15
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Thursday, 30 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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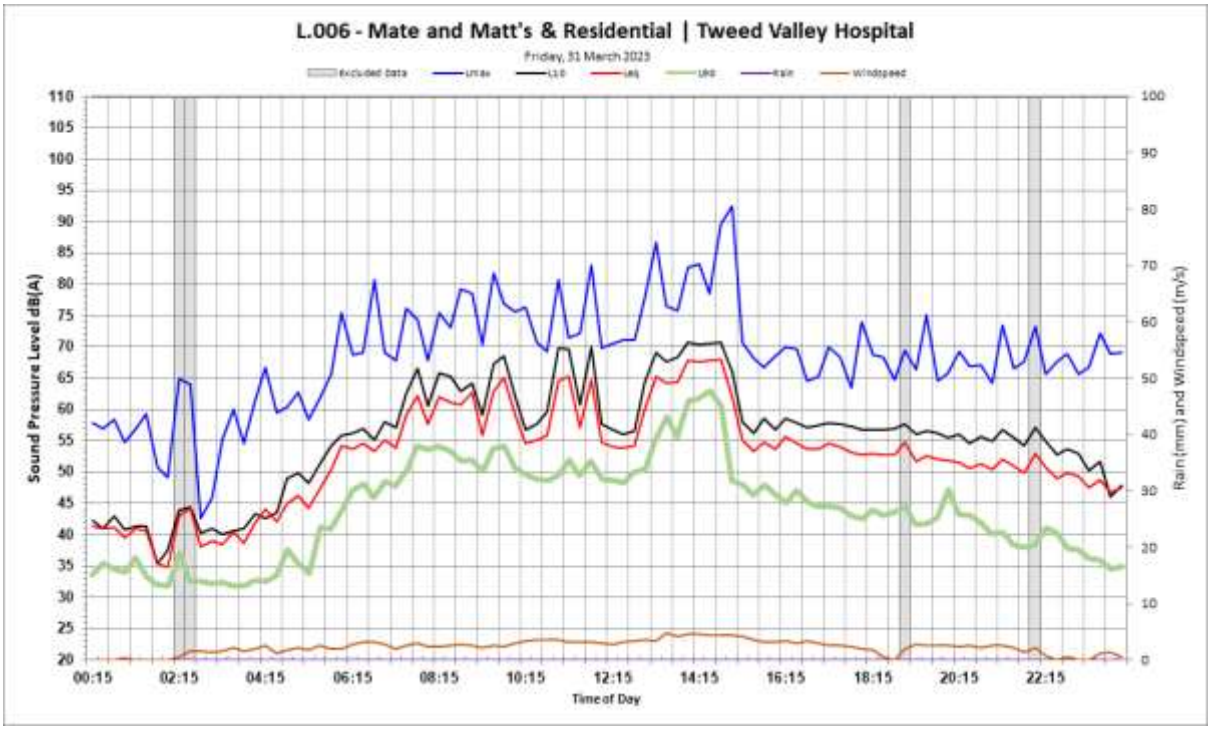
L.006 - Mate and Matt's & Residential | Tweed Valley Hospital
Friday, 31 March 2023
Excluded Data
LAmax
L10
Leq
L90
Rain
Windspeed
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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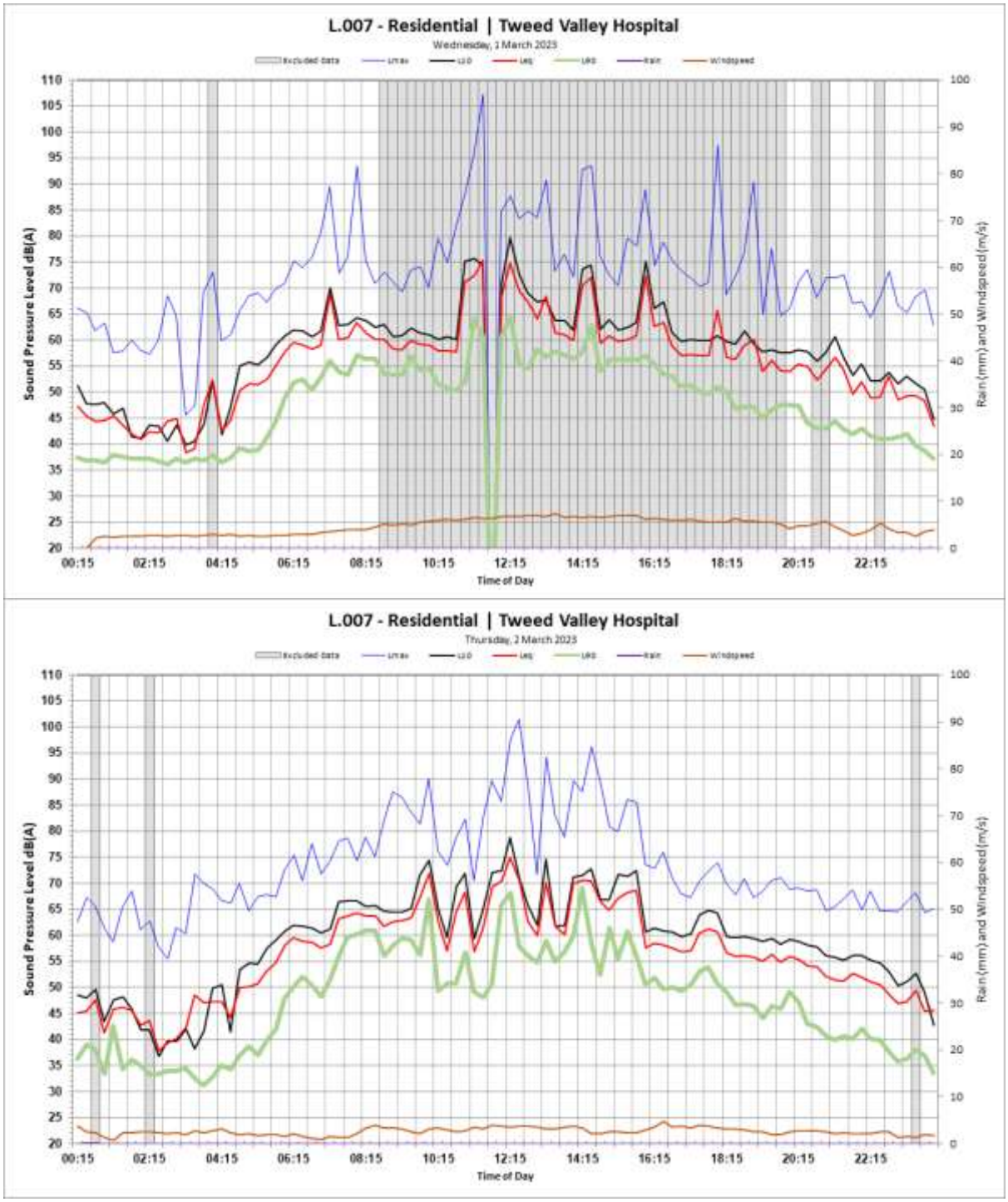
L.007 - Residential | Tweed Valley Hospital
Wednesday, 1 March 2023
Excluded Data
Lmax
L10
Leq
L90
Rain
Windspeed
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Thursday, 2 March 2023
Excluded Data
Lmax
L10
Leq
L90
Rain
Windspeed
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
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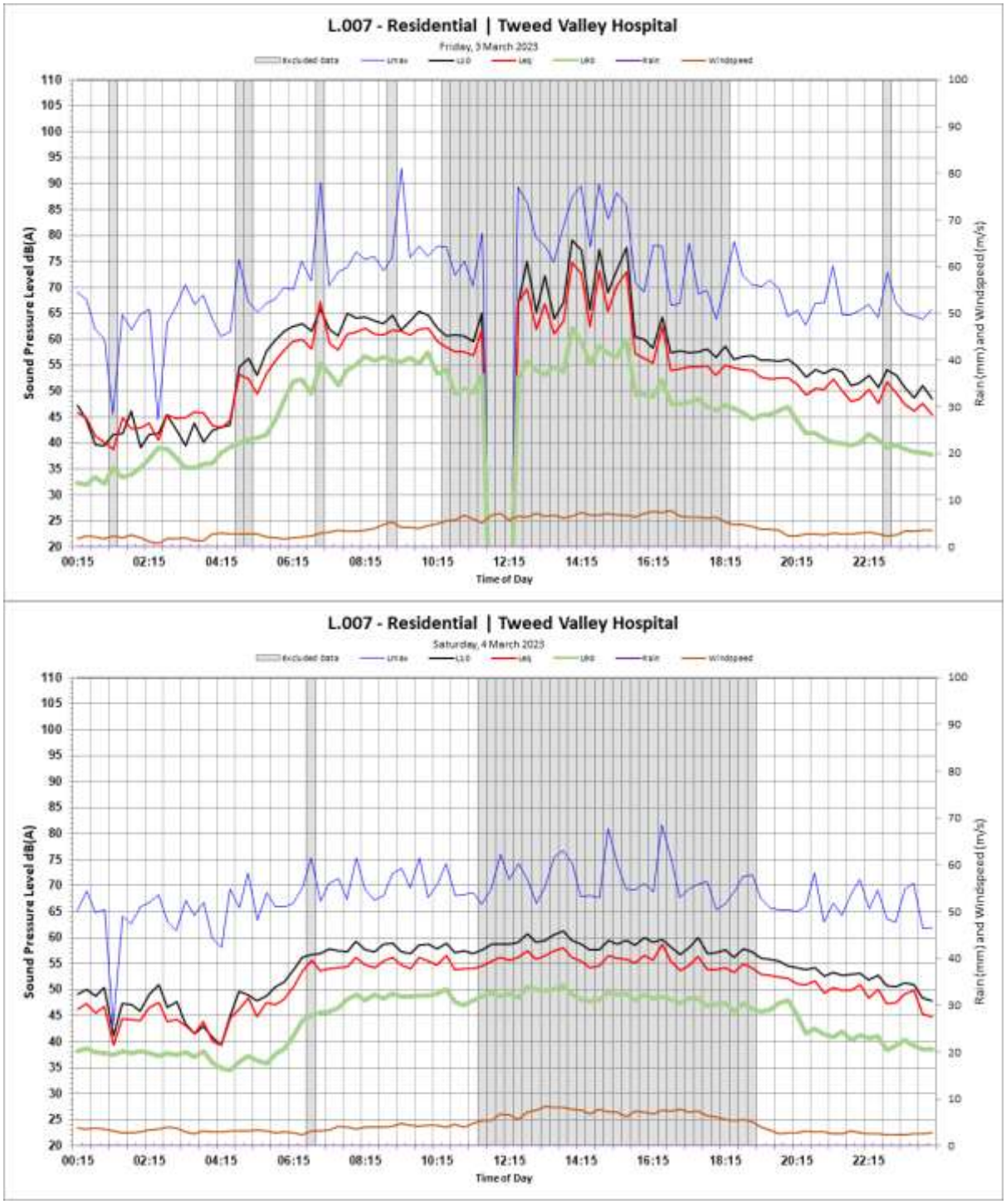
L.007 - Residential | Tweed Valley Hospital
Friday, 3 March 2023
Excluded Data
Lmax
L10
Leq
L90
Rain
Windspeed
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
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16:15
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20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Saturday, 4 March 2023
Excluded Data
Lmax
L10
Leq
L90
Rain
Windspeed
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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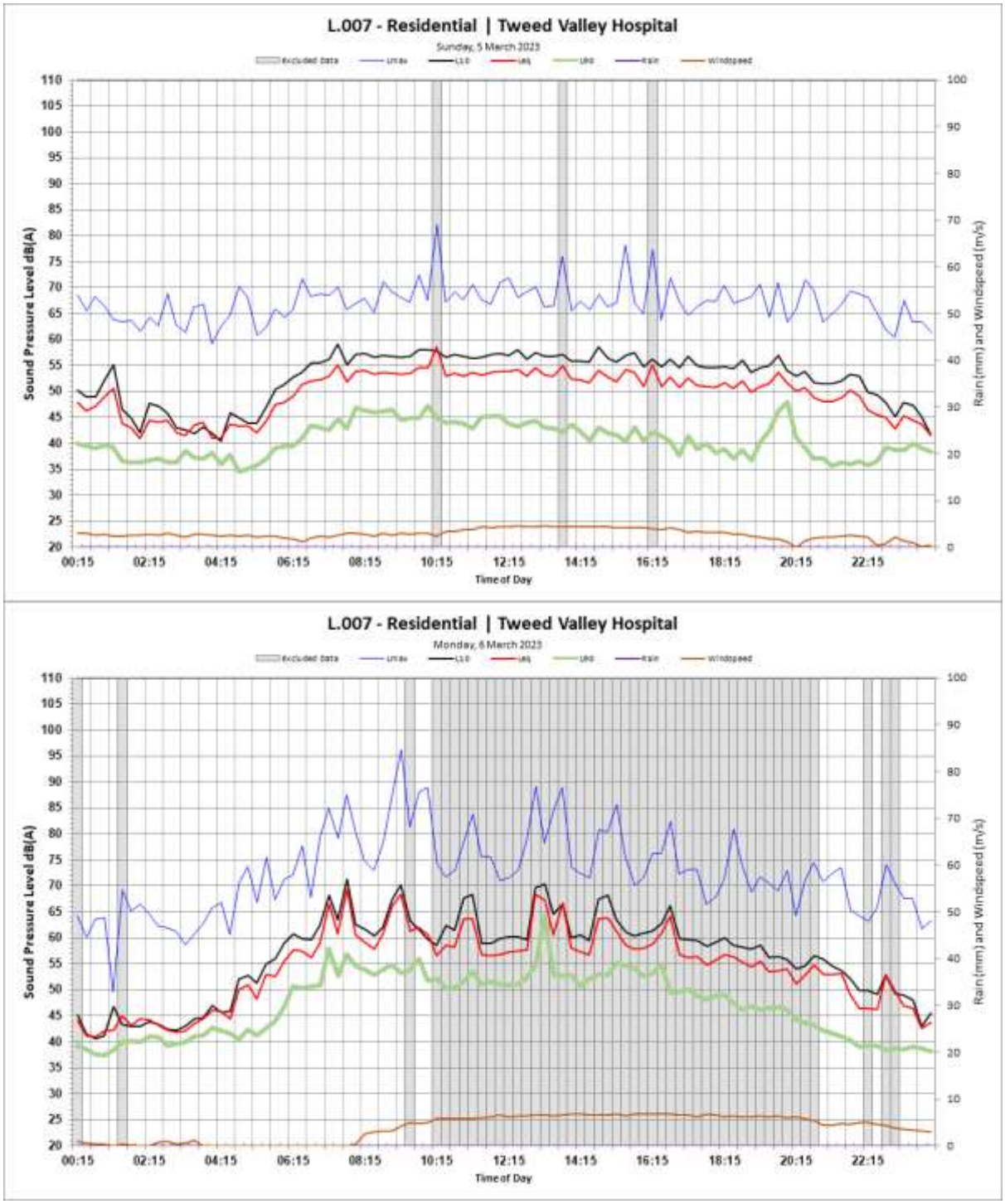
L.007 - Residential | Tweed Valley Hospital
Sunday, 5 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
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12:15
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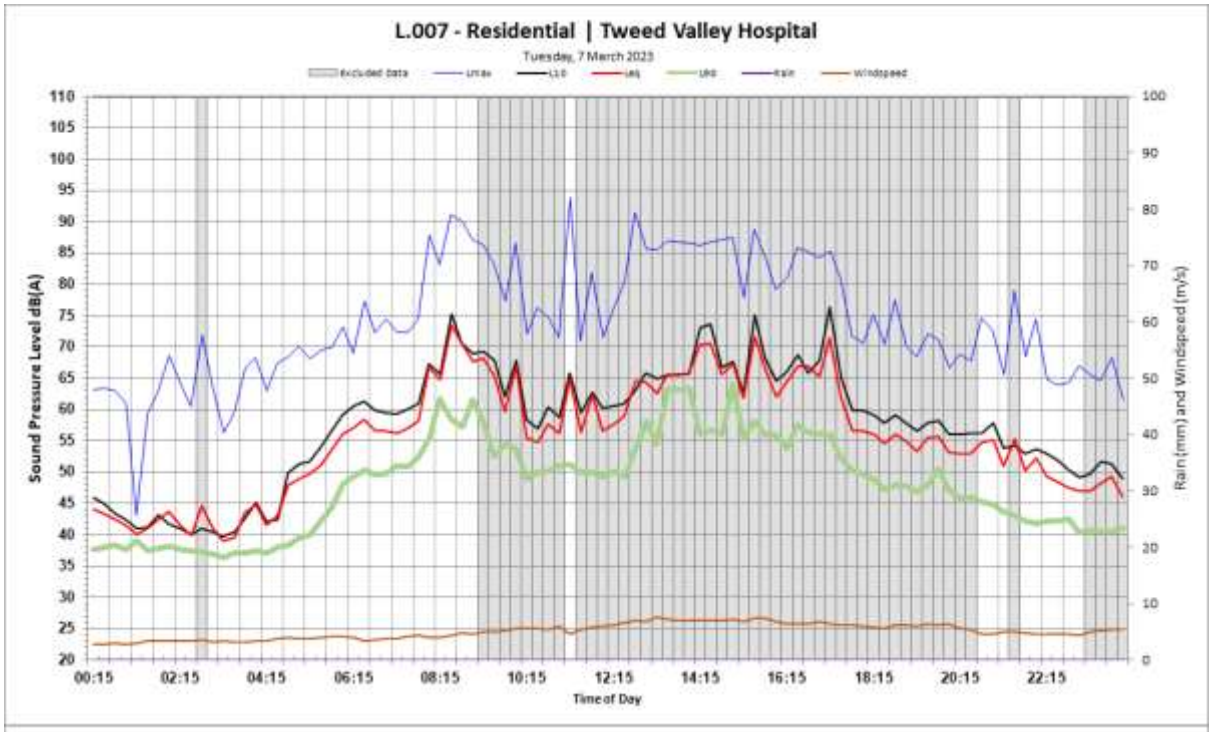
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Monday, 6 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day


L.007 - Residential | Tweed Valley Hospital
Tuesday, 7 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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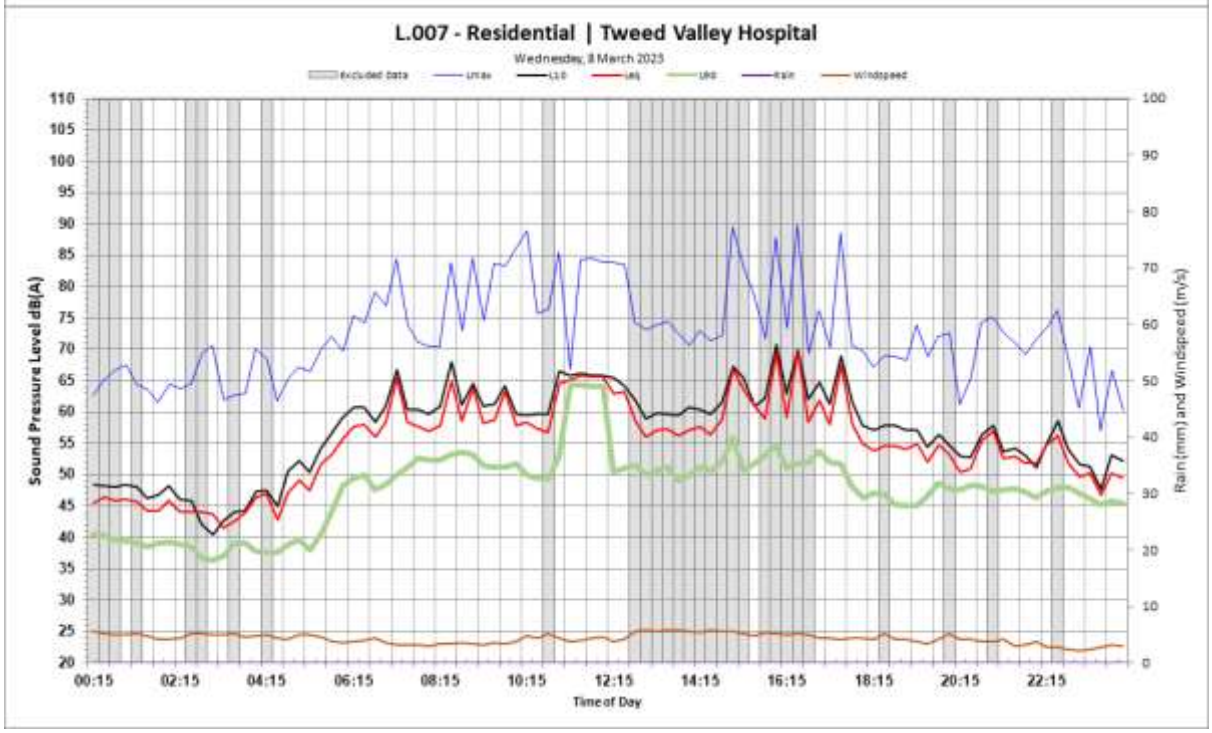
L.007 - Residential | Tweed Valley Hospital
Wednesday, 8 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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18:15
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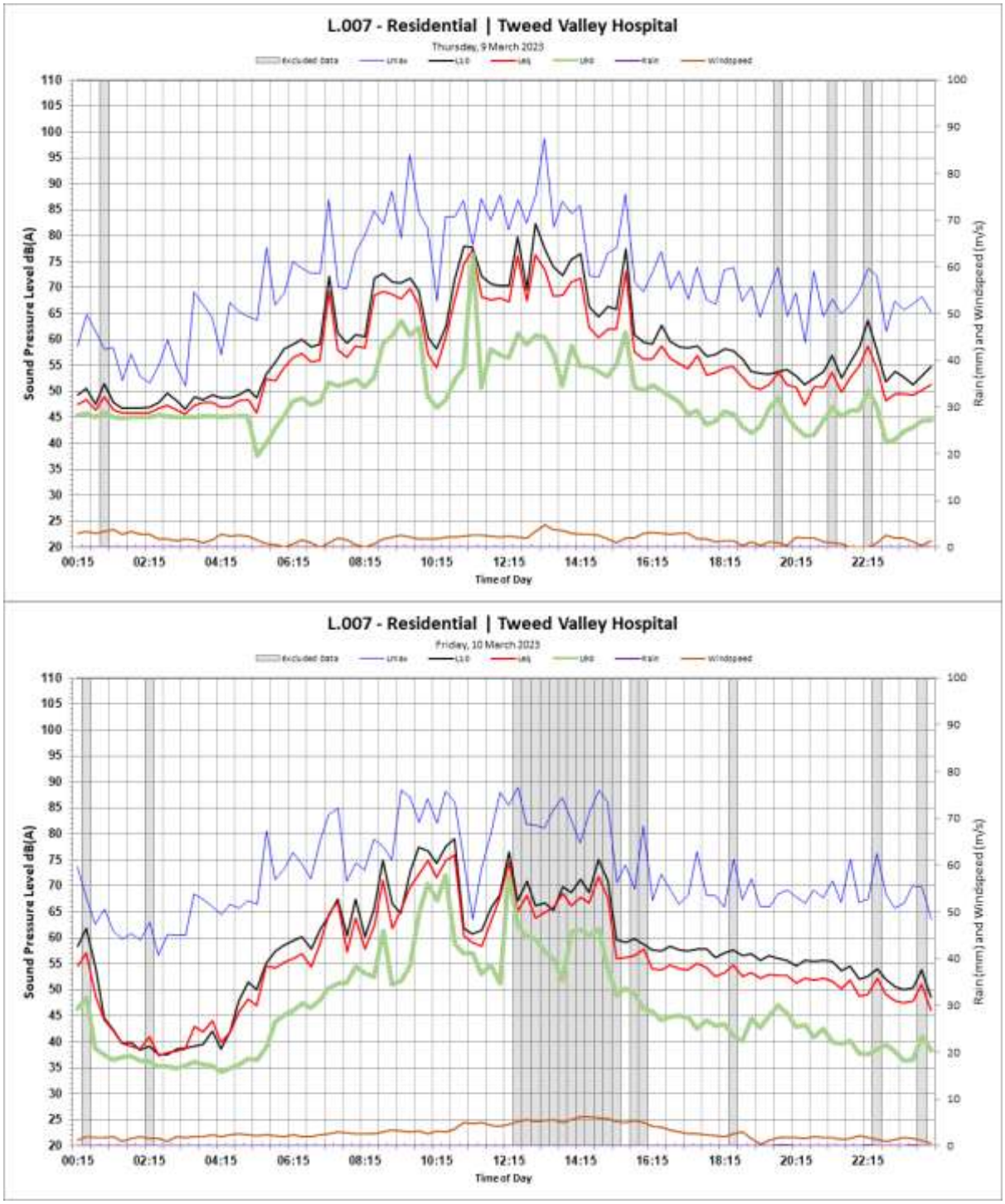
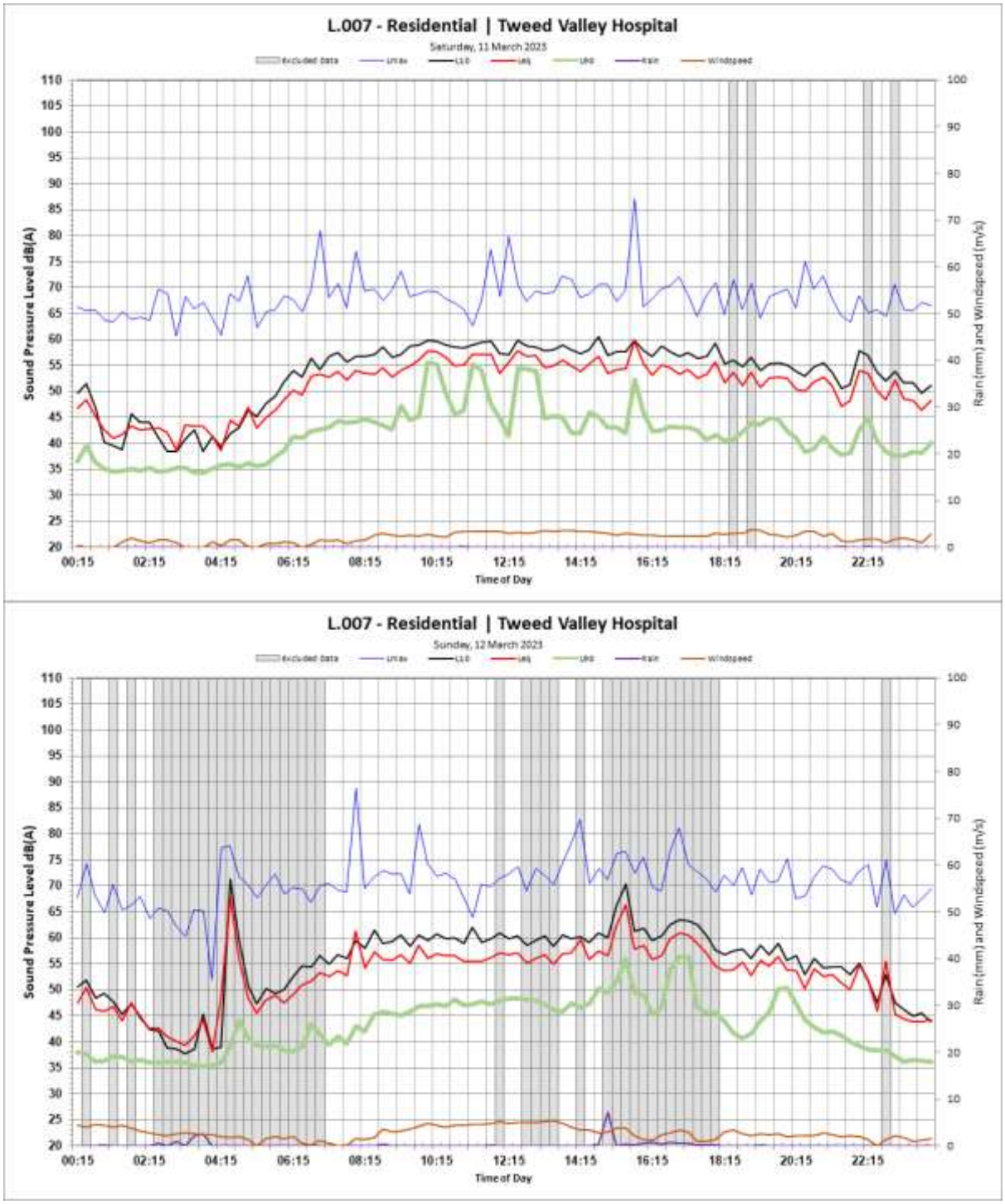
22:15


L.007 - Residential | Tweed Valley Hospital
Thursday, 9 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
L.007 - Residential | Tweed Valley Hospital
Friday, 10 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day


L.007 - Residential | Tweed Valley Hospital
Saturday, 11 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
14:15
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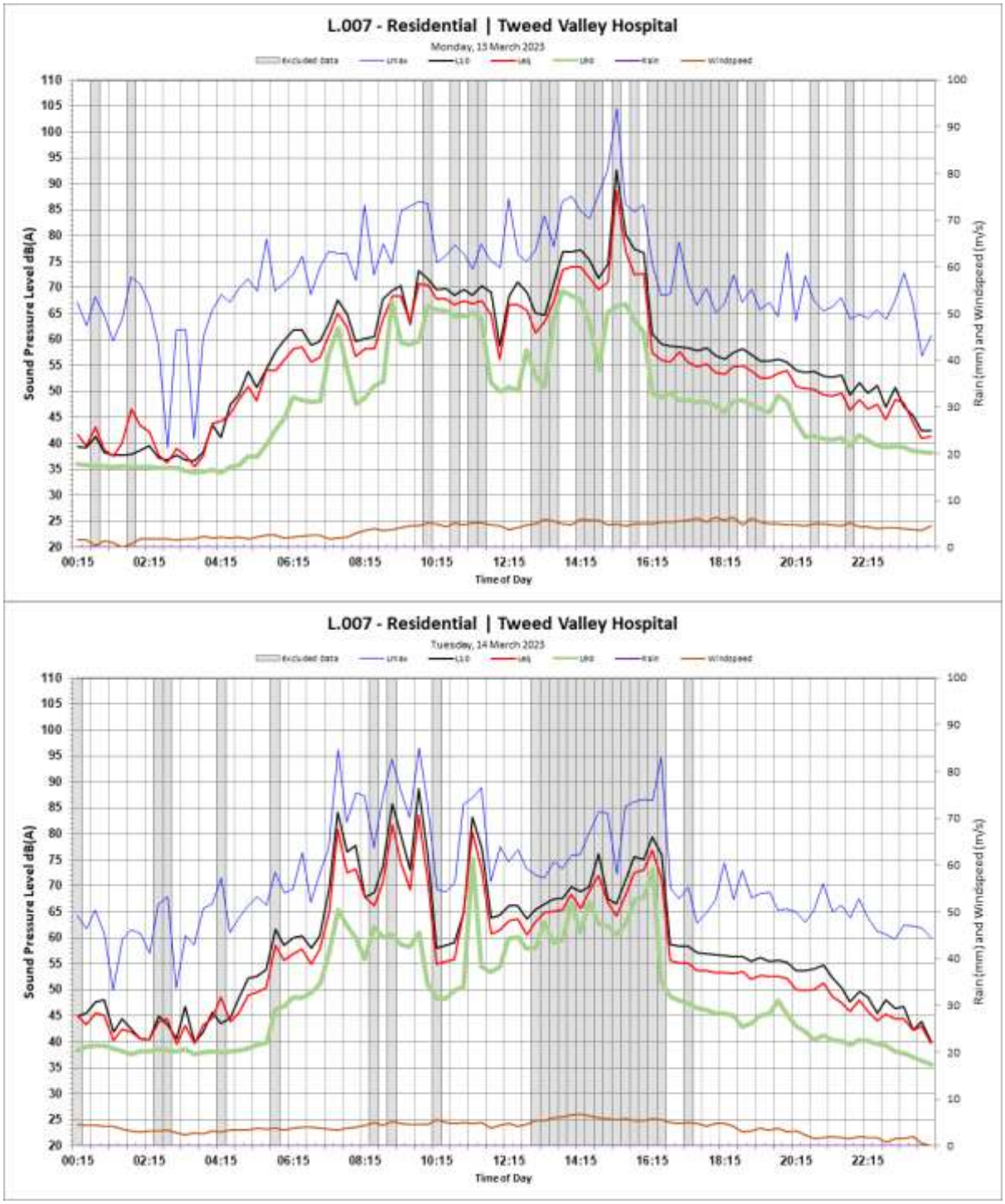
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Sunday, 12 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day


L.007 - Residential | Tweed Valley Hospital
Monday, 13 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Tuesday, 14 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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06:15
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18:15
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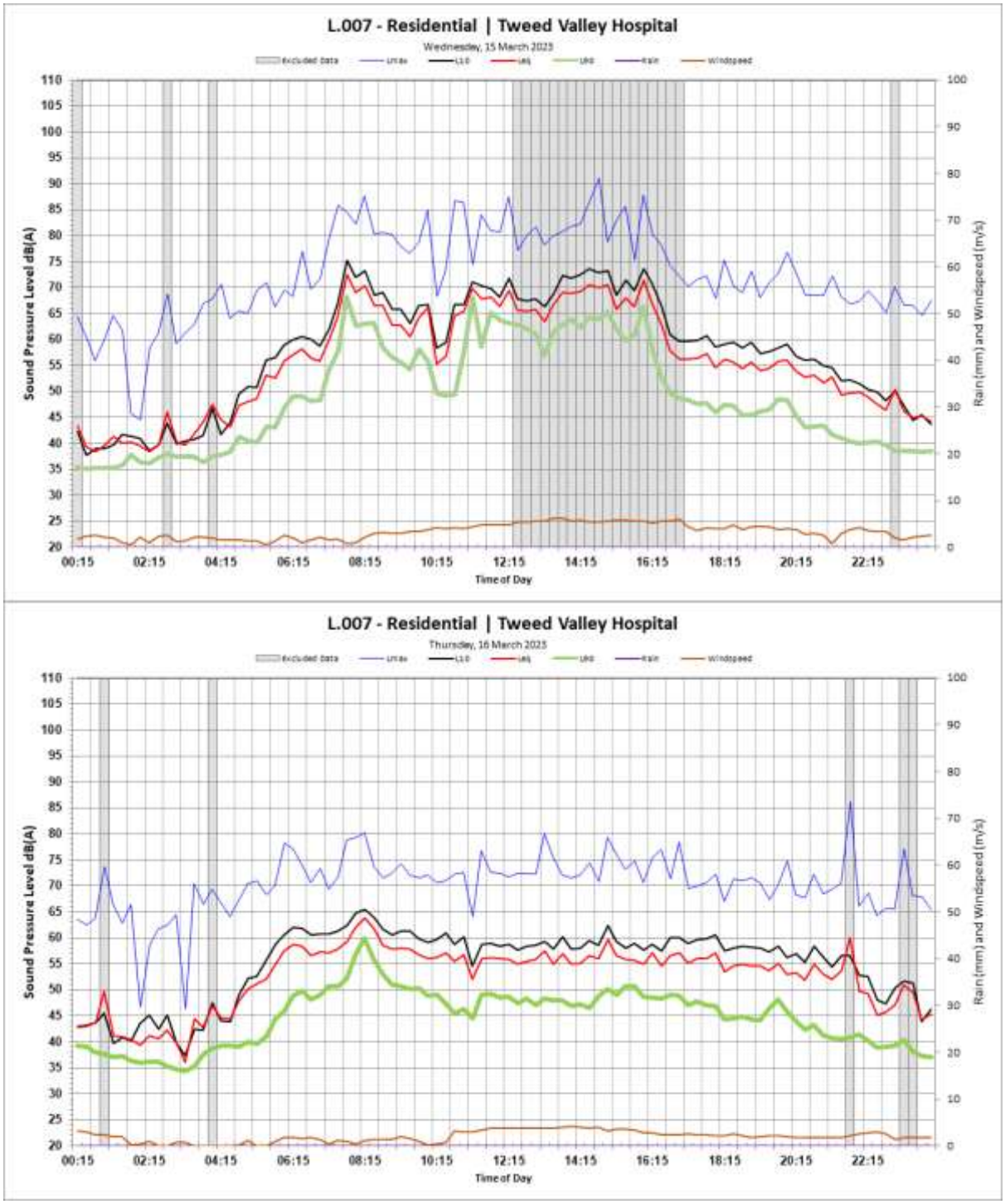
L.007 - Residential | Tweed Valley Hospital
Wednesday, 15 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Thursday, 16 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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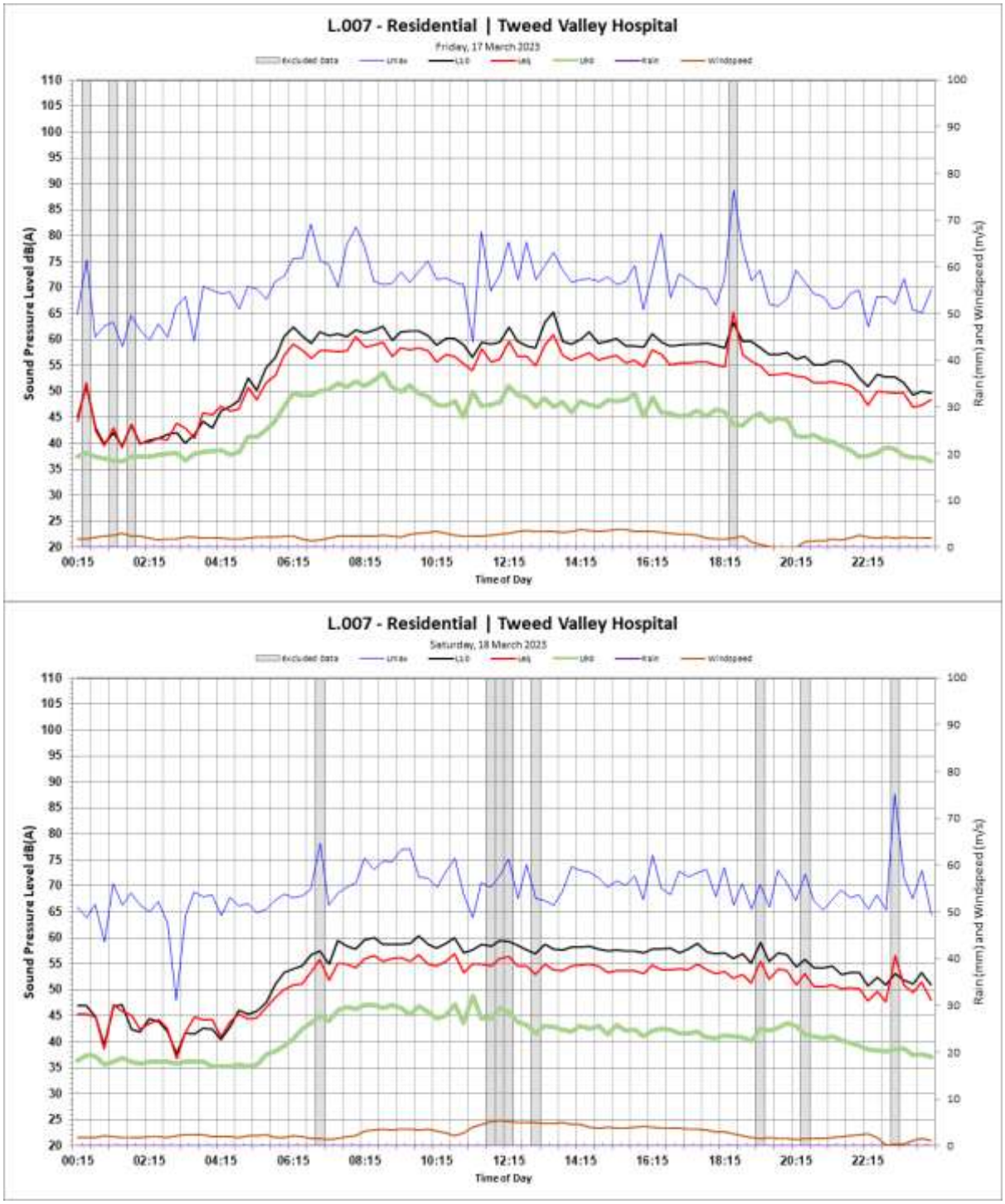
L.007 - Residential | Tweed Valley Hospital
Friday, 17 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Saturday, 18 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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06:15
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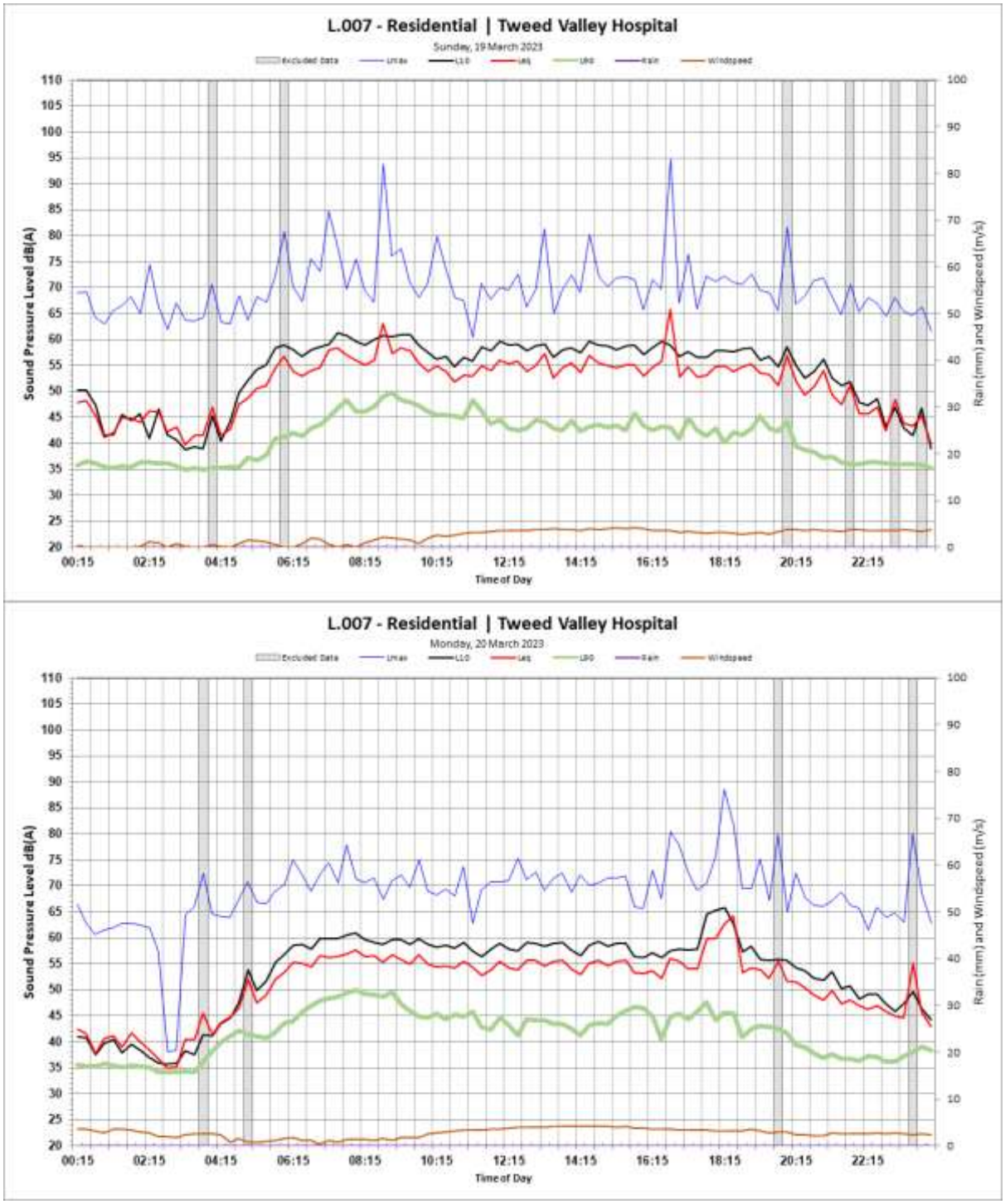
L.007 - Residential | Tweed Valley Hospital
Sunday, 19 March 2023
Excluded Data
Lmax
L10
Leq
L90
Rain
Windspeed
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Monday, 20 March 2023
Excluded Data
Lmax
L10
Leq
L90
Rain
Windspeed
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
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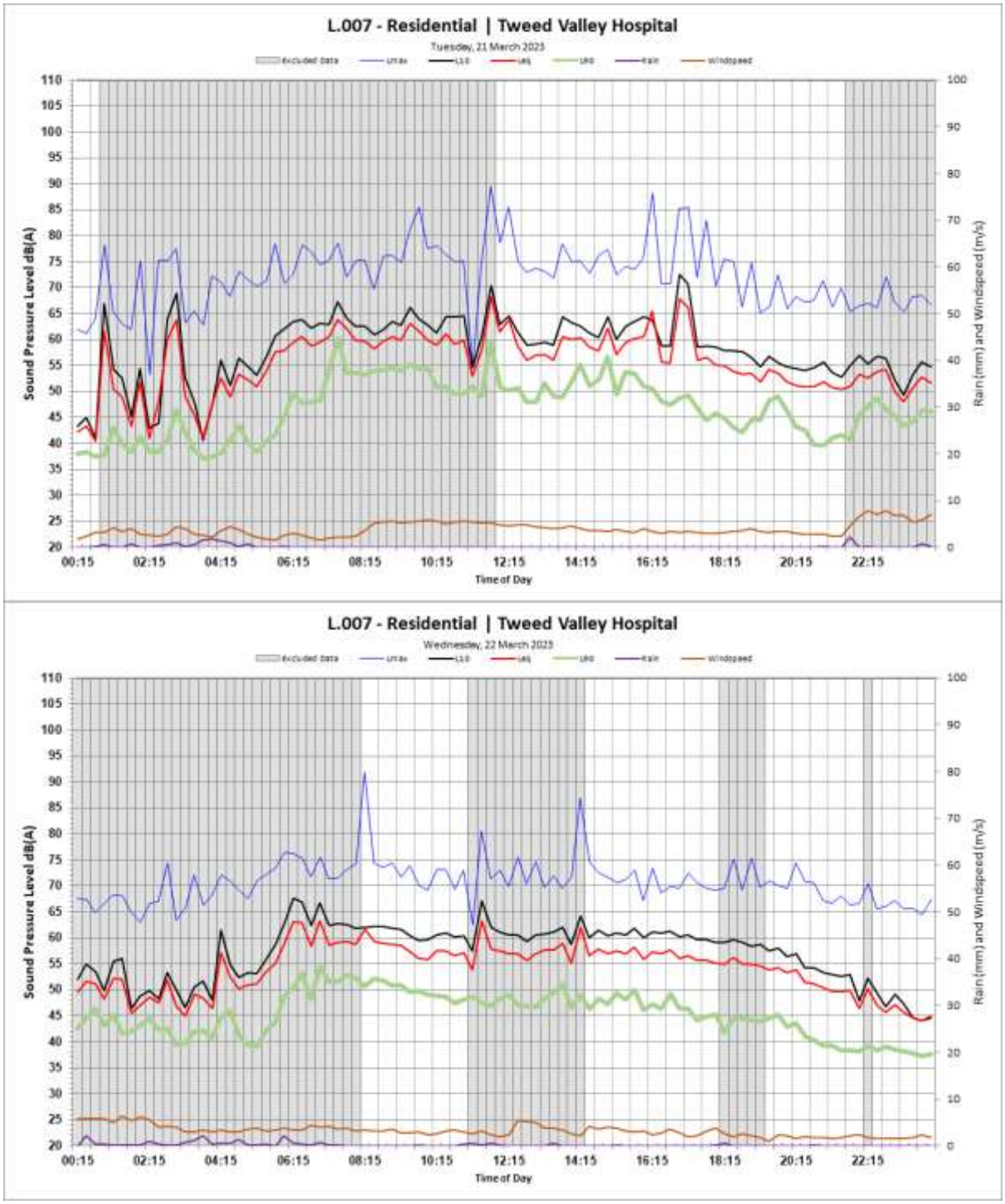
22:15


L.007 - Residential | Tweed Valley Hospital
Tuesday, 21 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
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14:15
16:15
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Wednesday, 22 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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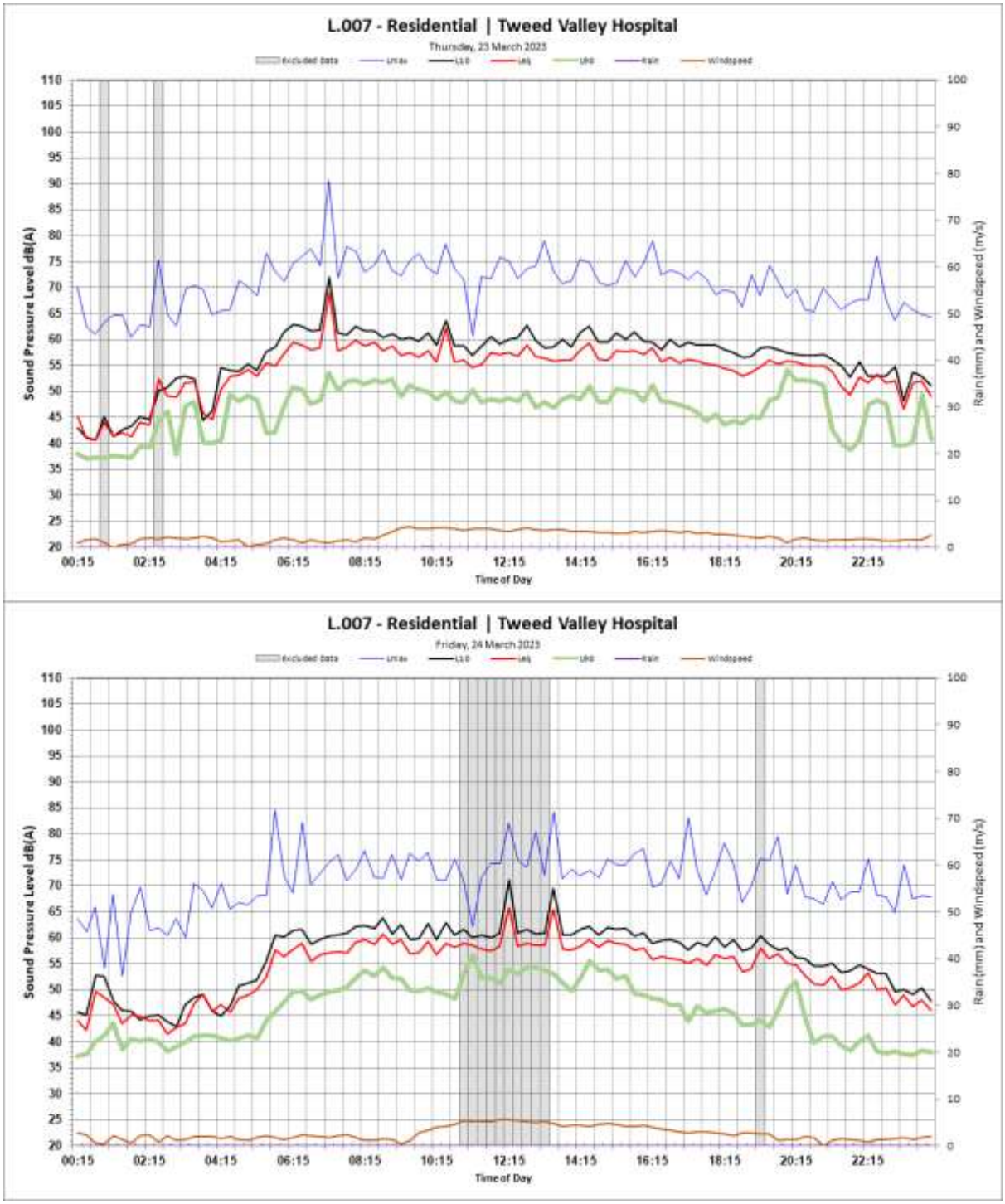
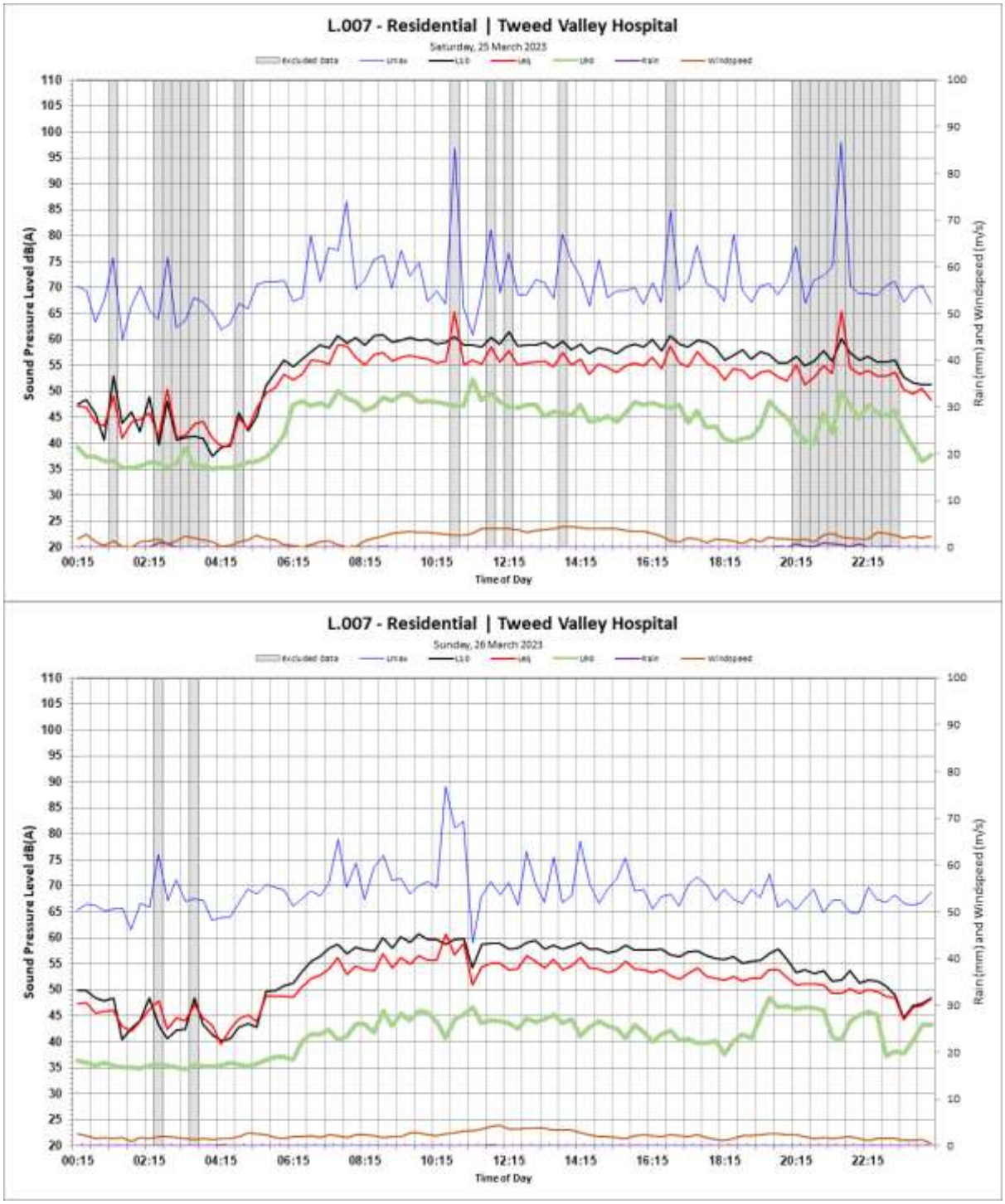

L.007 - Residential | Tweed Valley Hospital
Thursday, 23 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Friday, 24 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day


L.007 - Residential | Tweed Valley Hospital
Saturday, 25 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
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16:15
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Sunday, 26 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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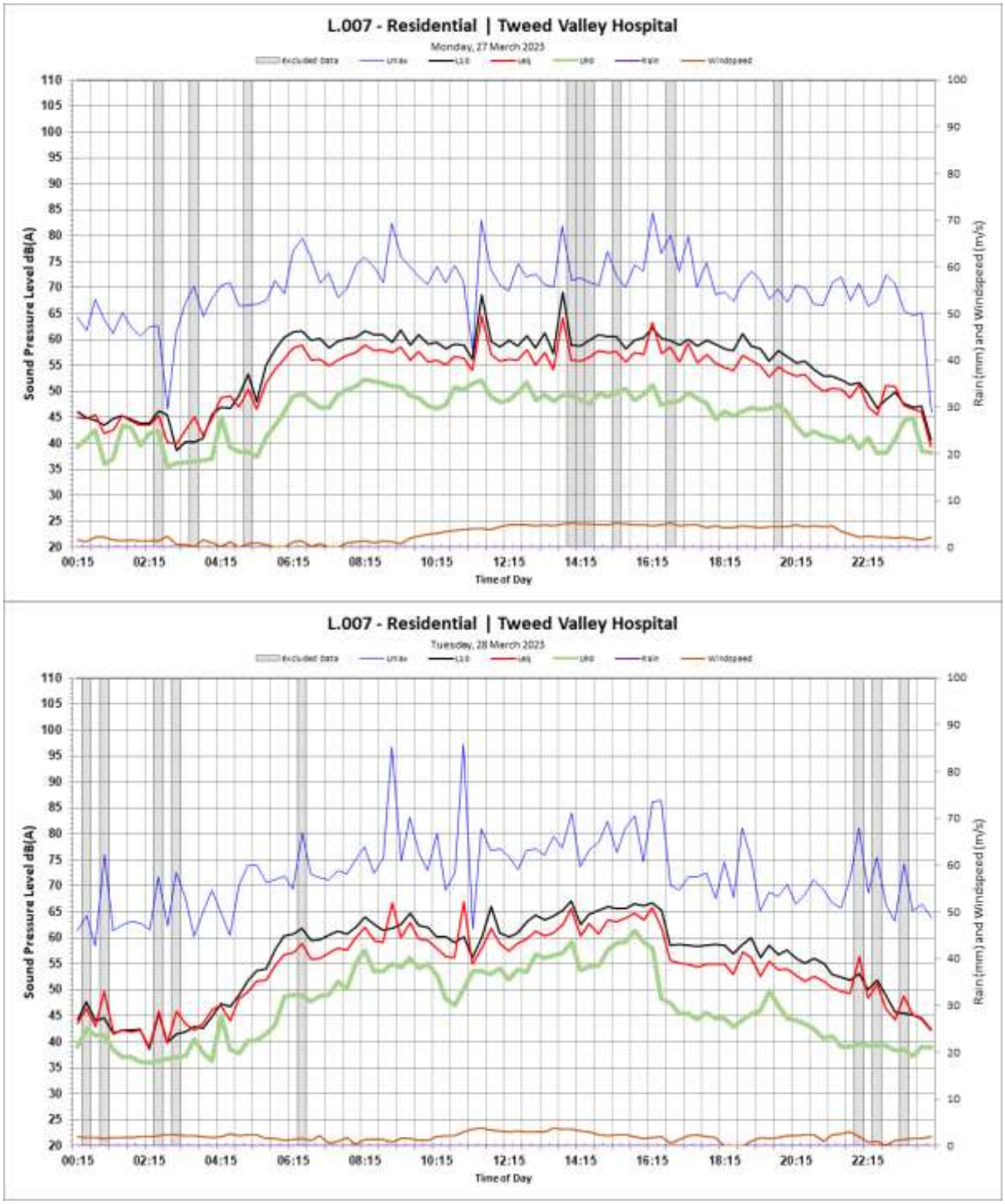
L.007 - Residential | Tweed Valley Hospital
Monday, 27 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Tuesday, 28 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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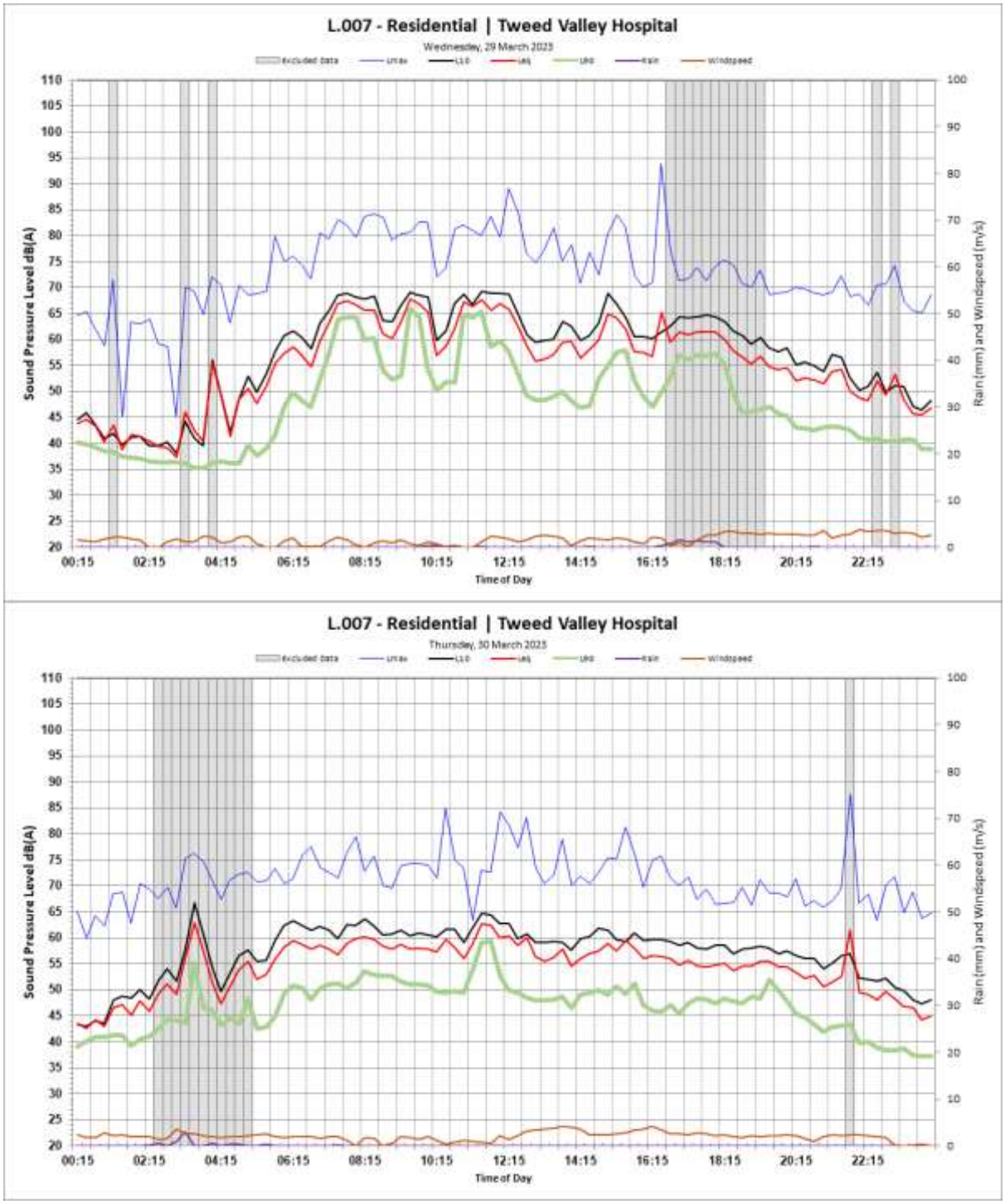
L.007 - Residential | Tweed Valley Hospital
Wednesday, 29 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
02:15
04:15
06:15
08:15
10:15
12:15
14:15
16:15
18:15
20:15
22:15
L.007 - Residential | Tweed Valley Hospital
Thursday, 30 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
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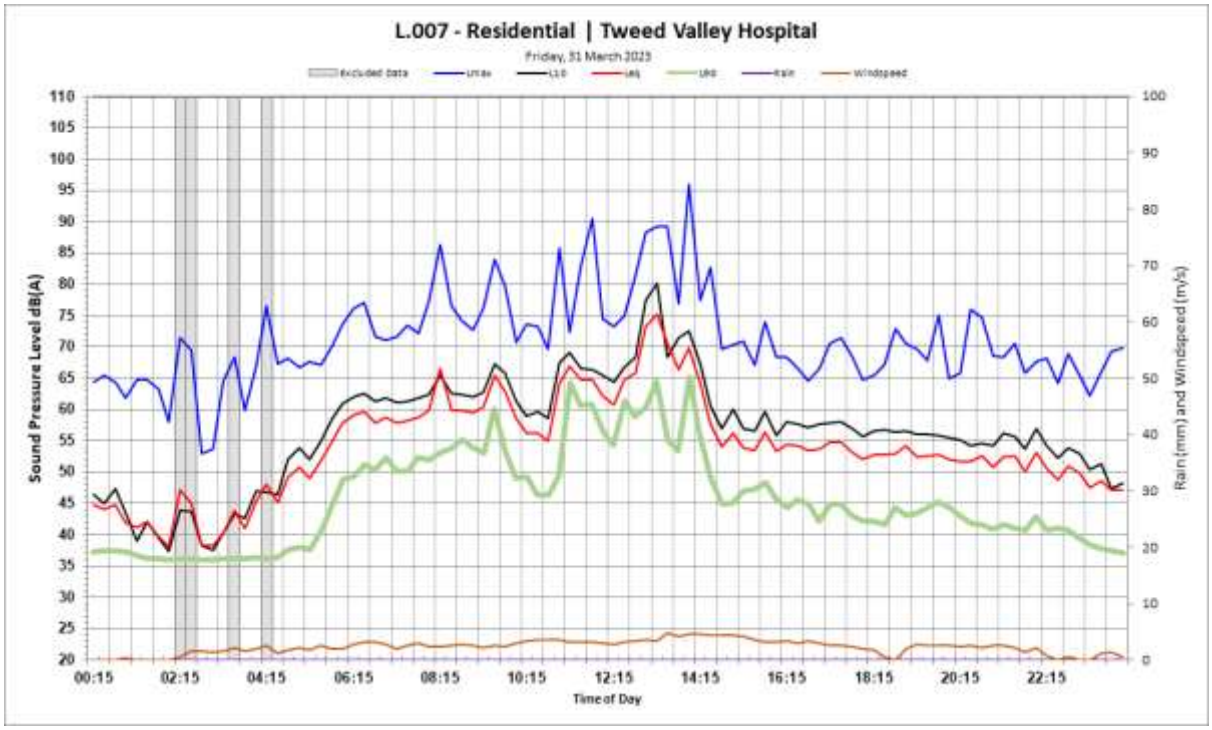
L.007 - Residential | Tweed Valley Hospital
Friday, 31 March 2023
Excluded Data
Sound Pressure Level dB(A)
Rain (mm) and Windspeed (m/s)
Time of Day
00:15
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20:15
22:15

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ADE Consulting Group Pty Ltd

Sydney
Unit 6/7 Millennium Court
Silverwater, NSW 2128, Australia

Newcastle
Unit 9/103 Glenwood Drive
Thornton, NSW 2322, Australia

ADE Consulting Group (QLD) Pty Ltd

Brisbane
Unit 10/53 Metroplex Avenue
Murarrie, QLD 4172, Australia

ADE Consulting Group (VIC) Pty Ltd

Melbourne
Unit 4/95 Salmon Street
Port Melbourne, VIC 3207, Australia