

Royal Prince Alfred Hospital Redevelopment (RPAH  
Redevelopment)

Construction Noise and Vibration Monitoring Report 9

Client Doc. No. RPA-ACO-ACL-RPT-MW-000012 - Rev A

Project ID	20230239.17
Document Title	Construction Noise and Vibration Monitoring
Attention To	CPB Contractors Pty Limited

<b>Revision</b>	<b>Date</b>	<b>Document Reference</b>	<b>Prepared By</b>	<b>Checked By</b>	<b>Approved By</b>
0	4/05/2024	20230239.17/0405A/R0/LA	LA		AW

## TABLE OF CONTENTS

1	INTRODUCTION .....	4
2	SITE DESCRIPTION .....	5
3	NOISE AND VIBRATION MANAGEMENT LEVELS.....	6
3.1	NOISE MANAGEMENT LEVELS .....	6
3.2	PROJECT VIBRATION CRITERIA.....	6
4	MONITORING EQUIPMENT AND LOCATIONS .....	7
4.1	NOISE MONITORING EQUIPMENT AND LOCATIONS.....	7
4.2	VIBRATION MONITORING EQUIPMENT AND LOCATIONS.....	8
5	RESULTS .....	9
5.1	NOISE MONITORING RESULTS DISCUSSION .....	9
5.2	VIBRATION MONITORING RESULTS DISCUSSION .....	11
6	CONCLUSION.....	16
	APPENDIX A – NOISE MONITORING RESULTS.....	17
	CENTENARY INSTITUTE – LEVEL 4 SURGERY ROOM (SOUTHERN FAÇADE) .....	17
	RPA HOSPITAL MAIN BUILDING – LEVEL 3 NICU.....	18
	OUTSIDE SUSAN WAKIL HEALTH BUILDING .....	19
	APPENDIX B – VIBRATION MONITORING RESULTS.....	20
	CENTENARY INSTITUTE – LEVEL 3 FISH TANKS .....	20
	CENTENARY INSTITUTE – LEVEL 4 SURGERY ROOM (SOUTHERN FAÇADE) .....	21
	CENTENARY INSTITUTE – LEVEL 4 BATHROOM (NORTHERN FAÇADE) .....	22
	CENTENARY INSTITUTE – LEVEL 4 SE CORNER EXPERIMENTATION ROOM (SOUTHERN FAÇADE).....	23
	CHARLES PERKINS CENTRE – LEVEL B1 SOUTHERN CORRIDOR .....	24
	CHARLES PERKINS CENTRE – LEVEL B1 SOUTHERN WING OBSERVATION ROOM E.....	25
	RPA HOSPITAL MAIN BUILDING – LEVEL 03 NICU .....	26
	OUTSIDE SUSAN WAKIL HEALTH BUILDING .....	27

## 1 INTRODUCTION

This report presents the results of the noise and vibration monitoring conducted by Acoustic Logic during the site establishment works for the RPA Hospital redevelopment, located at 50 Missenden Road, Camperdown. Details presented in this report include monitoring locations, relevant noise and vibration objectives, measured noise and vibration levels over the presented monitoring period and a discussion of results where applicable.

This report covers the ninth fortnight since the beginning of construction monitoring, being between Monday 1<sup>st</sup> April, 2024 and Sunday 14<sup>th</sup> April, 2024.

Unattended noise and vibration monitoring has been undertaken to satisfy the requirements of Condition B26 of SSD-47662959's Development Consent, in conjunction with the noise and vibration management levels established within the *Early Works Construction Noise and Vibration Management Plan*, prepared by this office, and as they are so updated throughout the construction process where necessitated (Ref: 20230239.9/0610A/R1/LA). Condition B26 of SSD-47662959's Development Consent is provided below for reference:

### ***"Environmental Management Plan Requirements***

**B26.** *Management plans required under this consent must be prepared having regard to the relevant guidelines, including but not limited to the Environmental Management Plan Guideline: Guideline for Infrastructure Projects (DPIE April 2020).*

Notes:

*The Environmental Management Plan Guideline is available on the Planning Portal at: <https://www.planningportal.nsw.gov.au/major-projects/assessment/post-approval>.*

*The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans."*

## 2 SITE DESCRIPTION

The site is maintained on Lot 1000 DP 1159799, and is bound by the existing operational RPA Hospital to the west, the Centenary Institute to the north, and University of Sydney’s Bruce William Pavilion and Susan Wakil Health Building to the east and south respectively. The site is surrounded by various residential, commercial, hospital, university, research and active recreation sensitive receivers generally.

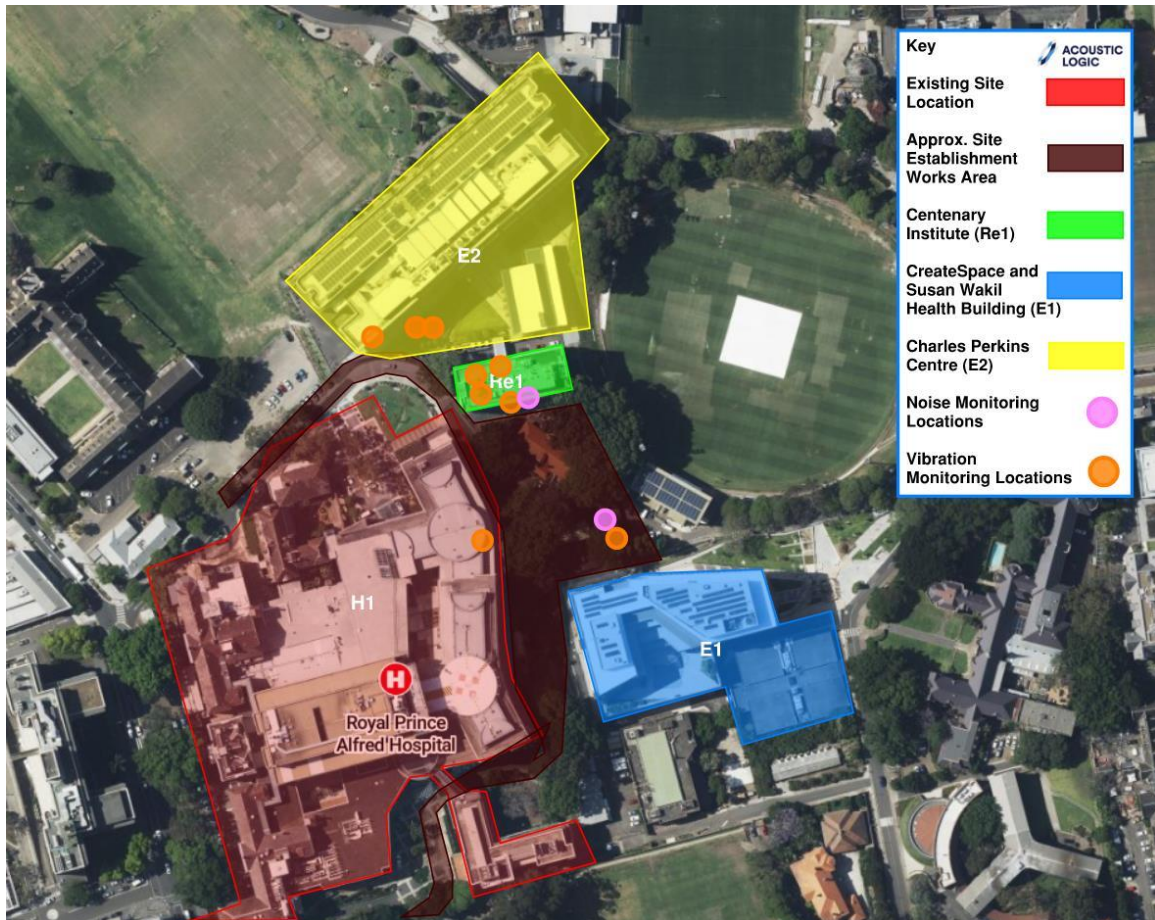
The works maintained within Early Works and Site Establishment pertain specifically to works along Lambie Dew Drive and John Hopkins Drive.

The surrounding affected sensitive receivers that are investigated within the contents of this monitoring assessment are as presented below:

**Table 1 – Surrounding Sensitive Receivers**

ID No.	Receiver Description	Receiver Category
H1	RPA Hospital Main Building	Hospital
Re1	Centenary Institute	Research Facilities
E1	CreateSpace and Susan Wakil Health Building	Education
E2	Charles Perkins Centre	

See an aerial photo in Figure 1 below for detailed receiver locations.



**Figure 1: Aerial Site Map with Nearest Sensitive Receivers (Sourced from Sixmaps)**

### 3 NOISE AND VIBRATION MANAGEMENT LEVELS

The following section details the relevant construction noise and vibration requirements assessed throughout the monitoring period.

#### 3.1 NOISE MANAGEMENT LEVELS

Noise Management levels relevant to the contents of this report are summarised in the table below, as provided within the *Early Works Construction Noise and Vibration Management Plan*, prepared for the project by this office (Ref: 20230239.9/0610A/R1/LA). Note that based upon measurements and discussions with relevant stakeholders on 12/03/2024, the Noise Management Level for the Animal Housing, Breeding and Observation Rooms within Centenary Institute will be reduced to 62dB(A)  $L_{eq(15\ min)}$ , and this will be adopted within this report, as well as further subsequent assessments:

**Table 2 – Noise Management Levels**

Receiver	Room Usage	Noise Management Level dB(A) $L_{eq(15\ min)}$
H1	NICU	60 (Internally)
E1 and E2	All	45 (Internally)
R1	Animal Housing / Breeding / Observation Rooms	62 (Internally)
	Rat Operating Room	48 (Internally)

#### 3.2 PROJECT VIBRATION CRITERIA

Relevant project vibration criteria to the contents of this report are provided within the table below. Vibration criteria presented for spaces within Re1 and E2 have been updated based upon the conclusion of the “Baseline Monitoring Results,” report, as well as the “Construction Noise and Vibration Monitoring Report 1,” both of which were prepared by this office for the project (Ref: 20230239.17/0412A/R1/LA and 20230239.17/2301A/R0/LA). Supplementarily, further correspondence between Charles Perkins Centre and the project team on 20/02/2024 has resulted in the reduction of criteria within the animal spaces on B2 to VC-A criteria, and this is reflected within the table below and has been in effect through this monitoring period:

**Table 3 – Summarised Proposed Project Vibration Limits**

<b>Receiver</b>	<b>Location</b>	<b>Vibration Criteria (<math>\mu\text{ms}^{-1}</math>)</b>
Re1 Centenary Institute	L3 Fish Tank Room	400 $\mu\text{ms}^{-1}$ Peak Particle Velocity
	L4 – Animal Behaviour / Holding / Breeding Rooms	VC-A (ASHRAE Handbook) (50 $\mu\text{ms}^{-1}$ ) RMS Velocity
E1 Createspace and Susan Wakil Health Building	All spaces	DIN 4150-3 Type 1 Criteria (20,000 $\mu\text{ms}^{-1}$ / 20 $\text{mms}^{-1}$ ) Peak Particle Velocity
E2 Charles Perkins Centre	Imaging Equipment (Southern Wing Corridor)	VC-B (ASHRAE Handbook) (25 $\mu\text{ms}^{-1}$ ) RMS Velocity
	Animal Behaviour / Holding / Breeding Rooms	VC-A (ASHRAE Handbook) (50 $\mu\text{ms}^{-1}$ ) RMS Velocity
H1 RPA Hospital Main Building	Operating Theatres (Level 3)	100 $\mu\text{ms}^{-1}$ RMS Velocity

## 4 MONITORING EQUIPMENT AND LOCATIONS

### 4.1 NOISE MONITORING EQUIPMENT AND LOCATIONS

Unattended noise monitoring was conducted using Acoustic Research Laboratories Pty Ltd noise loggers. The loggers were programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of each measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

Three individual noise monitors have been installed surrounding the site at the following locations:

- Centenary Institute Level 4 Surgery (Southern Façade).
- RPA Hospital Main Building – Level 03 NICU.
- Outside Susan Wakil Health Building, on grade.

Please refer to Figure 1 for detailed monitoring locations. Appendix C provides photos of the monitors installed at the project site.

## 4.2 VIBRATION MONITORING EQUIPMENT AND LOCATIONS

Vibration monitoring was conducted using either Texcel ETM vibration monitors with external Tri-axial Geophones, or Bruel and Kjaer Type 4450 vibration monitors.

Three Texcel ETM monitors have been placed surrounding the site at the following locations:

- Centenary Institute Level 3, Fish Tanks.
- Charles Perkins Centre Level B1, Southern Wing Observation Room E (Note that this monitor has been installed at this location to send alert messages at  $100 \mu\text{ms}^{-1}$  PPV vibration events, due to the limited reception achieved within the B2 area from the Bruel and Kjaer Type 4450 monitor installed to assess vibration impacts with respect to the VC-A vibration criteria curve within the animal holding area.
- Outside Susan Wakil Health Building, on grade.

Additionally, six Bruel and Kjaer Type 4450 Vibration monitors have been installed surrounding the site at the following locations:

- Centenary Institute:
  - Level 4 Surgery (Southern Façade).
  - Level 4 Change Rooms (Northern Façade)
  - Level 4 South-eastern Experimentation Room.
- Charles Perkins Centre:
  - Level B1, Southern Wing Corridor.
  - Level B1, Southern Wing Observation Room E
- RPA Hospital Main Building Level 3 NICU.

Please refer to Figure 1 for detailed monitoring locations.



## 5 RESULTS

Appendix A presents the results of the noise monitoring, whilst Appendix B presents the results of the vibration monitoring where exceedances occurred during the monitoring period as presented within the contents of this report.

A discussion pertaining the findings of the noise and vibration monitoring undertaken during this monitoring period is provided within the proceeding sections.

### 5.1 NOISE MONITING RESULTS DISCUSSION

Noise monitoring conducted throughout the monitoring period shows general adherence to the noise management levels provided within Section 3 of this letter.

#### For the Surgery Room Noise Management Level

- Measured noise levels were observed to be above the surgery room noise management level on the following dates during periods of construction:
  - 02/04/2024.
  - 03/04/2024.
  - 04/04/2024.
  - 08/04/2024.
  - 09/04/2024.
  - 10/04/2024.
  - 11/04/2024.
- Generally, measured noise levels above the noise management levels within the operating room were observed for short periods of time before returning to below the noise management level ( $\leq 1$  hr). Within the monitoring period, the longest sustained period whereby the recorded noise levels were found to be above the surgery room noise management level was for 2.75 hours on 08/04/2024.
- Noise levels are continuing to be observed and monitored to ensure ongoing adherence with the requirements of Section 3.1.

#### For the Holding, Breeding and Observation Rooms

- Noise levels were found to be above the NML for holding, breeding and observation rooms on 05/04 and 12/04, however these events were confirmed by CI to be caused by operational activity.
- No further measurements above the NML were experienced throughout the monitoring period.

#### For RPAH Main Building L03 NICU

- Acoustic Logic note that, due to the monitor being taken off charge, the monitor was inactive from approximately 3.00pm on 09/04, to approximately 12.30pm on 11/04. Data was not collated during this period.
- The monitor is located underneath a benchtop and against two individual walls within the NICU area on Level 03 of the hospital main building. Due to the reflections experienced at the monitoring location due to this, a 5dB correction has been conservatively applied to the noise levels measured at the monitoring station.
- Noise levels were observed to be measured above the NML within the NICU space for two 15-minute periods on 11/04/2024. All other measured levels above the NML have been found to occur outside of construction hours.
- Ongoing monitoring to continue within the NICU space.

#### For the Susan Wakil Health Building

- Due to battery depletion with the monitor, and being unable to access the monitor location due to asbestos control on site, the monitor was switched off for the duration of the monitoring period and no results have been collated during this period.
- Collating data was continued on 08/04 when access was available to the monitoring location.
- The monitor located outside of the Susan Wakil Health Building is within the demolition site boundary and approximately 15m closer to the area of the works than the façade of the Susan Wakil Health Building.
- Noting this increased distance attenuation, in conjunction with the transmission loss experienced through the inoperable façade of the Susan Wakil Health Building when comparing internal and external noise levels, Acoustic Logic expect that, at minimum, there is a 30dB reduction between the measured noise levels by the monitor, when compared with the resultant internal noise levels within the receiver.
- This reduction is considered conservative due to the distance between the monitor and the building, and hence, the noise impacts would be further reduced than what is outlined below in reality.
- Notwithstanding, and based on this reduction, measured noise levels which have been attributed to construction activity were observed to be above the noise management level on 09/04/2024.
- The measured noise level was observed to be above noise management levels for only two separate 15-minute intervals before reducing to be in line with internal noise objectives.
- Noise levels impacting Susan Wakil will be continued to be monitored throughout the early works construction to assess the impact of this receiver.

## 5.2 VIBRATION MONITORING RESULTS DISCUSSION

With regards to the vibration measured vibration levels during the monitoring period, we note the following:

- Note that the graphs presented within the Appendix of this document show the maximum recorded velocity for each individual frequency within a given day's monitoring period.
- Data has only been provided for days in which exceedances attributed to vibration works have been experienced at the monitoring station.
- The following matrix presents the dates and times within the monitoring period whereby exceedances have been recorded concurrently by multiple monitoring stations surrounding the construction area and have been attributed to construction activity. Note that the vibration monitor at Susan Wakil Health Building has been excluded from the matrix, due to the much higher vibration criteria when compared with all other vibration monitoring locations:

**Table 4 – Measured Correlated Vibration Exceedances**

Date of Correlated Exceedance Event	Time of Correlated Exceedance Event	Measured Maximum Exceedance?						
		Centenary Institute				Charles Perkins Centre		RPA Hospital Main Building
		L3 Fish Tanks	L4 Surgery (South)	L4 Bathroom (North)	L4 SE Corner	Southern Wing Corridor (Imaging)	Southern Wing Observation Room E (Animals)	NICU
09/04/2024	11.30am	No	No	No	59µms <sup>-1</sup> @ 31.5Hz*	53µms <sup>-1</sup> @ 31.5Hz	No	No
11/04/2024	2:30pm		85µms <sup>-1</sup> @ 25Hz	75µms <sup>-1</sup> @ 25Hz	No	29µms <sup>-1</sup> @ 20Hz*		
12/04/2024	7.45am		66µms <sup>-1</sup> @ 10Hz (Transverse)	68µms <sup>-1</sup> @ 10Hz (Transverse)		No		

\*This measured level considered to be a marginal exceedance of criteria (<20% above criteria at respective frequency).

- Incidents which are shown to result in exceedances of criteria at multiple monitoring locations currently would be considered to be caused by extraneous vibration generating activity, such as construction works.
- Through correlating exceedance events and the construction activity on site, it was established during this monitoring period that the detailed excavation works along John Hopkins Drive and Lambie Dew Drive have resulted in measured exceedances within both Centenary Institute as well as Charles Perkins Centre B2 for the imaging equipment on 09/04 and 11/04.
- Alternative construction methodologies have been explored where feasible, and reductions in generated vibration levels have been observed when alternative construction methodology has been implemented.
- In conjunction to the above dates, the following dates have had exceedances observed at individual monitoring locations:
- Centenary Institute:
  - Level 1 – Laser Imaging Room (Electrical Cupboard):
    - Precision imaging equipment such as the laser scanning apparatus investigated by this monitoring station are impacted by vibration through impacts on output results.
    - This would hence be observed by operators of the equipment, whereby the system would not be operating correctly/results of the system would be impacted.
    - To the knowledge of this office, no impacts on the results output of the equipment have been reported by Centenary Institute throughout the early works construction period.
    - Further, and based upon onsite inspections and testing, AL note that the Laser room is subject to various sources of ambient vibration from the operation of the facility which contribute to the levels measured during construction, inclusive of refrigerant plant maintained within the basement of the facility.
    - Where any changes to the operation / results of the laser scanning apparatus are observed by the operators of the equipment, this is to be relayed to this office for investigation and alignment with construction activity to appropriately assess and mitigate impacts.
  - Level 3 – Fish Tanks:
    - No exceedances of criteria were observed within the monitoring period which have been attributed to construction activity.
  - Level 4 – Surgery Room (Southern Façade) and Bathroom (Northern Façade):
    - Two exceedances were observed at each of these monitoring stations throughout monitoring period, namely on 11/04 at approximately 2.30pm, and 12/04 at approximately 7.45am (Transverse).
    - All measured exceedances throughout the monitoring period at these monitors are presented within Table 4.
    - It is likely that both of these exceedances were caused by construction activity within the RPA Hospital site, noting that on 11/04, it is likely that the exceedances were caused by continuous plant, whilst the transverse event measured on 12/04 is may have been caused by a high force impact causing the floorplate to shift, such as material handling or loading/unloading.
    - Based upon site investigation, it was determined that the major source of vibration generation at the time of the exceedances was the operation of a plate compactor approximately 30m away from the Centenary Institute boundary, and alternative works

methodology was implemented to reduce the resultant levels at the surrounding receivers.

- Exclusive of these events, no further exceedances were measured throughout the monitoring period at these locations.
- Level 4 – SE Corner Experimentation Room:
  - Two individual exceedance events were measured at this monitoring station throughout the monitoring period, once on 09/04, which was correlated with exceedances measured in the CPC L2 basement, and on 10/04, which was not correlated with an exceedance event at any other monitor.
  - Both of the measured exceedances were marginal in nature, noting that the highest measured velocity at the monitor during the period was  $59\mu\text{ms}^{-1}$  at 31.5Hz, or approximately 18% above the governing VC-A criteria
  - The exceedance measured on 09/04 is characteristic of construction generated vibration and is likely to be caused by a continuous plant item. The isolated exceedance measured on 10/04 is unlikely to be caused by construction, noting that the measured exceedance was transverse only and did not correlate with any transverse exceedance of the monitors on the same floorplate. It is likely that this exceedance was caused by localised operational activity of CI close to the monitor location.
  - Exclusive of these events, there were no further exceedances observed throughout the monitoring period.
- Charles Perkins Centre:
  - Southern Corridor (Imaging):
    - Supplementary to the measurements presented within Table 4, exceedances of B2 VC-B criteria which display characteristics consistent with construction activity were observed at the monitoring station on the following dates:
      - 03/04/2024 – 11.30am.
      - 09/04/2024 – 7.30am.
      - 10/04/2024 – 7.30am, 8.45am and 4.15pm.
      - 11/04/2024 – 12.00pm, 2.30pm.
      - 12/04/2024 – 4.00pm.
    - Exceedances are generally observed to result at up to a maximum of 150% of the VC-B criteria at a given frequency (Approximately measured at  $62.5\mu\text{ms}^{-1}$ ). The maximum level measured during the monitoring period was  $81\mu\text{ms}^{-1}$  at 12.5Hz on 10/04/2024.
    - Exceedances are generally observed at 12.5Hz, likely to be the natural frequency of the CPC suspended slab. Exceedances at frequencies exclusive of 12.5Hz, 16Hz and 20Hz are rarely observed.
    - With regards to the monitoring period within the CPC Basement, we note the following:
      - Throughout the monitoring period, works have been generally restricted to two main areas:
        - Demolition within the pathology demolition area, and

- Detailed excavation undertaken along John Hopkins Drive / Lambie Dew Drive.
- Based upon site investigation, it was determined that the major source of vibration generation between 10/04 and 12/04 was the operation of a plate compactor within the park area, and alternative works methodology was implemented to reduce the resultant levels at the surrounding receivers.
- When comparing the results of the B2 monitoring location with other surrounding monitors, we note that the B2 monitor is located on a suspended slab, and hence it is possible that significant amplification of the vibration impacts from these works is occurring and resulting in exceedances at the monitoring location.
- Notwithstanding, and due to the lack of correlation between the significant spikes measured by the B2 monitor and exceedances at other monitoring stations surrounding the project site, it is likely that some or most of these spikes have been caused by factors exclusive of the construction activity within the RPA Hospital project area.
- It is prudent to note that CPC is undergoing a façade refurbishment exclusive to the scope of the construction activity assessed within this report, and it is likely that these works attributed to some of the exceedances observed throughout the period.
- Observation Room E (Adjoining corridor):
  - No exceedances were observed of the VC-A criteria within the animal holding spaces at the monitoring location.
- RPA Hospital Main Building:
  - Level 03 NICU:
    - No exceedances have been measured at this monitoring throughout the monitoring period.
- Susan Wakil Health Building:
  - Due to battery depletion with the monitor, and being unable to access the monitor location due to asbestos control on site, the monitor was switched off for the duration of the monitoring period and no results have been collated during this period.
  - Collating data was continued on 08/04 when access was available to the monitoring location.
  - No exceedances of criteria were observed due to construction works during the remainder of this monitoring period.

## 6 CONCLUSION

Noise and vibration monitoring has been conducted by Acoustic Logic for the Early Works being undertaken for SSD-47662959, the RPA Hospital Redevelopment, located at 50 Missenden Road, Camperdown.

This letter presents the results of the monitoring between the period of Monday 1<sup>st</sup> April, 2024 and Sunday 14<sup>th</sup> April, 2024.

Monitoring results have been provided with reference to the Noise and Vibration Management Levels established within the *Early Works Construction Noise and Vibration Management Plan*, prepared by this office, or as they have been updated throughout the construction process, specifically pertaining to the recommendations of the *Baseline Monitoring Results* and *Construction Noise and Vibration Monitoring Report 1*, both also prepared by this office (Ref: 20230239.9/0610A/R1/LA, 20230239.17/0412A/R1/LA and 20230239.17/2301A/R0/LA).

Noise monitoring results have been provided within Appendix A, whilst vibration monitoring results have been provided throughout Appendix B of this letter.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,



Acoustic Logic Pty Ltd  
Lachlan Abood

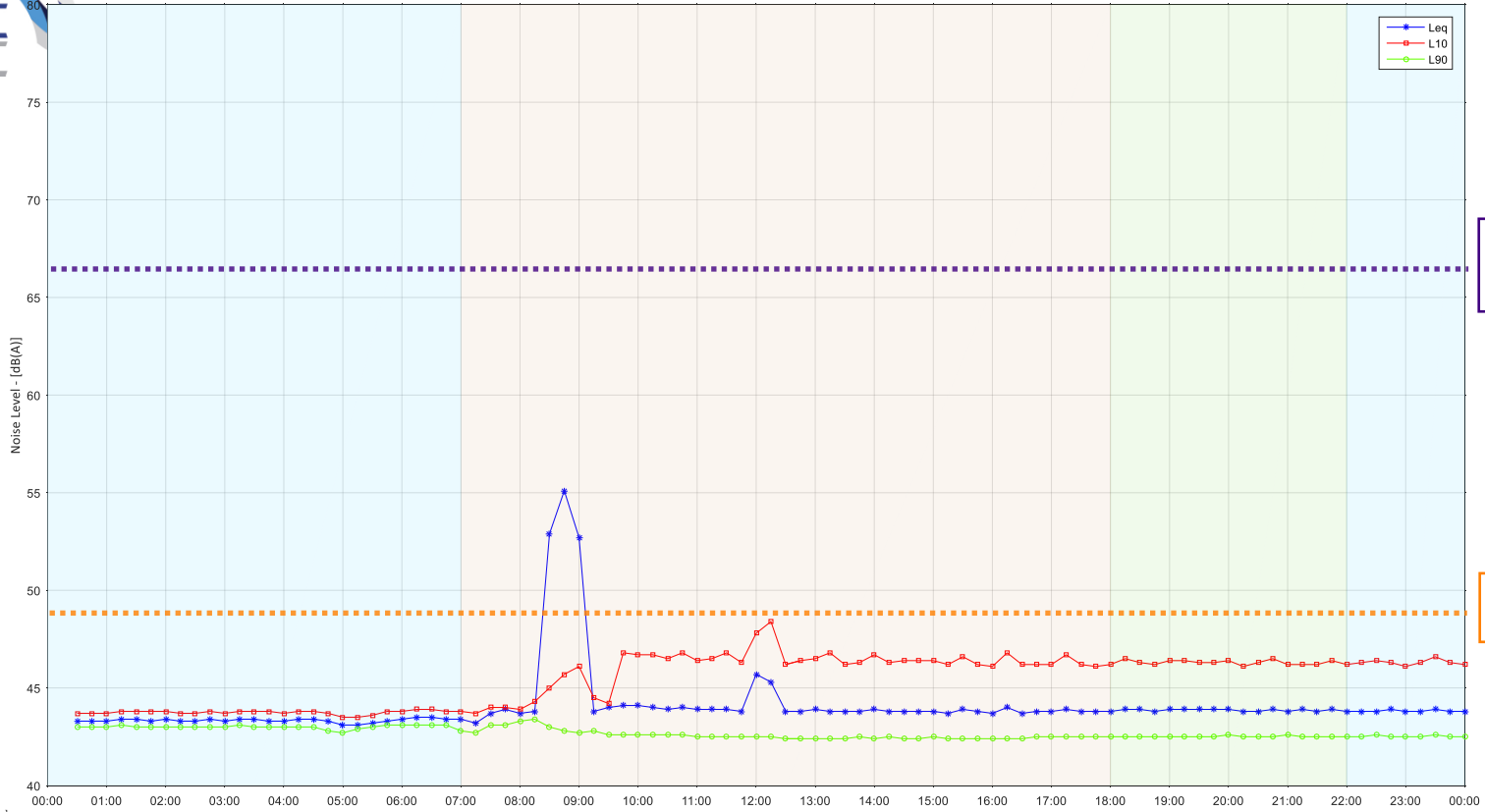


## **APPENDIX A – NOISE MONITORING RESULTS**

### **CENTENARY INSTITUTE – LEVEL 4 SURGERY ROOM (SOUTHERN FAÇADE)**



### Centenary Institute - L4 Surgery Room: Monday 01 April, 2024



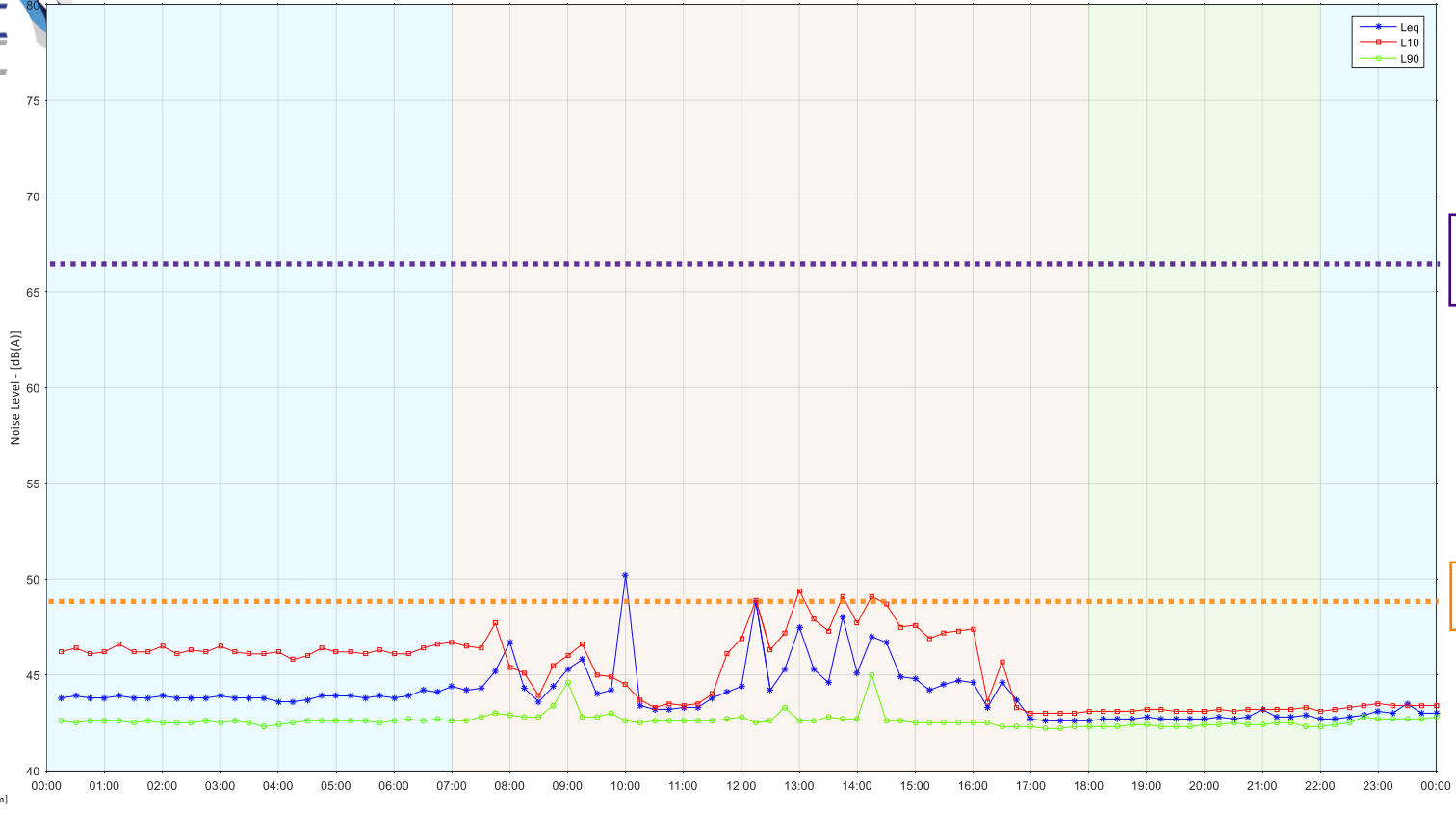
Animal Housing / Breeding / Observation Room NML  $\leq 62\text{dB(A)}L_{\text{eq}}$

Animal Operating Room NML  $\leq 48\text{dB(A)}L_{\text{eq}}$

- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

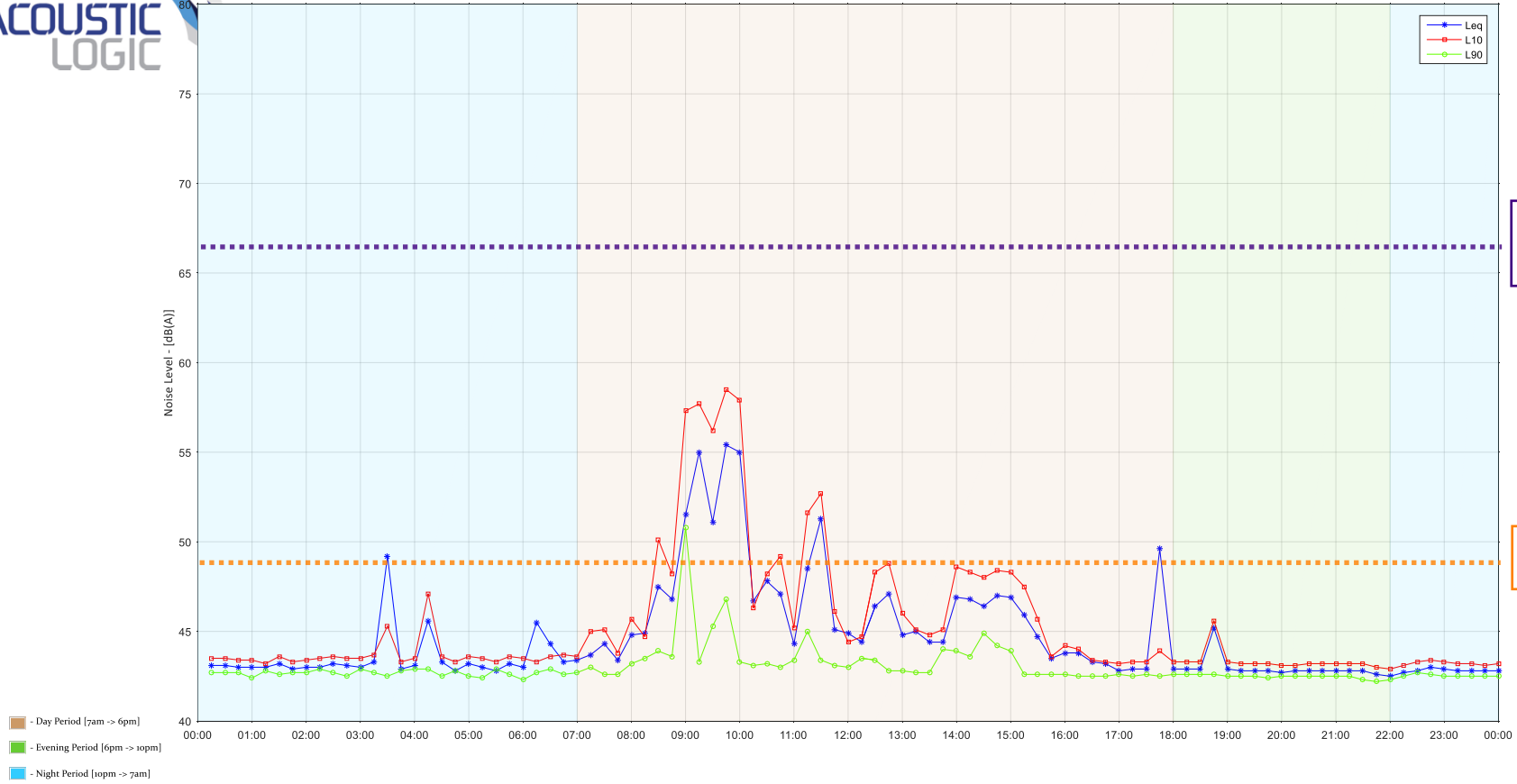


### Centenary Institute - L4 Surgery Room: Tuesday 02 April, 2024





### Centenary Institute - L4 Surgery Room: Wednesday 03 April, 2024

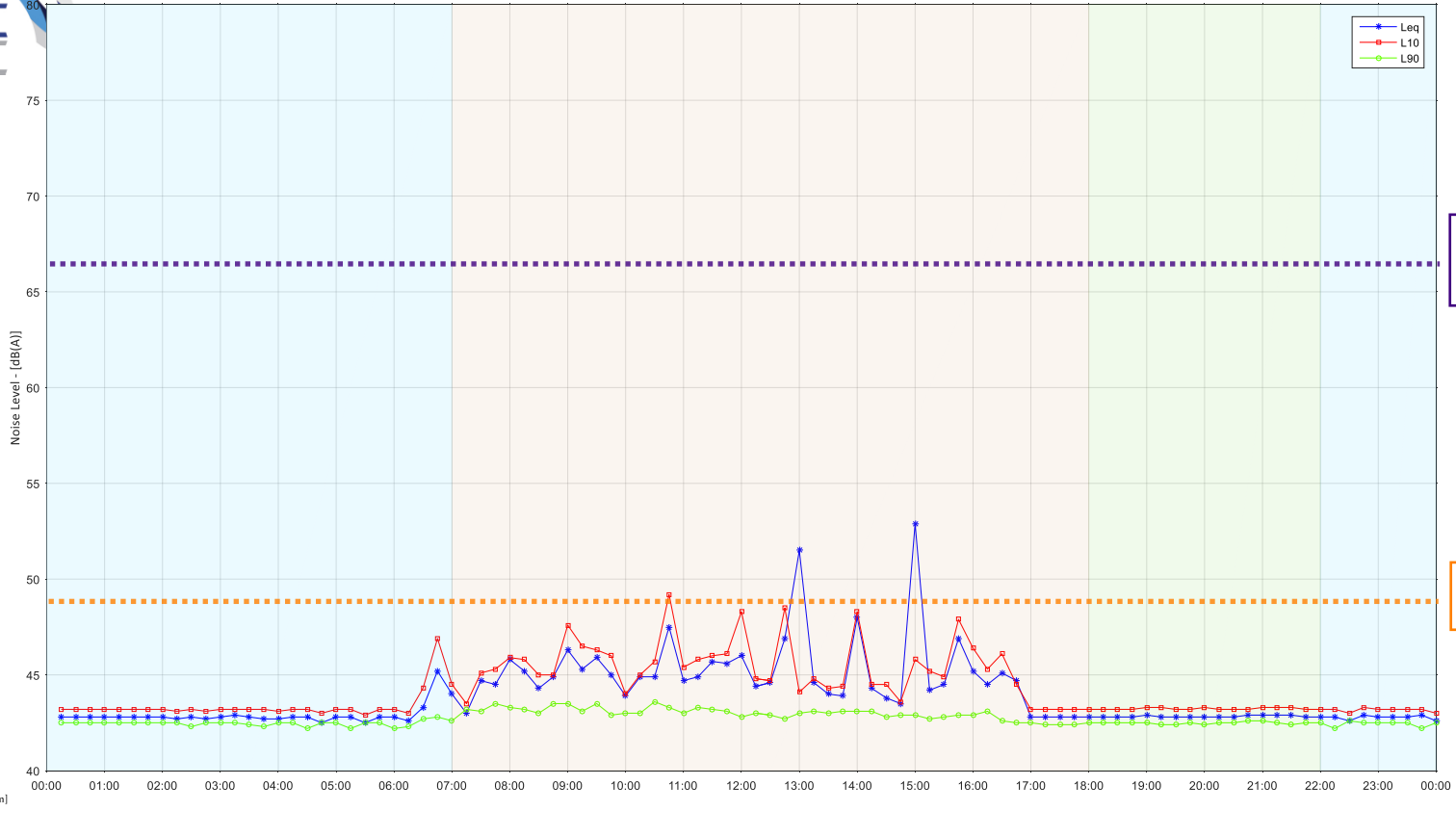


**Animal Housing / Breeding / Observation Room NML**  
**≤ 62dB(A)<sub>L<sub>eq</sub></sub>**

**Animal Operating Room NML**  
**≤ 48dB(A)<sub>L<sub>eq</sub></sub>**



### Centenary Institute - L4 Surgery Room: Thursday 04 April, 2024

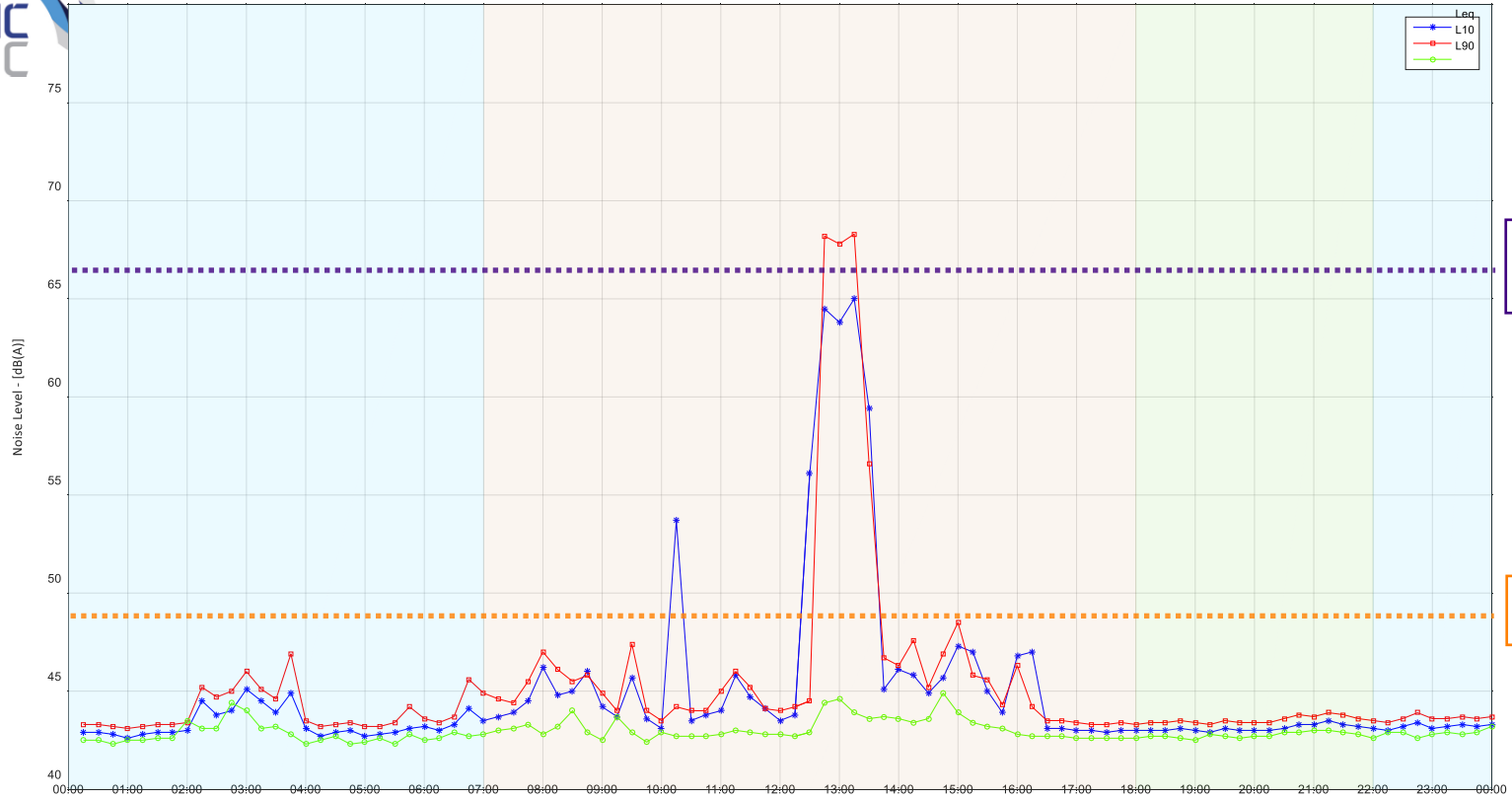


**Animal Housing / Breeding / Observation Room NML**  
**≤ 62dB(A)L<sub>eq</sub>**

**Animal Operating Room NML**  
**≤ 48dB(A)L<sub>eq</sub>**



### Centenary Institute - L4 Surgery Room: Friday 05 April, 2024



Animal Housing / Breeding /  
Observation Room NML  
 $\leq 62\text{dB(A)}L_{\text{eq}}$

Animal Operating Room NML  
 $\leq 48\text{dB(A)}L_{\text{eq}}$





### Centenary Institute - L4 Surgery Room: Saturday 06 April, 2024

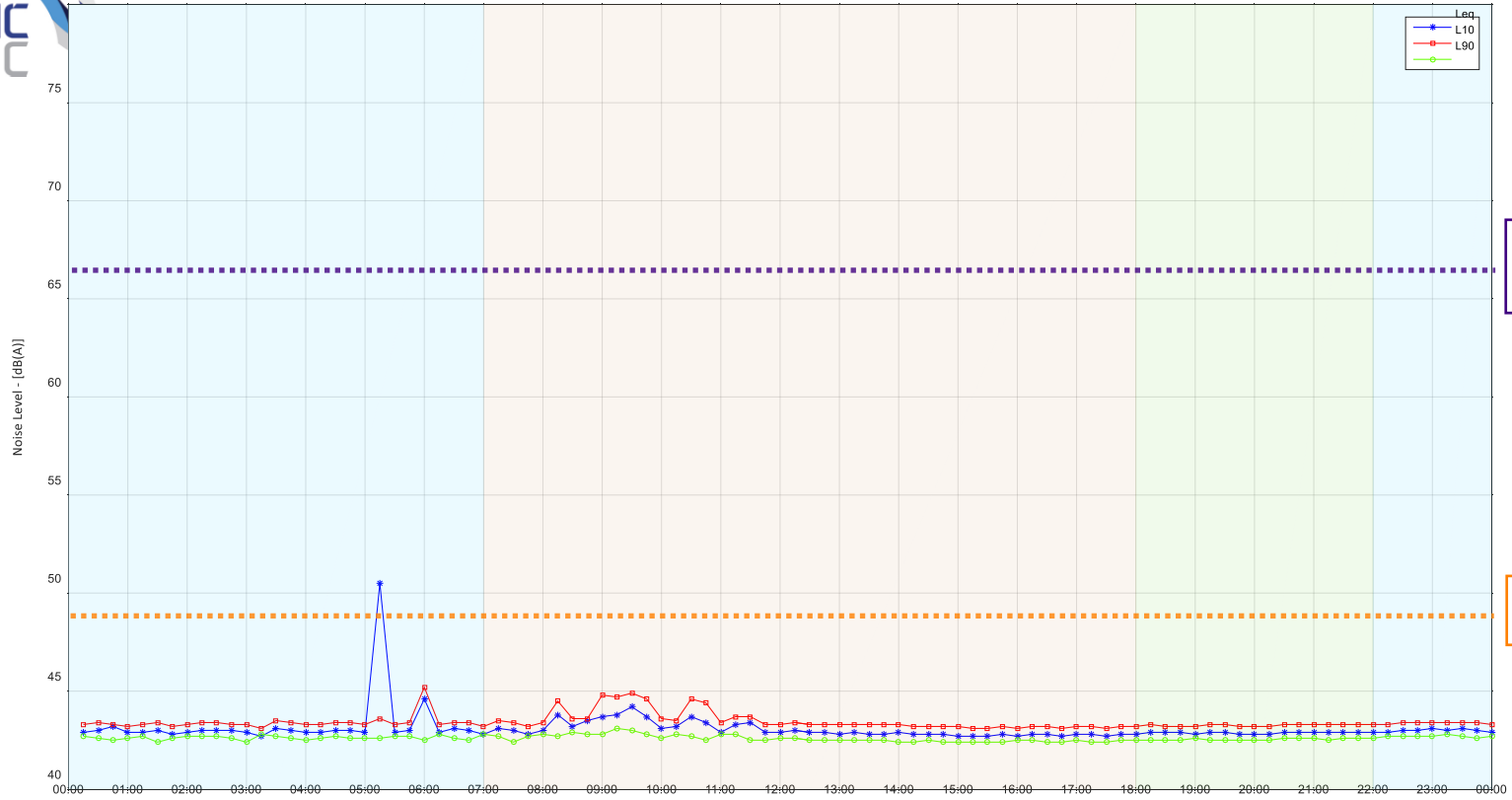


**Animal Housing / Breeding / Observation Room NML**  
**≤ 62dB(A)<sub>L<sub>eq</sub></sub>**

**Animal Operating Room NML**  
**≤ 48dB(A)<sub>L<sub>eq</sub></sub>**



### Centenary Institute - L4 Surgery Room: Sunday 07 April, 2024



Animal Housing / Breeding / Observation Room NML  $\leq 62\text{dB(A)}L_{\text{eq}}$

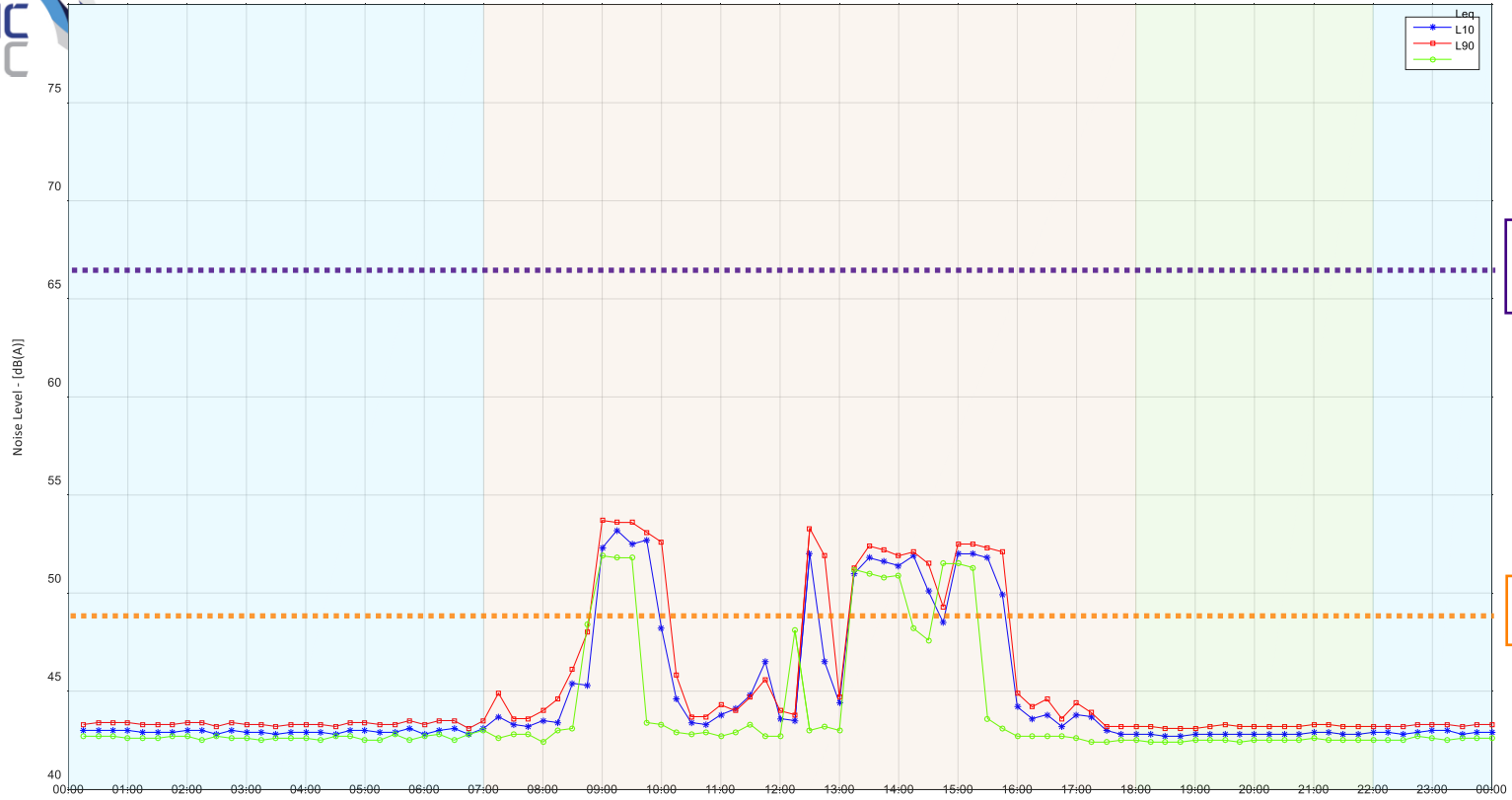
Animal Operating Room NML  $\leq 48\text{dB(A)}L_{\text{eq}}$







### Centenary Institute - L4 Surgery Room: Monday 08 April, 2024



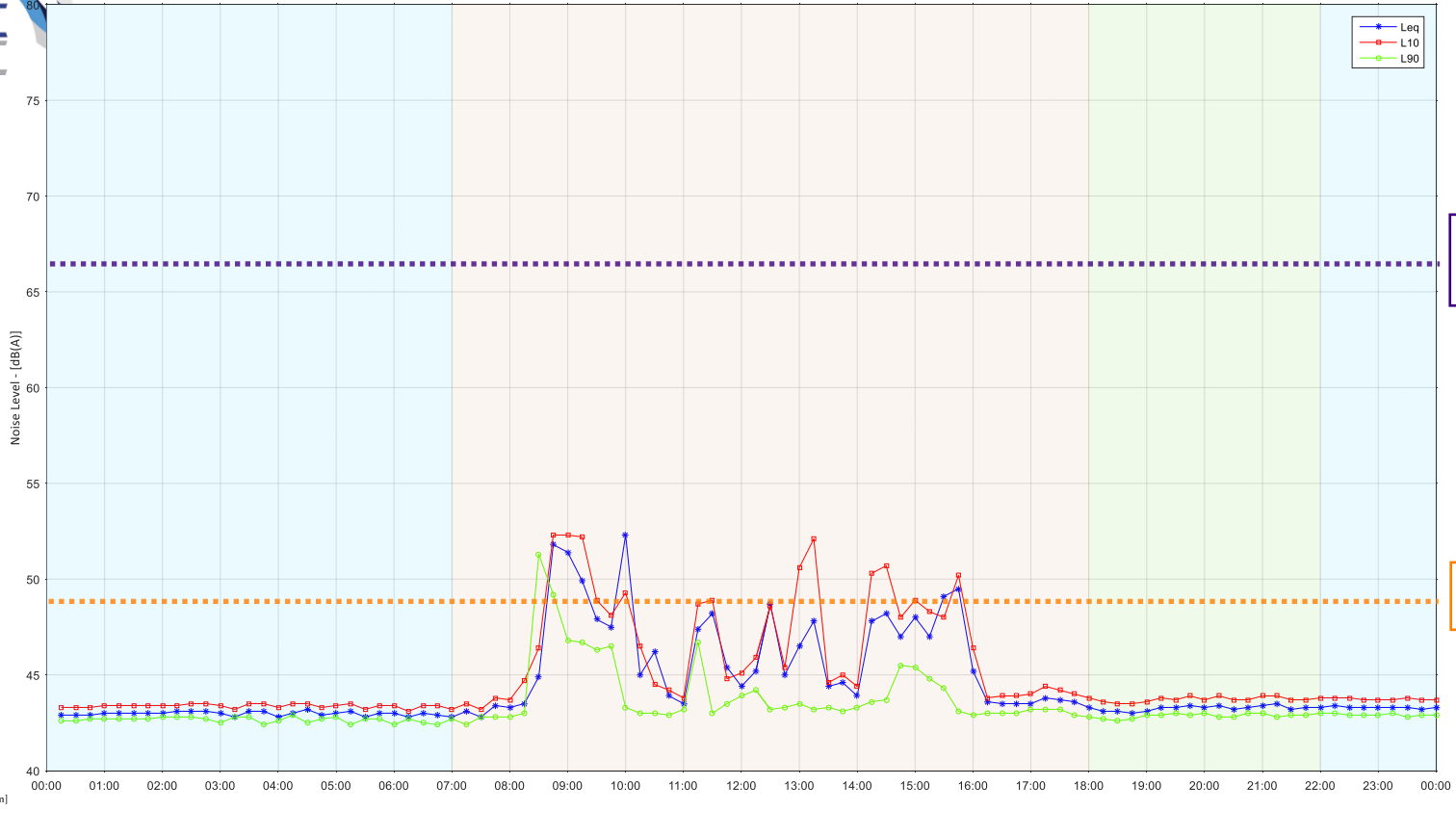
Animal Housing / Breeding / Observation Room NML  $\leq 62\text{dB(A)}L_{\text{eq}}$

Animal Operating Room NML  $\leq 48\text{dB(A)}L_{\text{eq}}$





### Centenary Institute - L4 Surgery Room: Tuesday 09 April, 2024

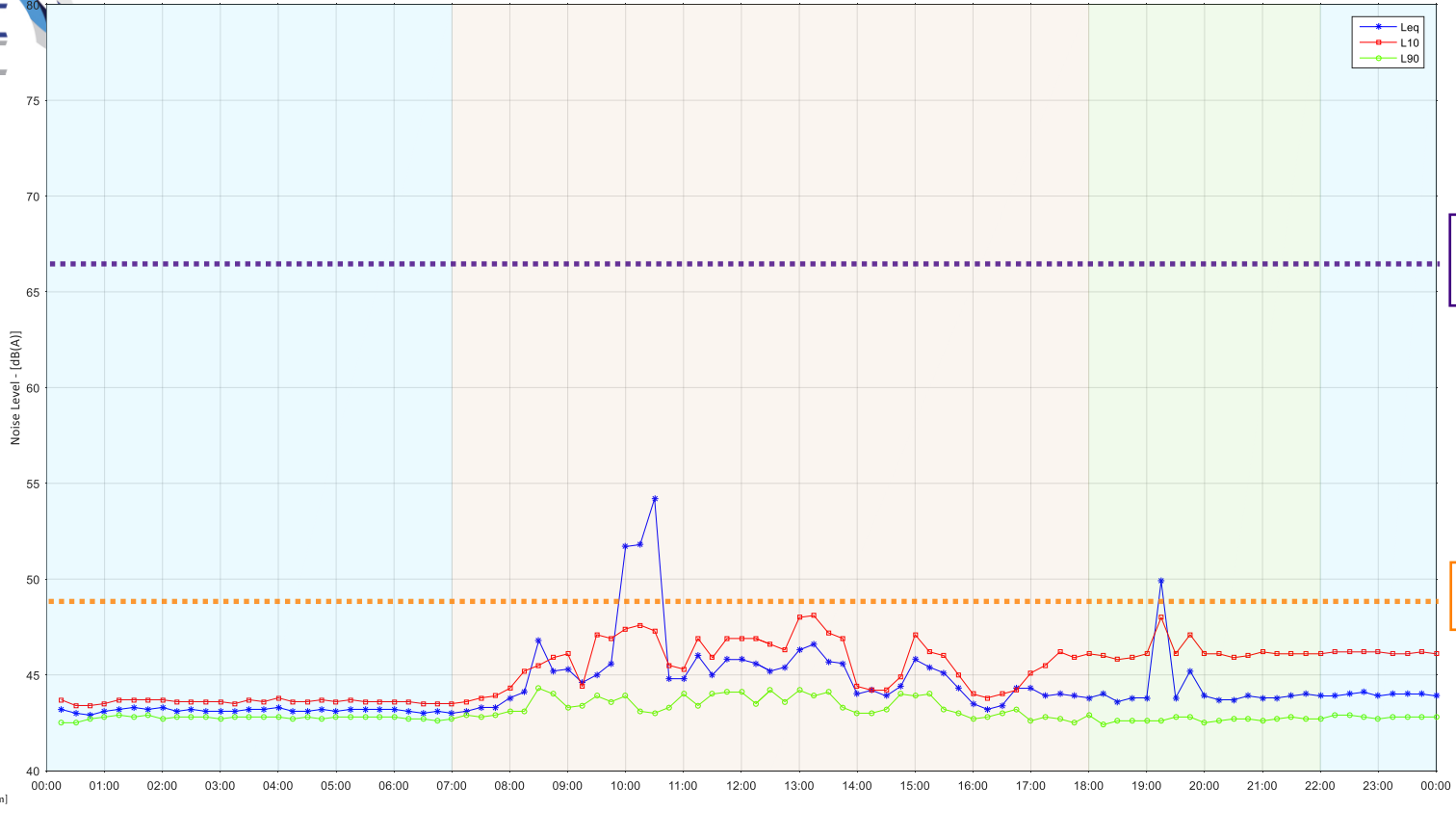


Animal Housing / Breeding / Observation Room NML  $\leq 62\text{dB(A)}L_{\text{eq}}$

Animal Operating Room NML  $\leq 48\text{dB(A)}L_{\text{eq}}$



### Centenary Institute - L4 Surgery Room: Wednesday 10 April, 2024

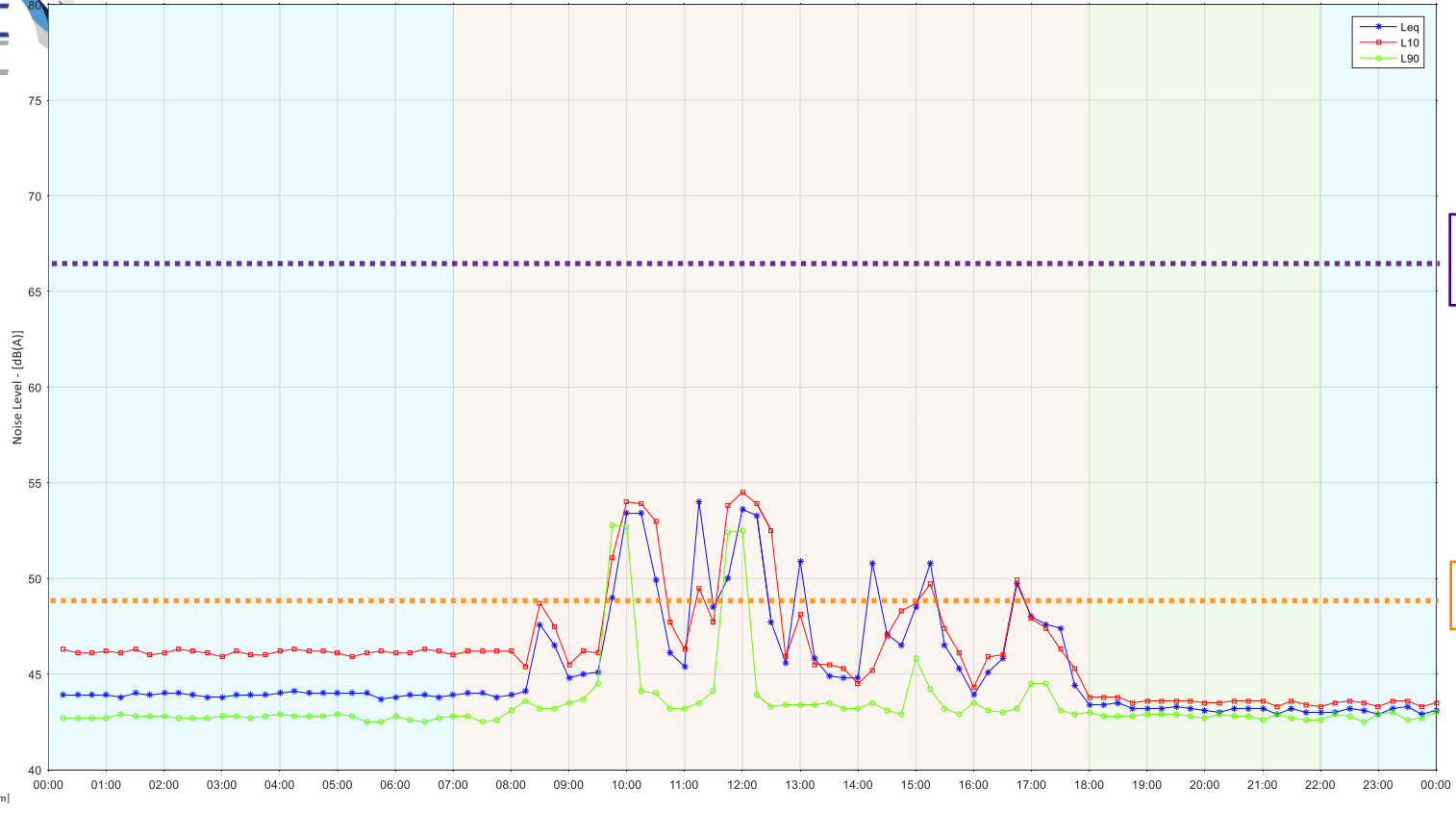


Animal Housing / Breeding /  
Observation Room NML  
≤ 62dB(A)<sub>L<sub>eq</sub></sub>

Animal Operating Room NML  
≤ 48dB(A)<sub>L<sub>eq</sub></sub>



### Centenary Institute - L4 Surgery Room: Thursday 11 April, 2024

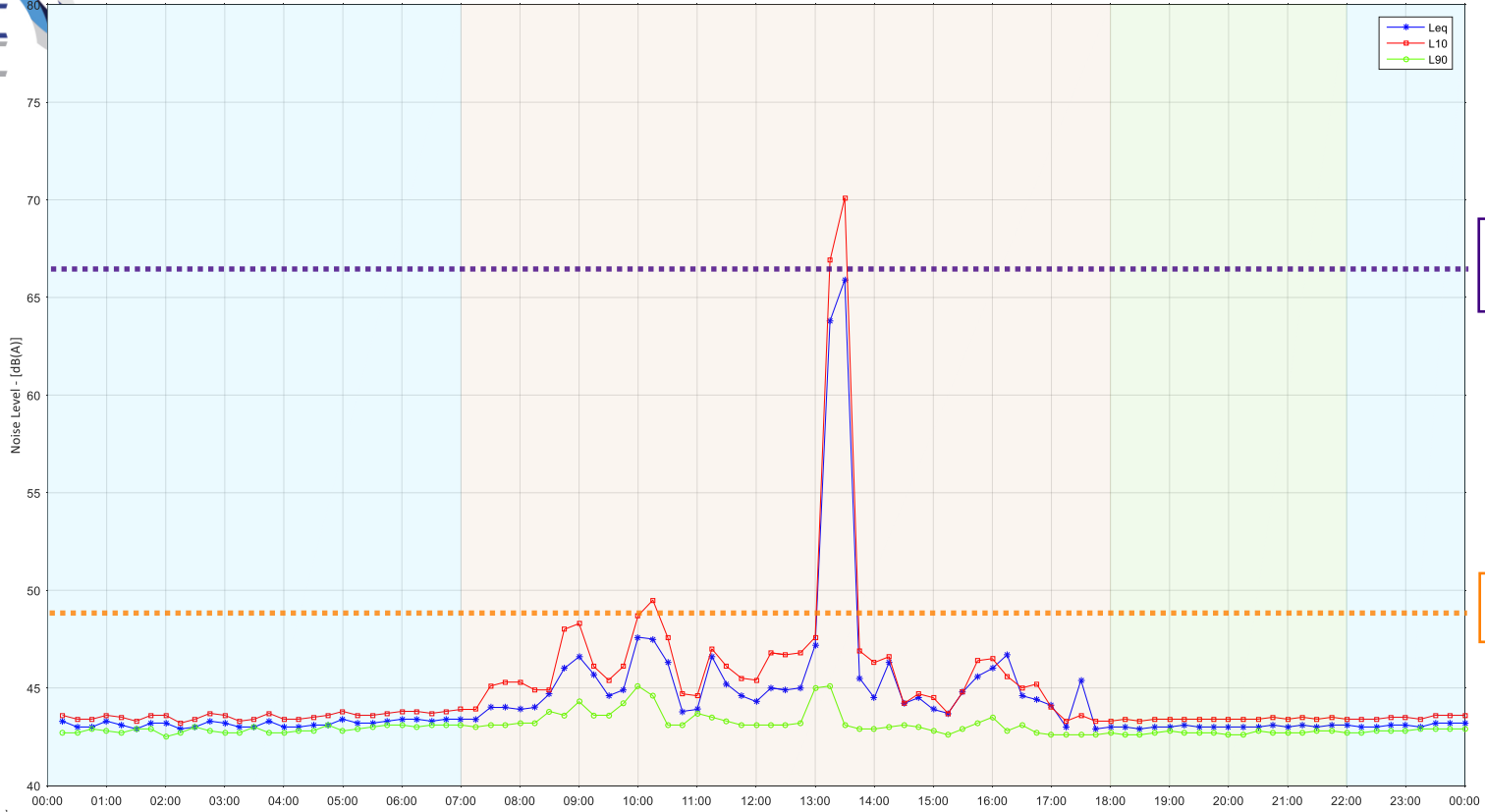


**Animal Housing / Breeding / Observation Room NML**  
**≤ 62dB(A)<sub>L<sub>eq</sub></sub>**

**Animal Operating Room NML**  
**≤ 48dB(A)<sub>L<sub>eq</sub></sub>**



### Centenary Institute - L4 Surgery Room: Friday 12 April, 2024



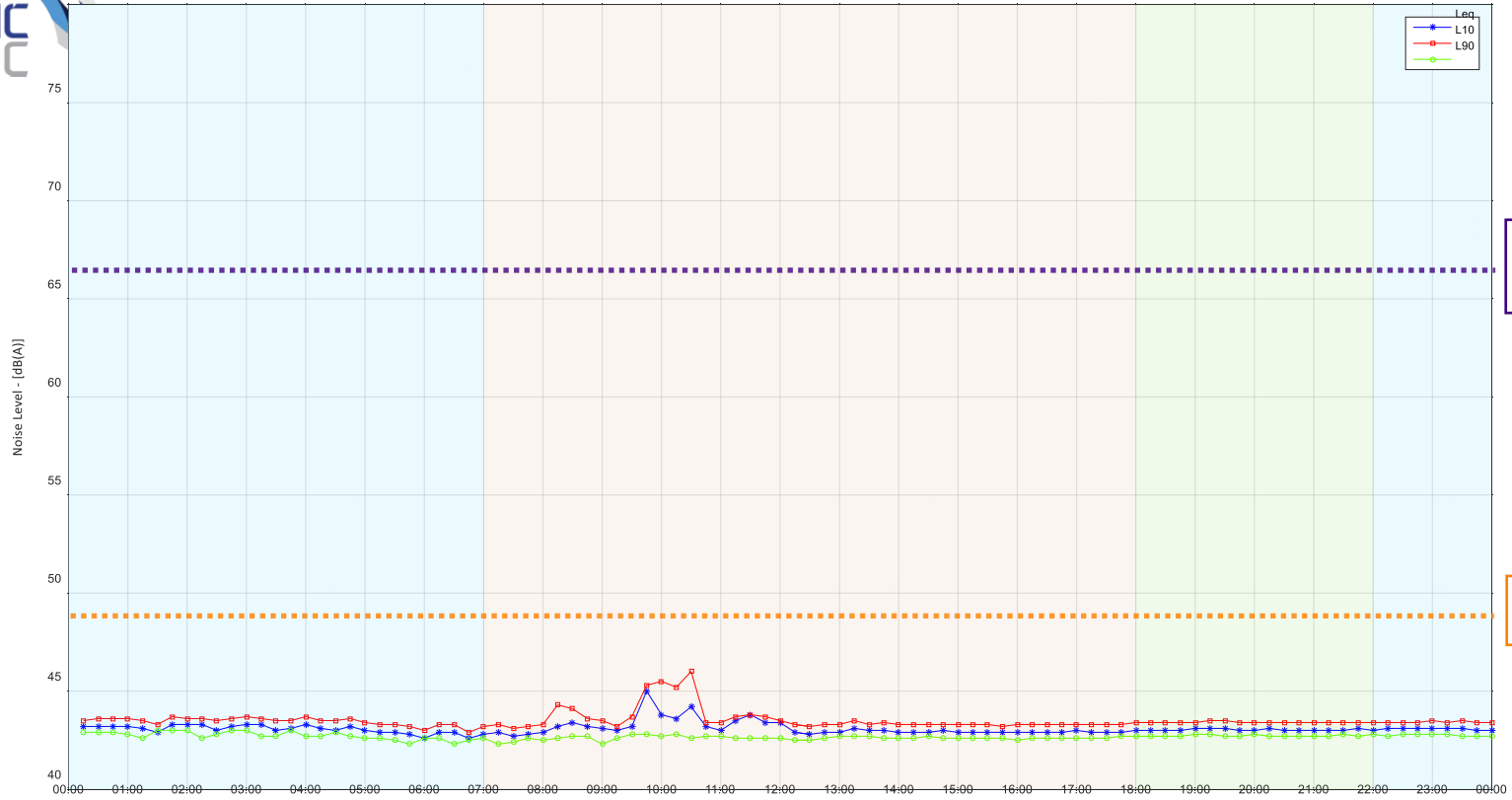
**Animal Housing / Breeding / Observation Room NML**  
 $\leq 62\text{dB(A)}L_{\text{eq}}$

**Animal Operating Room NML**  
 $\leq 48\text{dB(A)}L_{\text{eq}}$

- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]



### Centenary Institute - L4 Surgery Room: Saturday 13 April, 2024



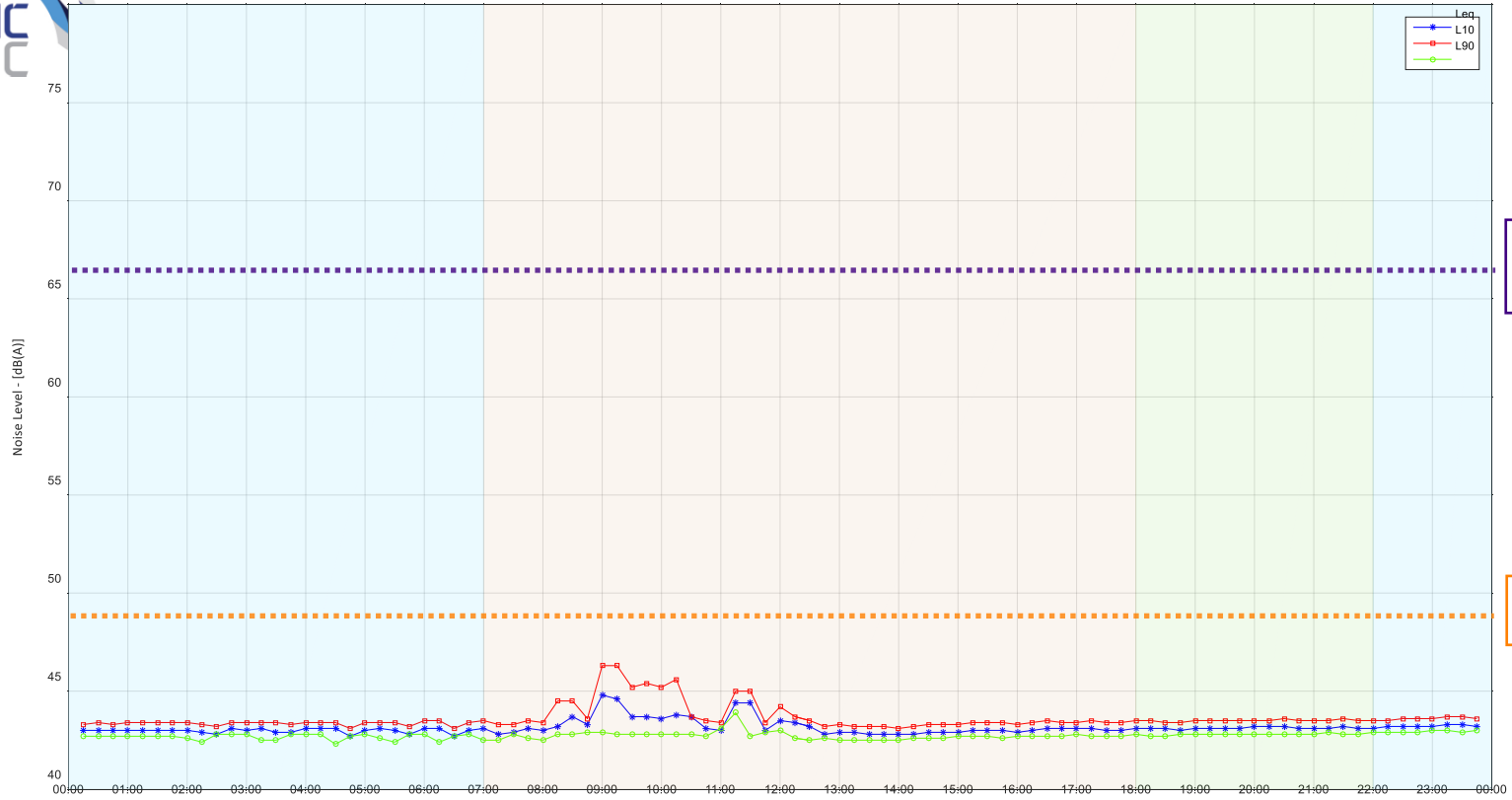
Animal Housing / Breeding /  
Observation Room NML  
 $\leq 62\text{dB(A)}L_{\text{eq}}$

Animal Operating Room NML  
 $\leq 48\text{dB(A)}L_{\text{eq}}$





### Centenary Institute - L4 Surgery Room: Sunday 14 April, 2024



**Animal Housing / Breeding / Observation Room NML**  
 $\leq 62\text{dB(A)}L_{\text{eq}}$

**Animal Operating Room NML**  
 $\leq 48\text{dB(A)}L_{\text{eq}}$

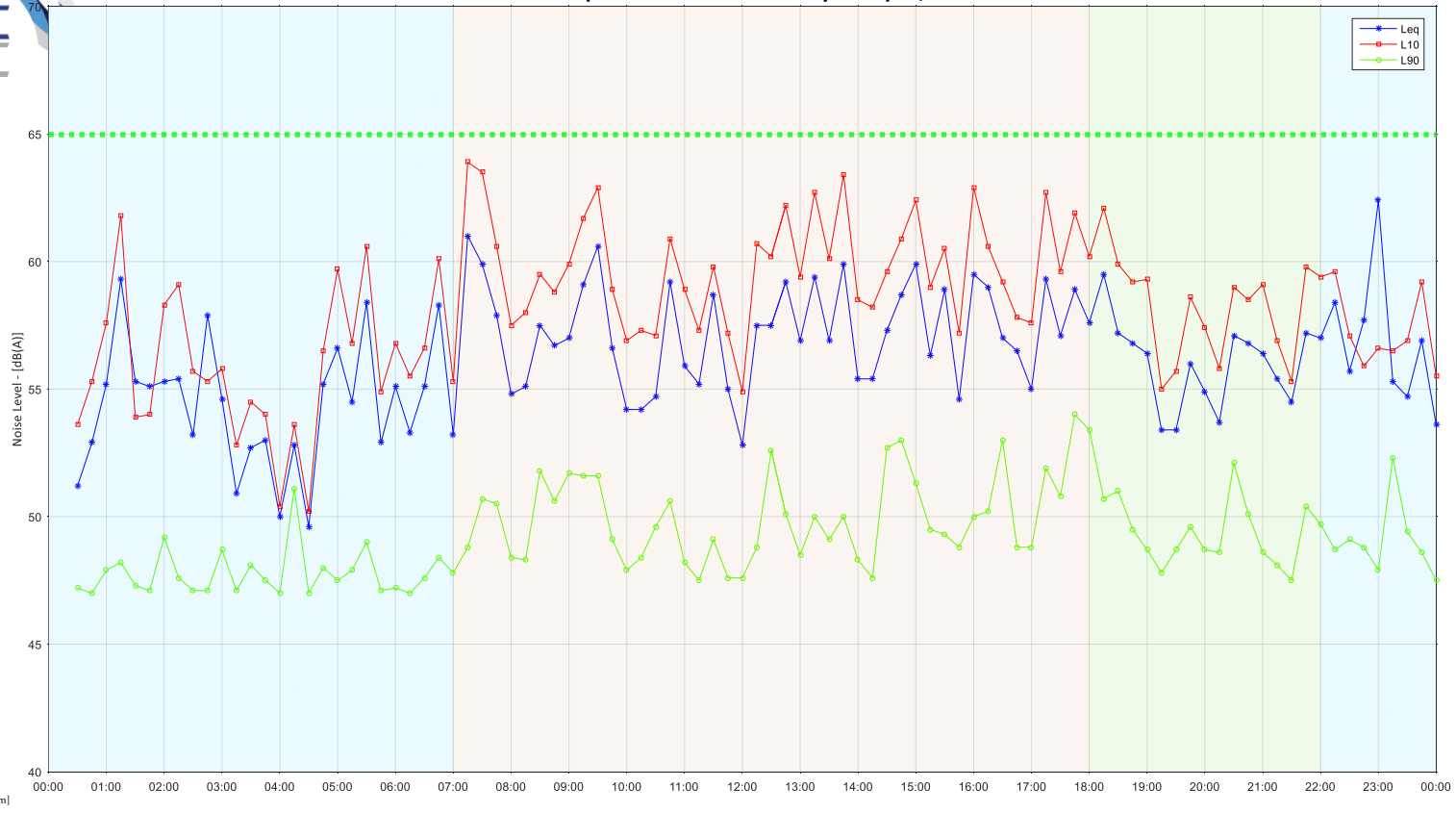


## RPA HOSPITAL MAIN BUILDING – LEVEL 3 NICU





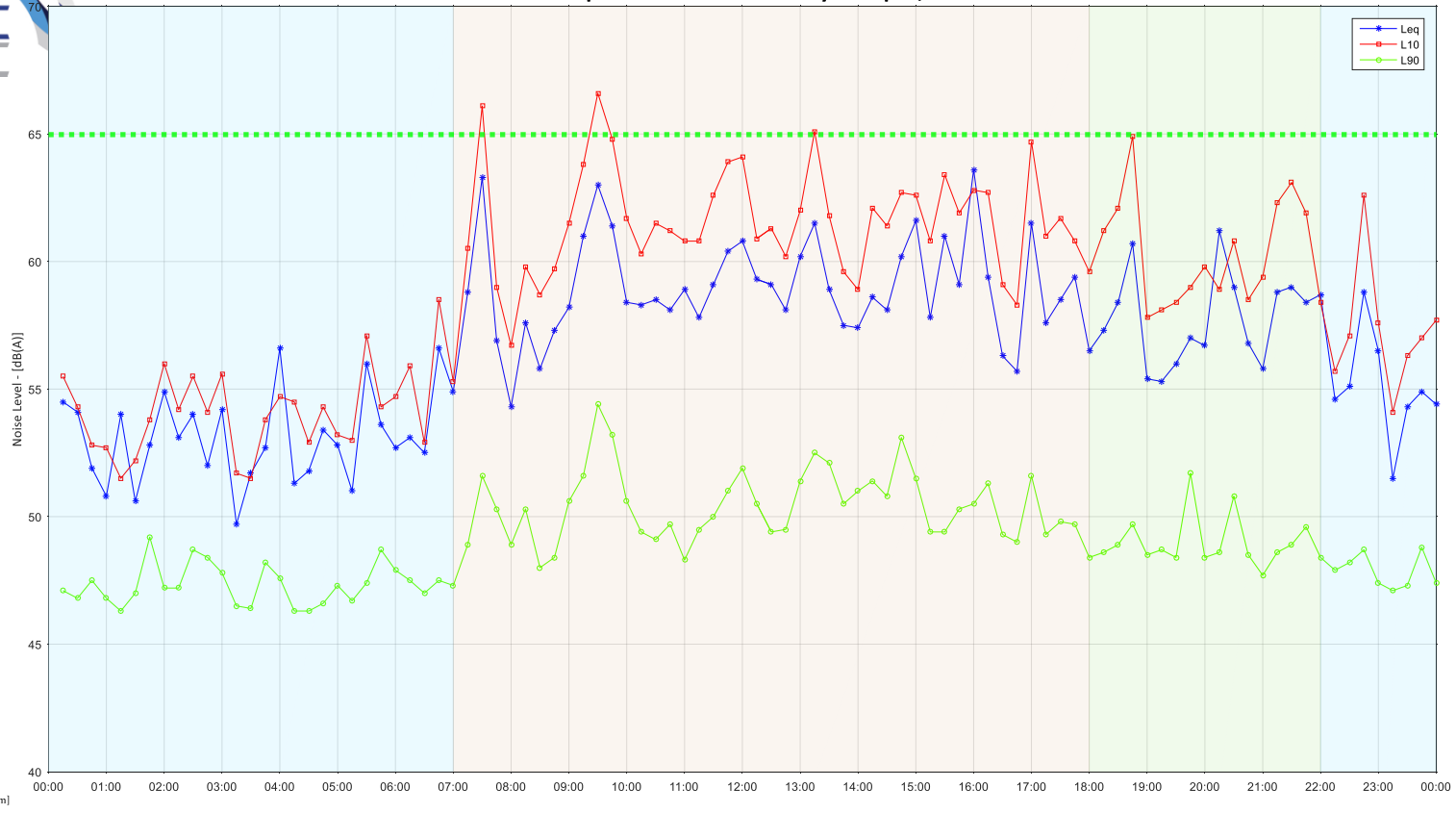
### RPA Hospital - L3 NICU: Monday 01 April, 2024



**NICU NML**  
**(Including correction)**  
**≤ 65dB(A)<sub>L<sub>50</sub></sub>**



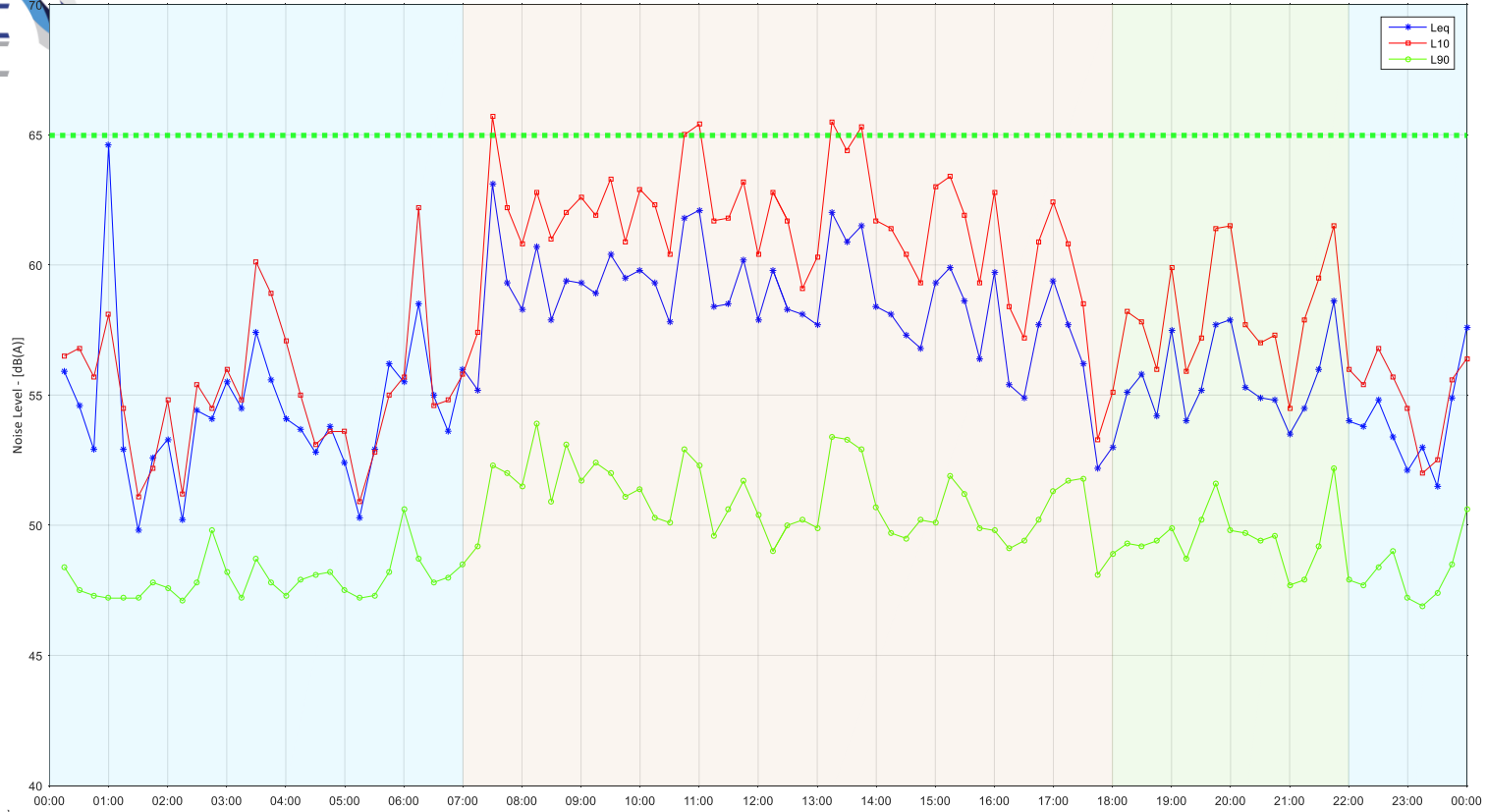
### RPA Hospital - L3 NICU: Tuesday 02 April, 2024



**NICU NML  
(Including correction)  
≤ 65dB(A)<sub>Leq</sub>**



### RPA Hospital - L3 NICU: Wednesday 03 April, 2024

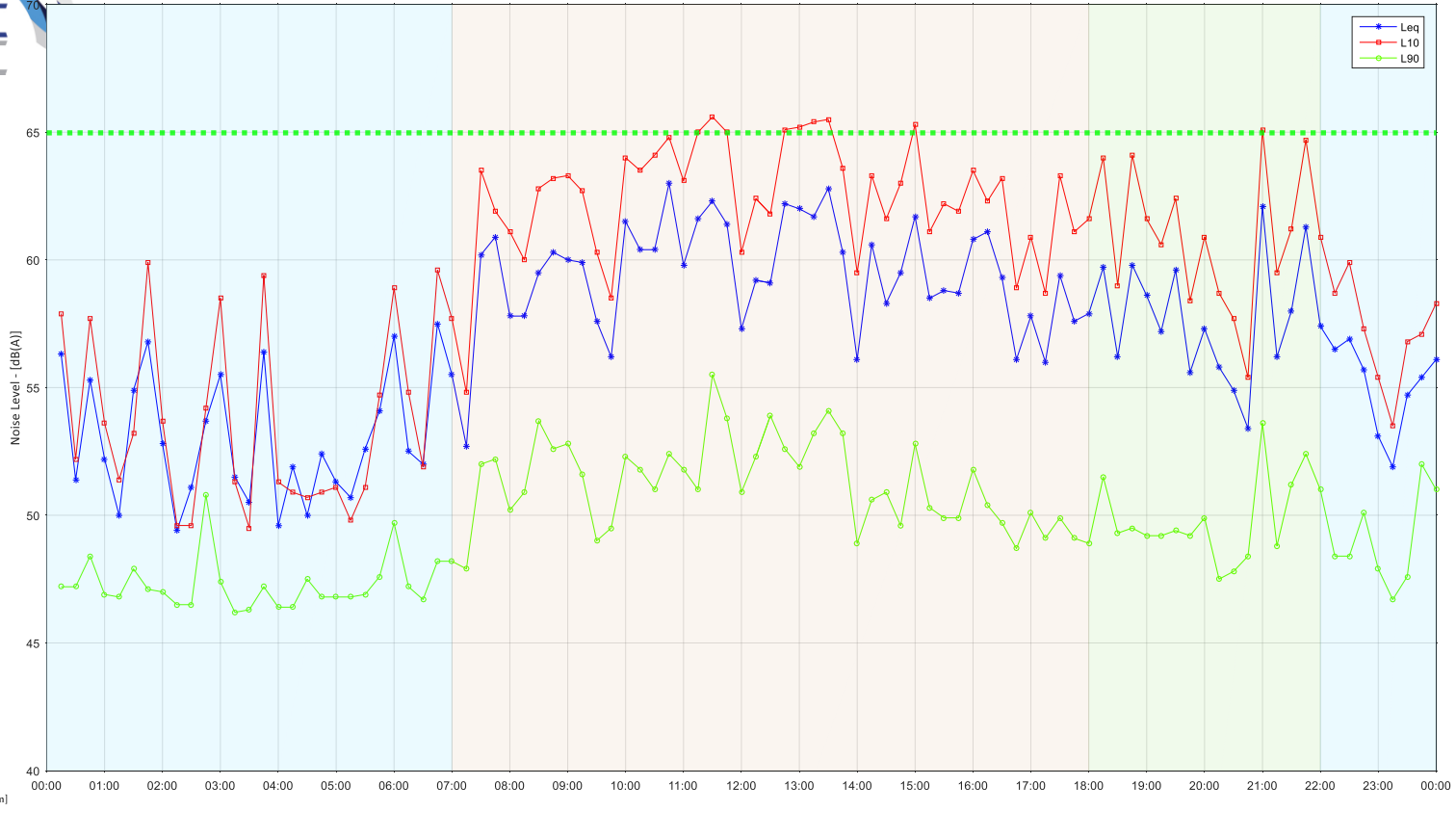


**NICU NML**  
**(Including correction)**  
**≤ 65dB(A)<sub>Leq</sub>**

- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]



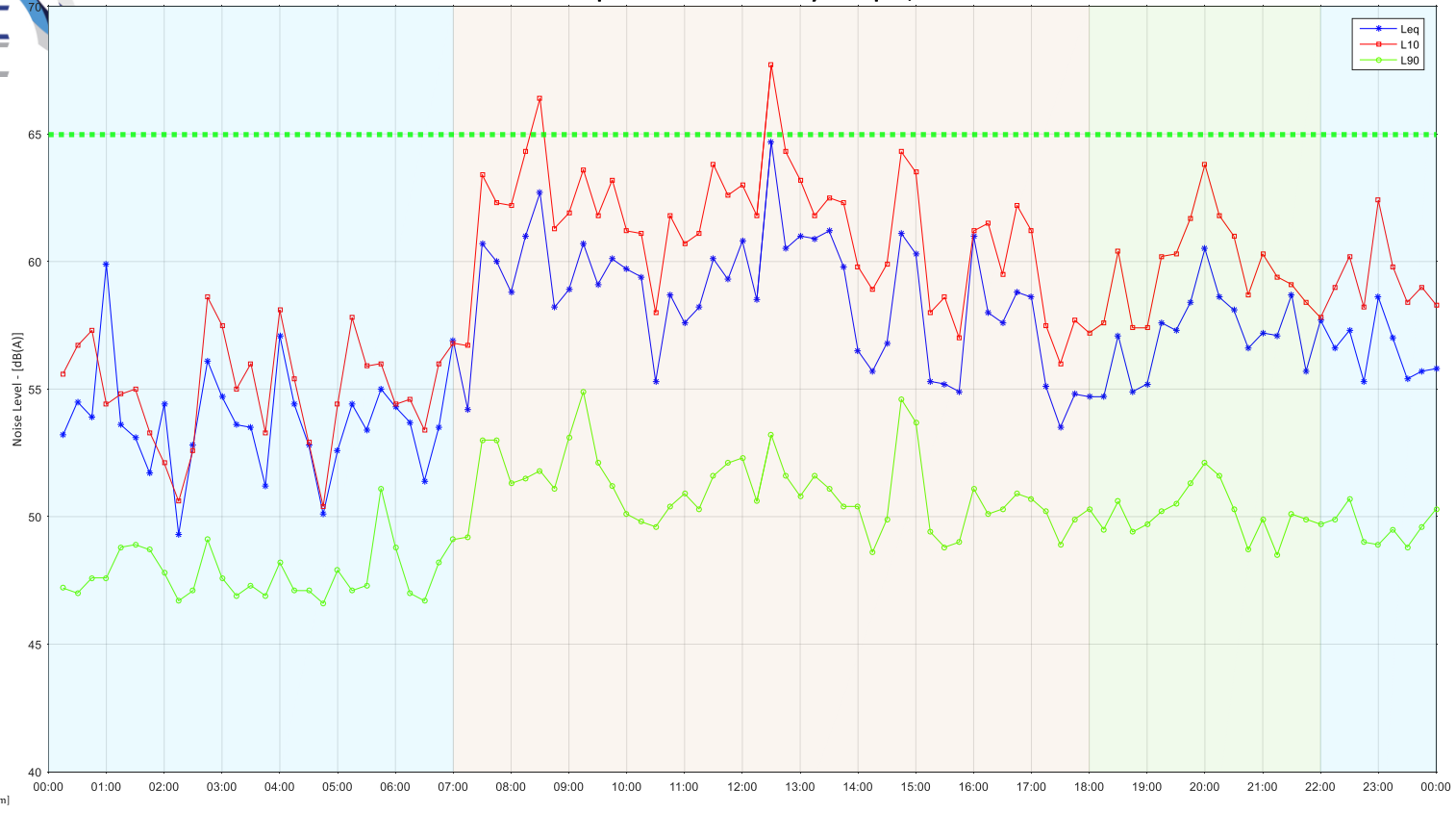
### RPA Hospital - L3 NICU: Thursday 04 April, 2024



**NICU NML**  
**(Including correction)**  
**≤ 65dB(A)<sub>Leq</sub>**



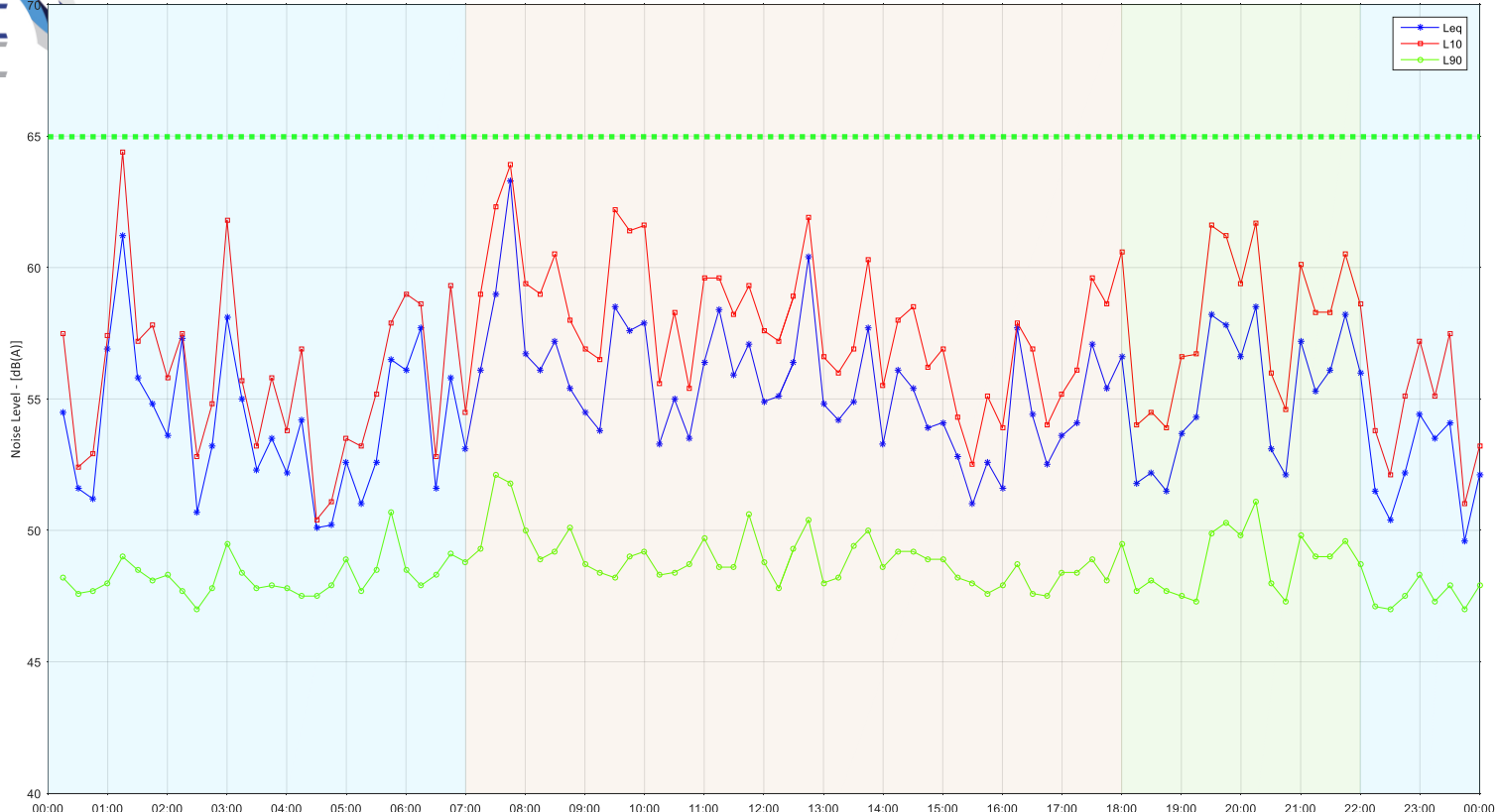
### RPA Hospital - L3 NICU: Friday 05 April, 2024



**NICU NML**  
**(Including correction)**  
**≤ 65dB(A)<sub>Leq</sub>**



### RPA Hospital - L3 NICU: Saturday 06 April, 2024

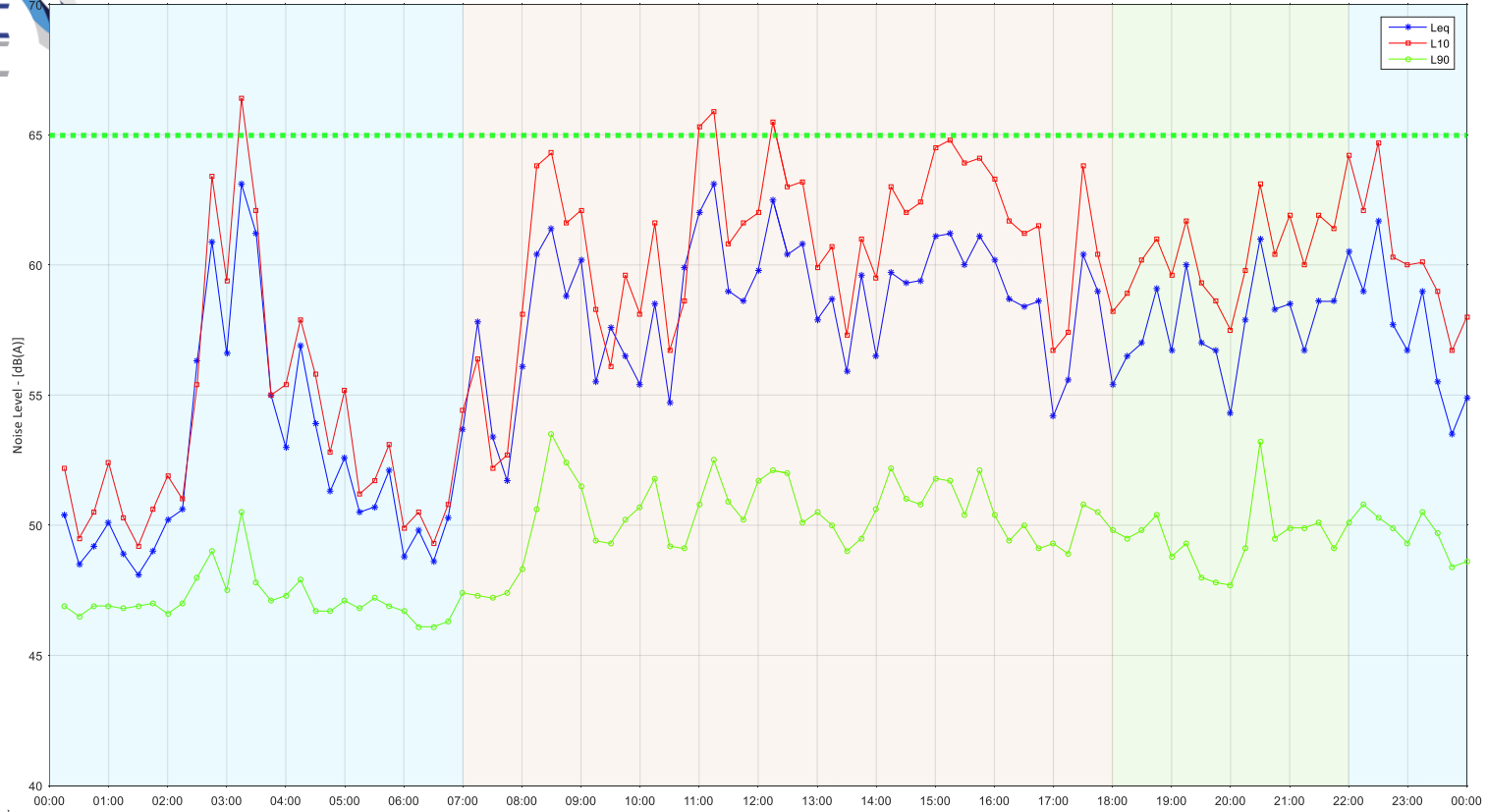


**NICU NML**  
**(Including correction)**  
**≤ 65dB(A)<sub>Leq</sub>**

- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]



### RPA Hospital - L3 NICU: Sunday 07 April, 2024

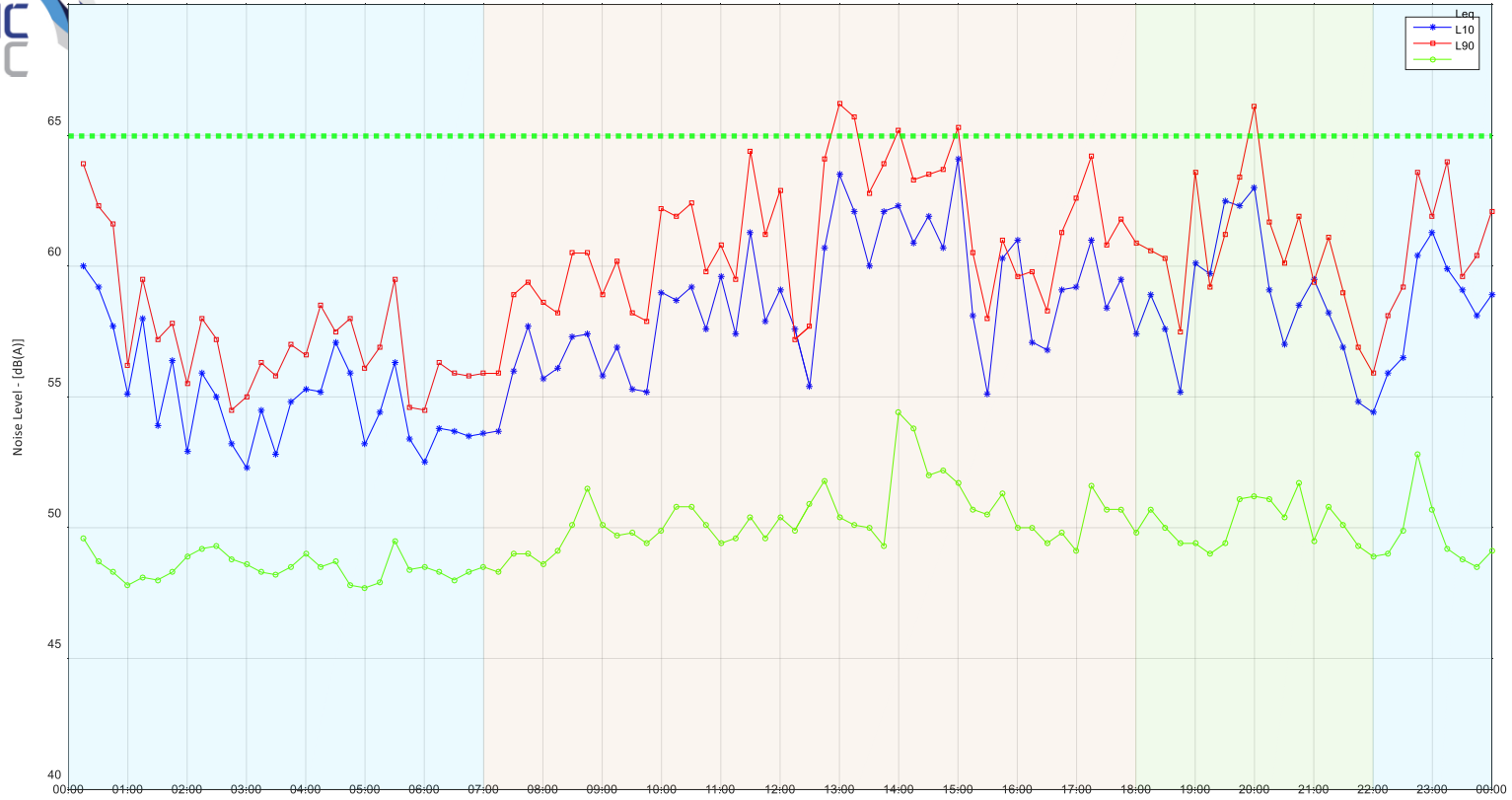


**NICU NML  
(Including correction)  
≤ 65dB(A)<sub>L<sub>50</sub></sub>**

- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]



### RPA Hospital - L3 NICU: Monday 08 April, 2024



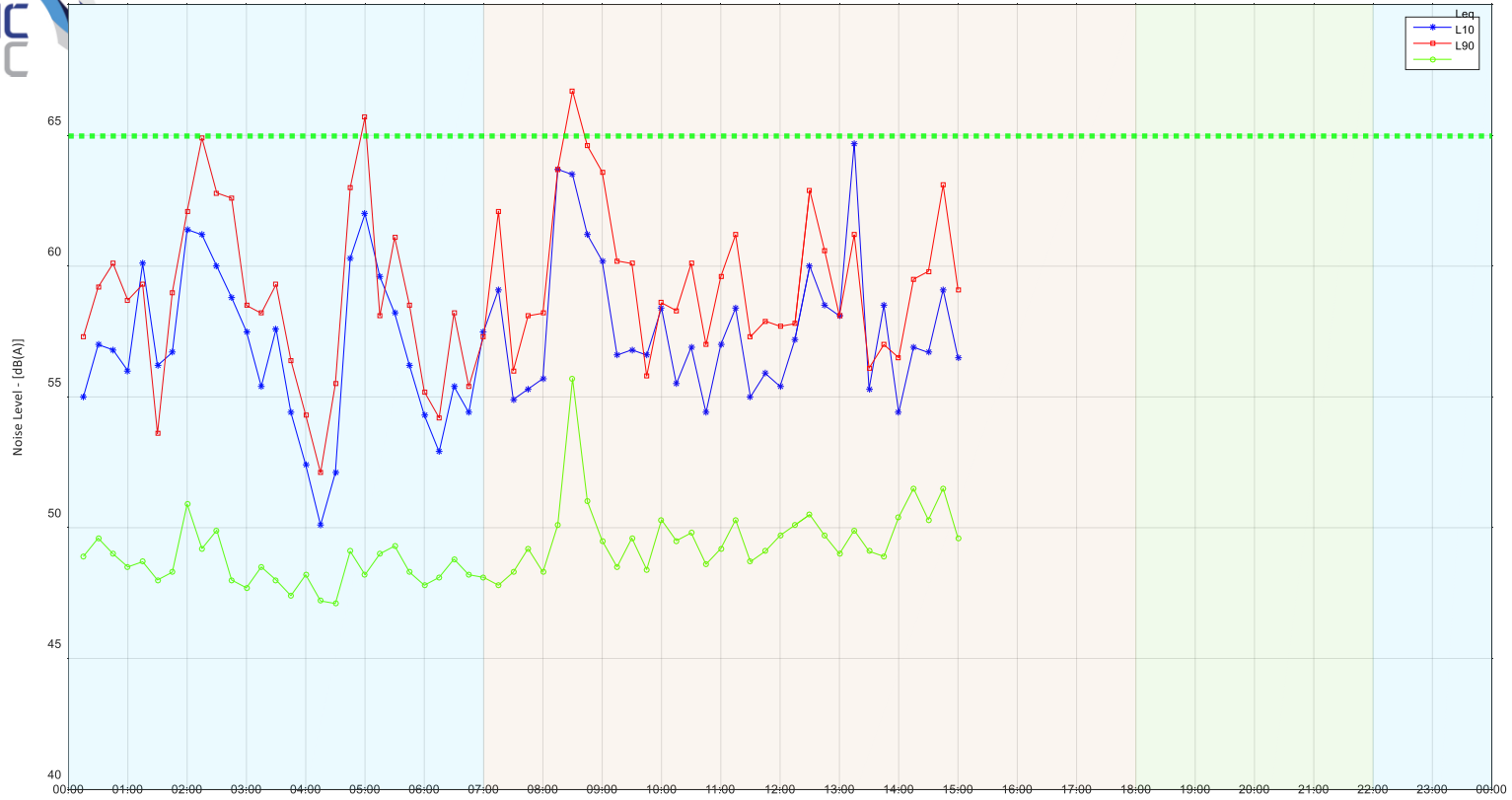
**NICU NML**  
**(Including correction)**  
**≤ 65dB(A)<sub>Leq</sub>**







### RPA Hospital - L3 NICU: Tuesday 09 April, 2024



**NICU NML**  
**(Including correction)**  
**≤ 65dB(A)<sub>Leq</sub>**





### RPA Hospital - L3 NICU: Thursday 11 April, 2024

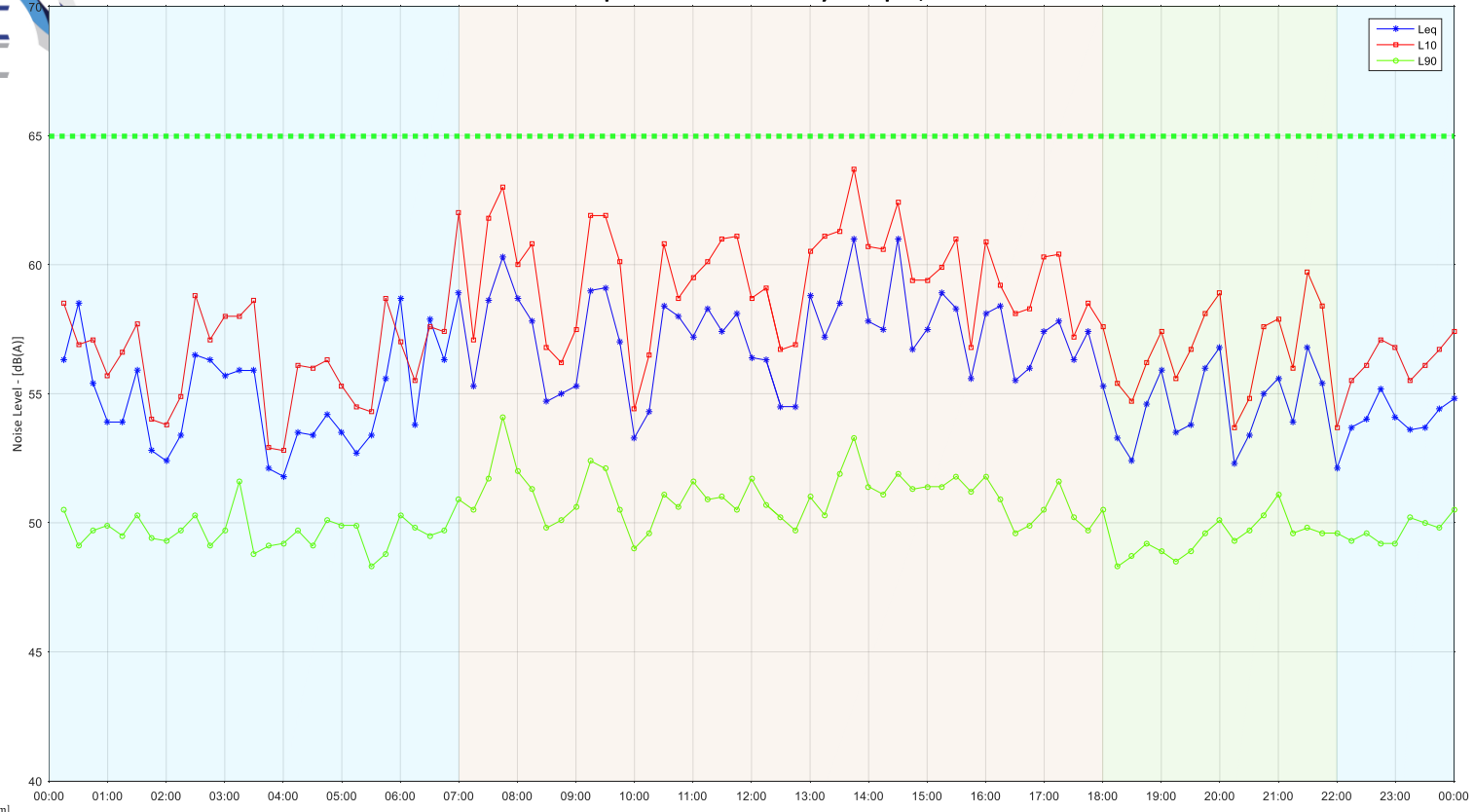


**NICU NML  
(Including correction)  
≤ 65dB(A)<sub>Leq</sub>**





### RPA Hospital - L3 NICU: Friday 12 April, 2024

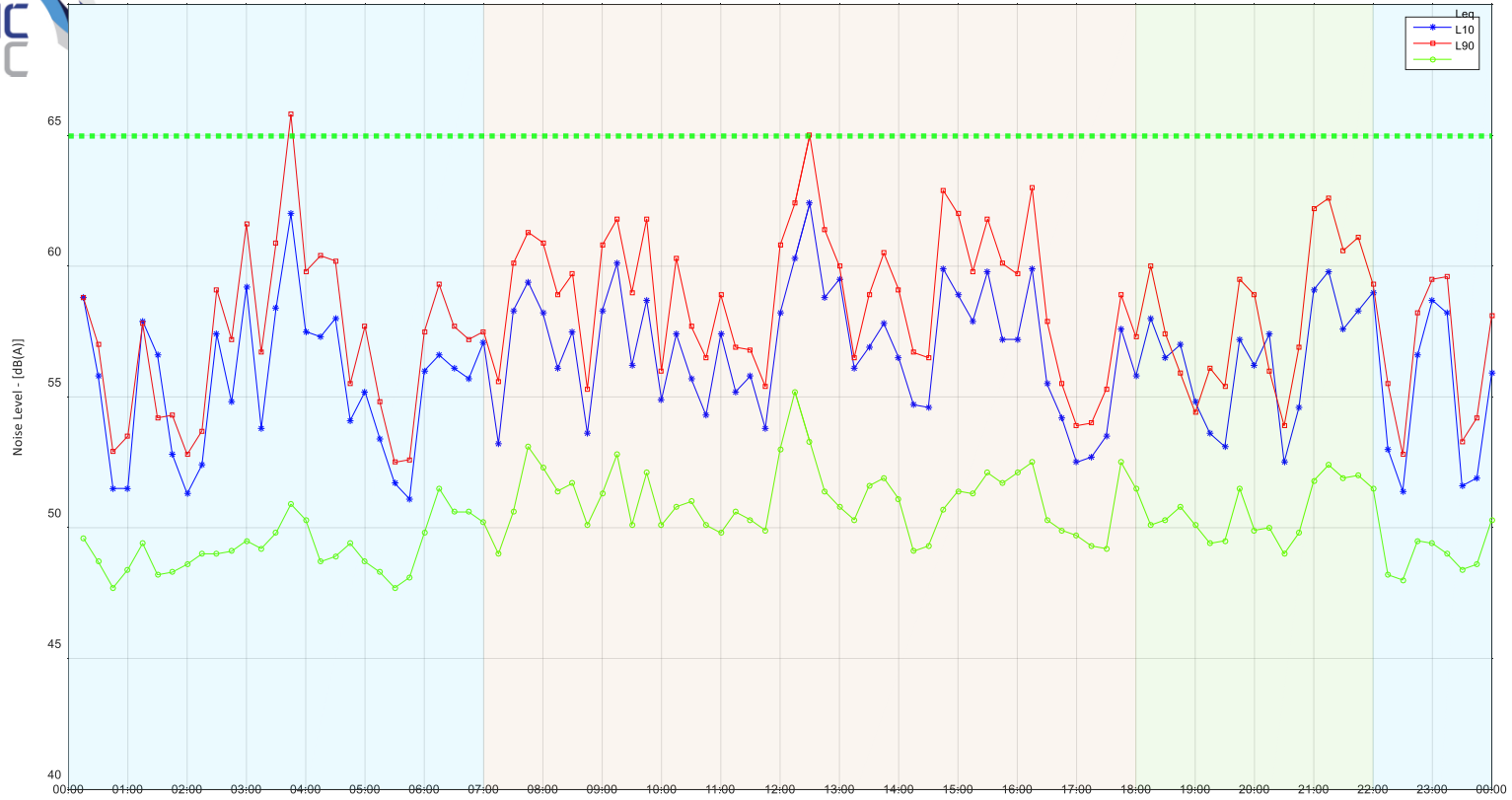


**NICU NML**  
**(Including correction)**  
**≤ 65dB(A)<sub>Leq</sub>**

- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]



### RPA Hospital - L3 NICU: Saturday 13 April, 2024

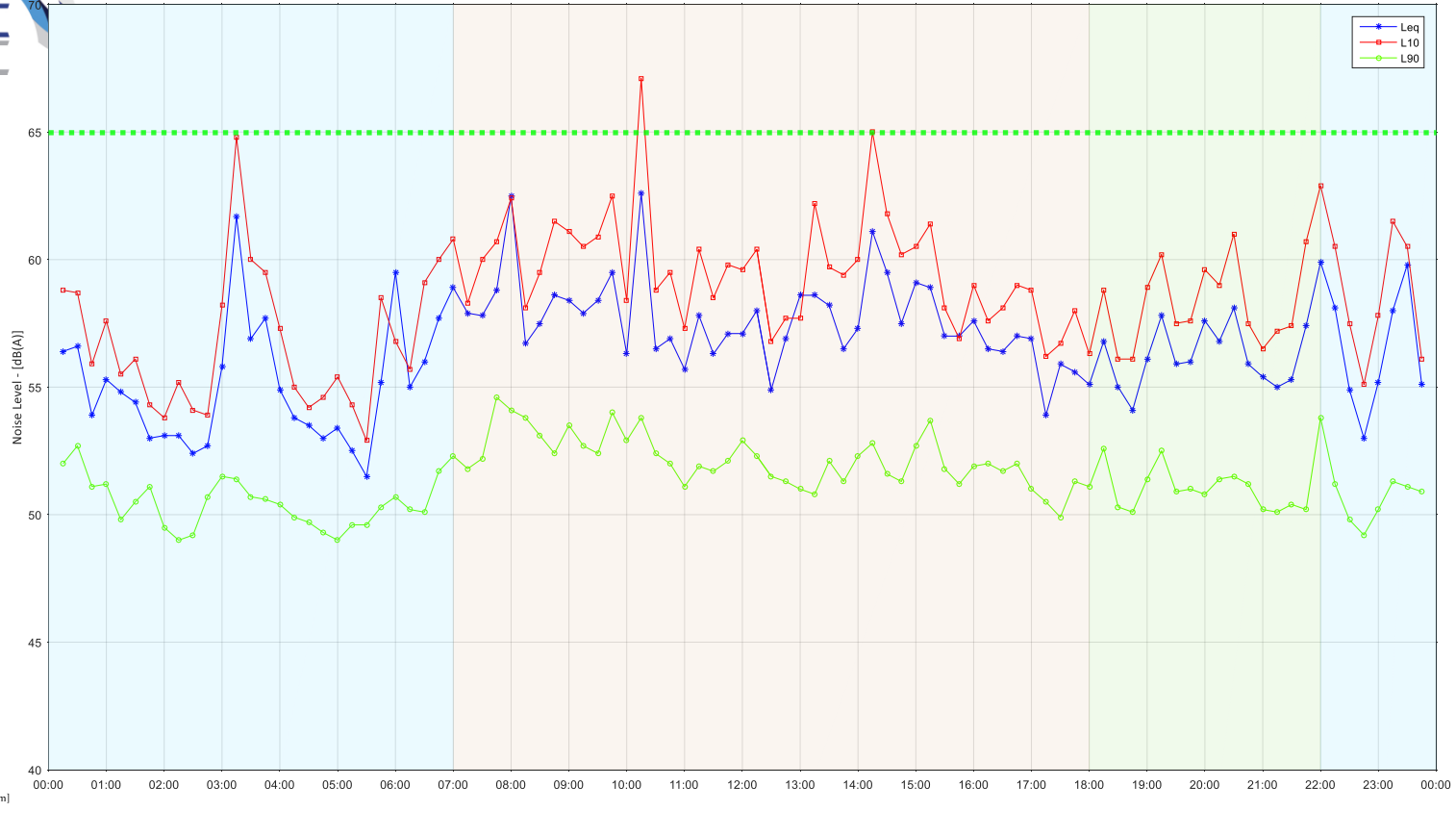


**NICU NML**  
(Including correction)  
 $\leq 65\text{dB(A)}_{L_{eq}}$





### RPA Hospital - L3 NICU: Sunday 14 April, 2024

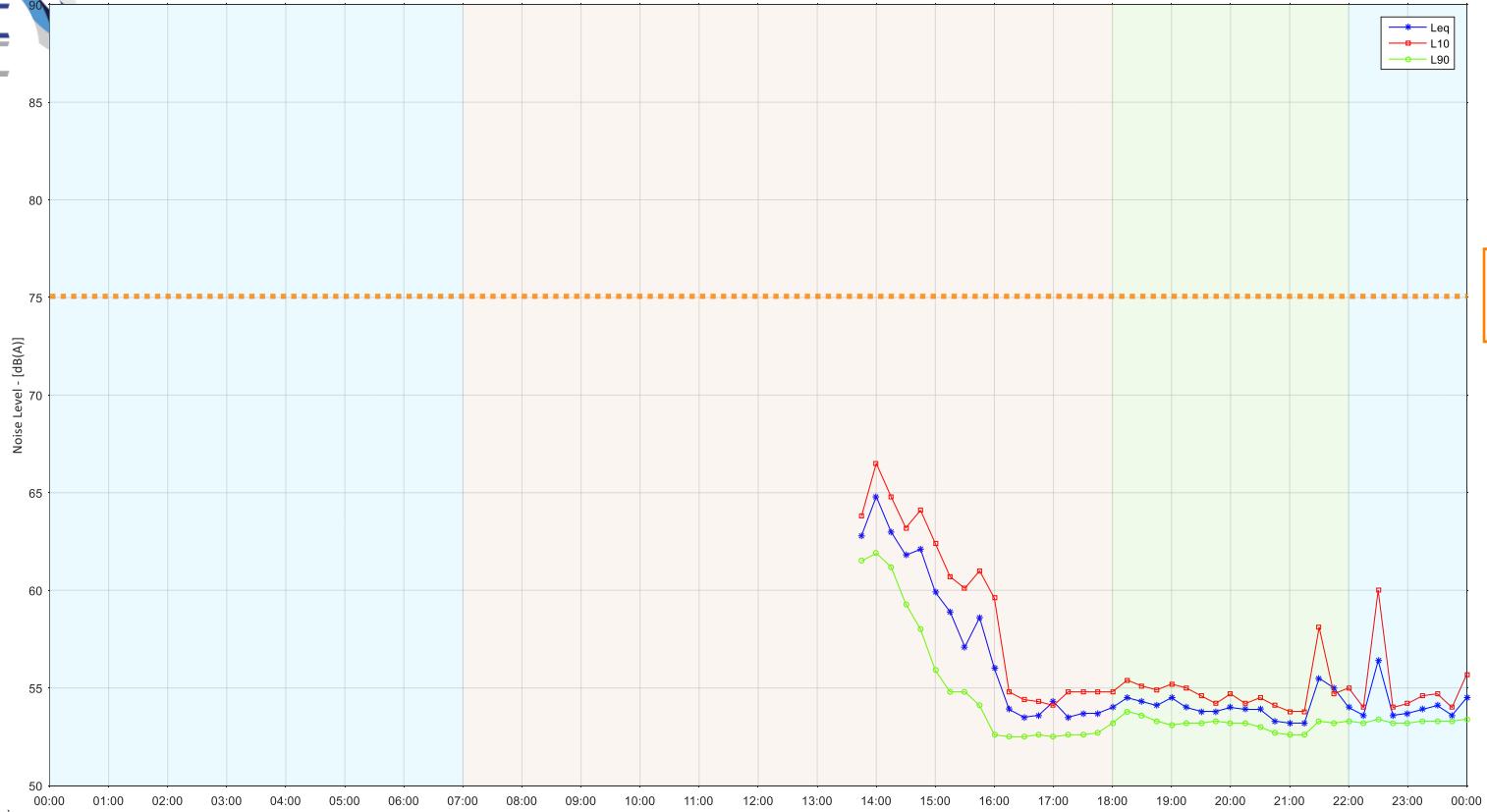


**NICU NML**  
**(Including correction)**  
**≤ 65dB(A)<sub>L<sub>eq</sub></sub>**

## OUTSIDE SUSAN WAKIL HEALTH BUILDING



### Outside Susan Wakil Health Building: Monday 08 April, 2024

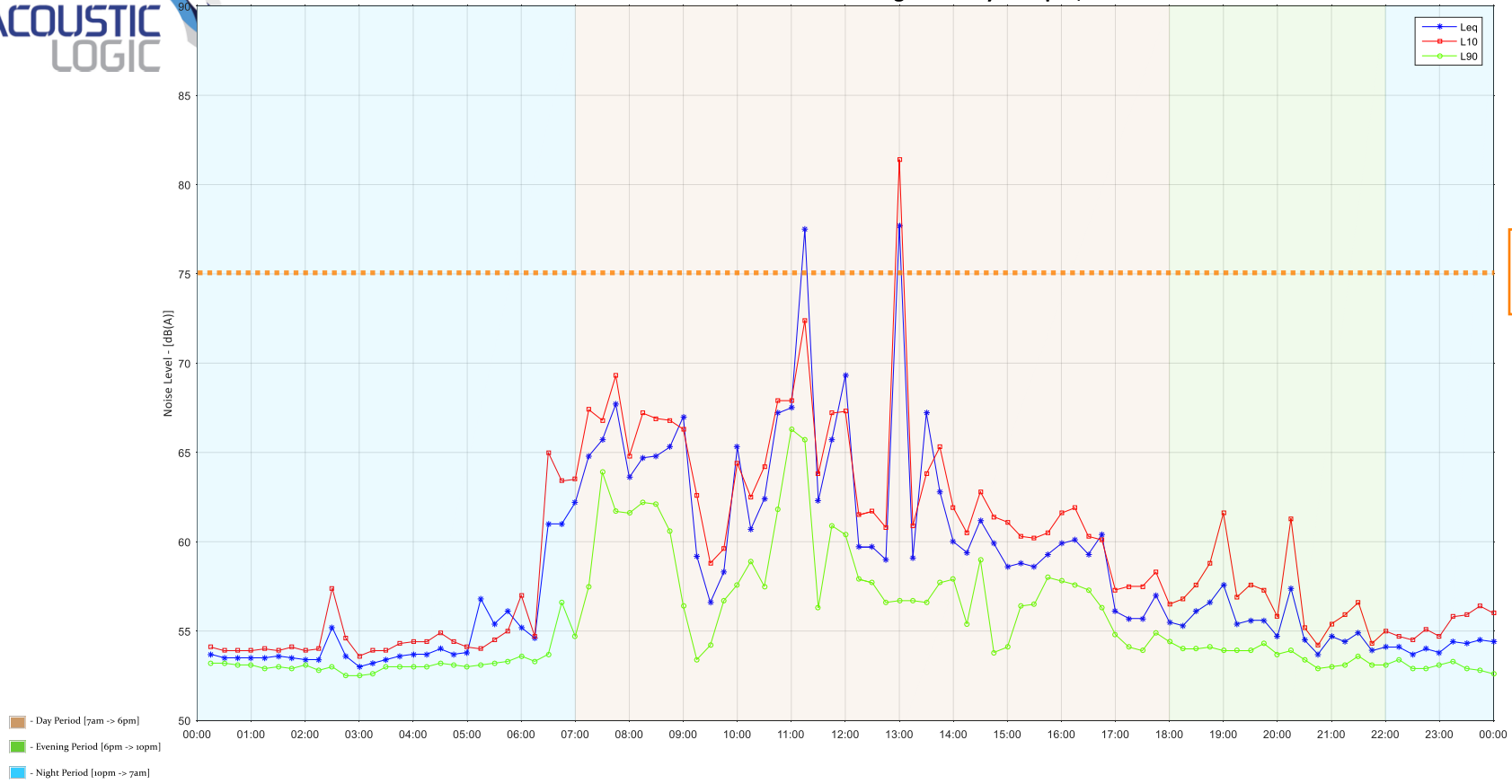


Education NML  
(Including correction)  
 $\leq 75\text{dB(A)}L_{eq}$

- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]



### Outside Susan Wakil Health Building: Tuesday 09 April, 2024

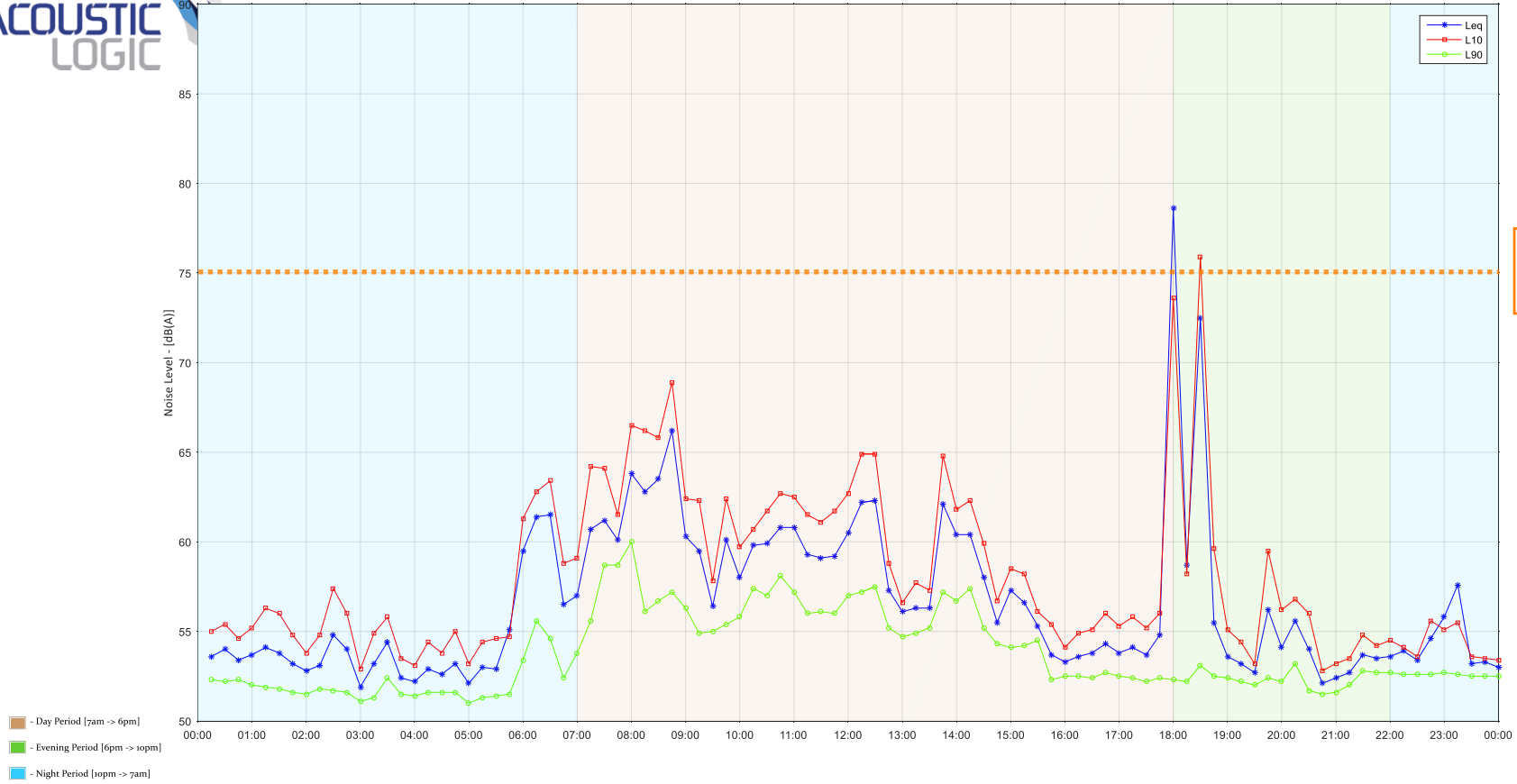


**Education NML  
(Including correction)  
≤ 75dB(A)<sub>L<sub>eq</sub></sub>**





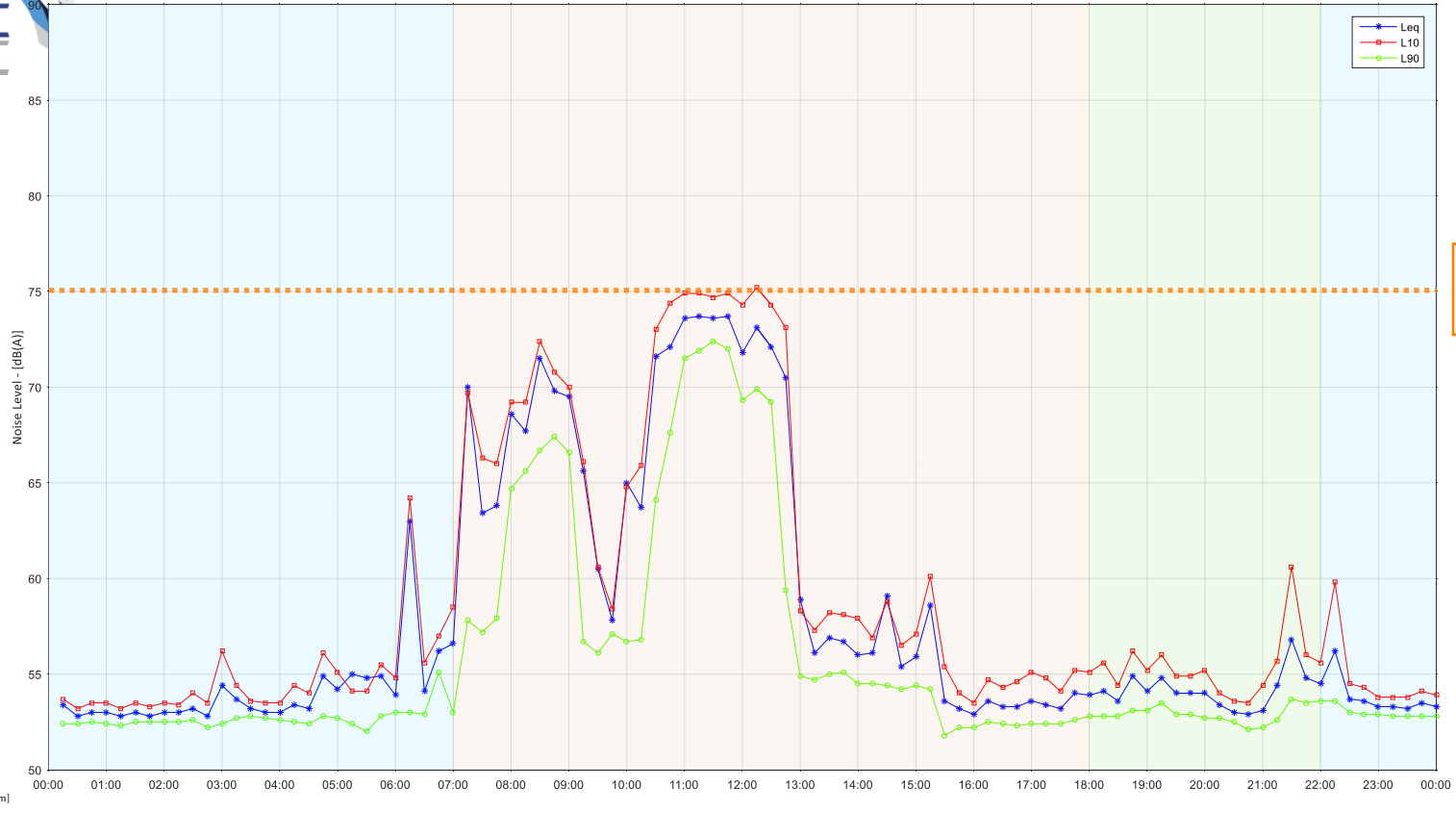
### Outside Susan Wakil Health Building: Wednesday 10 April, 2024



Education NML  
(Including correction)  
 $\leq 75\text{dB(A)}L_{eq}$



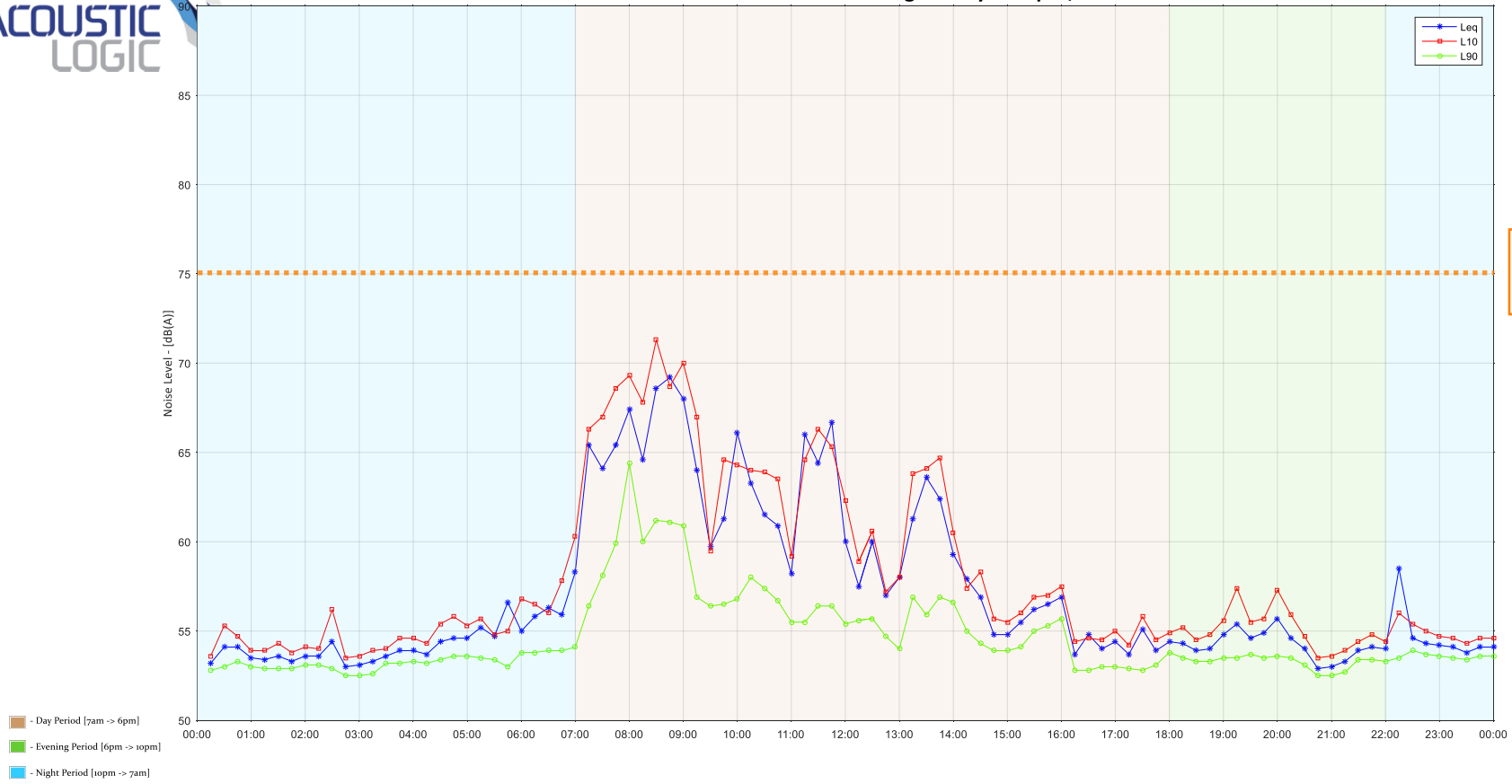
### Outside Susan Wakil Health Building: Thursday 11 April, 2024



Education NML  
(Including correction)  
 $\leq 75\text{dB(A)}L_{\text{eq}}$



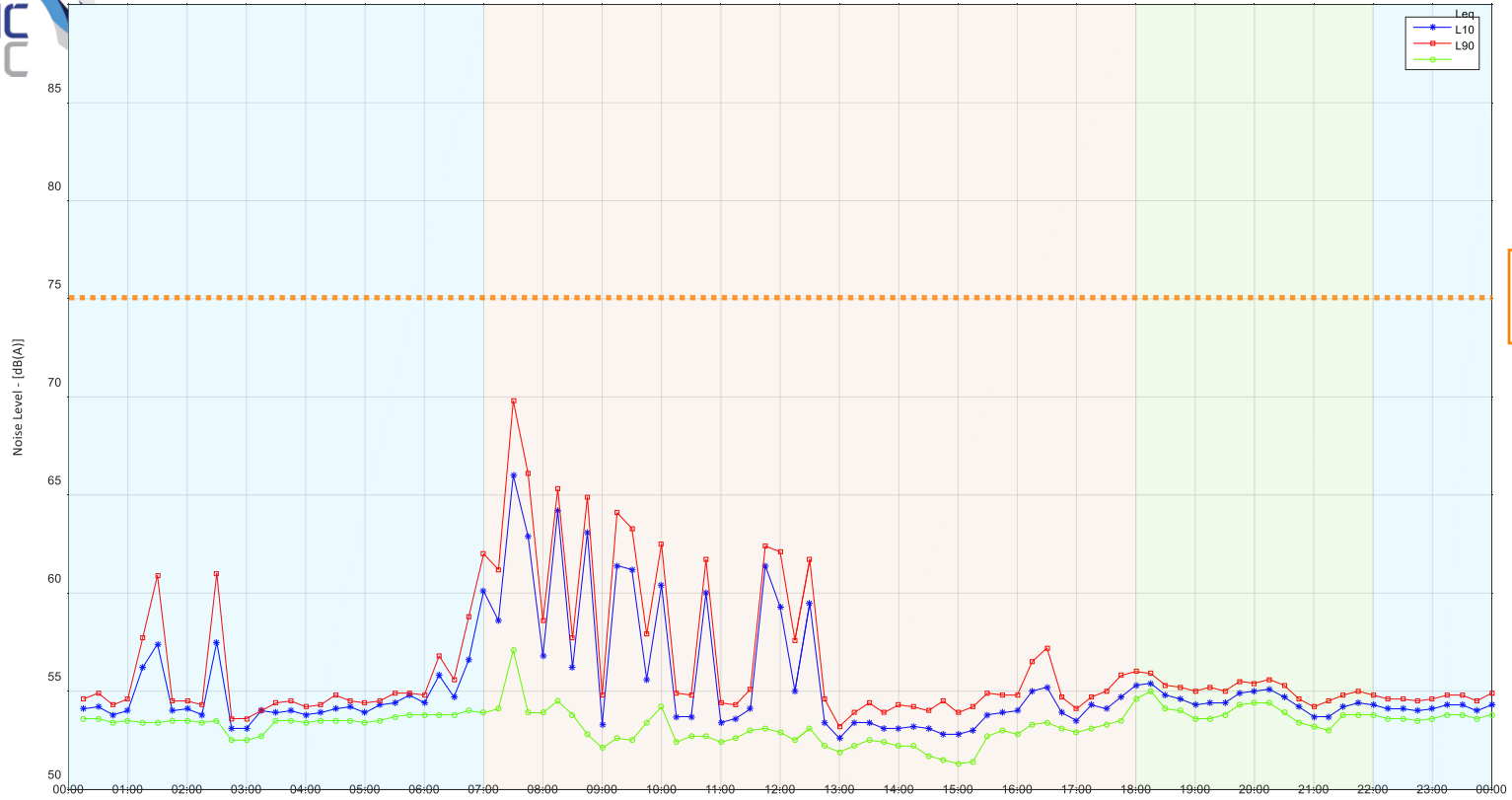
### Outside Susan Wakil Health Building: Friday 12 April, 2024



**Education NML  
(Including correction)  
≤ 75dB(A)<sub>L<sub>eq</sub></sub>**



### Outside Susan Wakil Health Building: Saturday 13 April, 2024

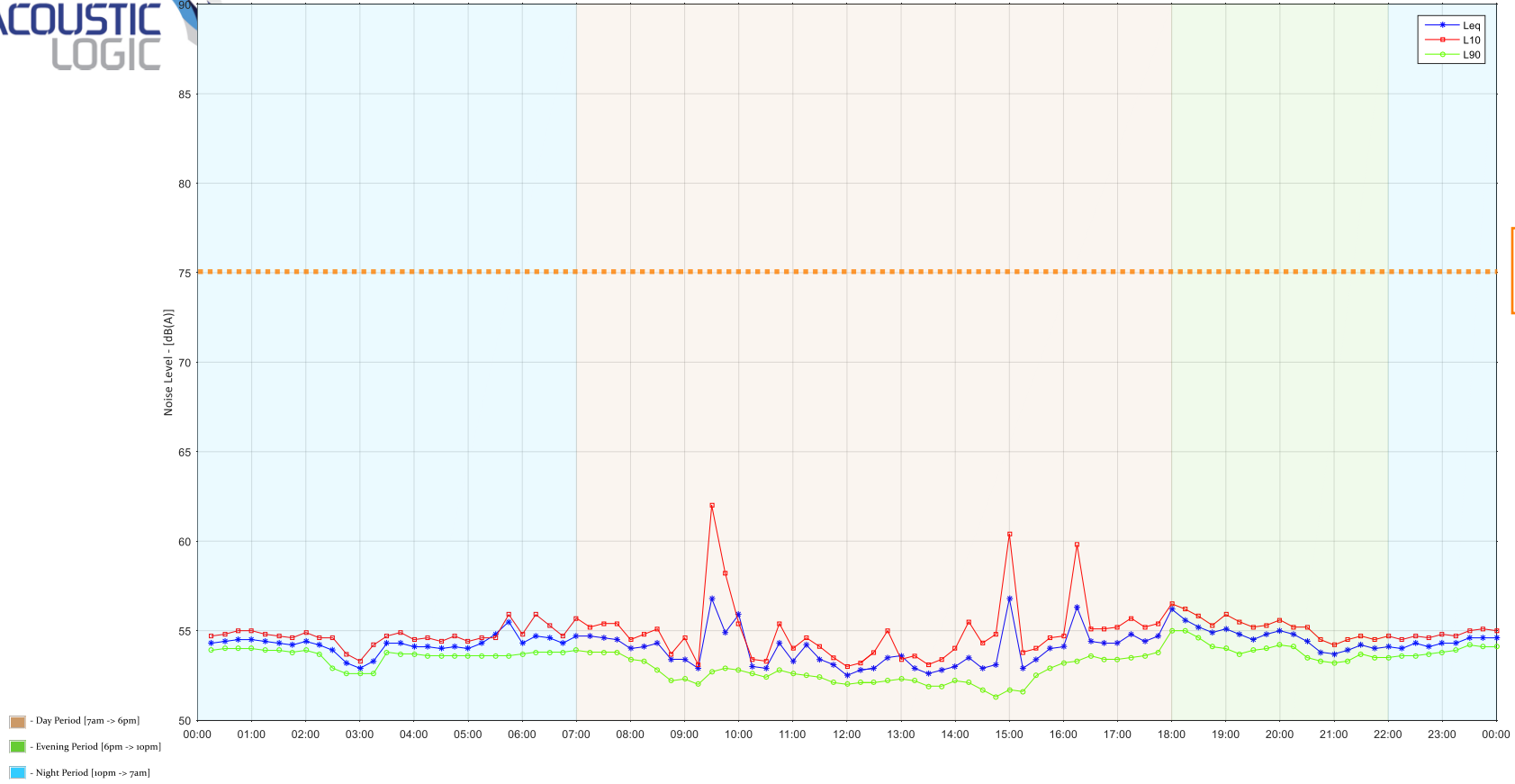


Education NML  
(Including correction)  
 $\leq 75\text{dB(A)}_{L_{eq}}$





### Outside Susan Wakil Health Building: Sunday 14 April, 2024



**Education NML  
(Including correction)  
≤ 75dB(A)<sub>L<sub>eq</sub></sub>**

## **APPENDIX B – VIBRATION MONITORING RESULTS**

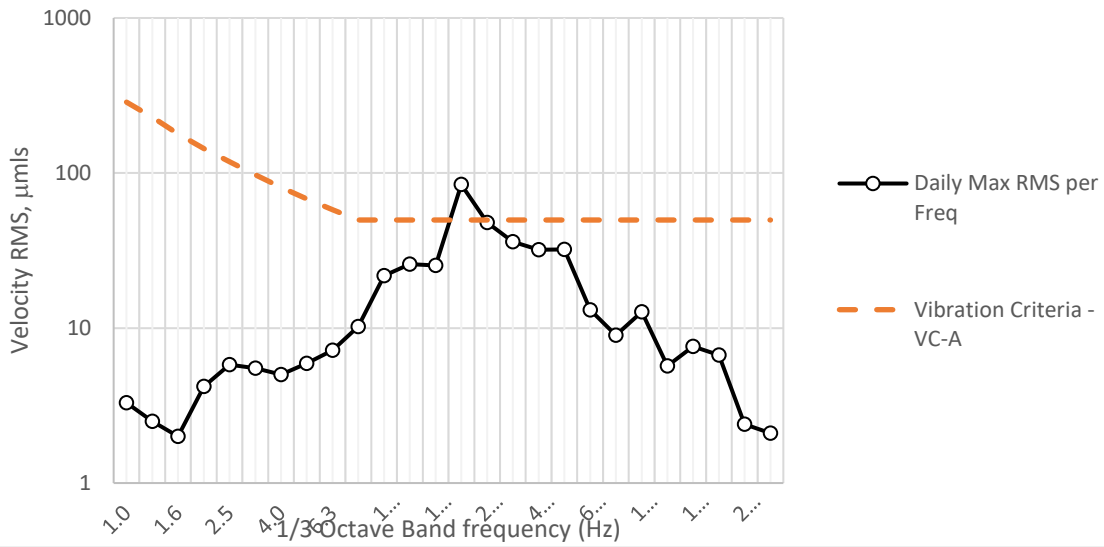
Note that only dates where exceedances of events were experienced have been provided as per discussion with relevant stakeholders.

### **CENTENARY INSTITUTE – LEVEL 3 FISH TANKS**

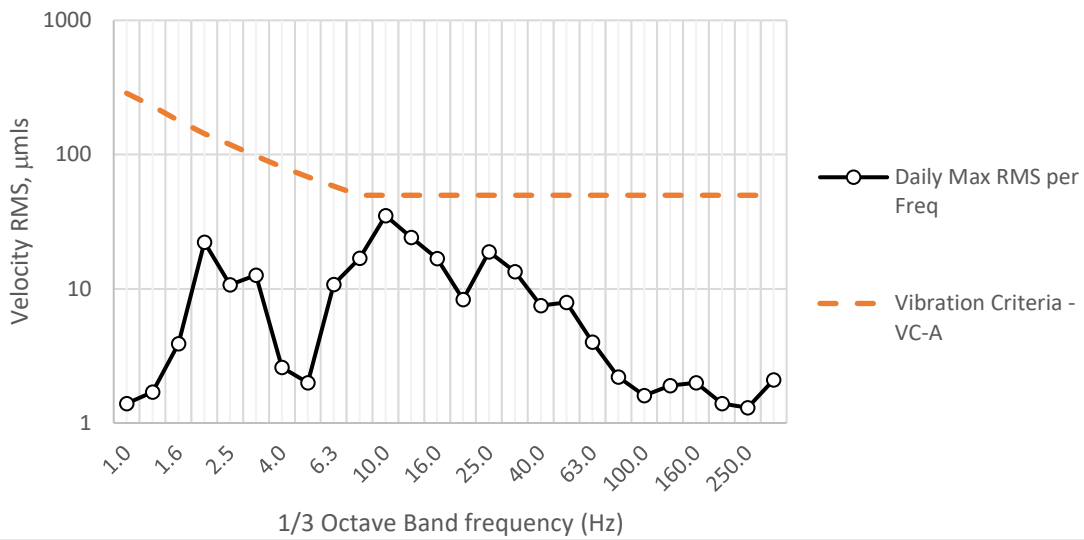
No exceedances occurred during the monitoring period.

## CENTENARY INSTITUTE – LEVEL 4 SURGERY ROOM (SOUTHERN FAÇADE)

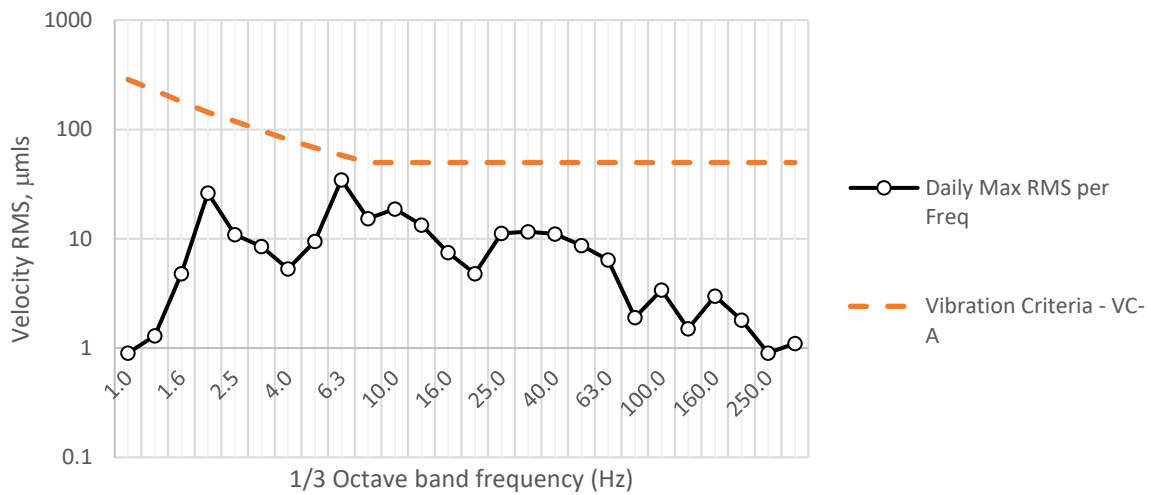
### Vertical Vibration



### FwdBackwd Vibration

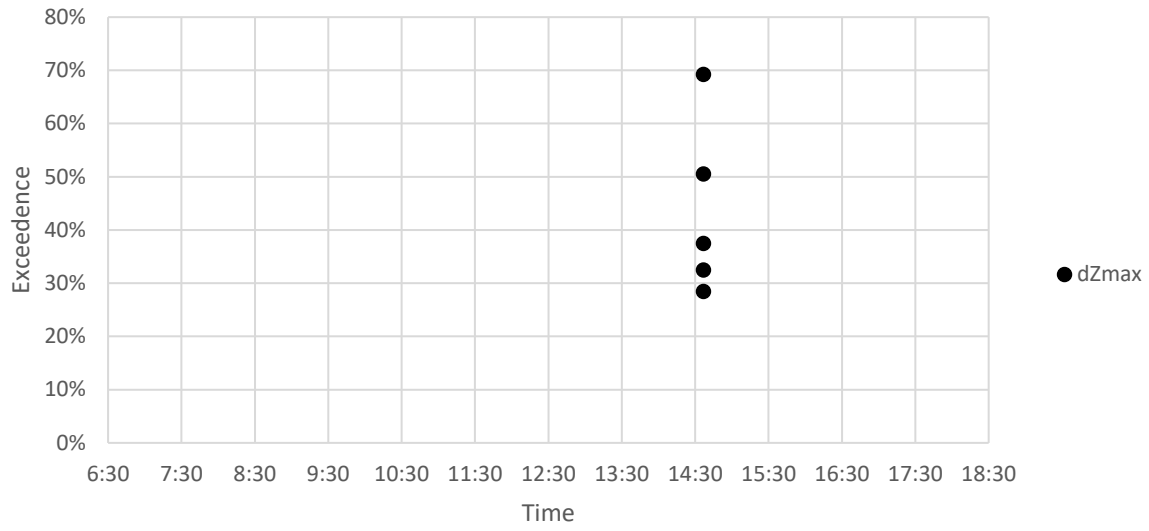


### Sideways Vibration

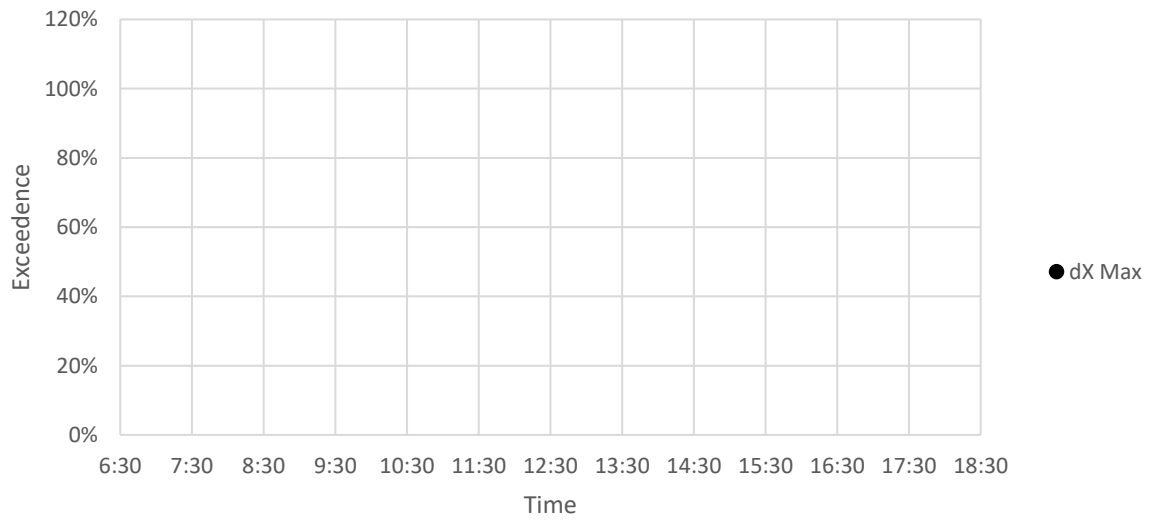




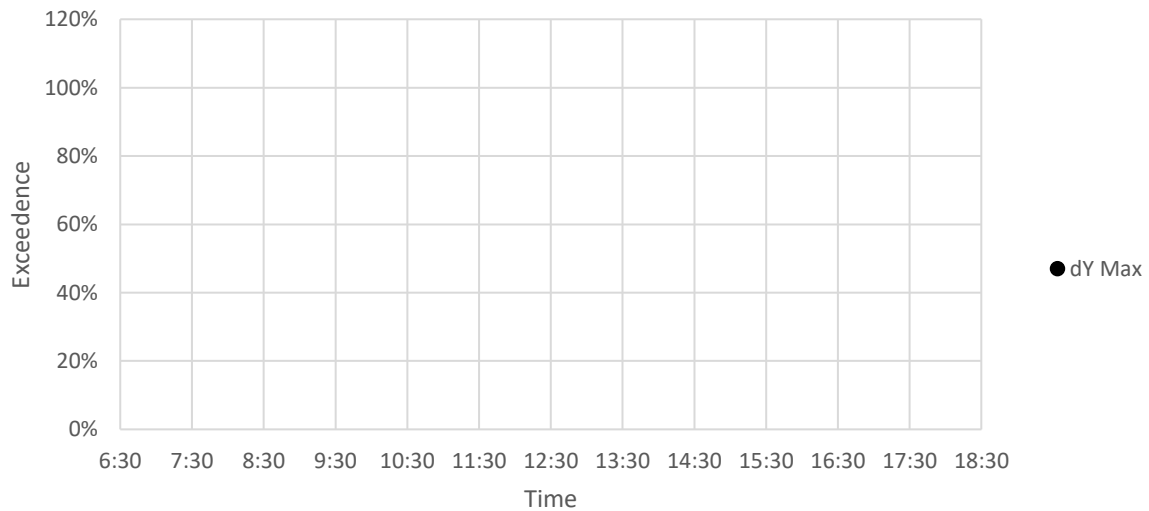
### Vertical



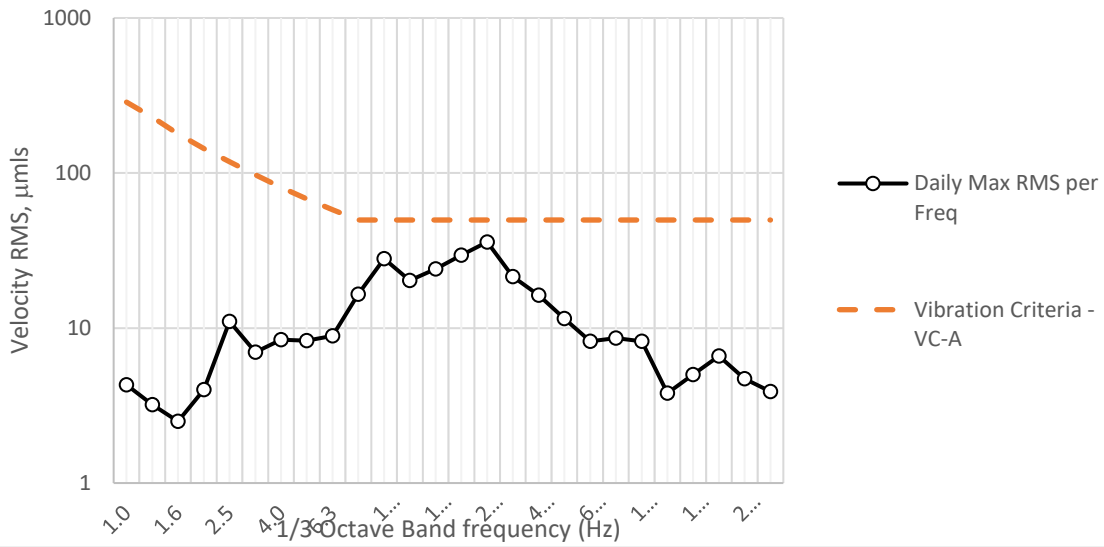
### Fwd/Backwards



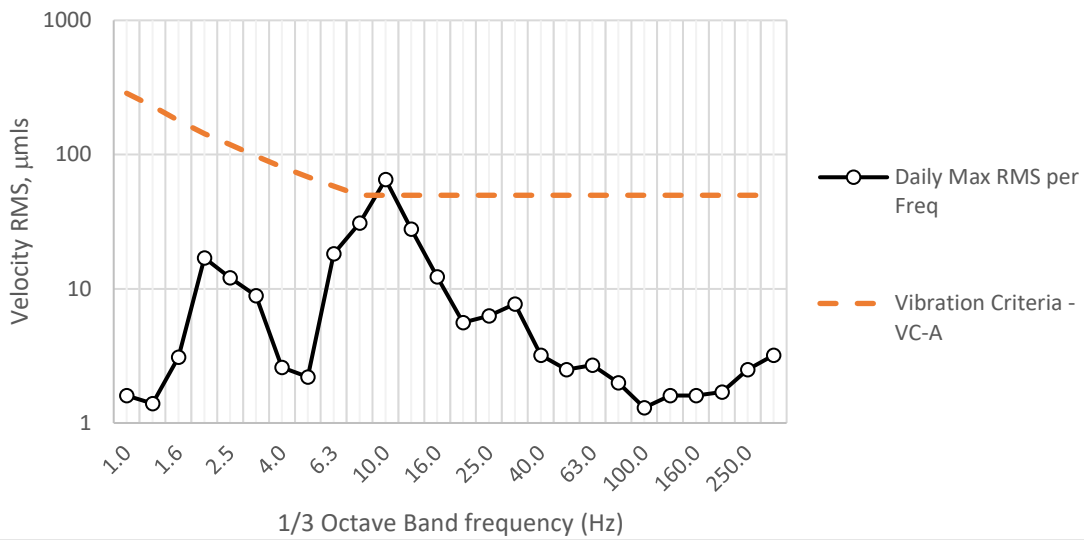
### Sideways



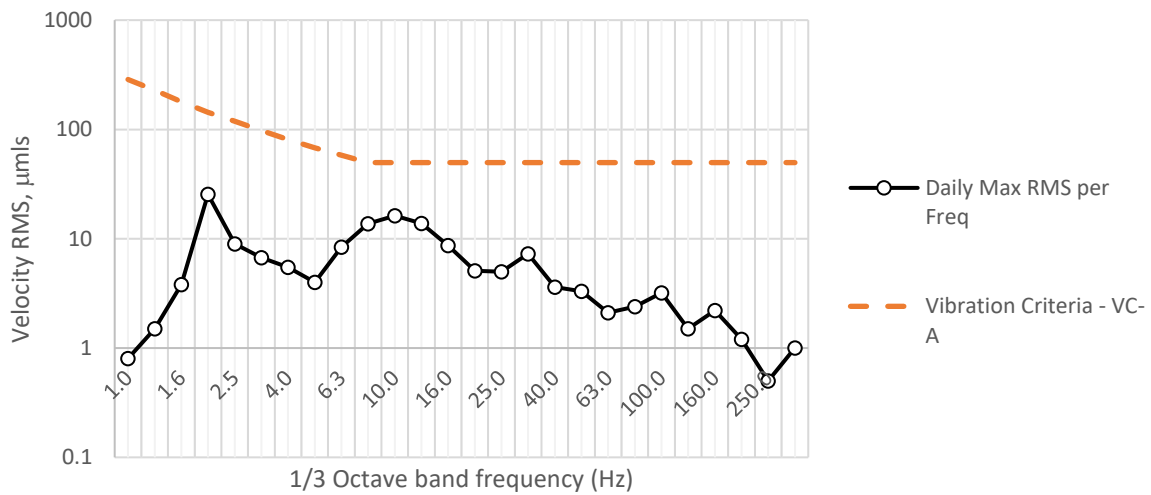
### Vertical Vibration



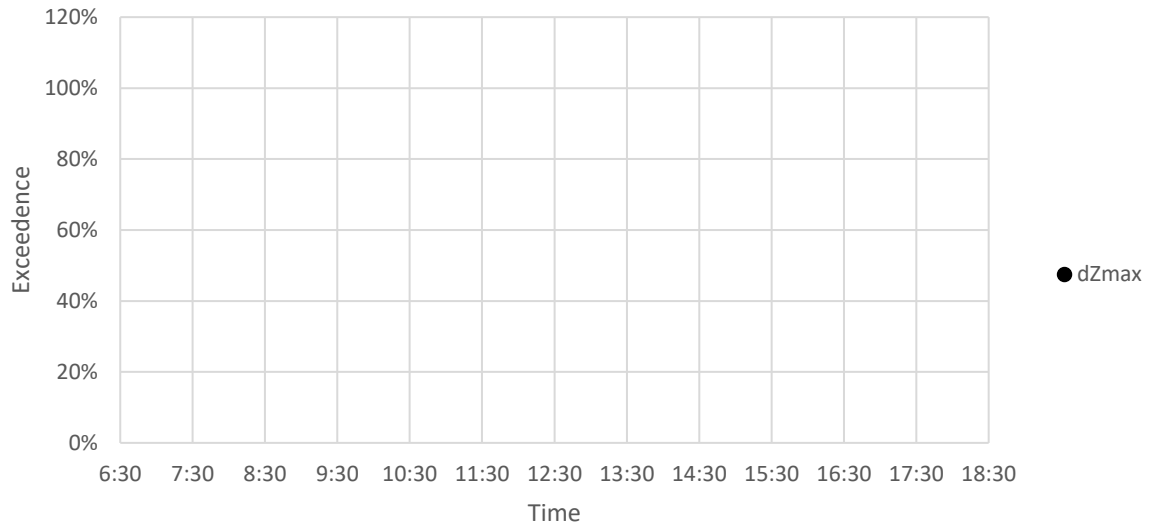
### FwdBackwd Vibration



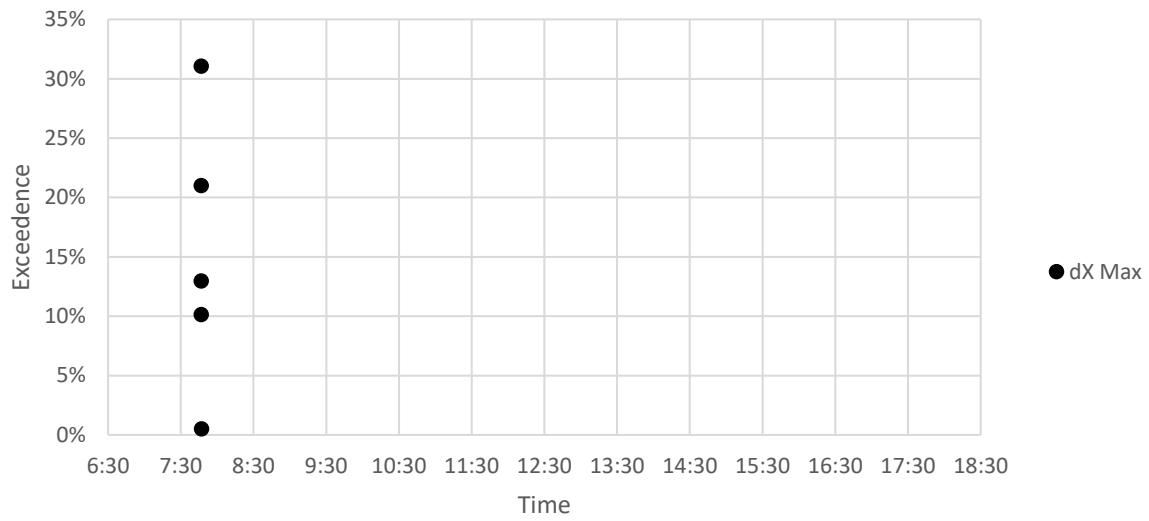
### Sideways Vibration



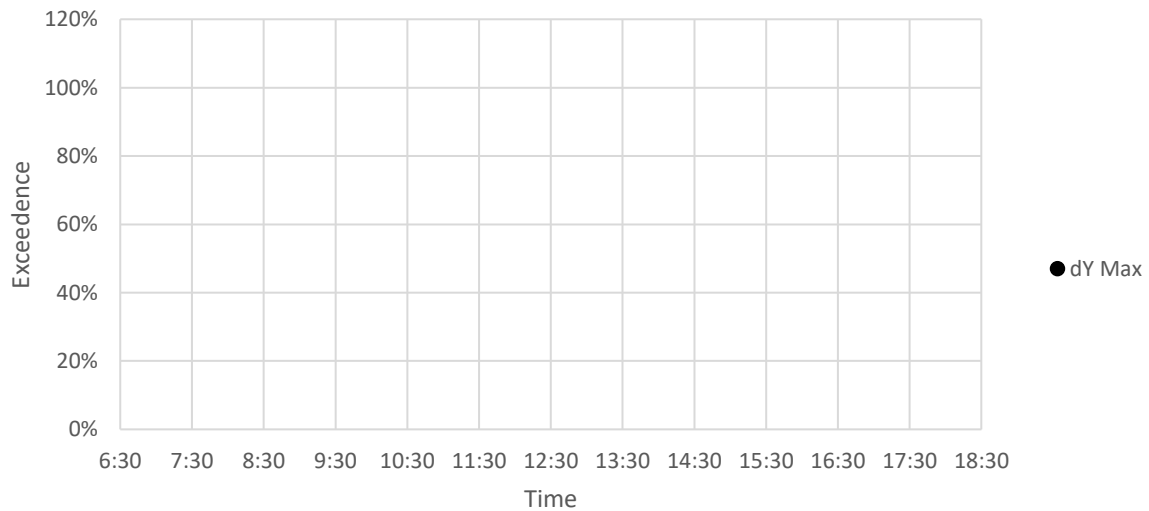
### Vertical



### Fwd/Backwards

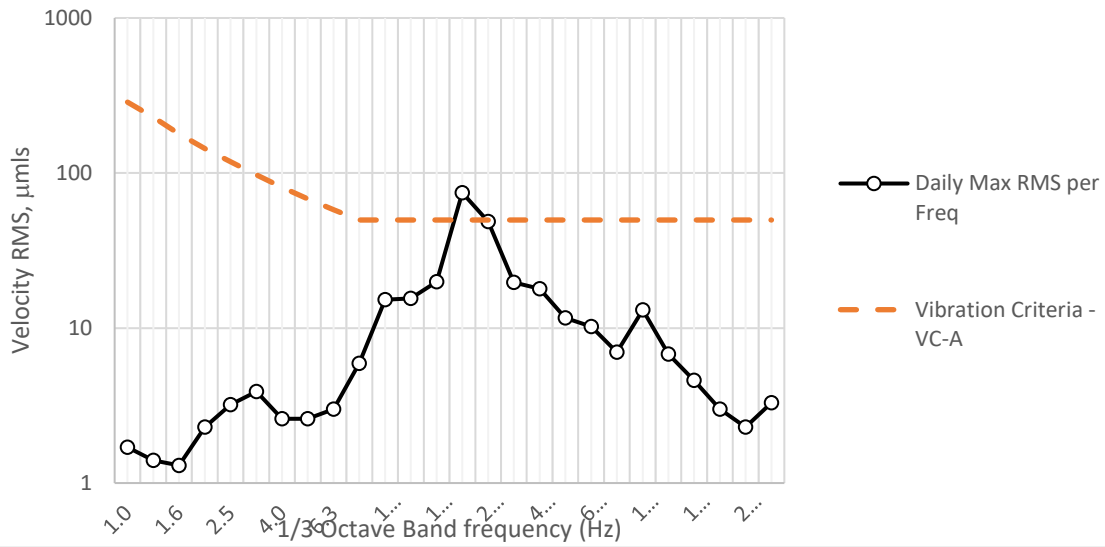


### Sideways

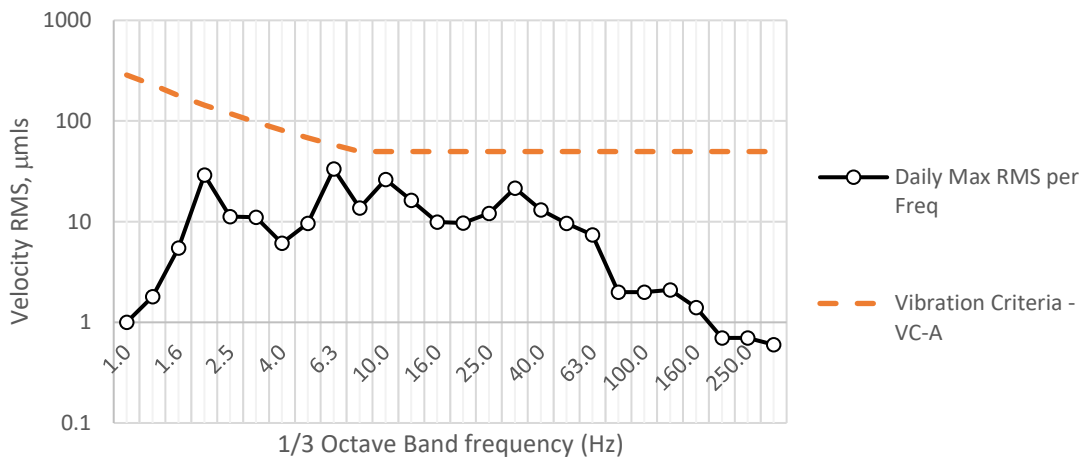


## CENTENARY INSTITUTE – LEVEL 4 BATHROOM (NORTHERN FAÇADE)

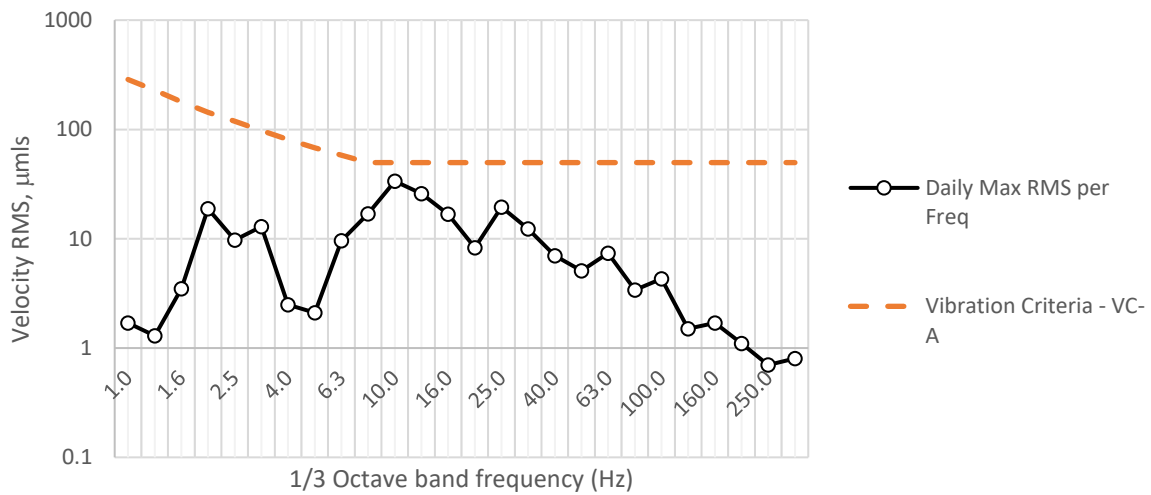
### Vertical Vibration



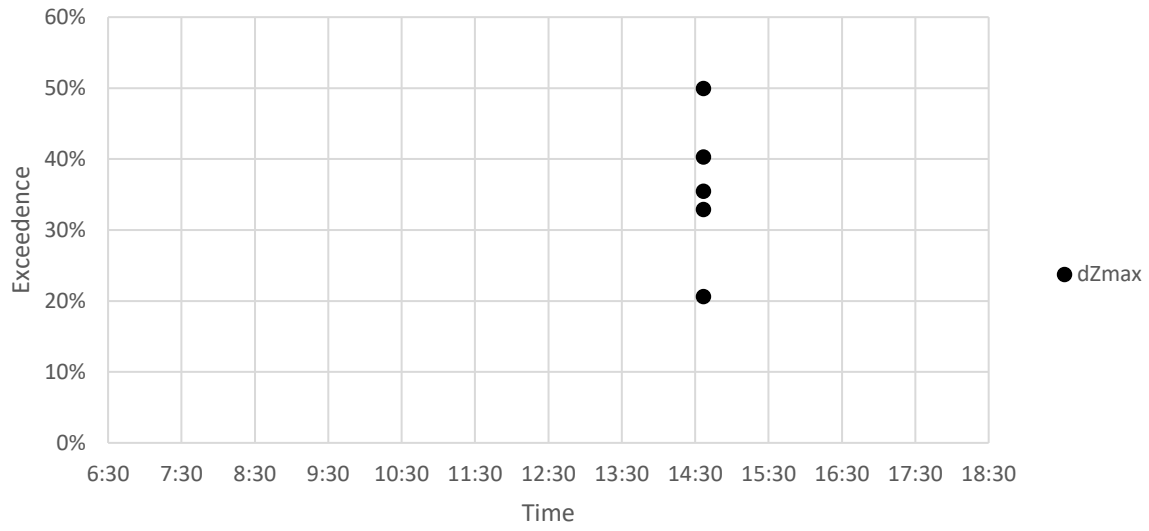
### FwdBackwd Vibration



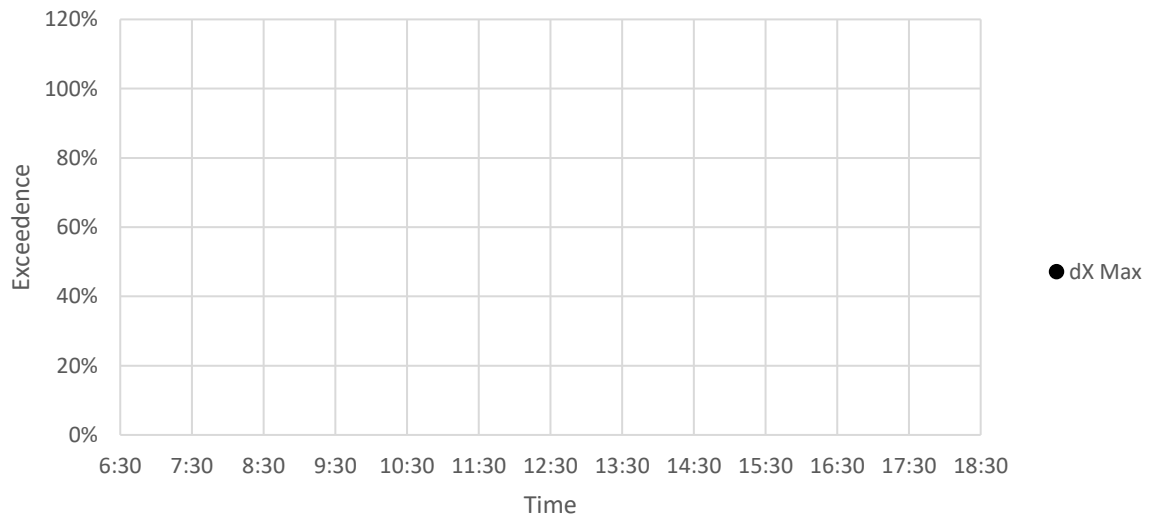
### Sideways Vibration



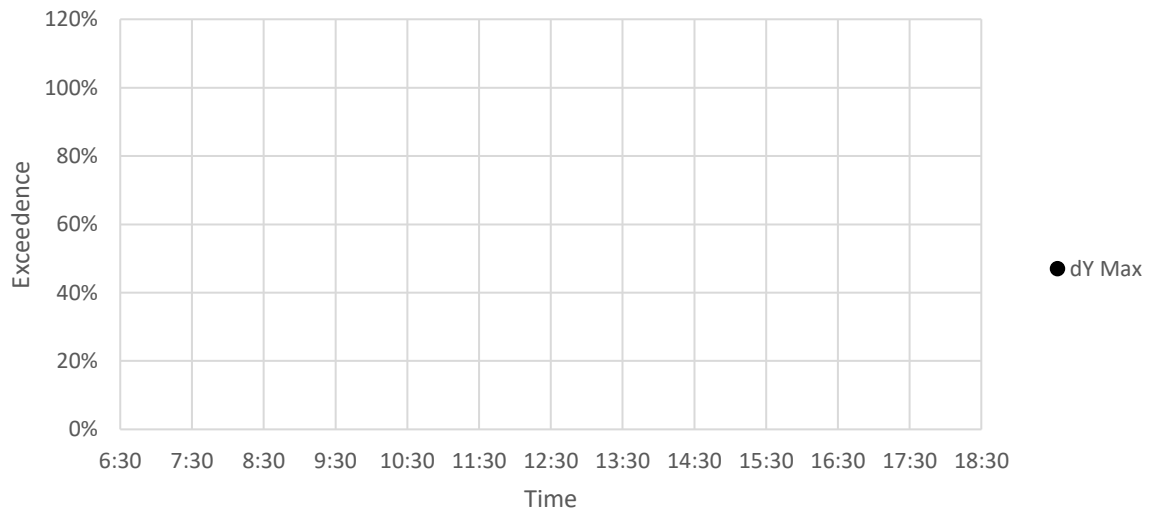
### Vertical



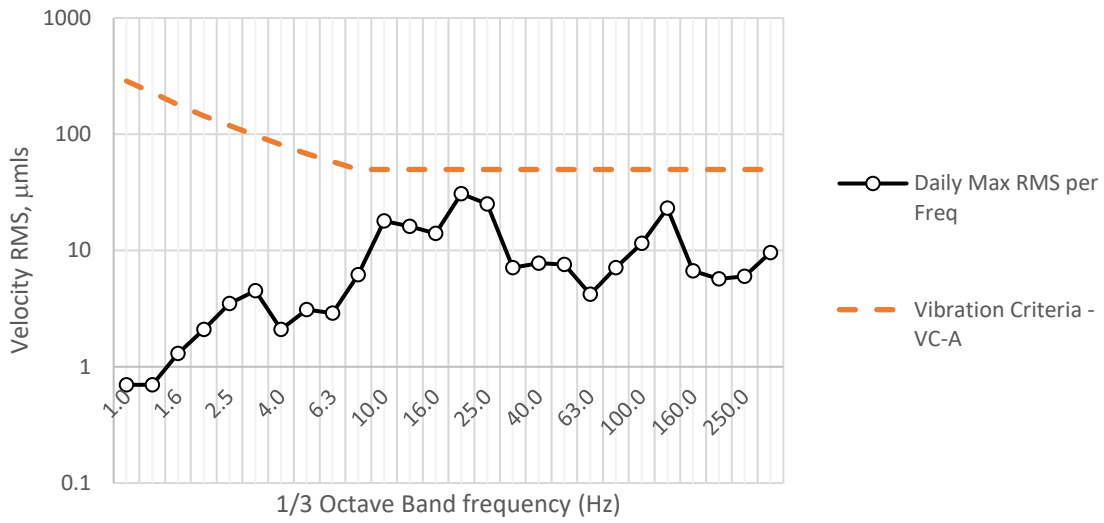
### Fwd/Backwards



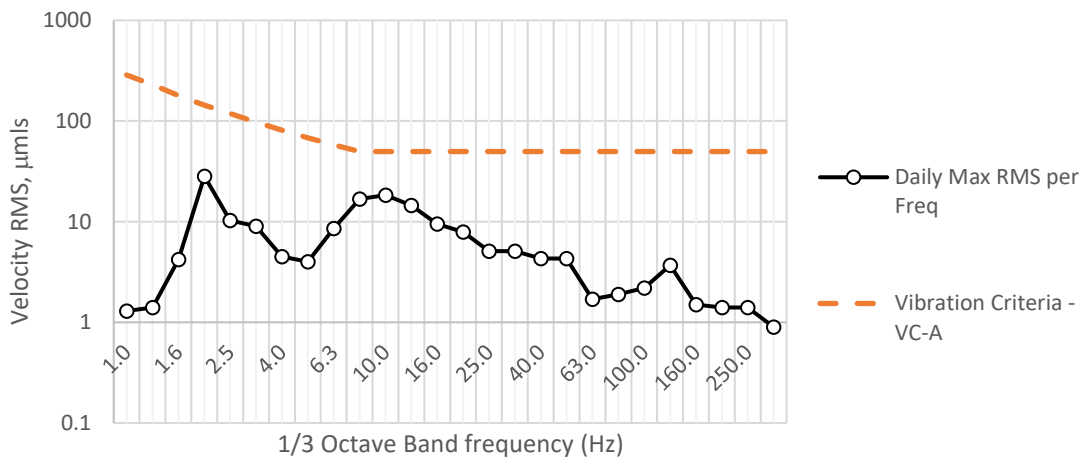
### Sideways



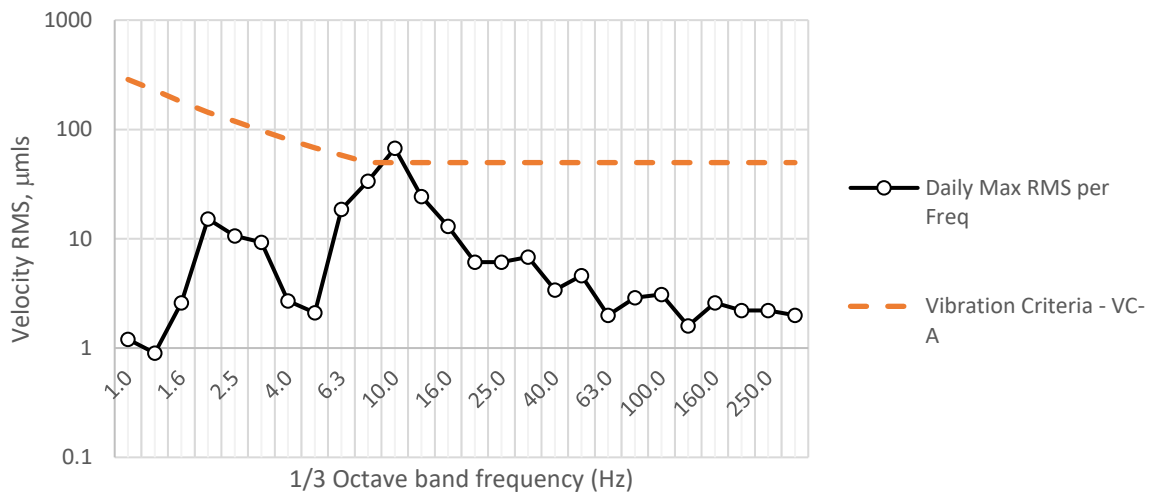
### Vertical Vibration



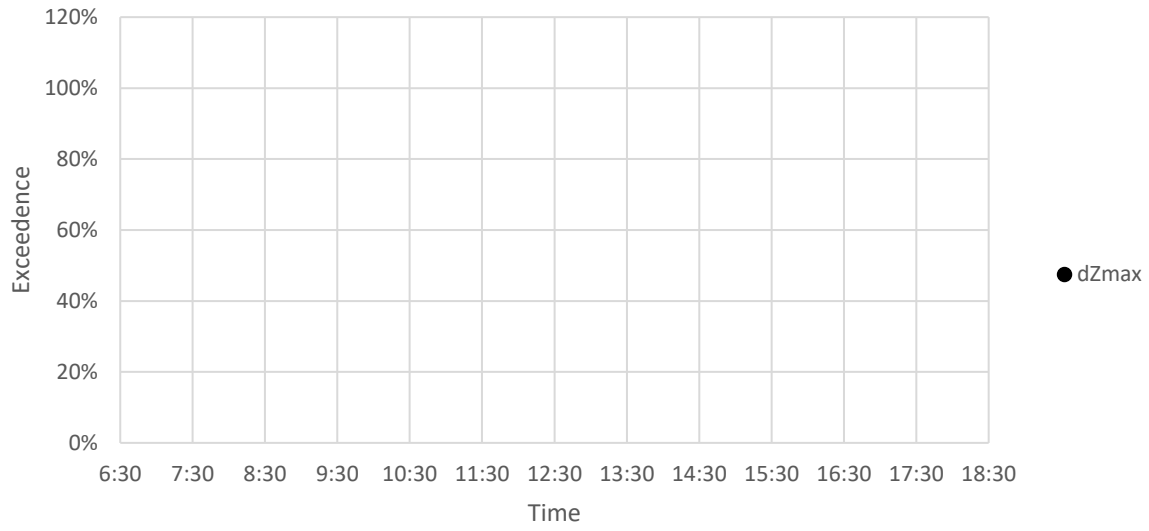
### FwdBackwd Vibration



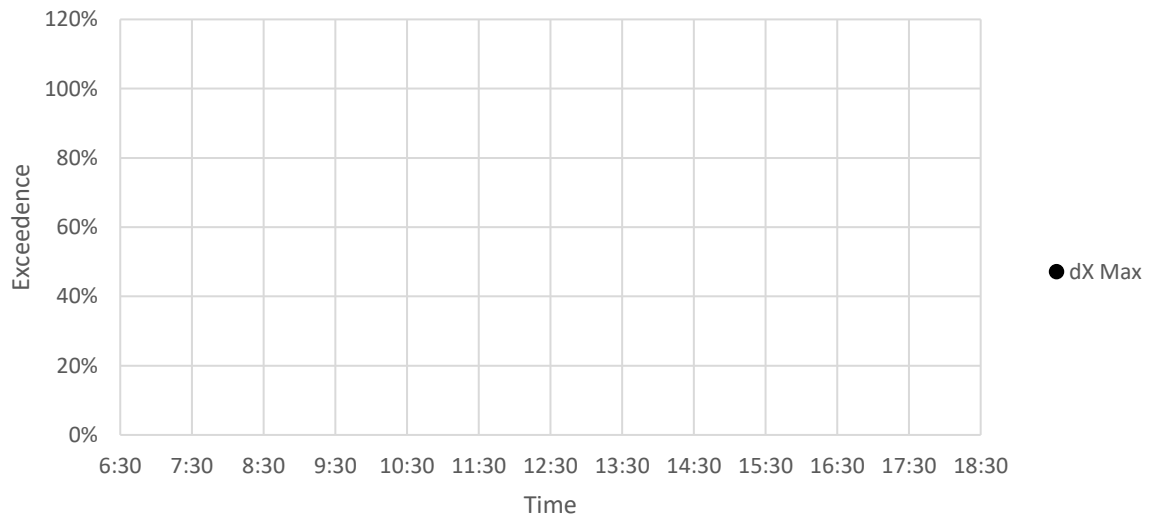
### Sideways Vibration



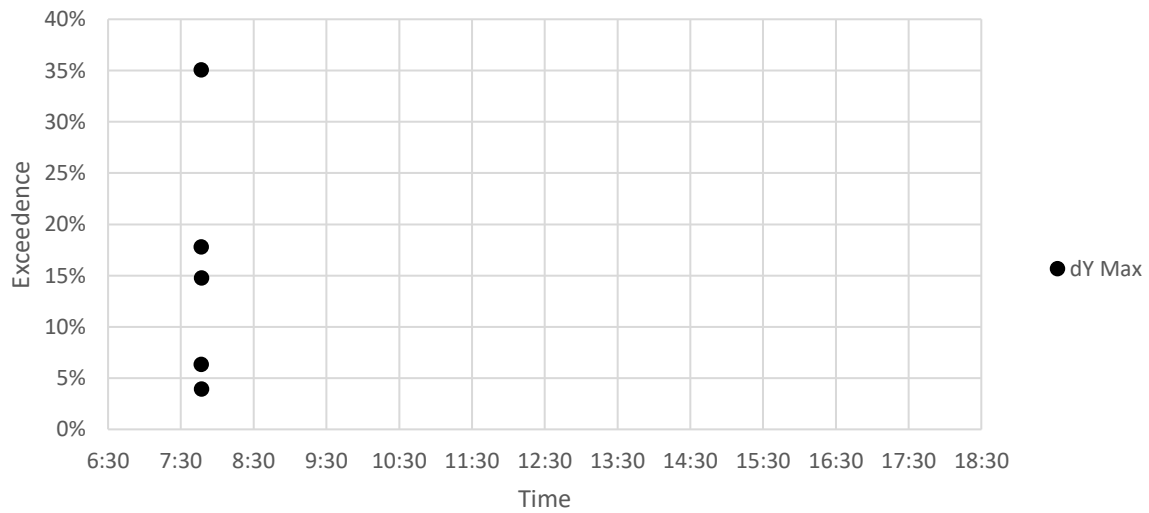
### Vertical



### Fwd/Backwards



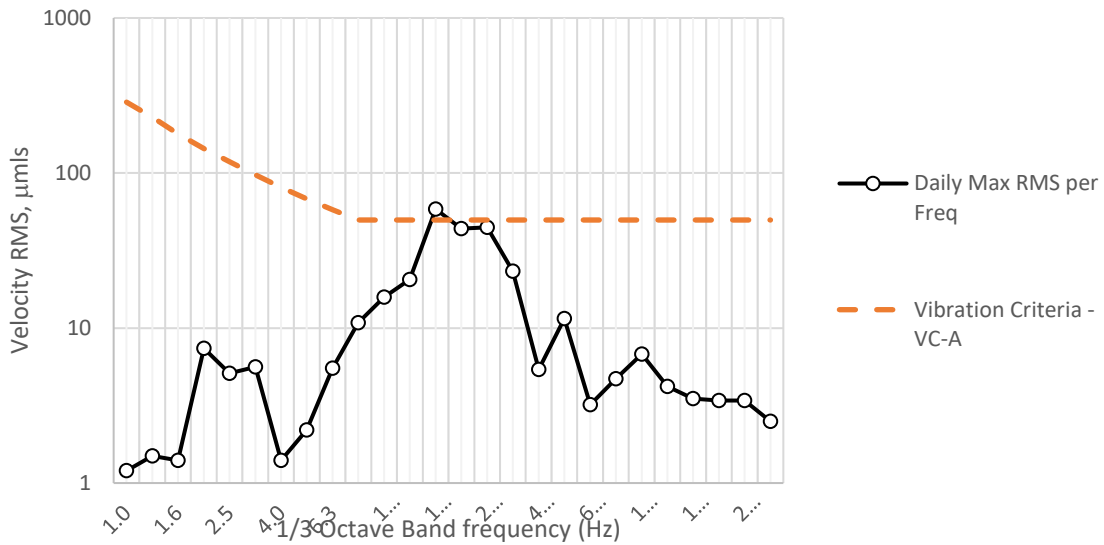
### Sideways



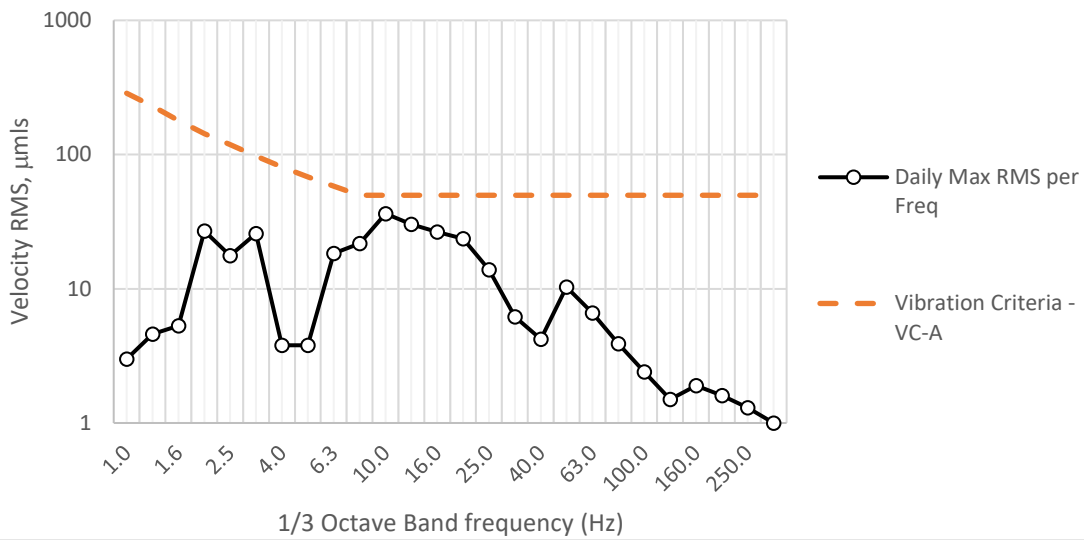


## CENTENARY INSTITUTE – LEVEL 4 SE CORNER EXPERIMENTATION ROOM (SOUTHERN FAÇADE)

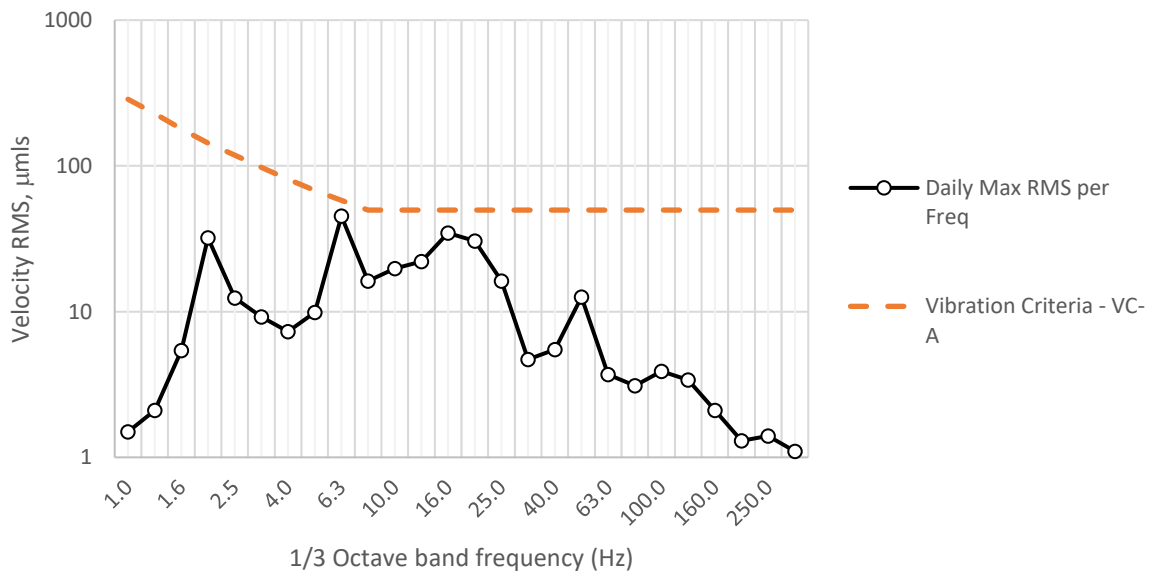
### Vertical Vibration



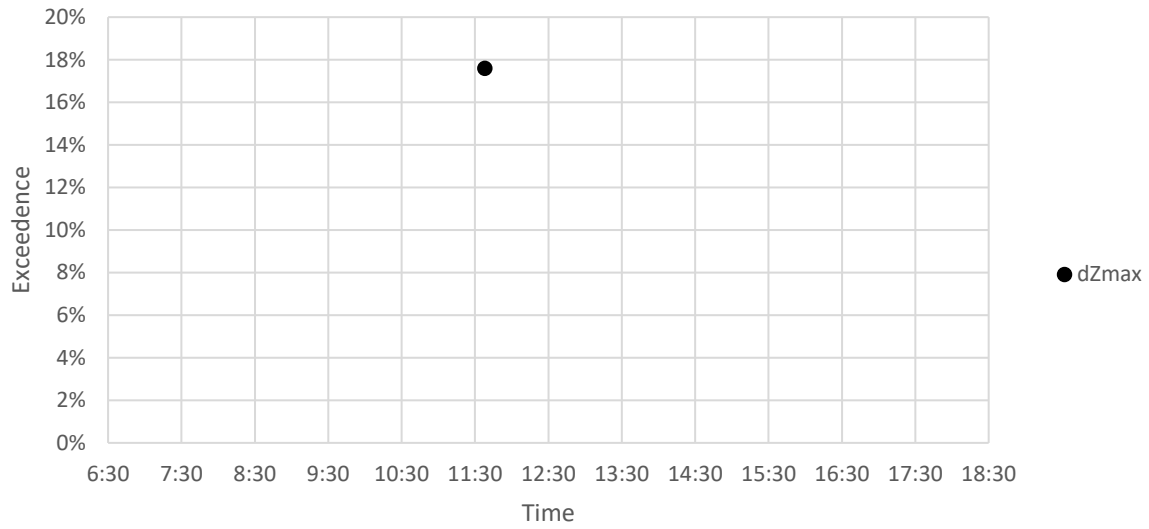
### FwdBackwd Vibration



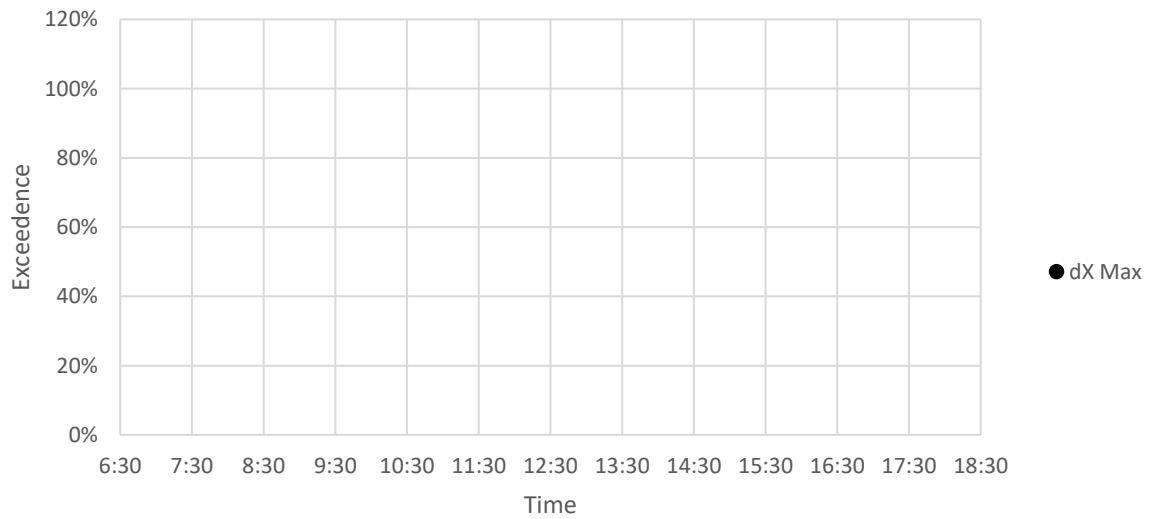
### Sideways Vibration



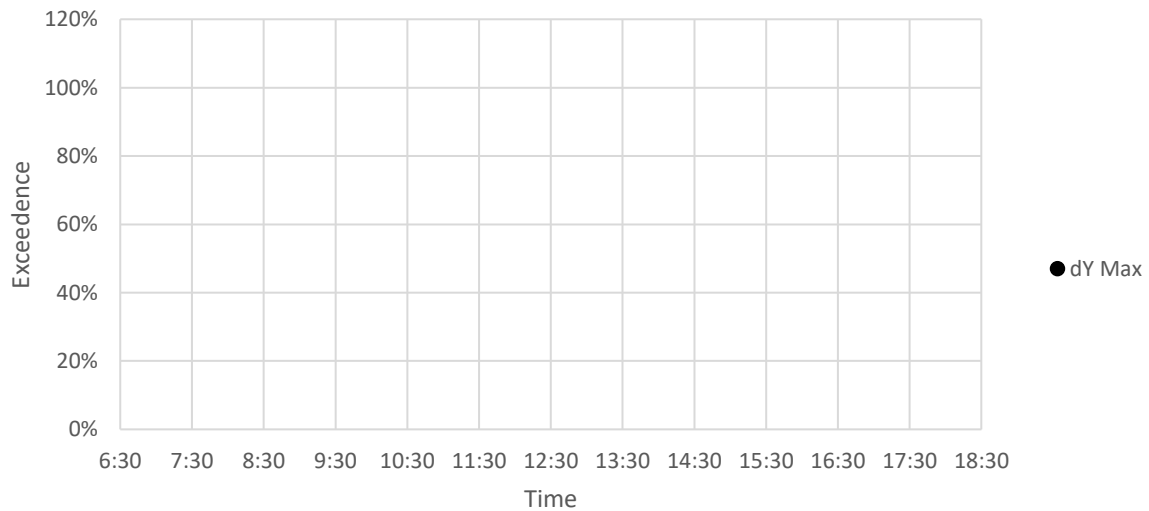
### Vertical



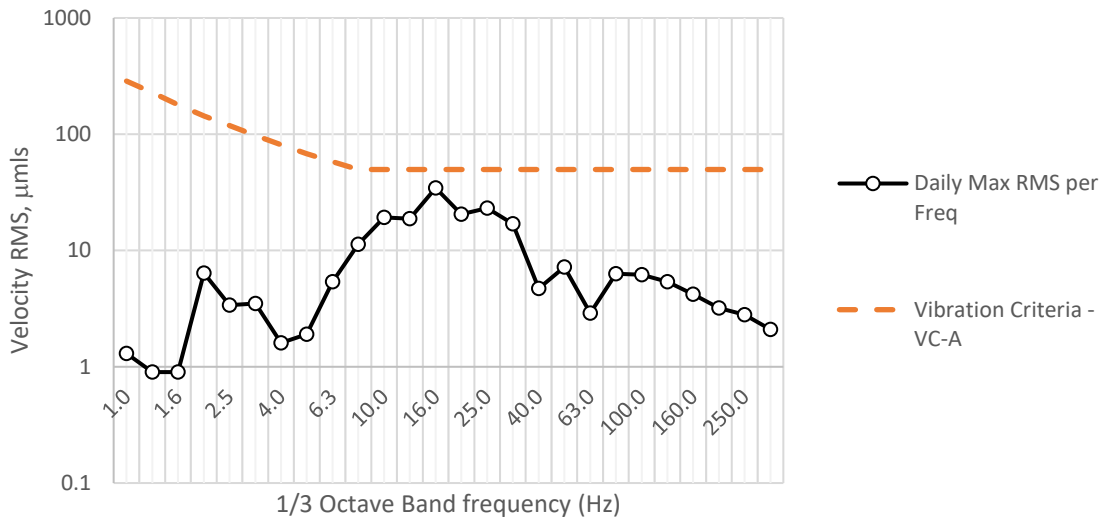
### Fwd/Backwards



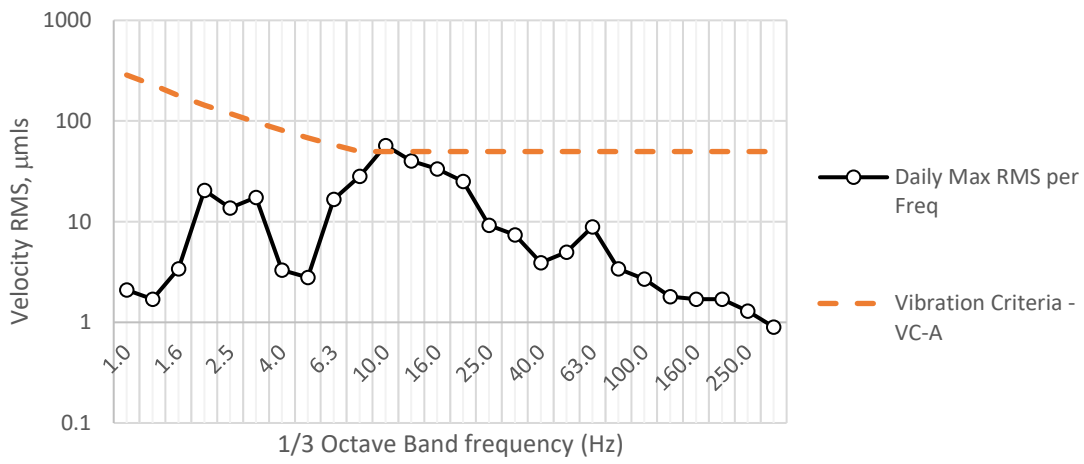
### Sideways



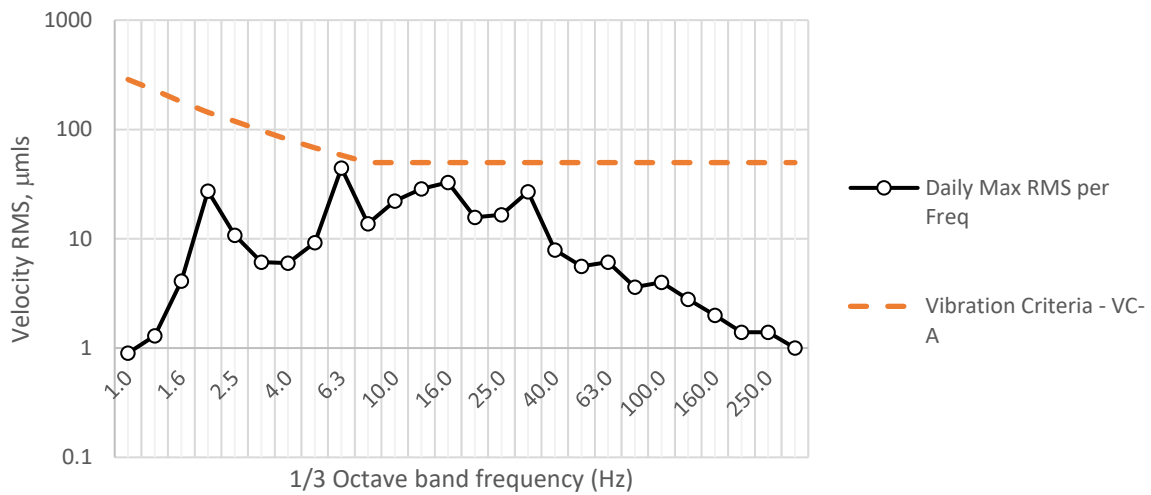
### Vertical Vibration



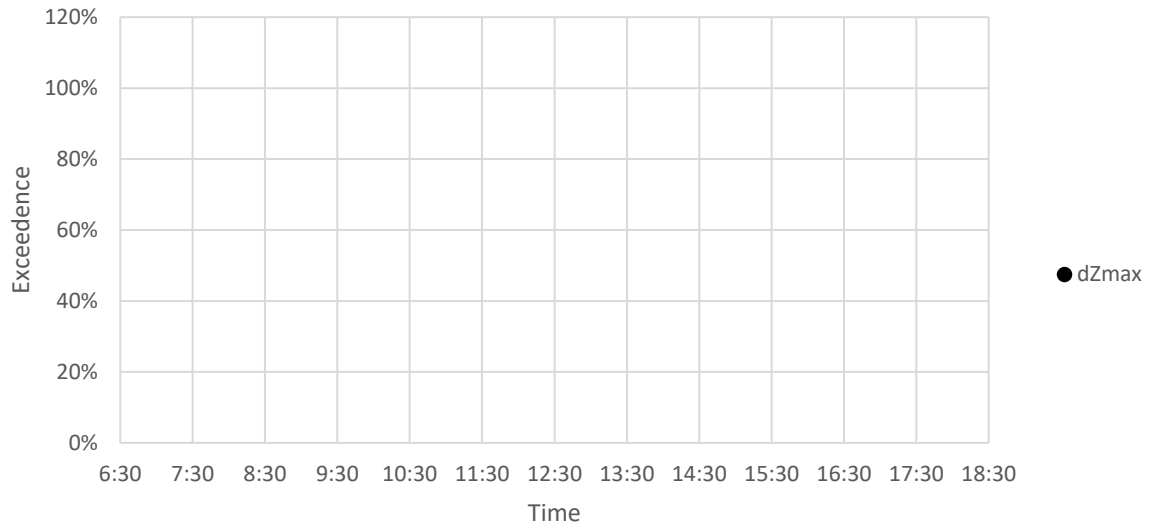
### FwdBackwd Vibration



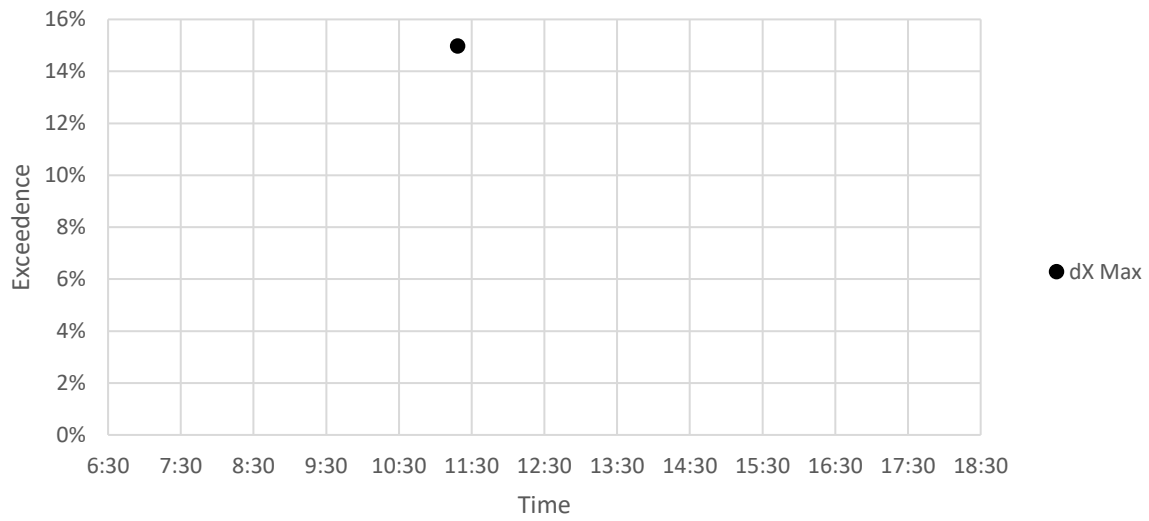
### Sideways Vibration



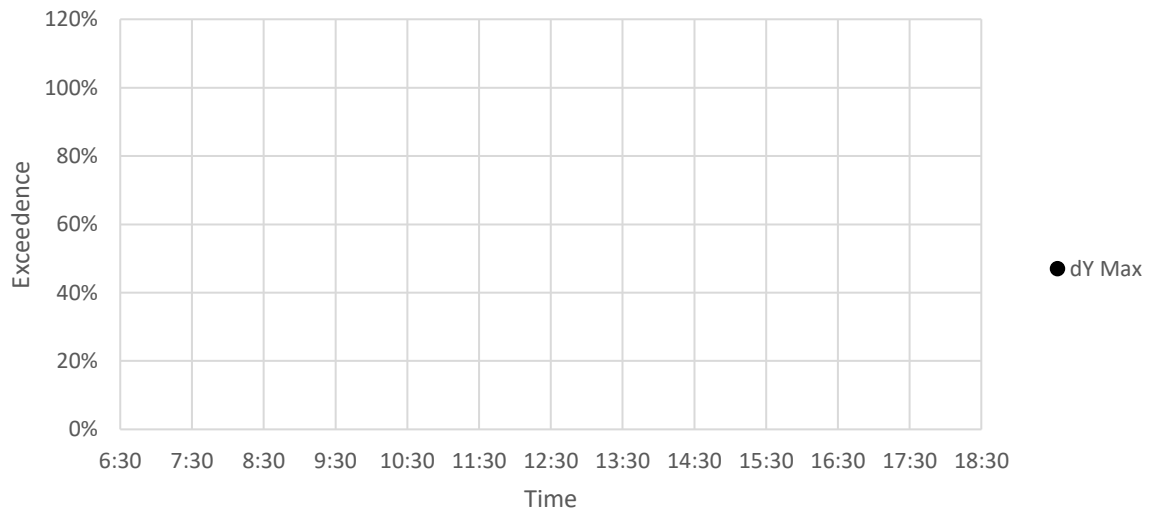
### Vertical



### Fwd/Backwards

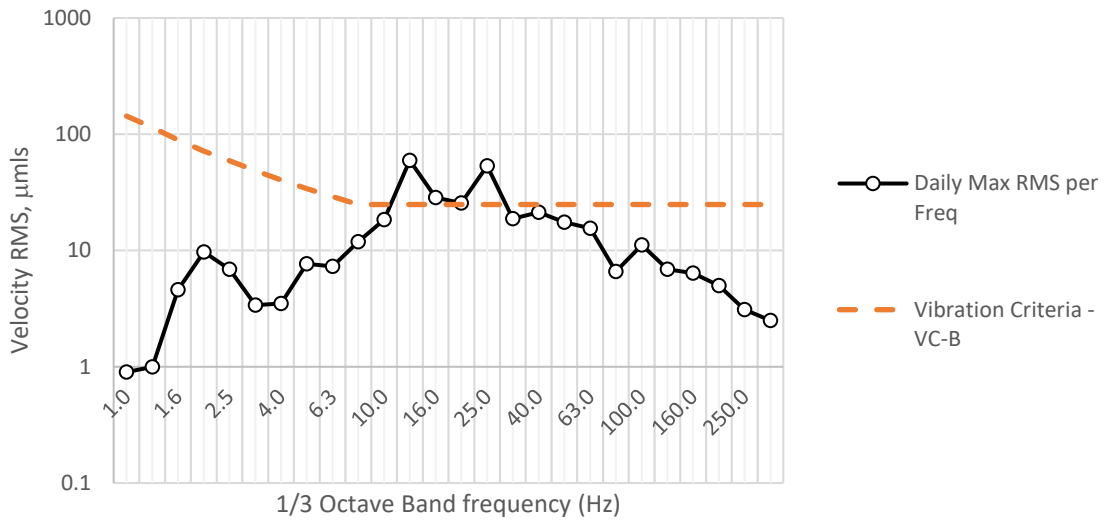


### Sideways

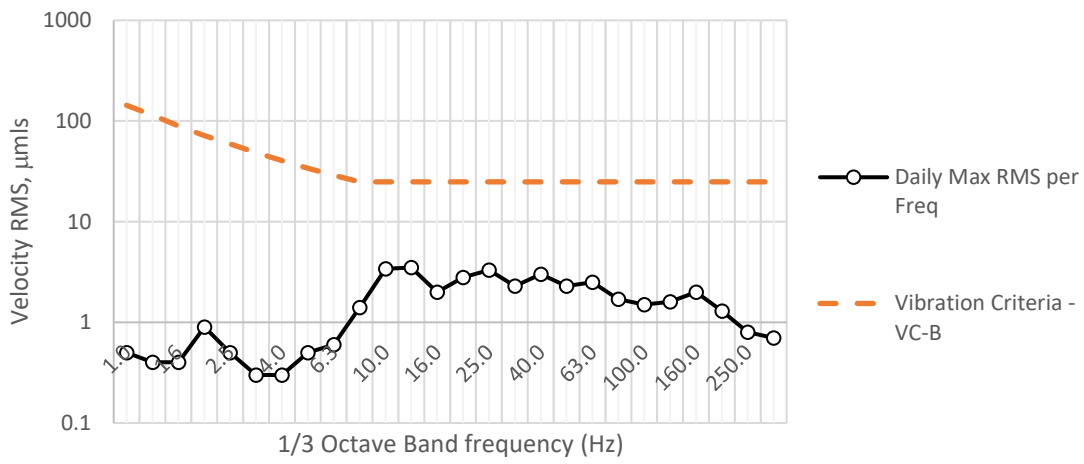


## CHARLES PERKINS CENTRE – LEVEL B1 SOUTHERN CORRIDOR

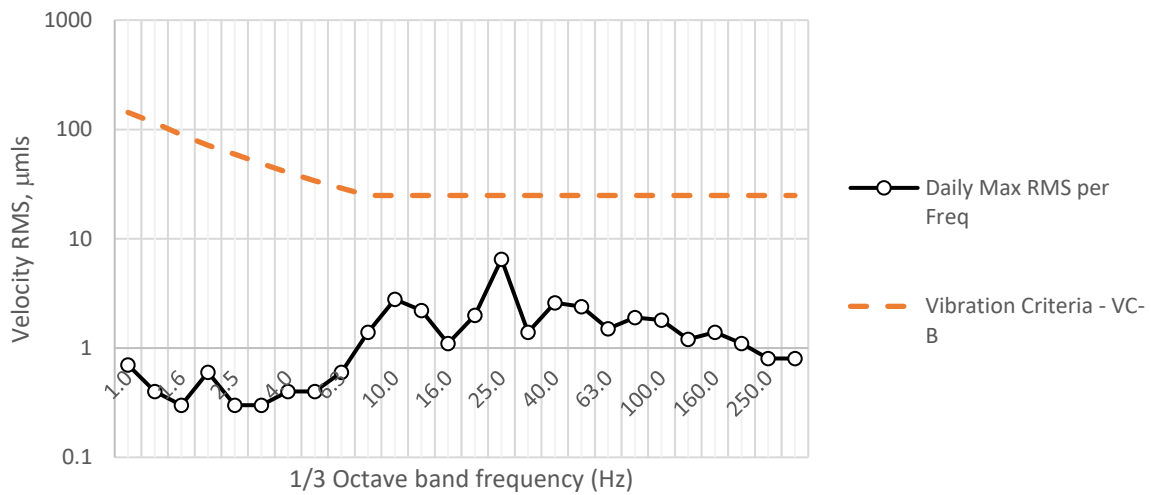
### Vertical Vibration



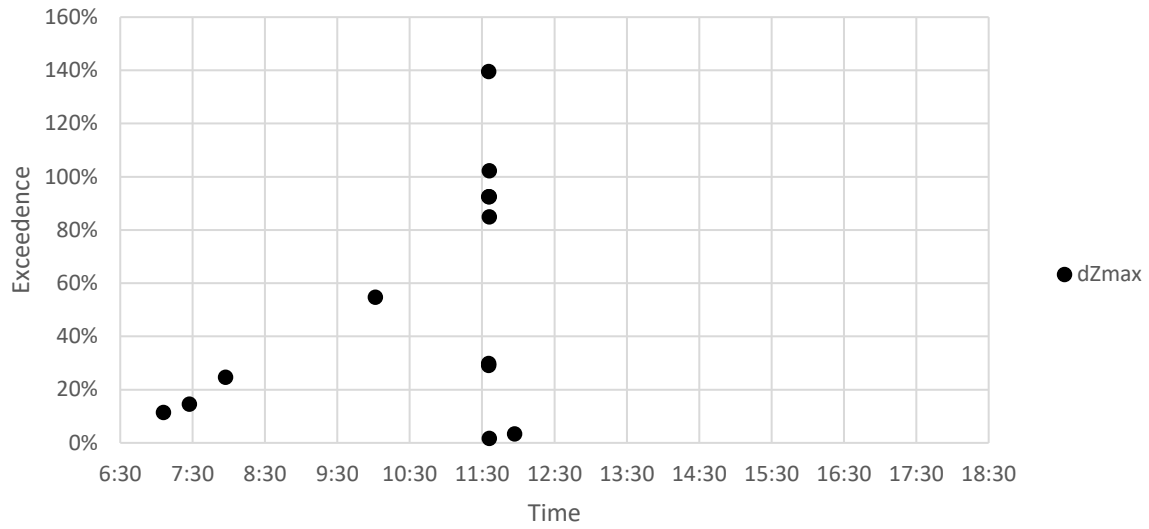
### FwdBackwd Vibration



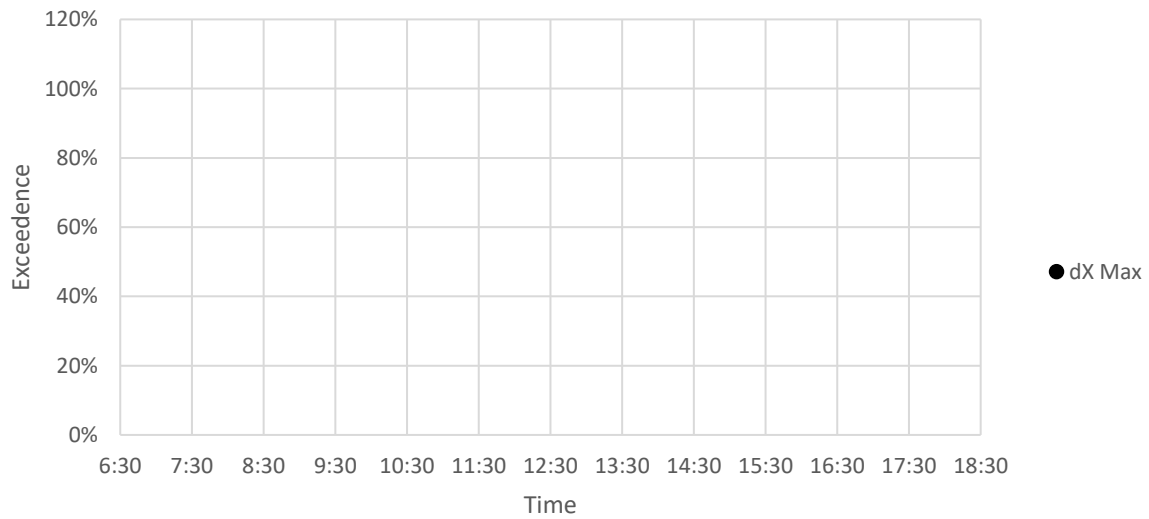
### Sideways Vibration



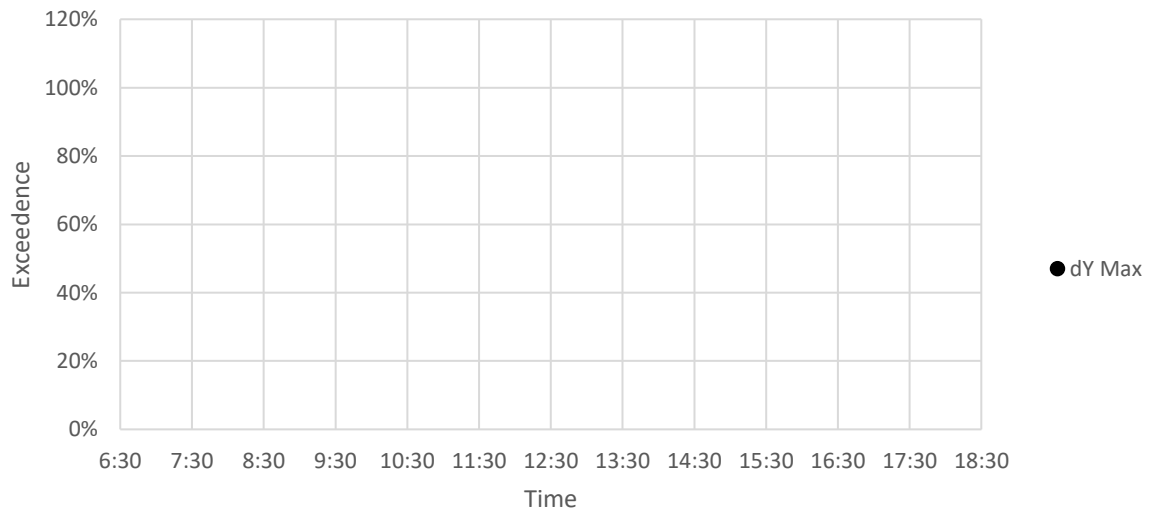
### Vertical



### Fwd/Backwards

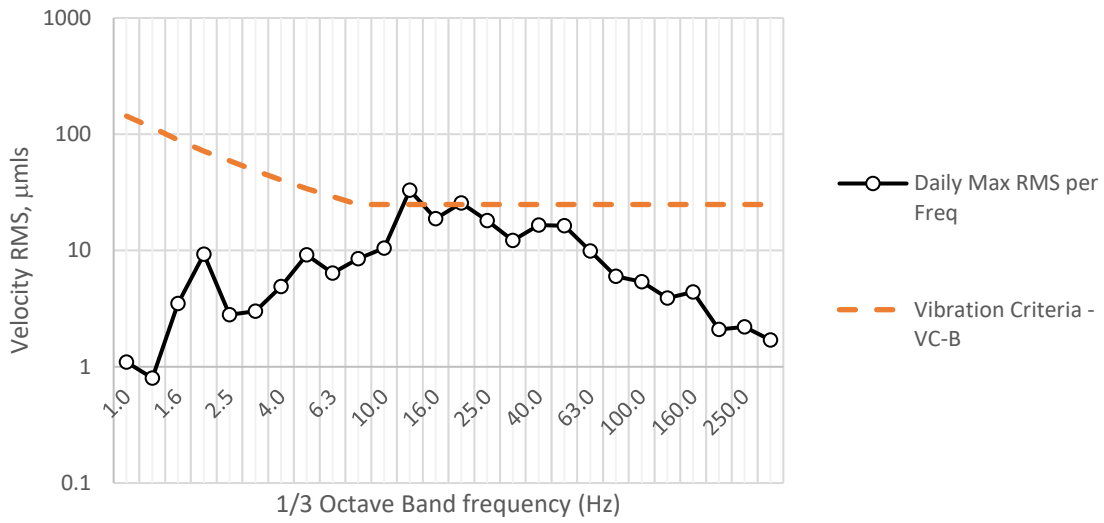


### Sideways

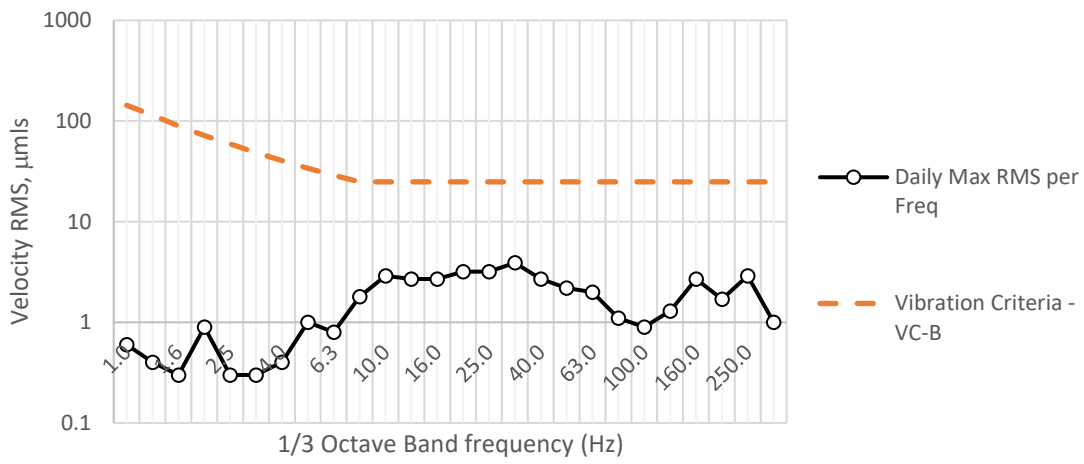




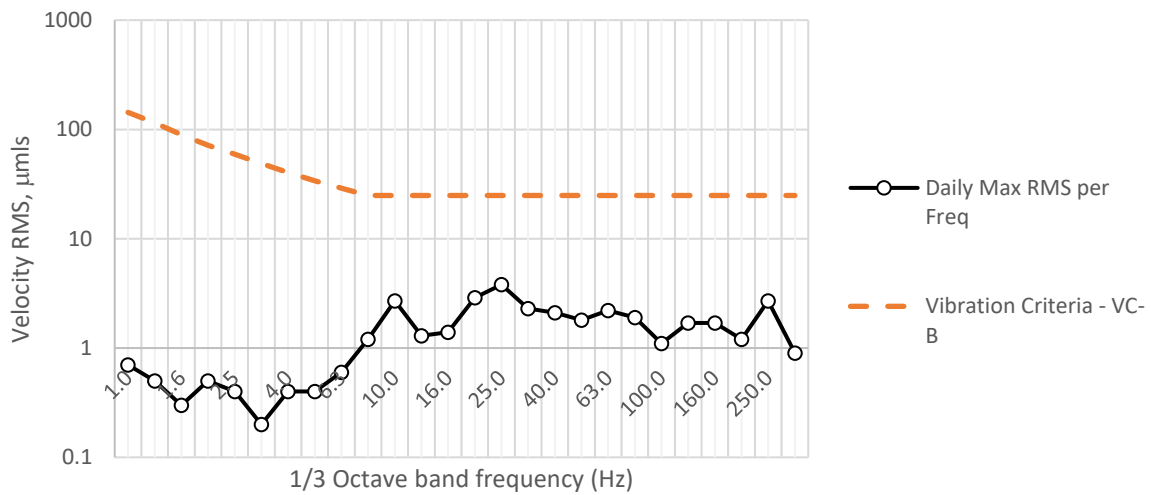
### Vertical Vibration



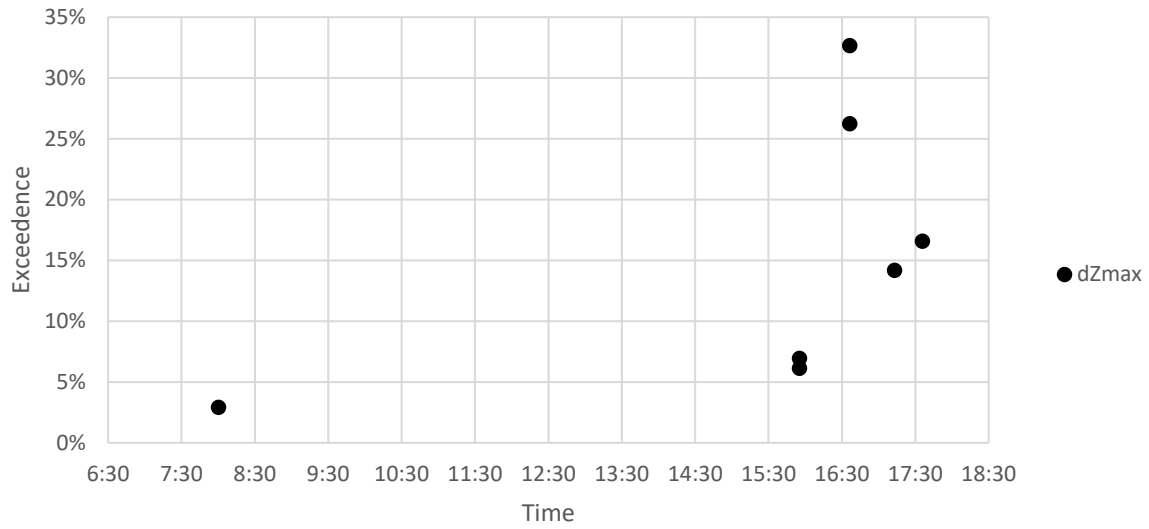
### FwdBackwd Vibration



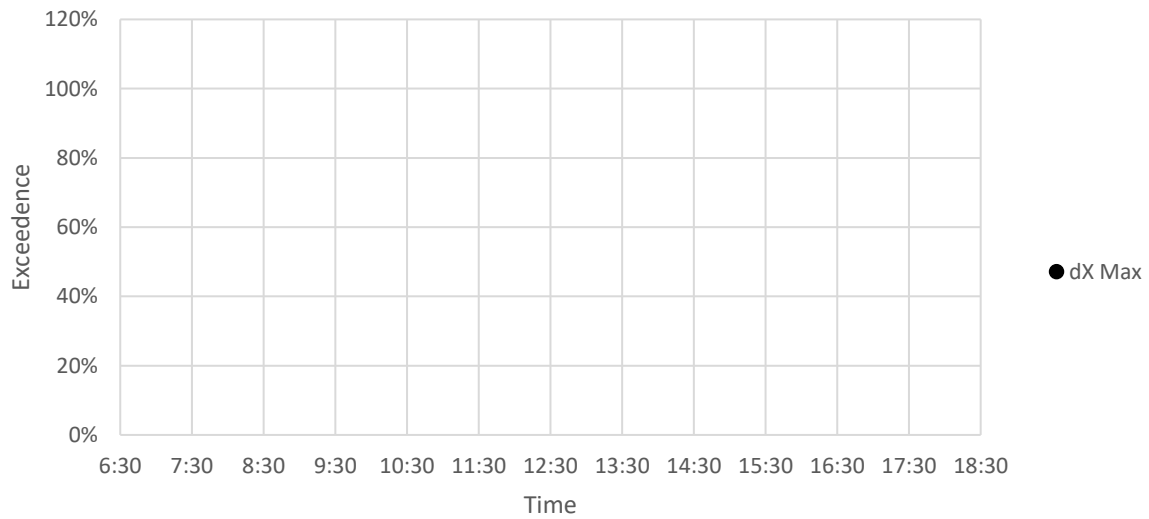
### Sideways Vibration



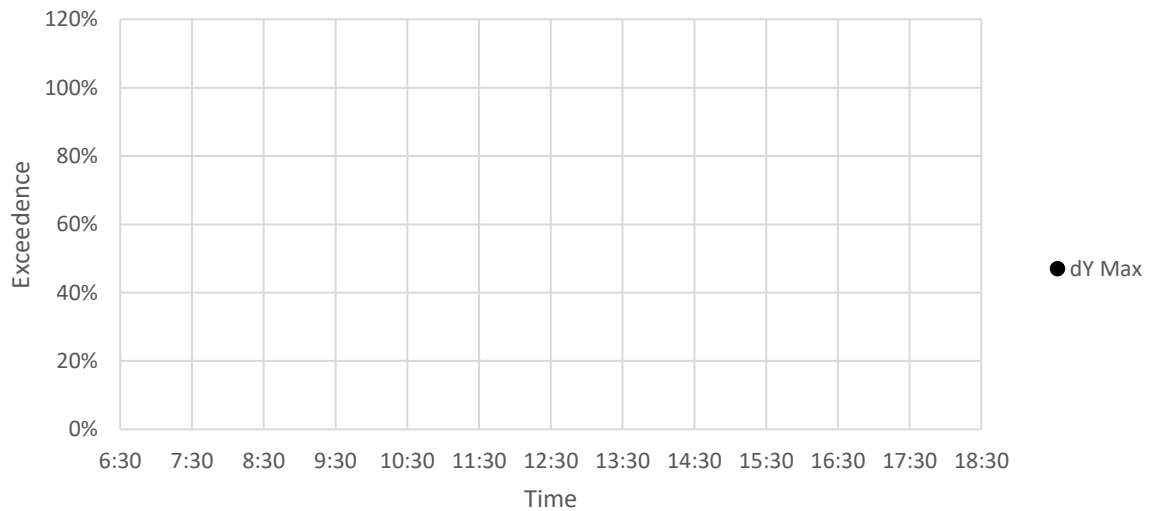
### Vertical



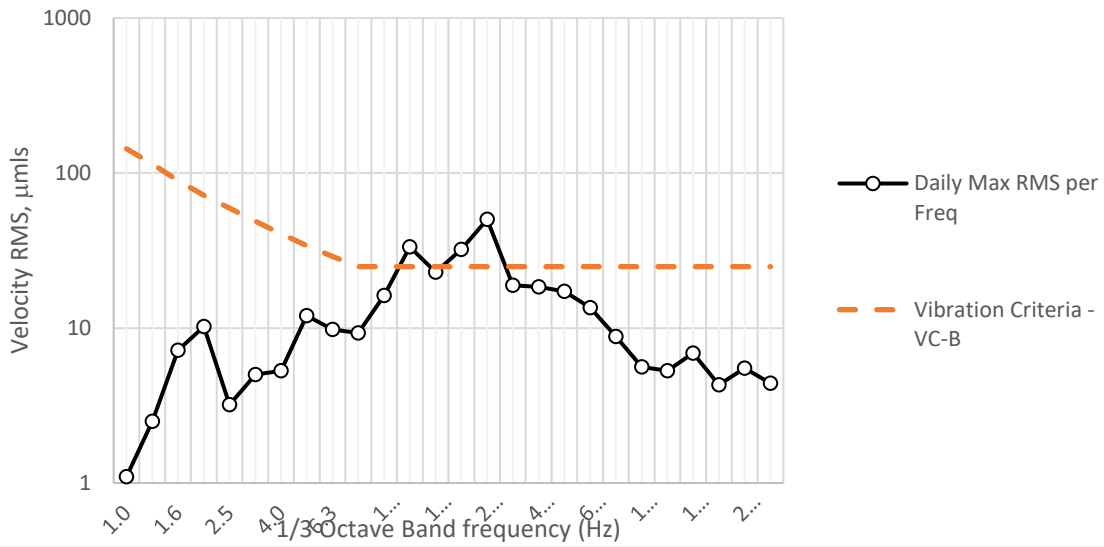
### Fwd/Backwards



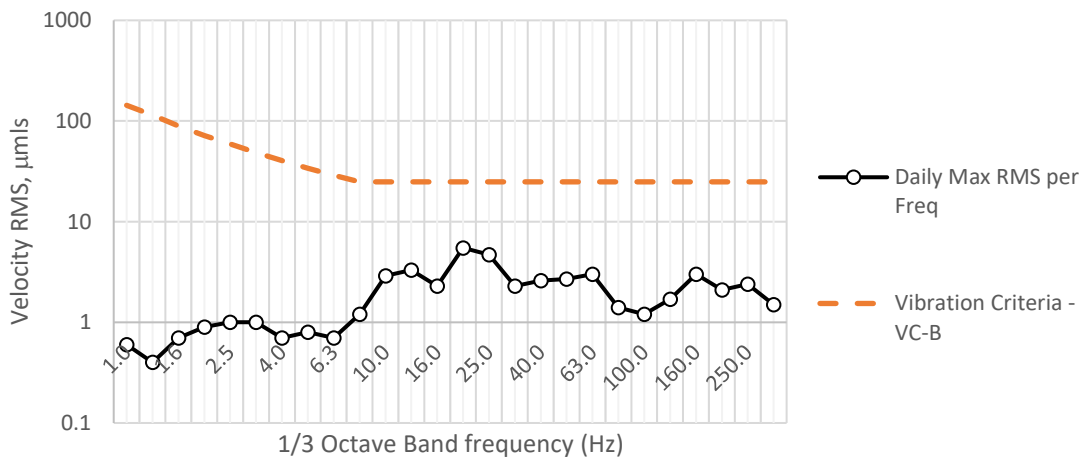
### Sideways



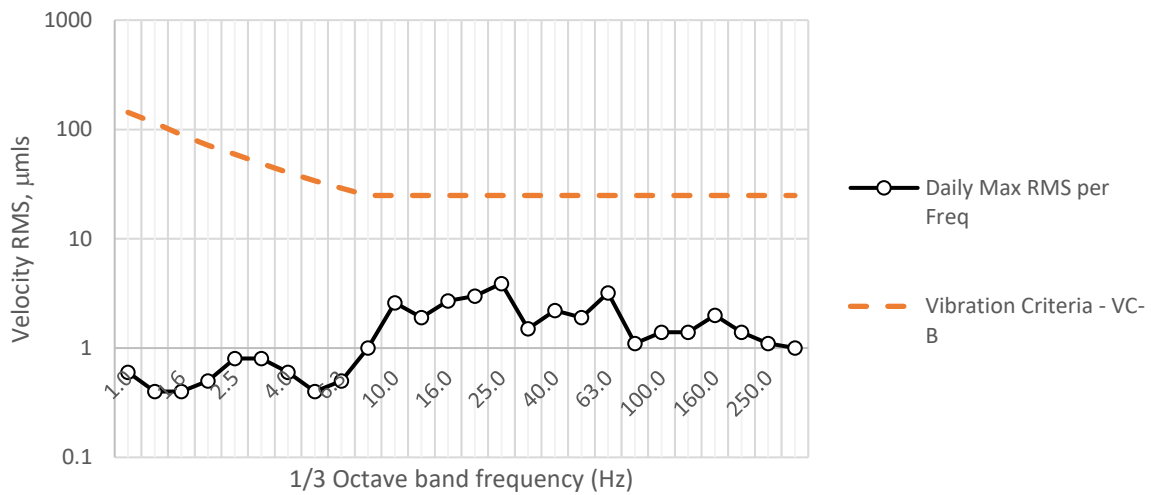
### Vertical Vibration



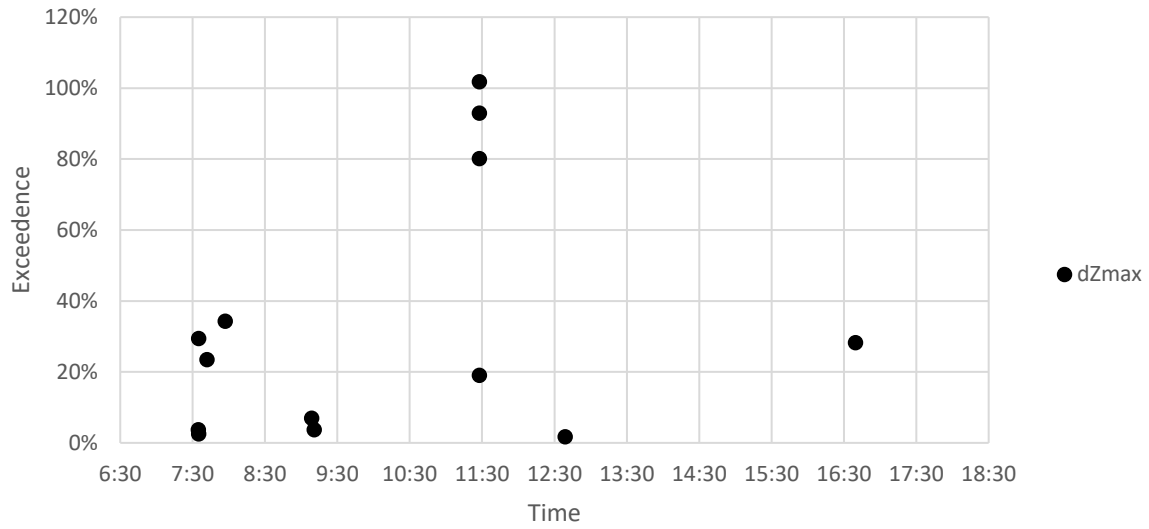
### FwdBackwd Vibration



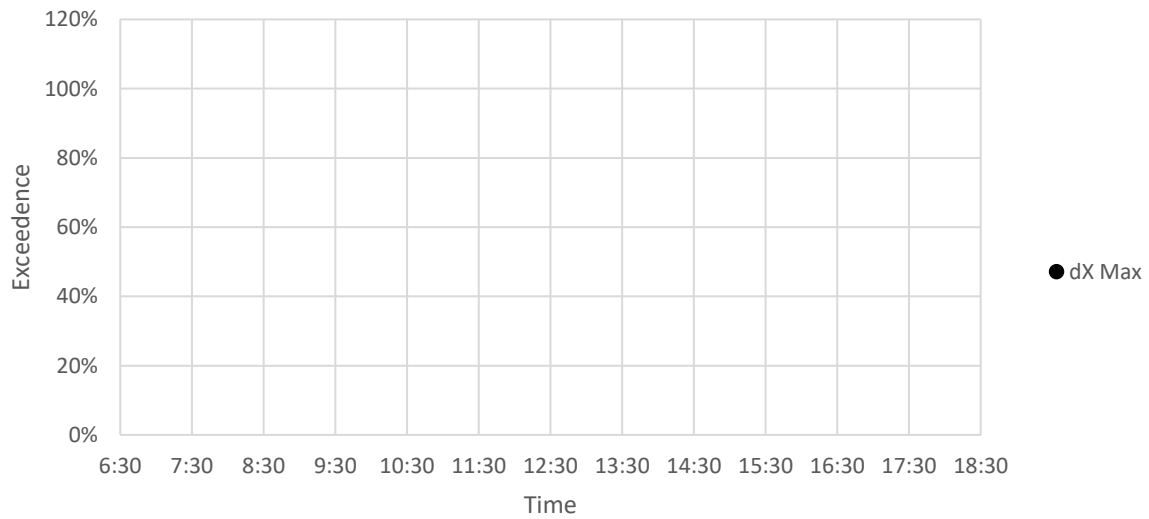
### Sideways Vibration



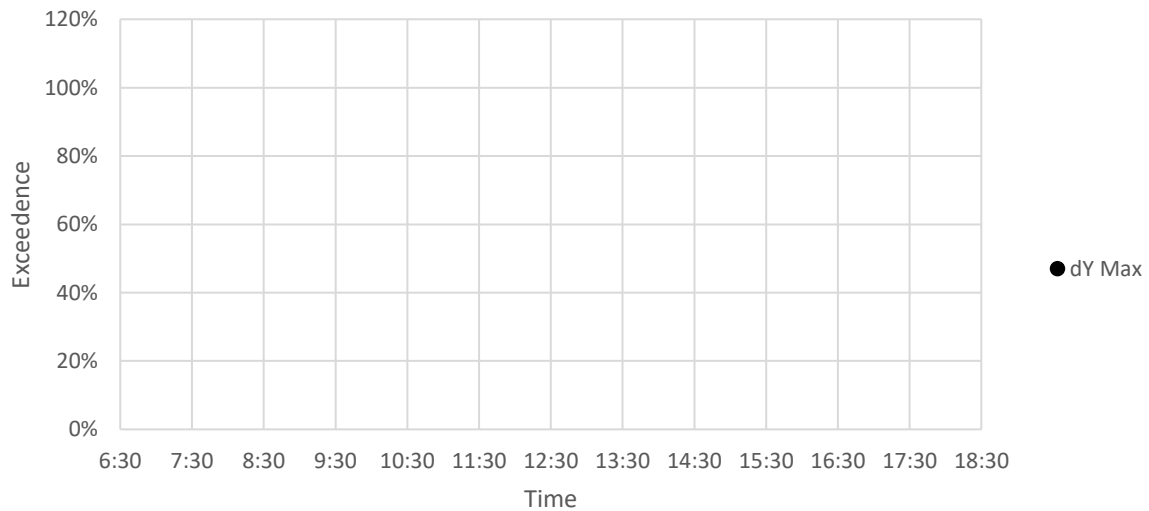
### Vertical



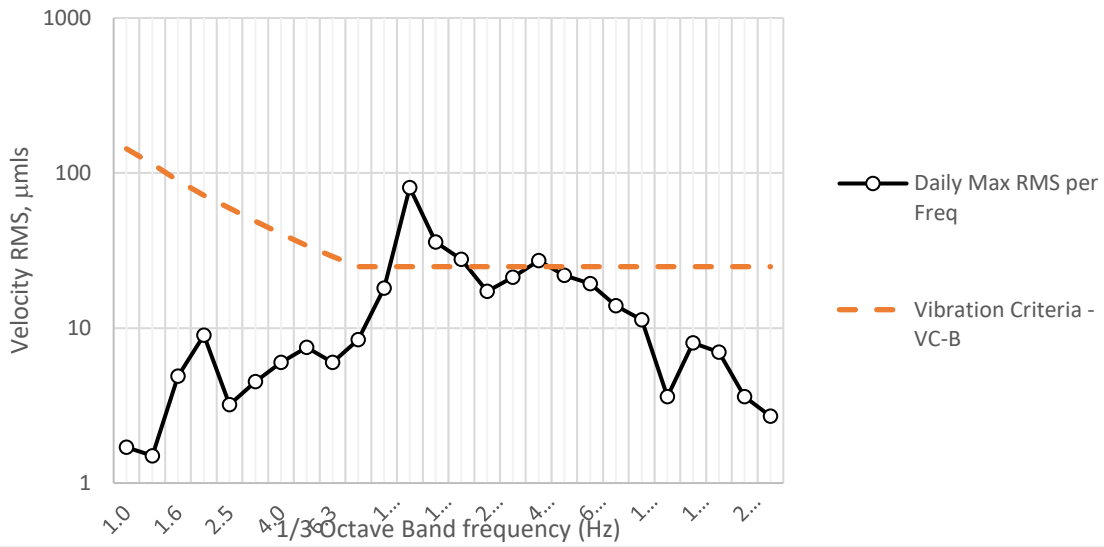
### Fwd/Backwards



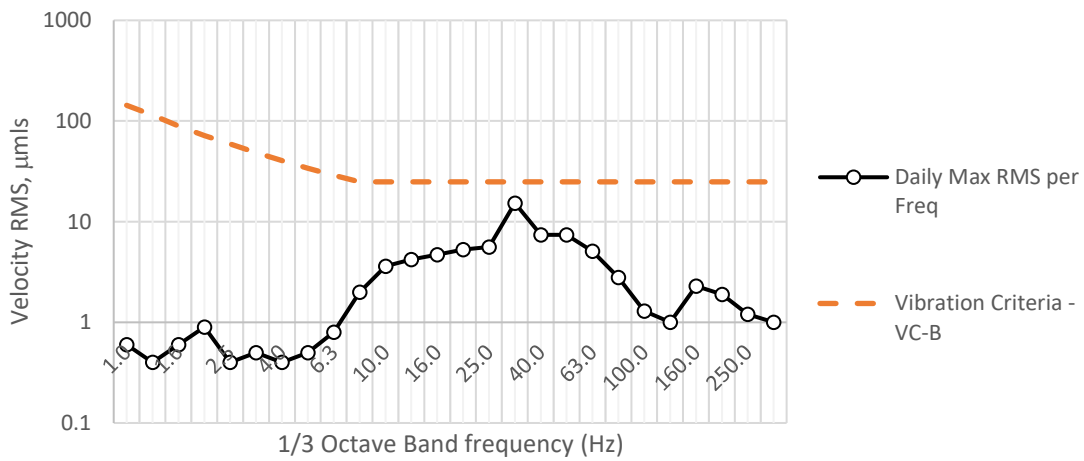
### Sideways



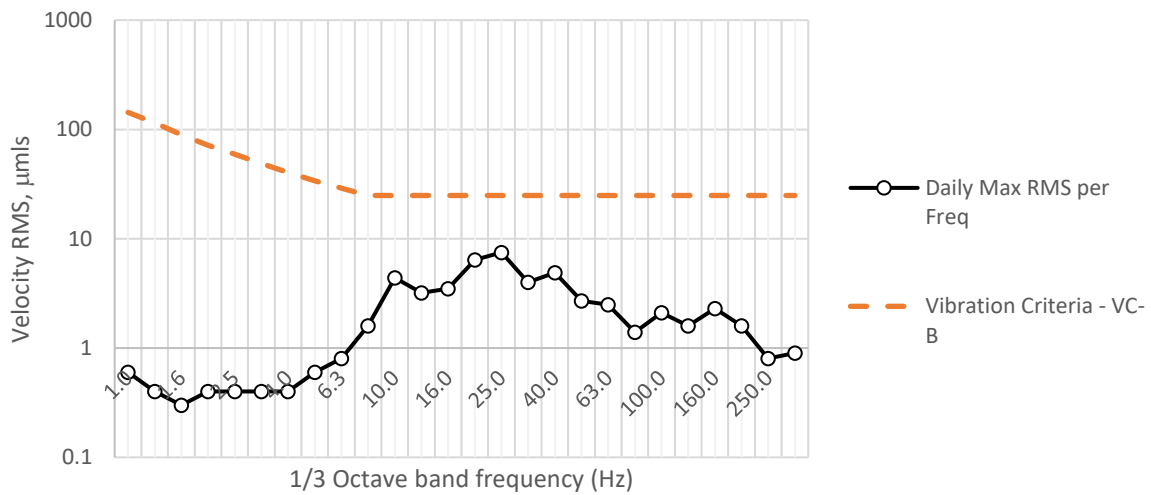
### Vertical Vibration



### FwdBackwd Vibration

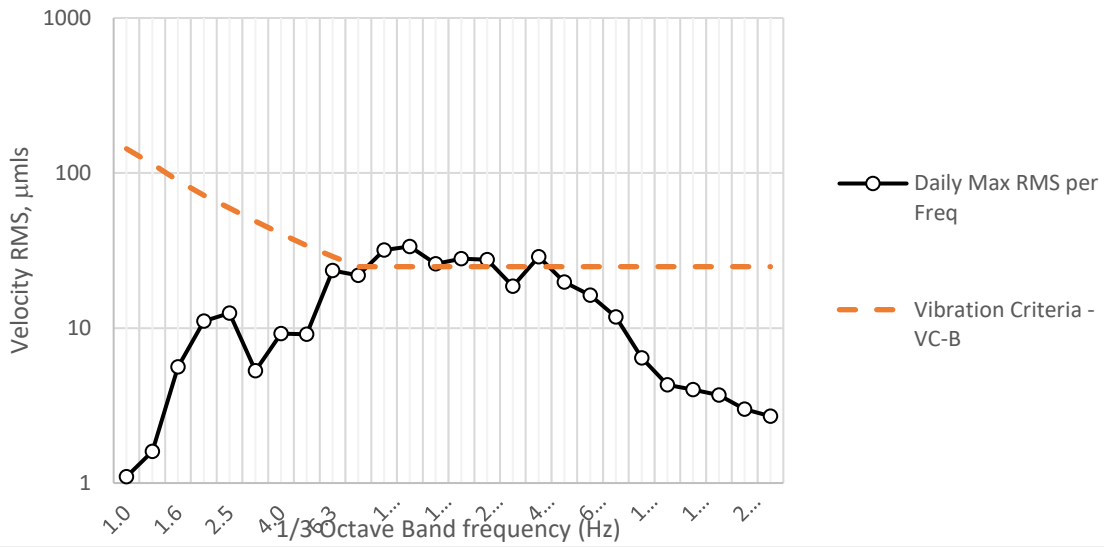


### Sideways Vibration

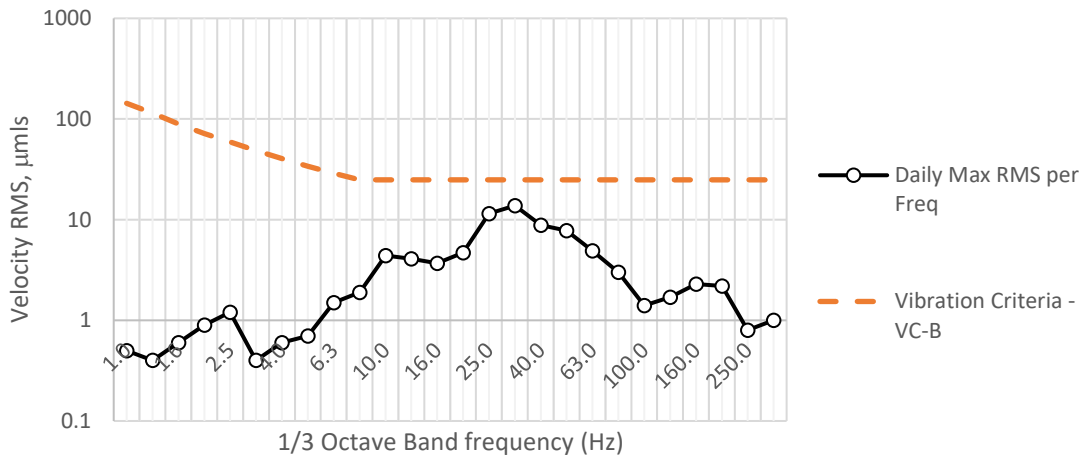




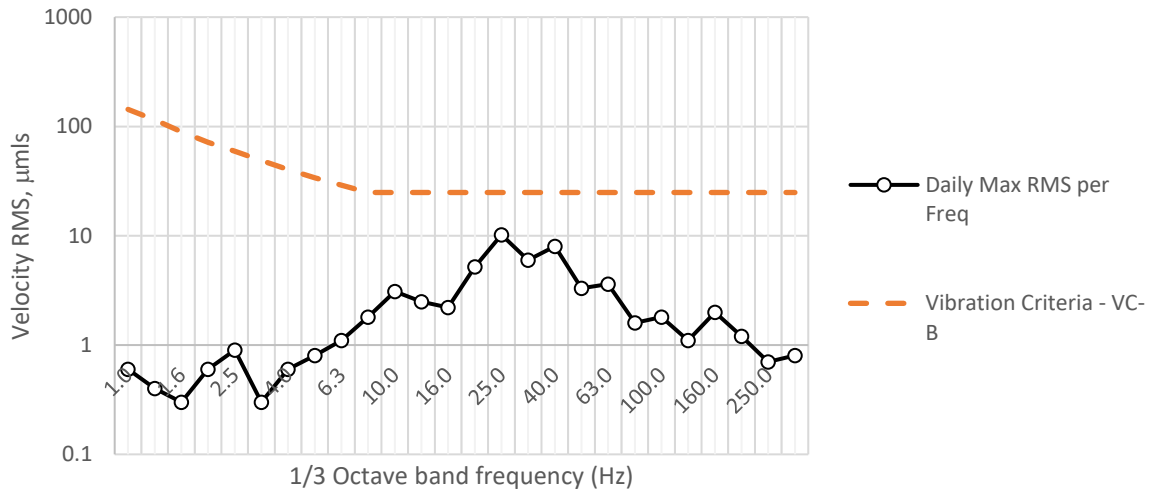
### Vertical Vibration



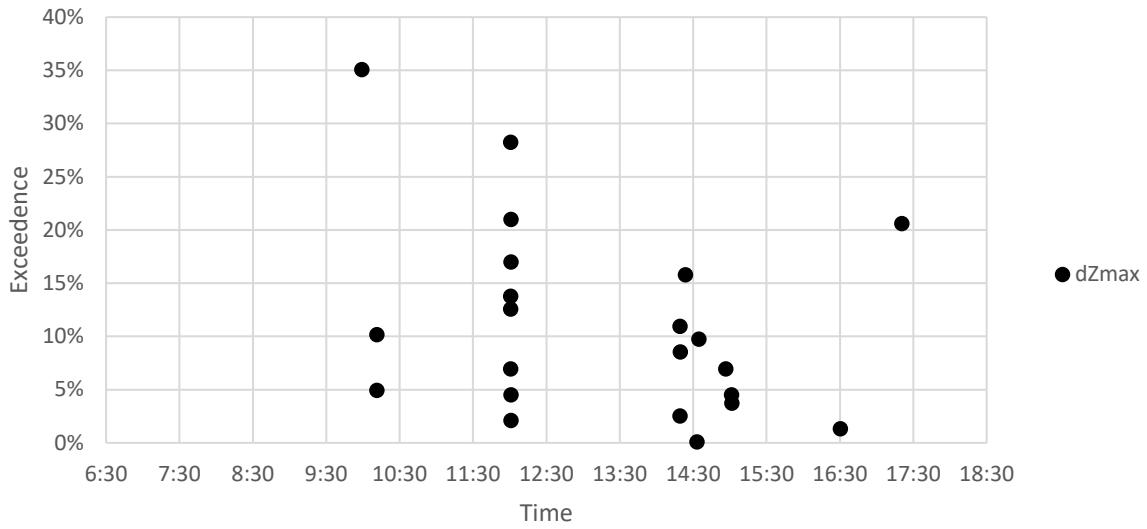
### FwdBackwd Vibration



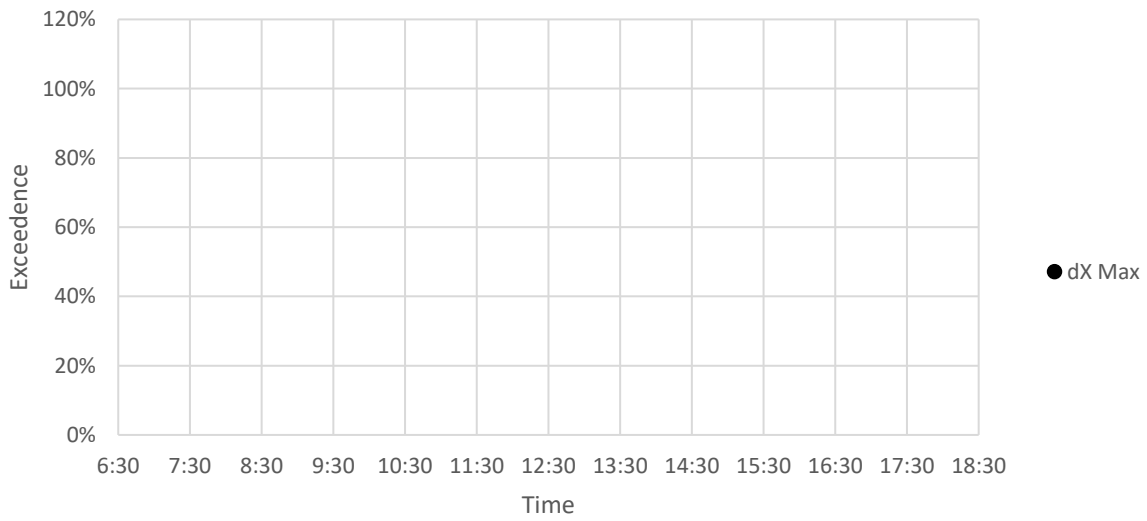
### Sideways Vibration



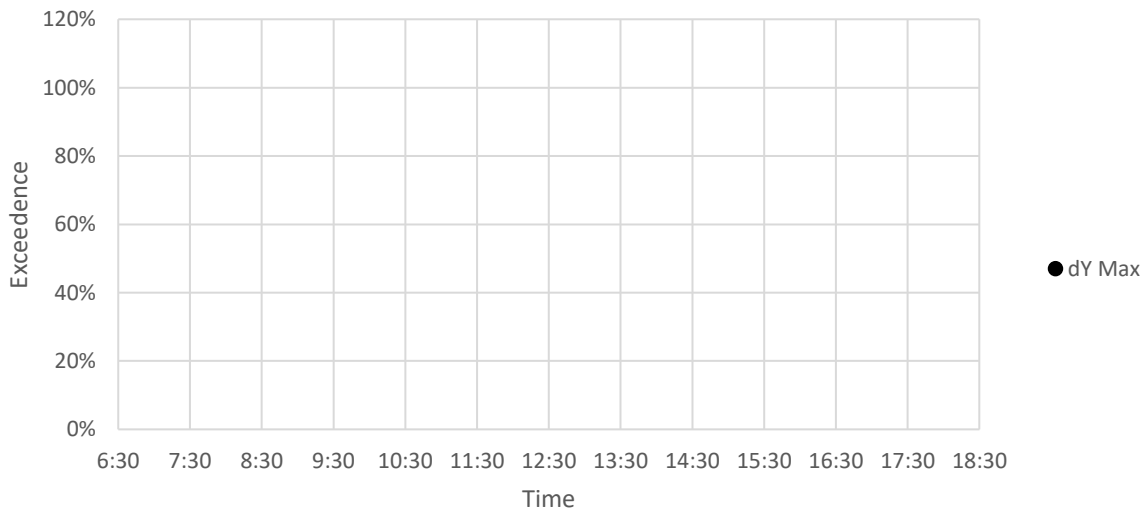
### Vertical



### Fwd/Backwards

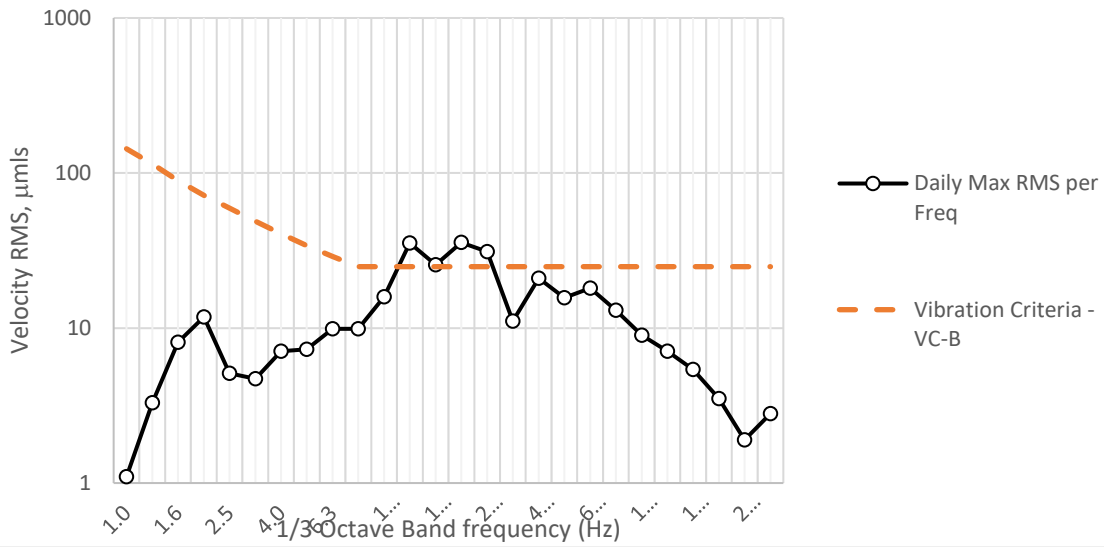


### Sideways

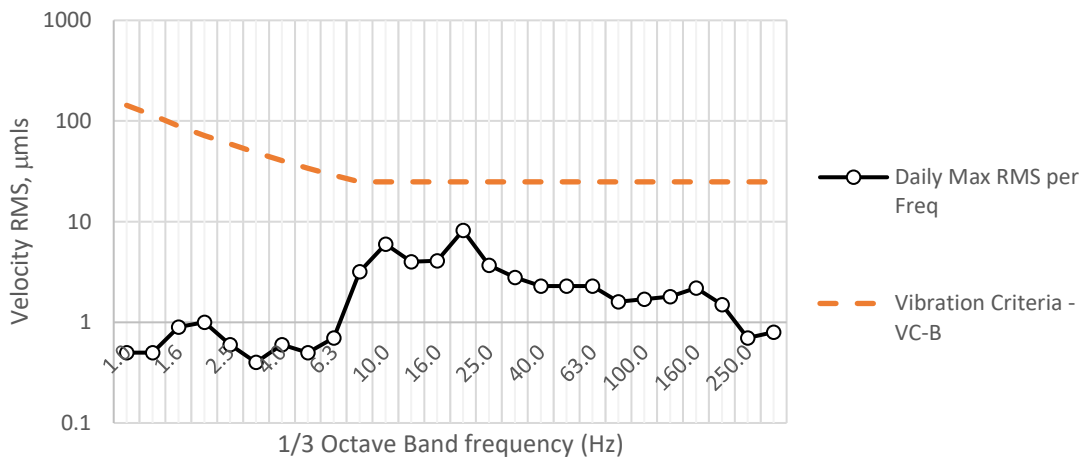




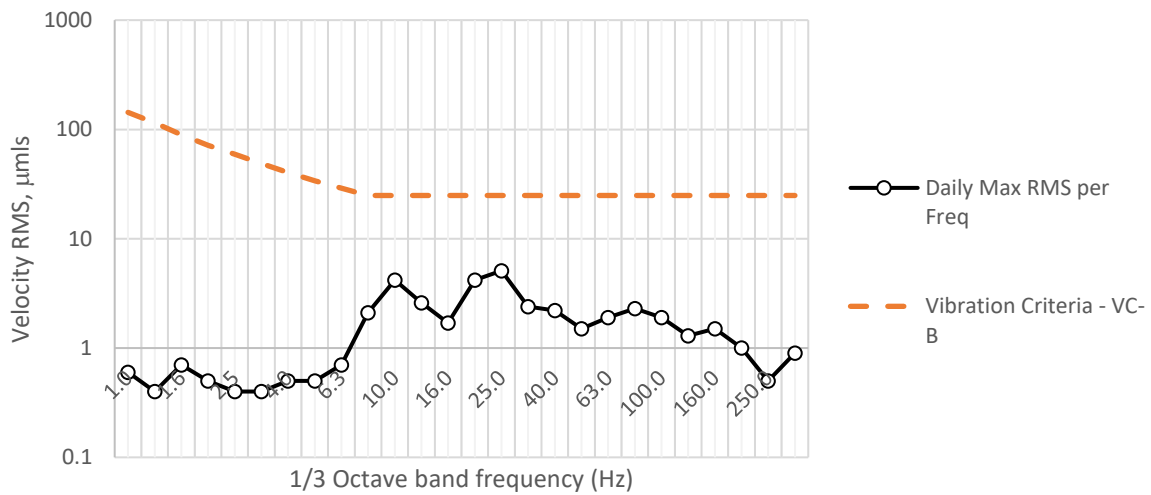
### Vertical Vibration



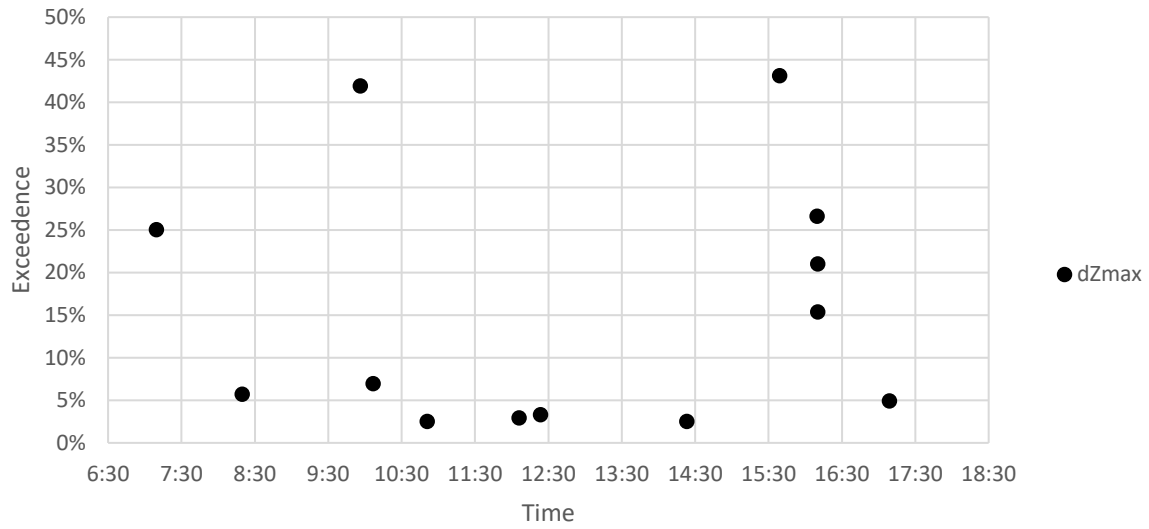
### FwdBackwd Vibration



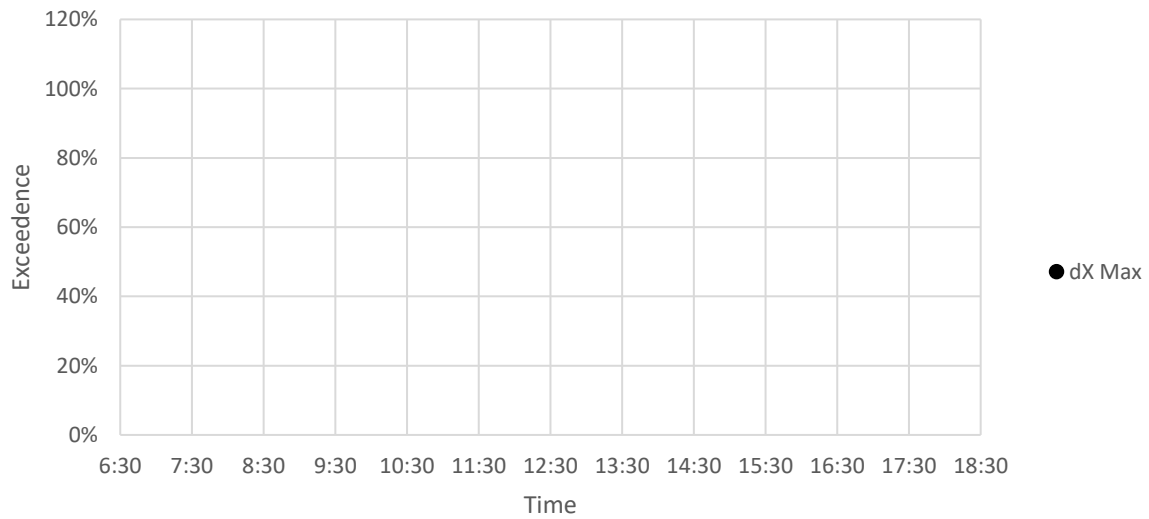
### Sideways Vibration



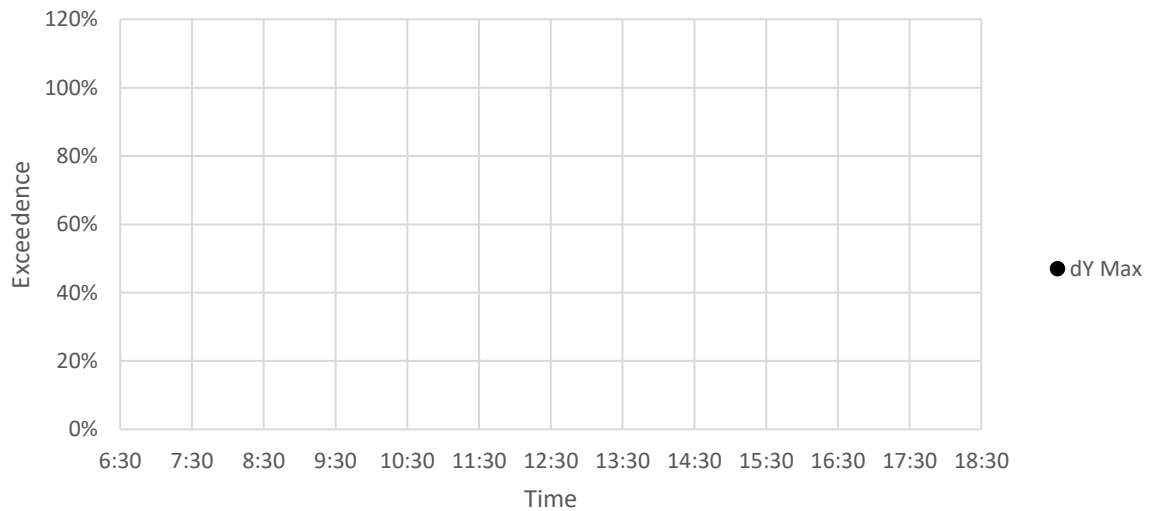
### Vertical



### Fwd/Backwards



### Sideways



## **CHARLES PERKINS CENTRE – LEVEL B1 SOUTHERN WING OBSERVATION ROOM E**

No exceedances occurred during the monitoring period (VC-A -  $50\mu\text{ms}^{-1}$ ).

## **RPA HOSPITAL MAIN BUILDING – LEVEL 03 NICU**

No exceedances occurred during the monitoring period.

## **OUTSIDE SUSAN WAKIL HEALTH BUILDING**

No exceedances occurred during the monitoring period.