

Royal Prince Alfred Hospital Redevelopment (RPAH
Redevelopment)

Construction Noise and Vibration Monitoring Report 1

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

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	23/01/2024	20230239.17/2301A/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.....	7
5	RESULTS	8
5.1	NOISE MONITONG RESULTS DISCUSSION	8
5.2	VIBRATION MONITORING RESULTS DISCUSSION	9
6	CONCLUSION.....	12
	APPENDIX A – NOISE MONITORING RESULTS.....	13
	CENTENARY INSTITUTE – LEVEL 4 SURGERY ROOM (SOUTHERN FAÇADE)	13
	OUTSIDE SUSAN WAKIL HEALTH BUILDING	14
	APPENDIX B – VIBRATION MONITORING RESULTS.....	15
	CENTENARY INSTITUTE – LEVEL 1 LASER IMAGING ROOM	15
	CENTENARY INSTITUTE – LEVEL 3 FISH TANKS	16
	CENTENARY INSTITUTE – LEVEL 4 SURGERY ROOM (SOUTHERN FAÇADE)	17
	CENTENARY INSTITUTE – LEVEL 4 BATHROOM (NORTHERN FAÇADE)	18
	CHARLES PERKINS CENTRE – LEVEL B1 SOUTHERN CORRIDOR	19
	CHARLES PERKINS CENTRE – LEVEL B1 SOUTHERN WING OBSERVATION ROOM E.....	20
	OUTSIDE SUSAN WAKIL HEALTH BUILDING	21

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 first fortnight since the beginning of construction monitoring, being between Thursday 23rd November, 2023 and Wednesday 06th December, 2023.

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
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.

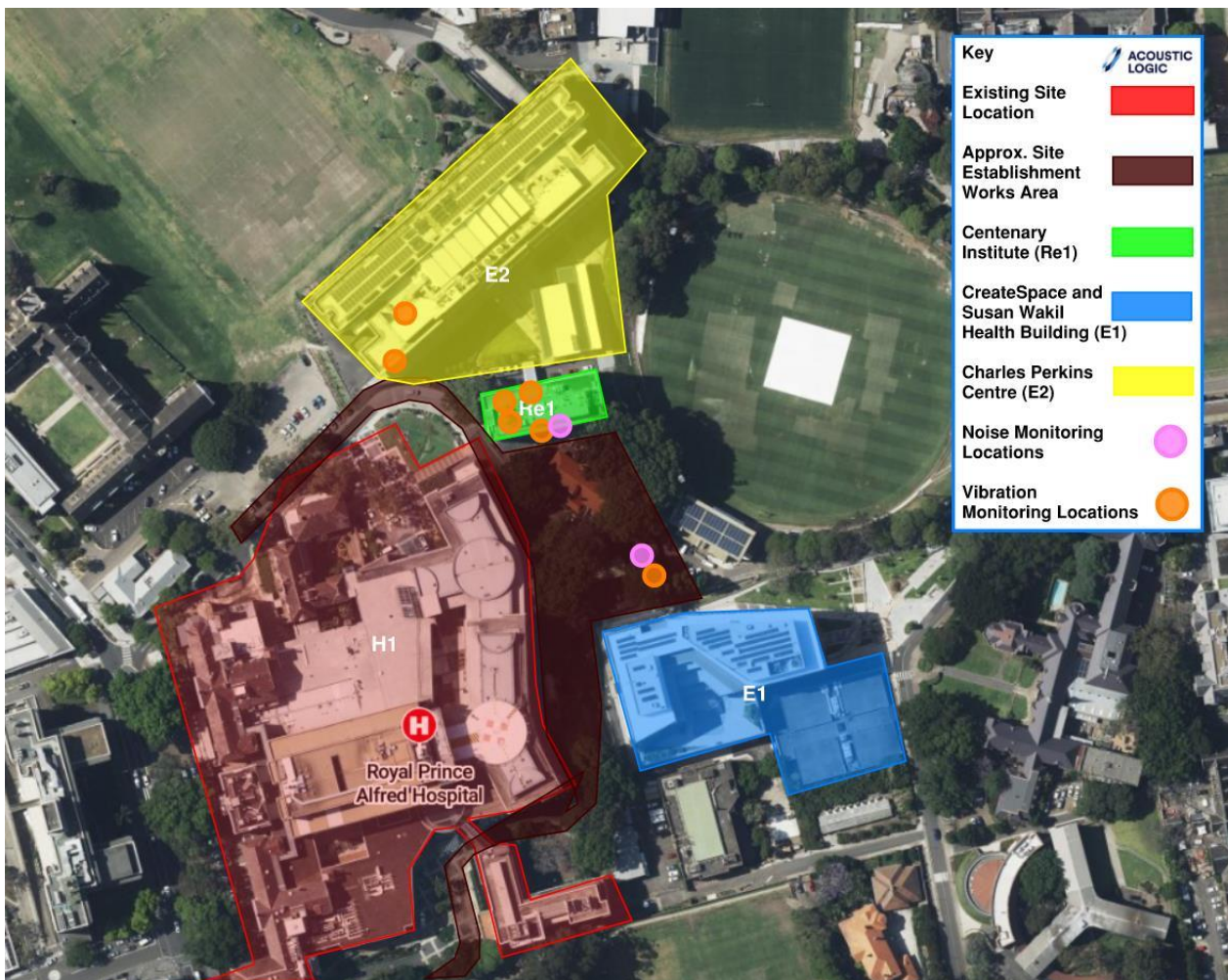


Figure 1: Aerial Site Map with Nearest Sensitive Receivers (Sourced from Sixmaps)

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):

Table 2 – Noise Management Levels

Receiver	Room Usage	Noise Management Level dB(A) $L_{eq}(15min)$
E1 and E2	All	45 (Internally)
R1	Laser Scanning Microscope	58 (Internally)
	Animal Housing / Breeding / Observation Rooms	64 (Internally)
	Rat Operating Room	46 (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, prepared by this office for the project (Ref: 20230239.17/0412A/R1/LA):

Table 3 – Summarised Proposed Project Vibration Limits

Receiver	Location	Vibration Criteria (μms^{-1})
Re1 Centenary Institute	L1 Laser Room	VC-C (ASHRAE Handbook) (12.5 μms^{-1}) RMS Velocity
	L3 Fish Tank Room	400 μms^{-1} Peak Particle Velocity
	L4 – Animal Behaviour / Holding / Breeding Rooms	VC-A (ASHRAE Handbook) (50 μms^{-1}) RMS Velocity
E1 Createspace and Susan Wakil Health Building	All spaces	DIN 4150-3 Type 1 Criteria (20,000 μms^{-1} / 20 mms^{-1}) Peak Particle Velocity
E2 Charles Perkins Centre	Imaging Equipment (Southern Wing Corridor)	VC-B (ASHRAE Handbook) (25 μms^{-1}) RMS Velocity
	Animal Behaviour / Holding / Breeding Rooms	200 μms^{-1} Peak Particle 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.

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

- Centenary Institute Level 4 Surgery (Southern Façade).
- 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.
- Outside Susan Wakil Health Building, on grade.

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

- Centenary Institute:
 - Level 1 Laser Imaging Room.
 - Level 4 Surgery (Southern Façade).
 - Level 4 Change Rooms (Northern Façade)
- Charles Perkins Centre Level B1, Southern Wing Corridor.

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

5 RESULTS

Appendix A presents the results of the noise monitoring, whilst Appendix B presents the results of the vibration monitoring for 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.

With regards to the noise monitor in place within the L4 Surgery Room of Centenary Institute, we note the following:

- Noise levels are generally in accordance with the noise management levels for Rat Operating Rooms provided within Section 3 of this letter.
- Where the recorded noise levels are above this noise management level, these occurrences are generally marginal, sporadic and isolated, and do not generally correspond with measurements of increased construction noise as recorded by other noise monitoring stations surrounding the project site.
- Based on the above, increased noise levels may not inherently be a product of the construction activity, noting that the monitor installed internally in Centenary Institute is also subject to measuring any internal operational noise within the facility.
- Noise levels are always in accordance with the noise management levels for animal behavioural, holding and breeding spaces.

With regards to the noise monitor in place for the Susan Wakil Health Building, we note the following:

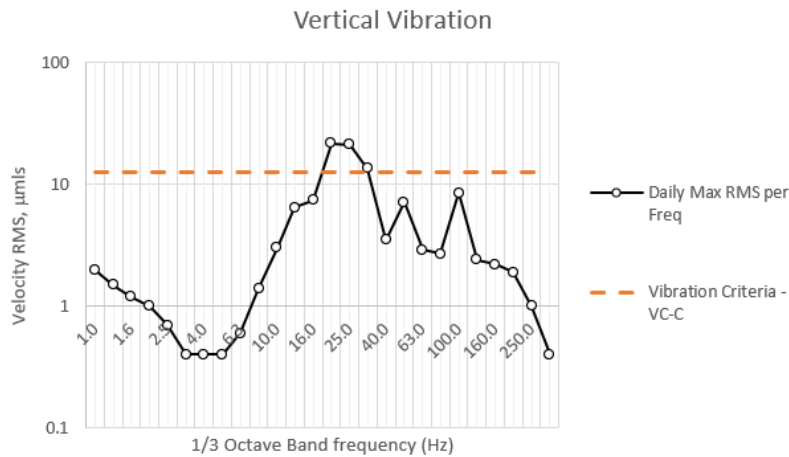
- The monitor maintained outside of the Susan Wakil Health Building is maintained within the demolition site boundary and is approximately 15m closer to the area of the works than the façade of the Susan Wakil Health Building.
- Noting this increased distance attenuation, in conjunction with the transmission 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.
- Hence, the noise levels generated by construction works, measured by this monitoring station are shown to adhere to the noise management levels provided within Section 3 of this letter.

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.
- Centenary Institute:
 - Level 1 – Laser Imaging Room:
 - Measured vibration levels throughout the monitoring period show ongoing exceedances of the VC-C vibration criteria.
 - Exceedances are measured throughout the monitoring period, including on Saturdays and Sundays, where it has been confirmed to this office that no works were being undertaken during this monitoring period. The measured vertical vibration velocities recorded on Sunday 26th November, 2023, are provided below for reference, noting that exceedances at individual frequencies were measured on 13 separate occasions between 6.30am and 6:30pm, despite no works being undertaken during this period.

Monitor Location: Centenary Institute - L1 Laser Imaging Room 26/11/2023



Monitor Location: Centenary Institute - L1 Laser Imaging Room 26/11/2023

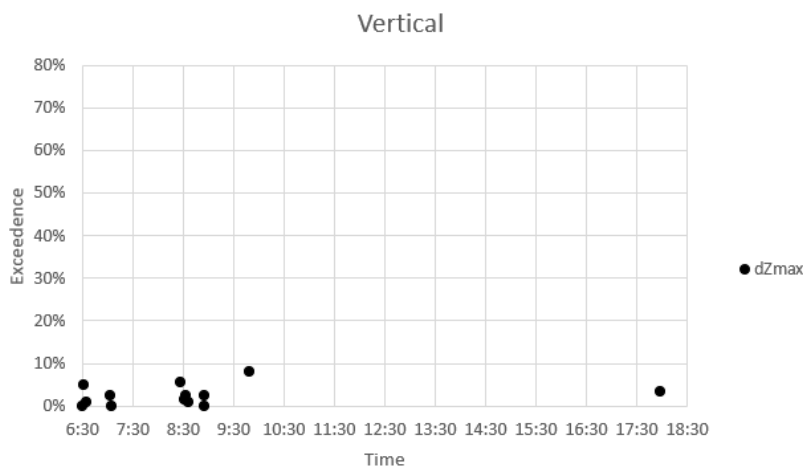


Figure 2: Sunday 26th November 2023 Laser Imaging Room Results

- Generally, exceedances are sporadic and varying in nature and magnitude. This would generally not be considered consistent with vibration impacts expected from construction activity, noting that construction vibration tends to show gradual peaks of exceedances as continuous construction activity occurs.
 - Due to the highly sensitive vibration criteria set for this space, there are various sources of vibration impacting the monitoring station exclusive of the construction activity which may result in “Phantom” exceedances of criteria within the monitored space.
 - Sources of vibration which may incite phantom exceedances may include, but are not limited to, footsteps (Both within the monitored room and in adjacent rooms), moving of materials and equipment, and operation of surrounding equipment which may produce vibration.
 - Based on this, it can be concluded that the use of VC-C vibration criteria for this space, as currently in place, is not appropriate for the management of vibration impacts on the laser imaging space, as exceedances due to construction activity will not be able to be discerned separate to other operational vibration sources.
 - Hence, AL propose that an increase of vibration criteria to the ASHRAE Handbook VC-B curve be implemented for the Laser Imaging Space moving forward.
 - This criterion will hence be referenced in future monitoring reports.
- Level 3 Fish Tanks and Level 4 Animal Testing:
 - No exceedances of the relevant imposed vibration criteria were observed during the monitoring period.
- Charles Perkins Centre:
 - Continuous exceedances of criteria were observed at both monitors within CPC at approximately 3:00pm-3:30pm on the 23rd November, 2023, and between 10:00am and 11:00am on 06th December, 2023, however AL note that these exceedances were caused by maintenance undertaken by this office on the monitoring stations during this period, and are hence not the result of construction activity.
 - Southern Corridor (Imaging):
 - Exceedances are measured throughout the monitoring period, including on Saturdays and Sundays, where it has been confirmed to this office that no works were being undertaken during this monitoring period. The measured vertical vibration velocities recorded on Sunday 26th November, 2023, are provided below for reference, noting that exceedances at individual frequencies were measured on 4 separate occasions between 6.30am and 6:30pm, despite no works being undertaken during this period.

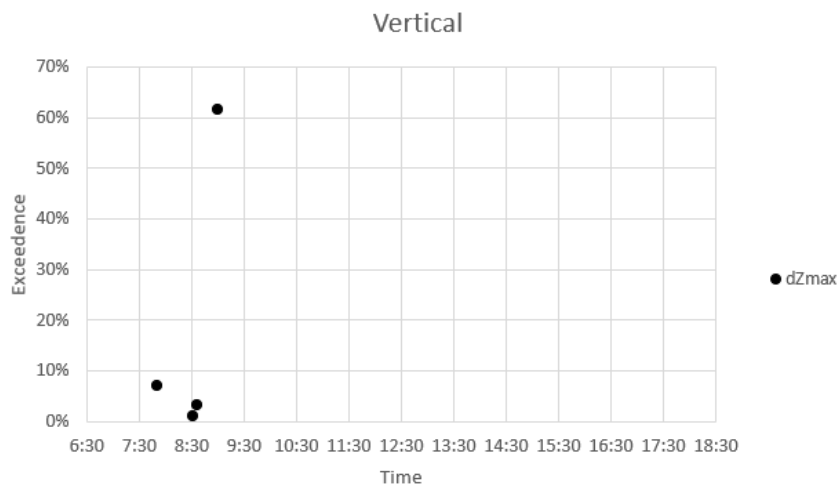
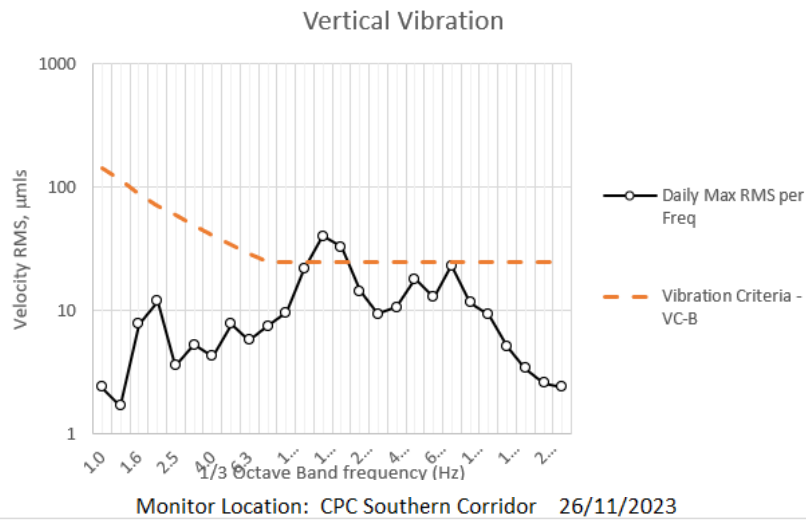


Figure 3: Sunday 26th November 2023 Southern Corridor Results

- Generally, exceedances are sporadic and varying in nature and magnitude, exclusive of the events on 23/11 and 06/12 as discussed above. These sporadic exceedances would generally not be considered consistent with vibration impacts expected from construction activity, noting that construction vibration tends to show gradual peaks of exceedances as continuous construction activity occurs.
 - Whilst it is expected that the measured exceedances are considered to occur due to operational activity within the facility, as opposed to construction activity, exceedances at this monitoring station are not as frequent as when compared with the exceedances of the VC-C curve measured during this monitoring period at the Laser Imaging Monitoring Station within Centenary Institute.
 - Based on these exceedances, the use of vibration curve VC-B may not be appropriate for the monitoring of vibration impacts on the B1 imaging equipment, and the use of this curve for criteria will be assessed throughout future monitoring periods in order to assess its validity for controlling construction vibration.
- Observation Room E:
 - No exceedances of the relevant imposed vibration criteria were observed during the monitoring period.

- Susan Wakil Health Building:
 - One exceedance was observed on 27/11/2023. It was confirmed to this office that this exceedance was caused by work on the hoarding in which the monitor was chained to, and therefore the resultant vibration levels at the receiver would inherently be compliant with the vibration criteria outlined within Section 3 of this document.
 - Exclusive of the above, no other exceedances of criteria were observed during the 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 Thursday 23rd November 2023 and Wednesday 06th December 2023.

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* report, also prepared by this office (Ref: 20230239.9/0610A/R1/LA and 20230239.17/0412A/R1/LA).

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

As per Section 5.2 and based upon the results of the monitoring, an increase of vibration criteria from the ASHRAE VC-C Curve to the ASHRAE VC-B curve for the Centenary Institute L1 Laser Imagin space will be implemented in all future monitoring reports, in order to allow for a more accurate assessment of construction impacts on the use.

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

Yours faithfully,



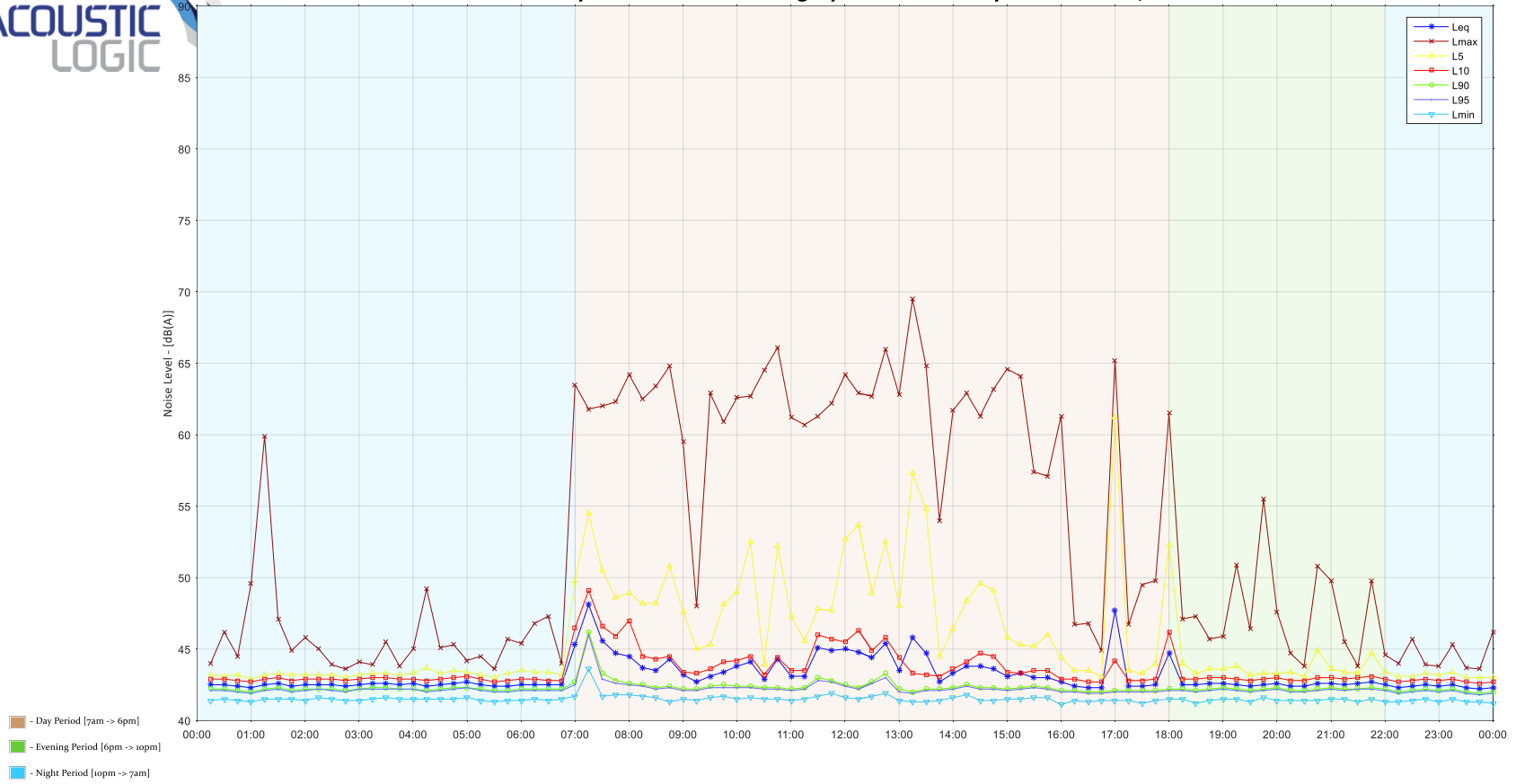
Acoustic Logic Pty Ltd
Lachlan Abood

APPENDIX A – NOISE MONITORING RESULTS

CENTENARY INSTITUTE – LEVEL 4 SURGERY ROOM (SOUTHERN FAÇADE)

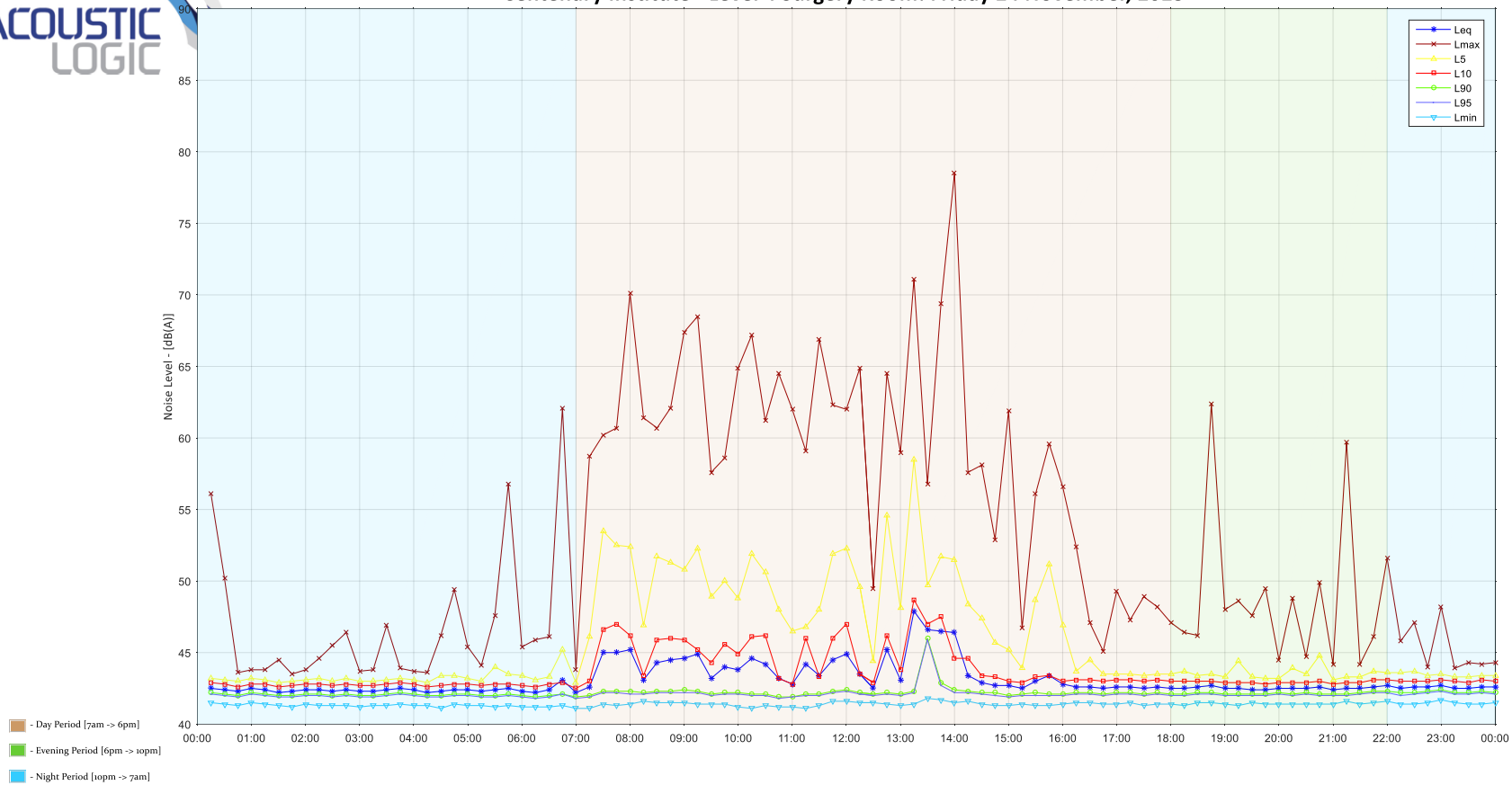


Centenary Institute - Level 4 Surgery Room: Thursday 23 November, 2023



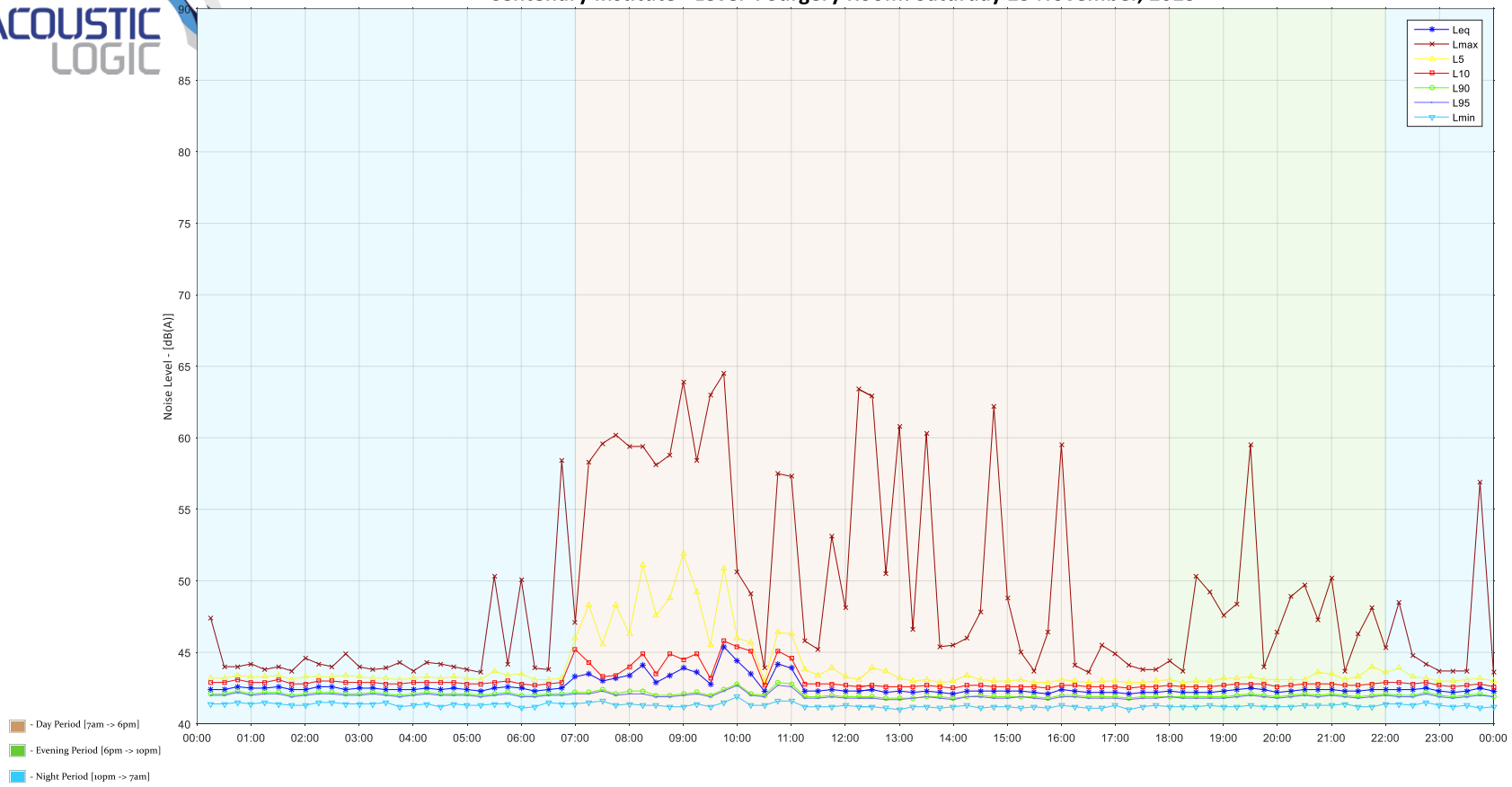


Centenary Institute - Level 4 Surgery Room: Friday 24 November, 2023



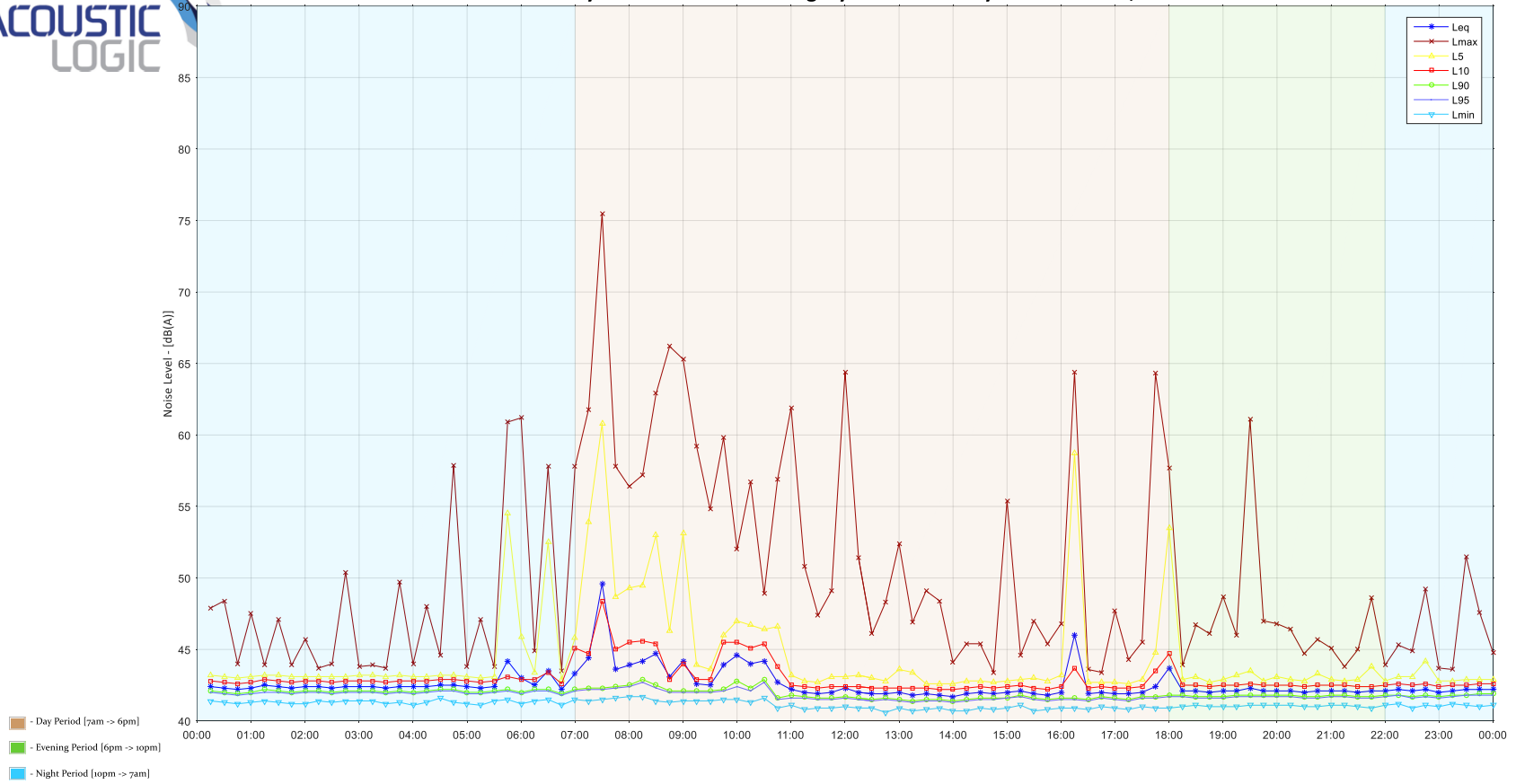


Centenary Institute - Level 4 Surgery Room: Saturday 25 November, 2023



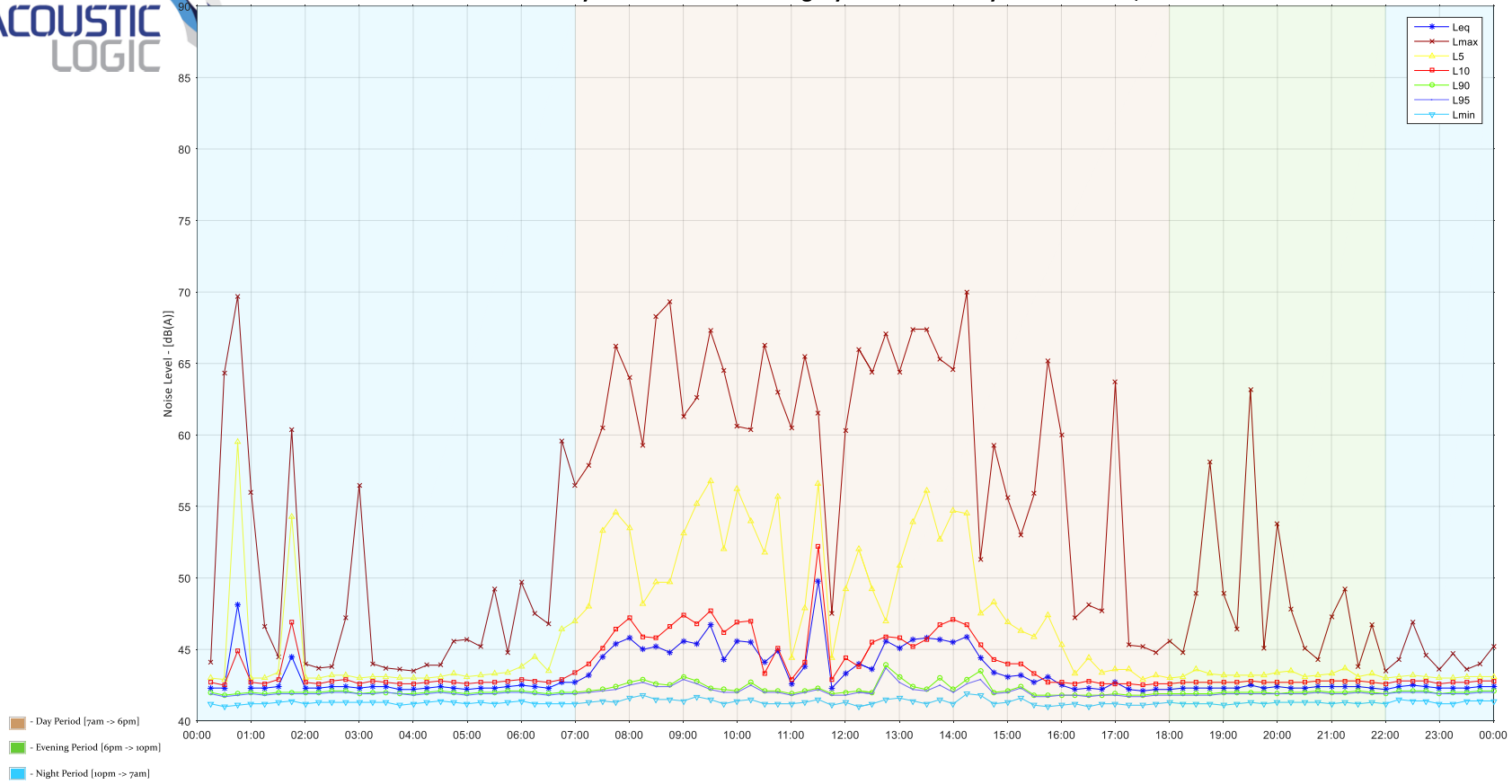


Centenary Institute - Level 4 Surgery Room: Sunday 26 November, 2023



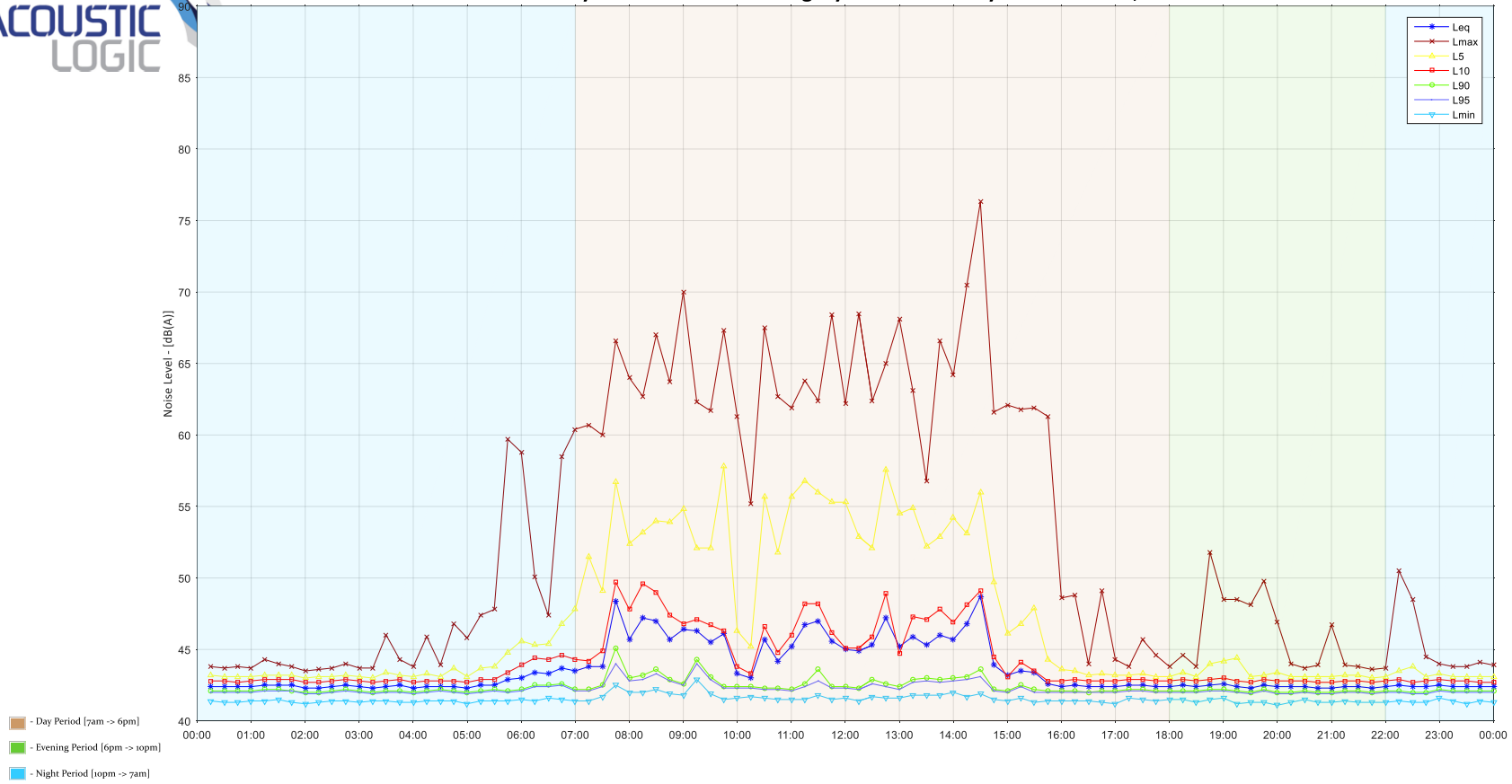


Centenary Institute - Level 4 Surgery Room: Monday 27 November, 2023



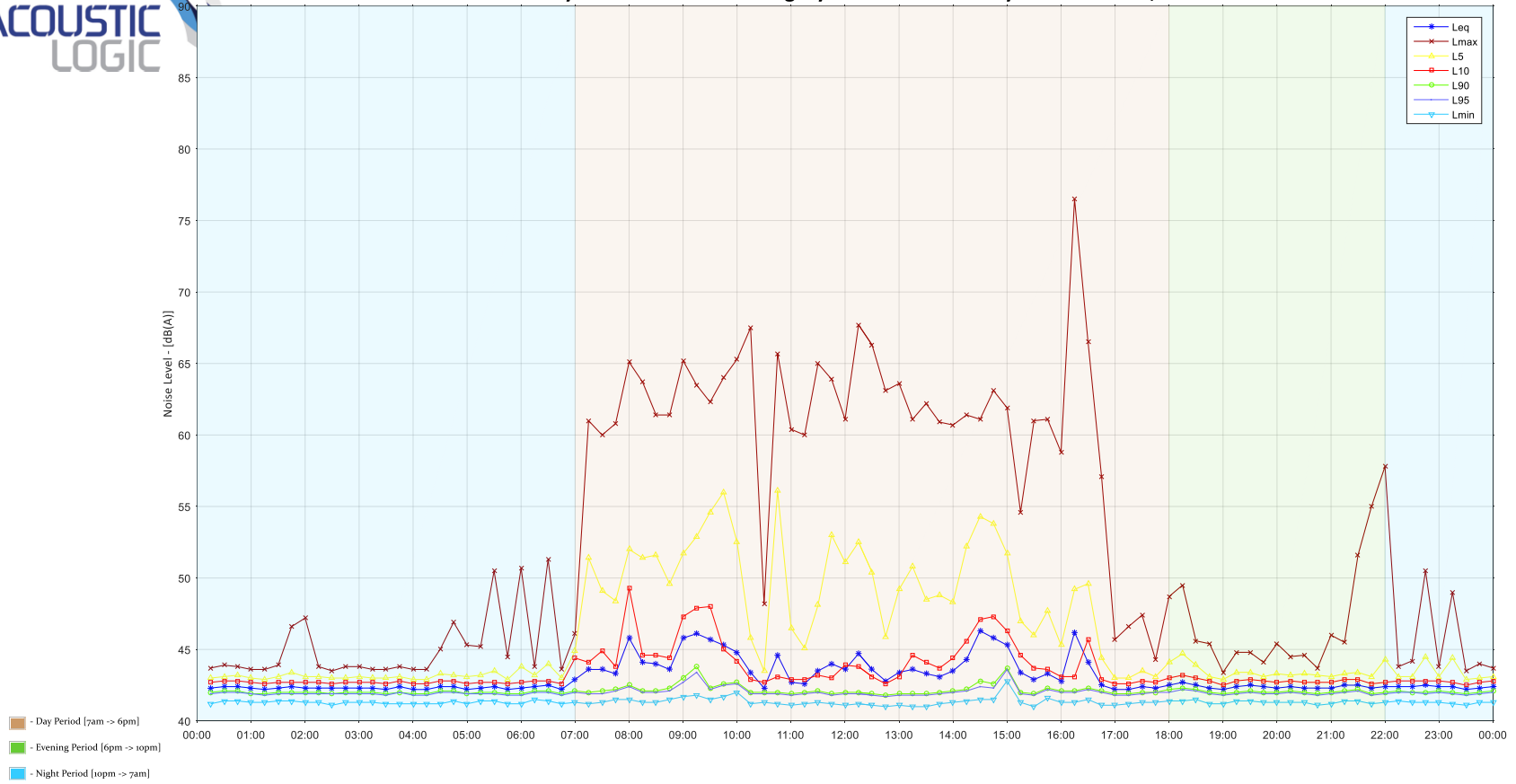


Centenary Institute - Level 4 Surgery Room: Tuesday 28 November, 2023



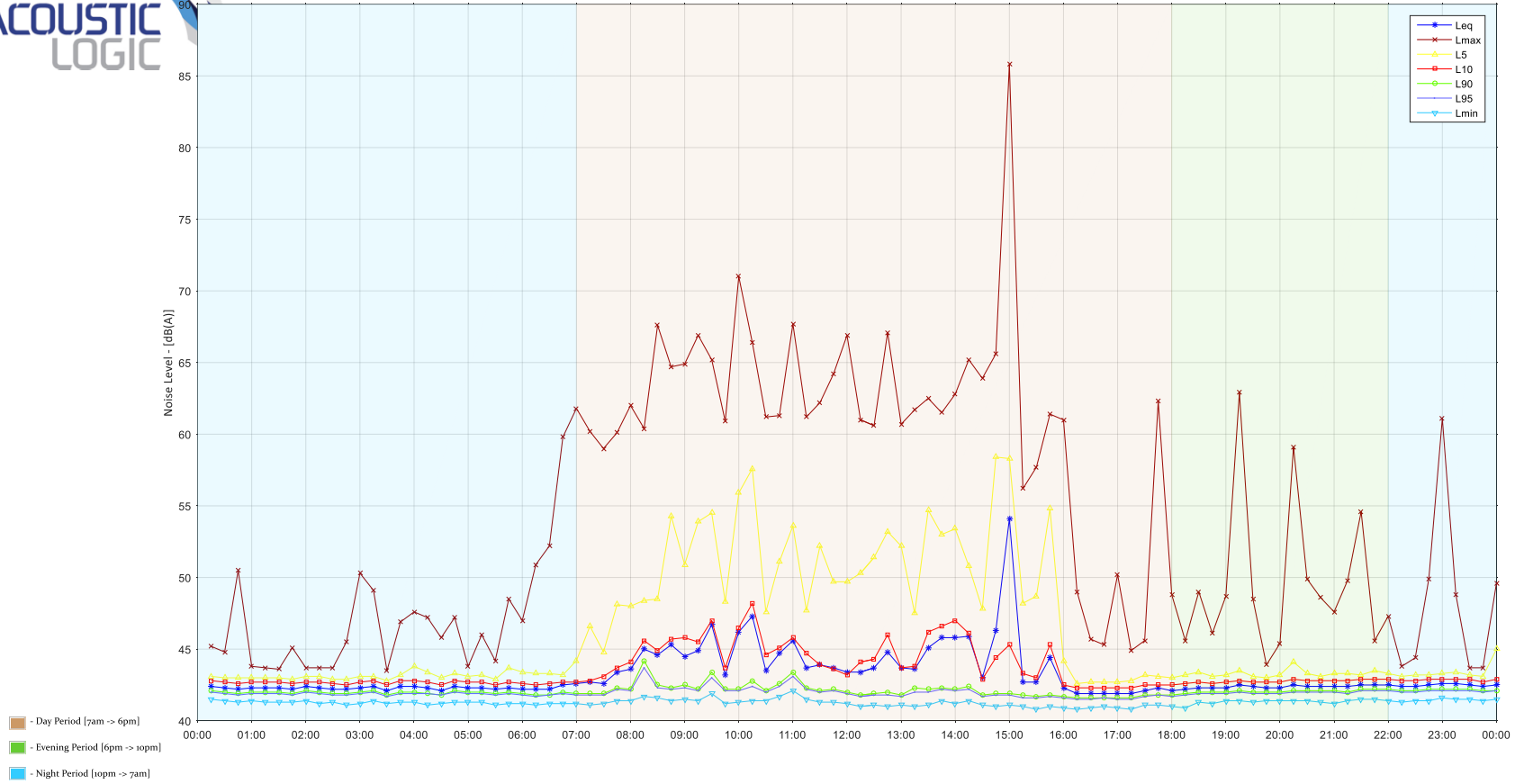


Centenary Institute - Level 4 Surgery Room: Wednesday 29 November, 2023



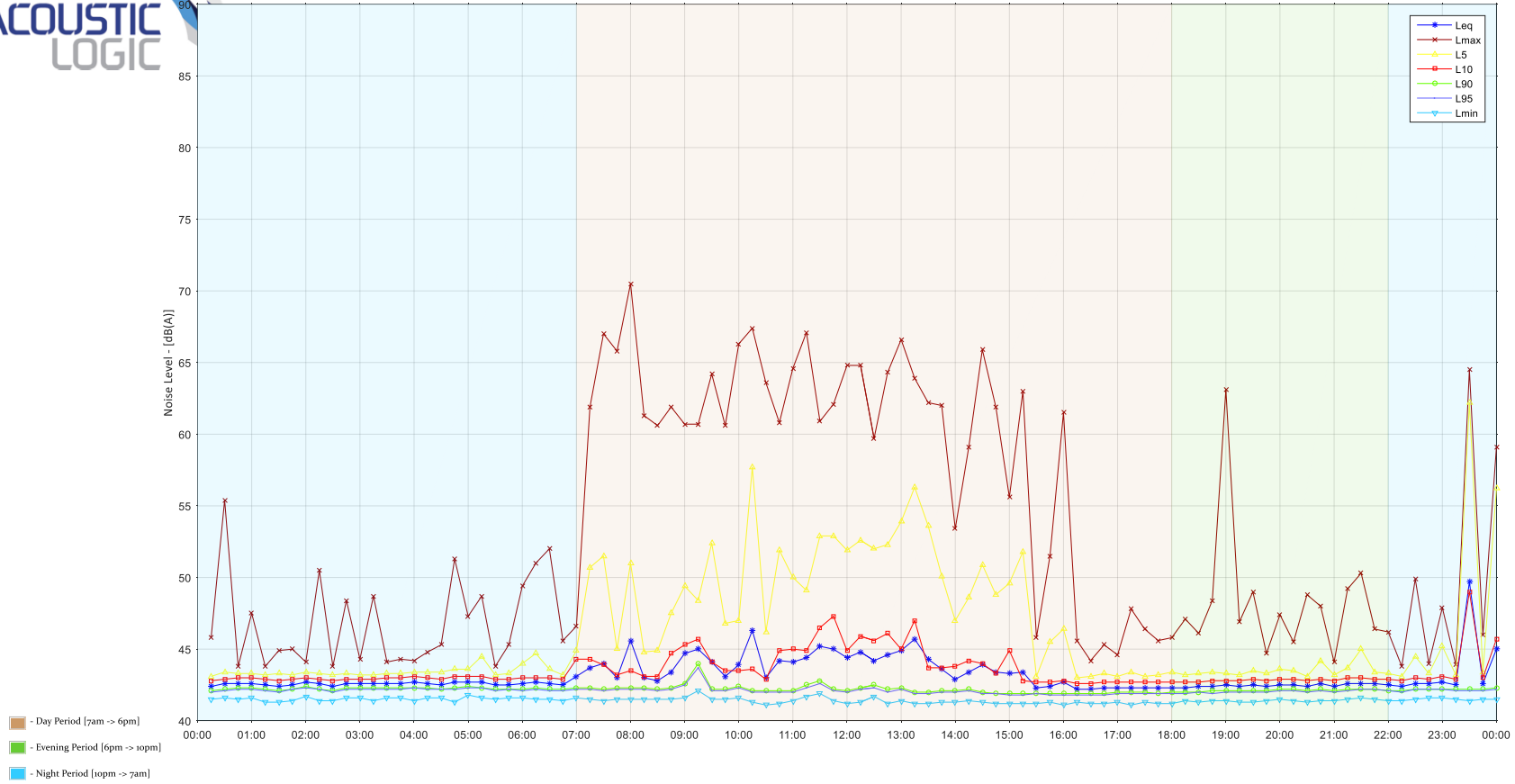


Centenary Institute - Level 4 Surgery Room: Thursday 30 November, 2023



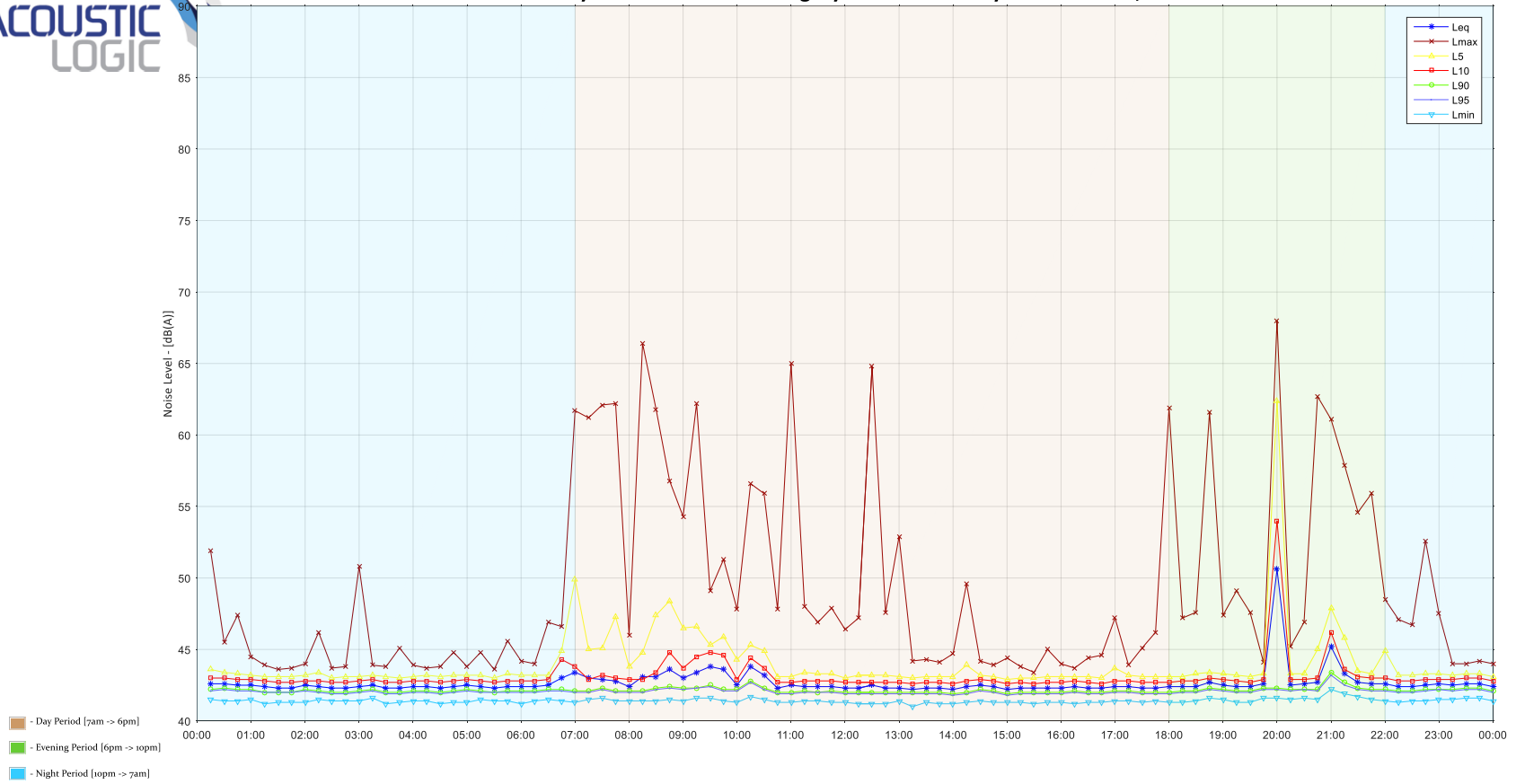


Centenary Institute - Level 4 Surgery Room: Friday 01 December, 2023



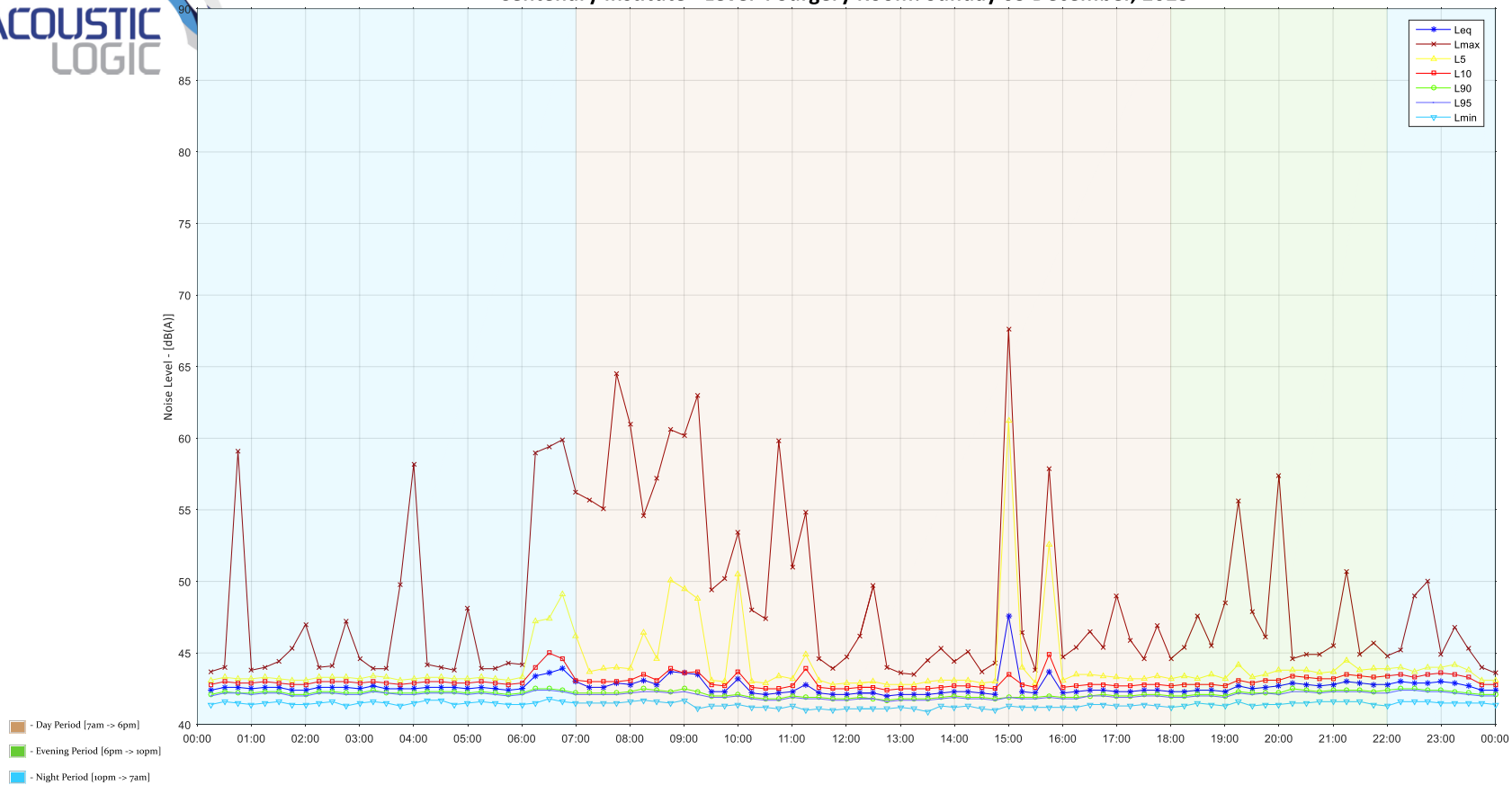


Centenary Institute - Level 4 Surgery Room: Saturday 02 December, 2023



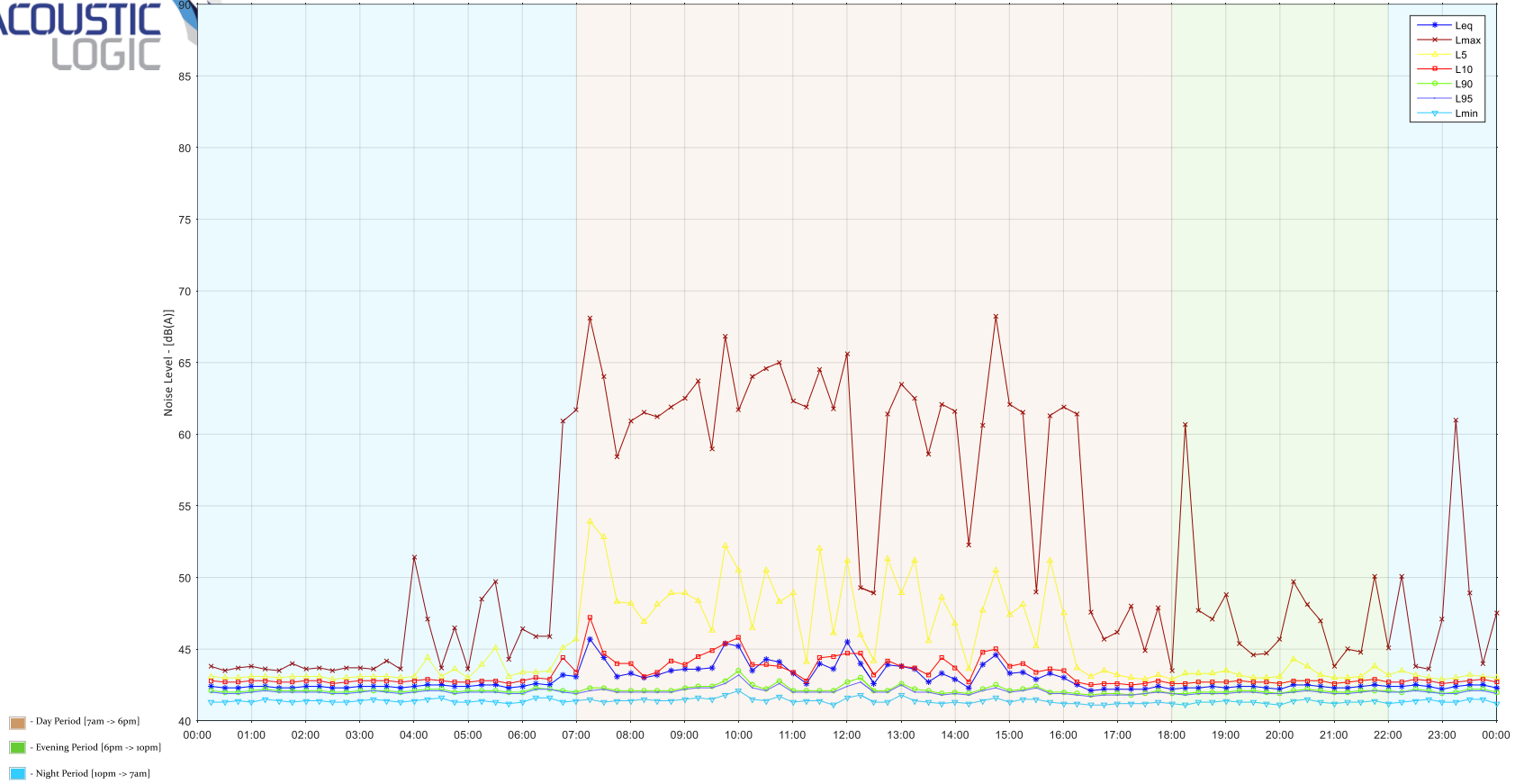


Centenary Institute - Level 4 Surgery Room: Sunday 03 December, 2023



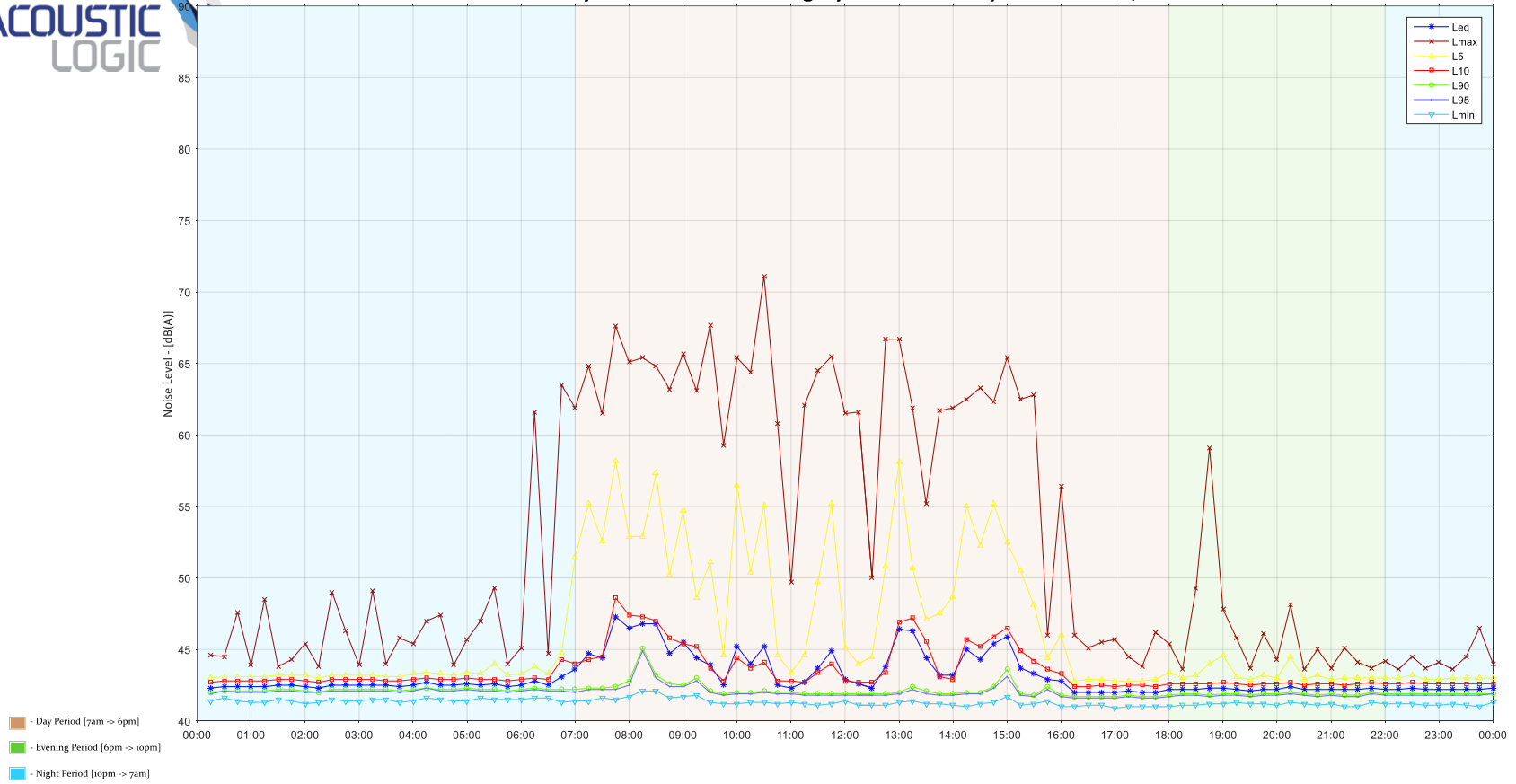


Centenary Institute - Level 4 Surgery Room: Monday 04 December, 2023



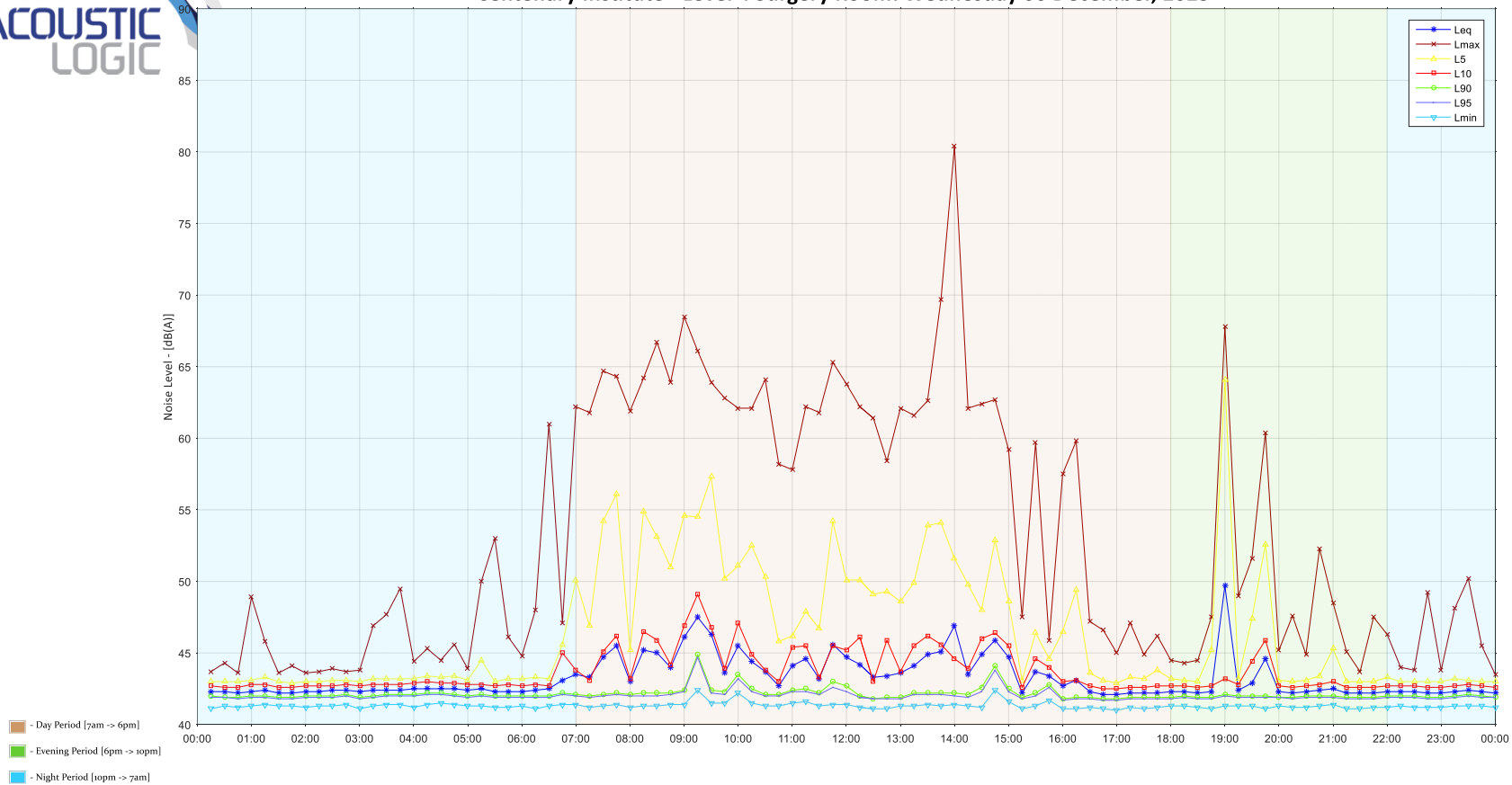


Centenary Institute - Level 4 Surgery Room: Tuesday 05 December, 2023



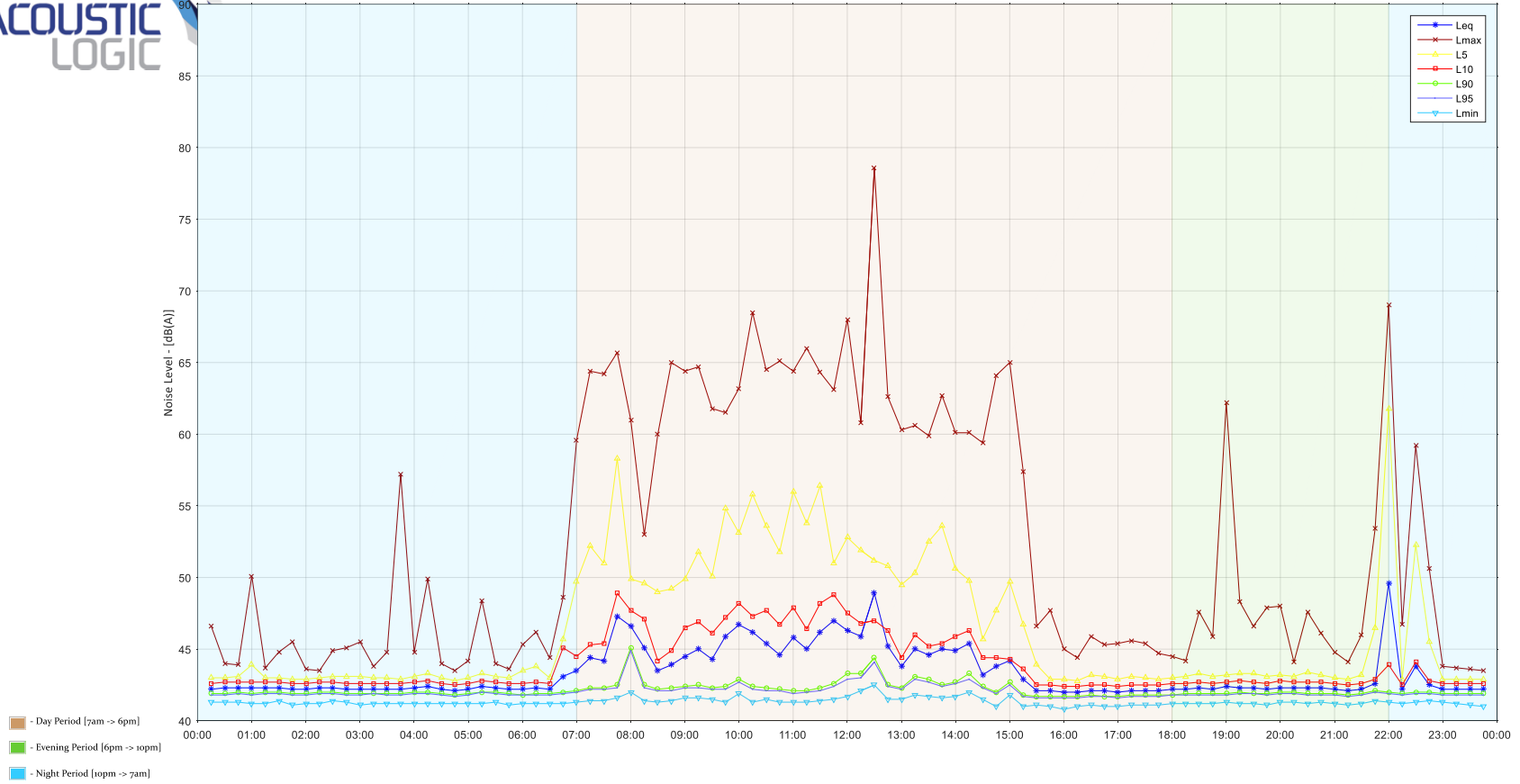


Centenary Institute - Level 4 Surgery Room: Wednesday 06 December, 2023

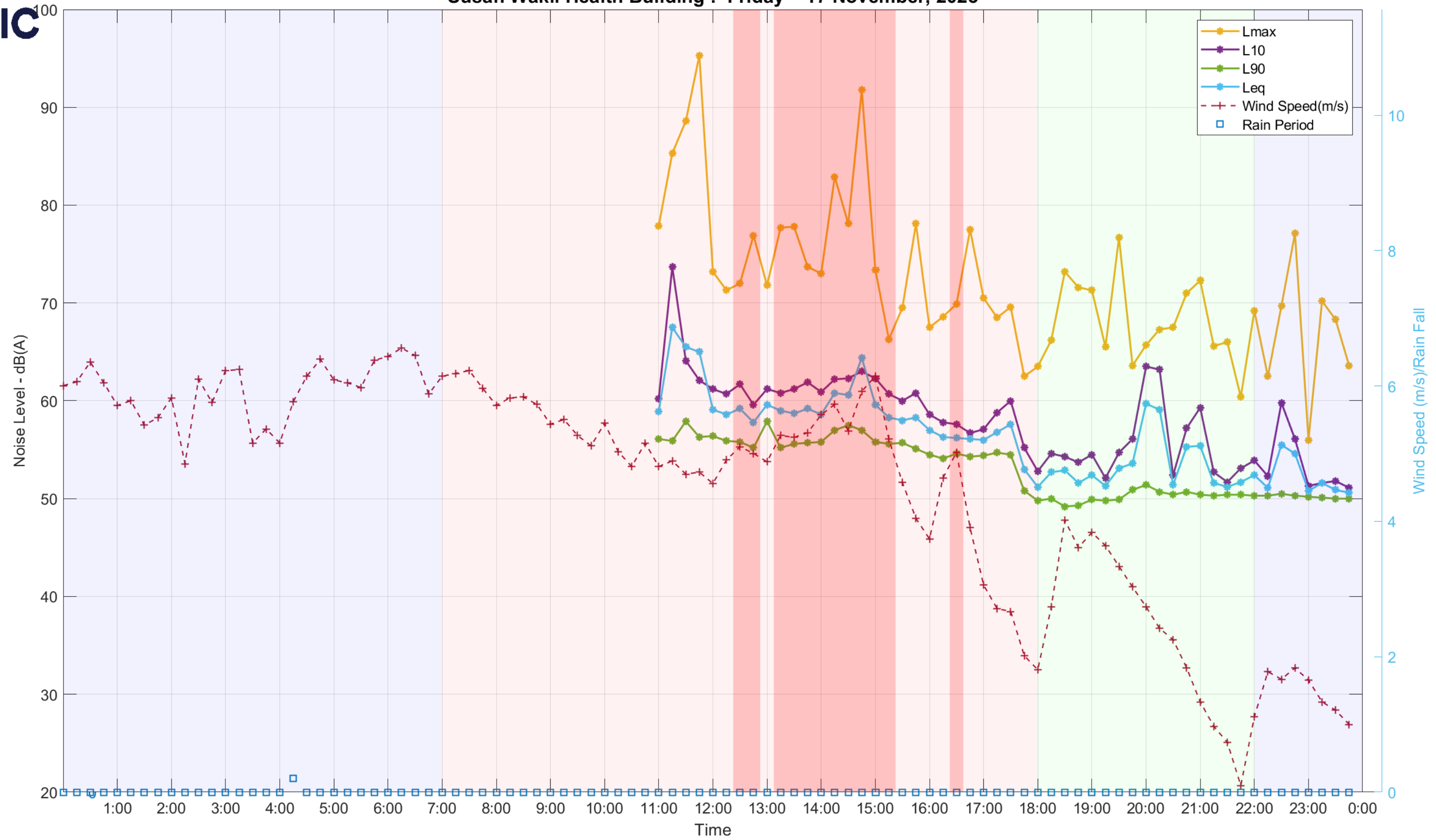


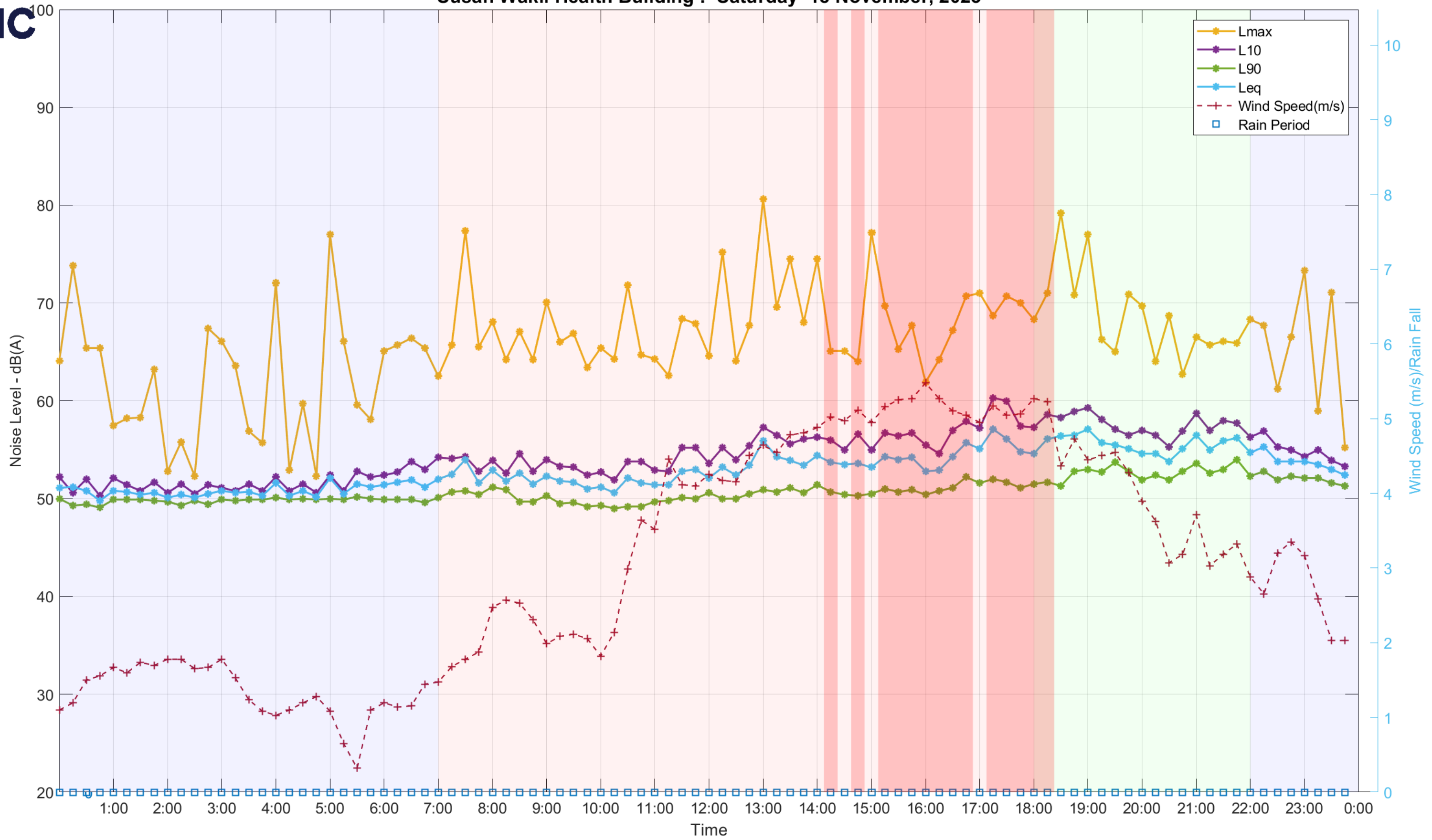


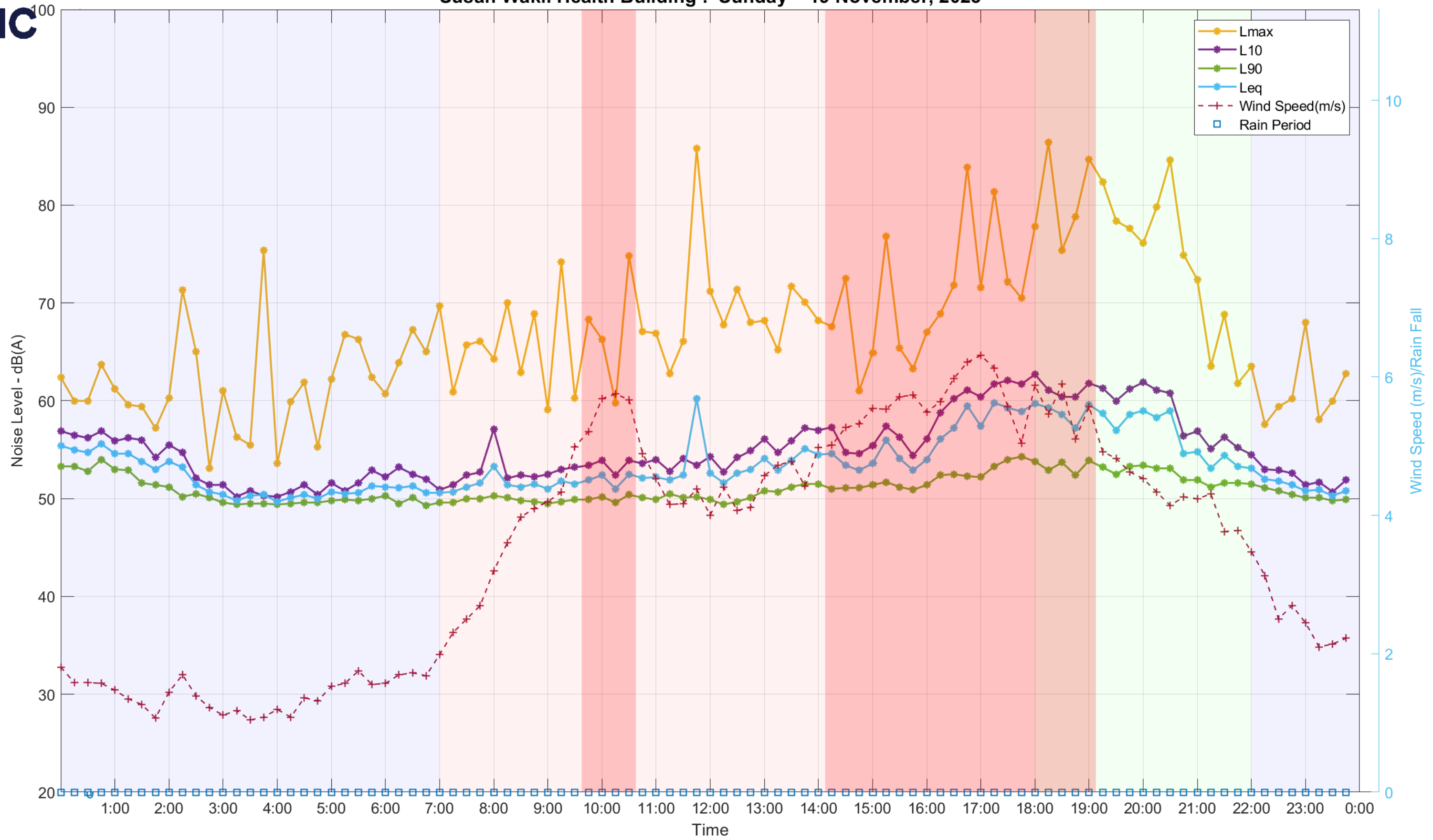
Centenary Institute - Level 4 Surgery Room: Thursday 07 December, 2023

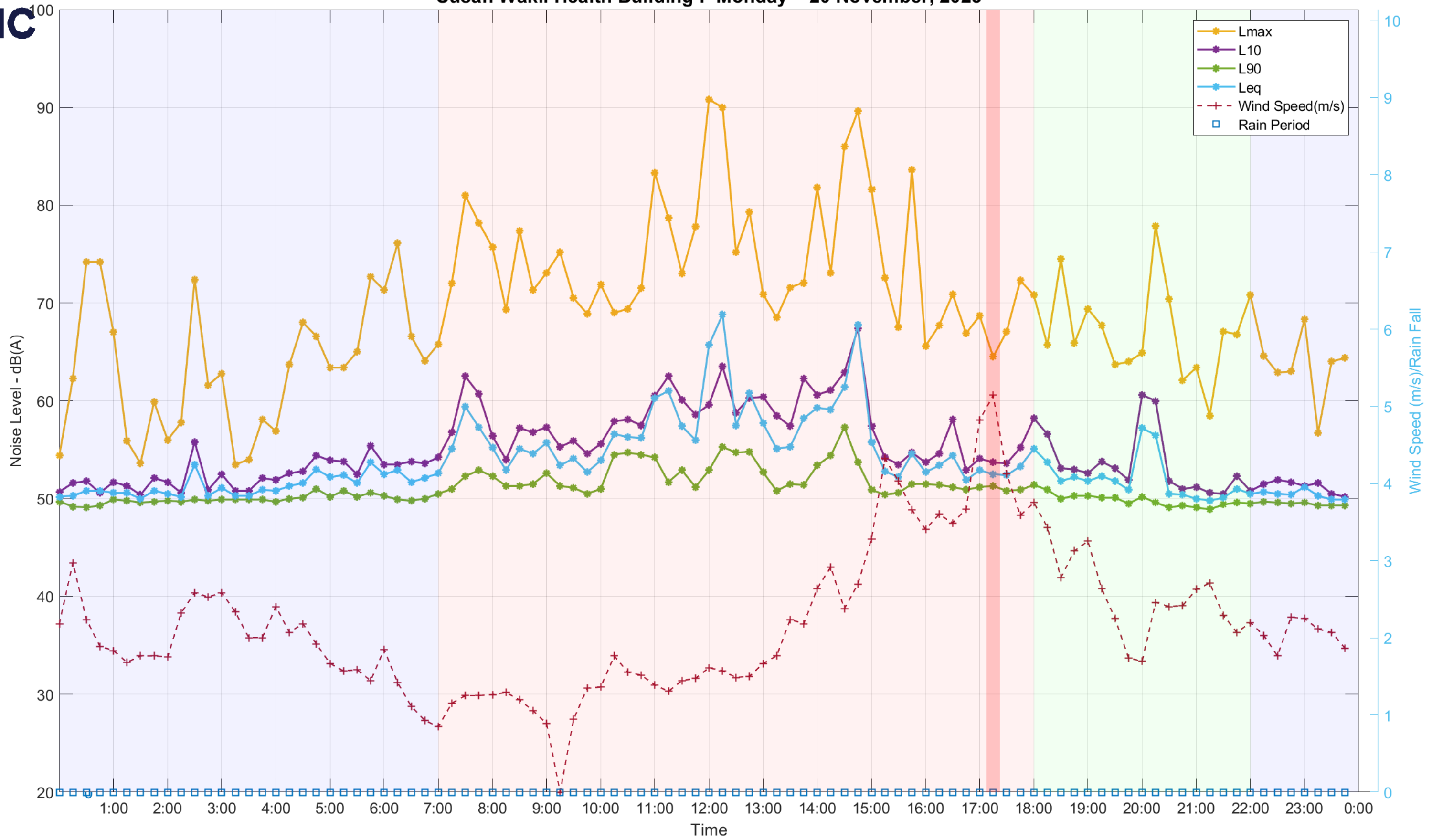


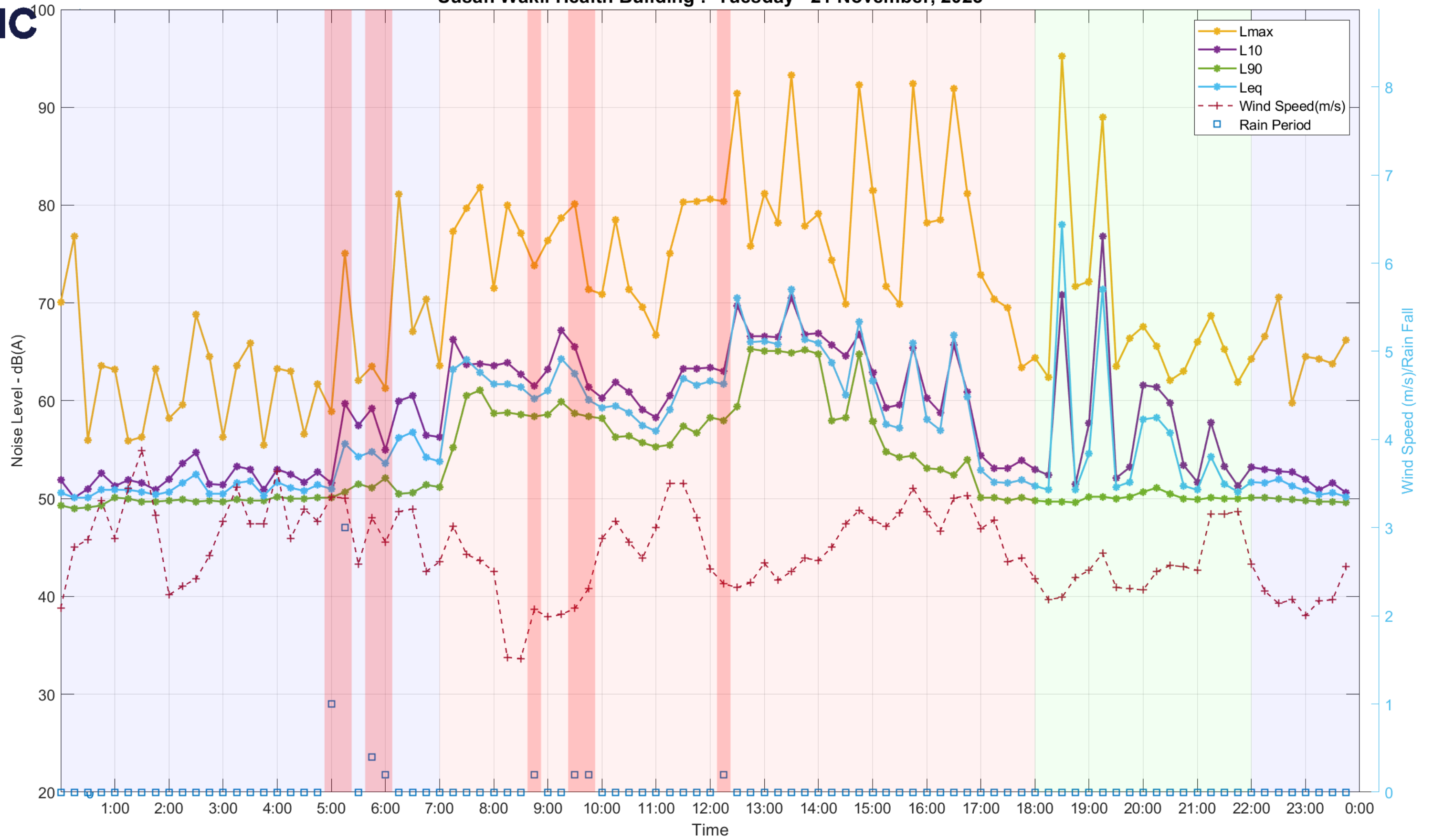
OUTSIDE SUSAN WAKIL HEALTH BUILDING

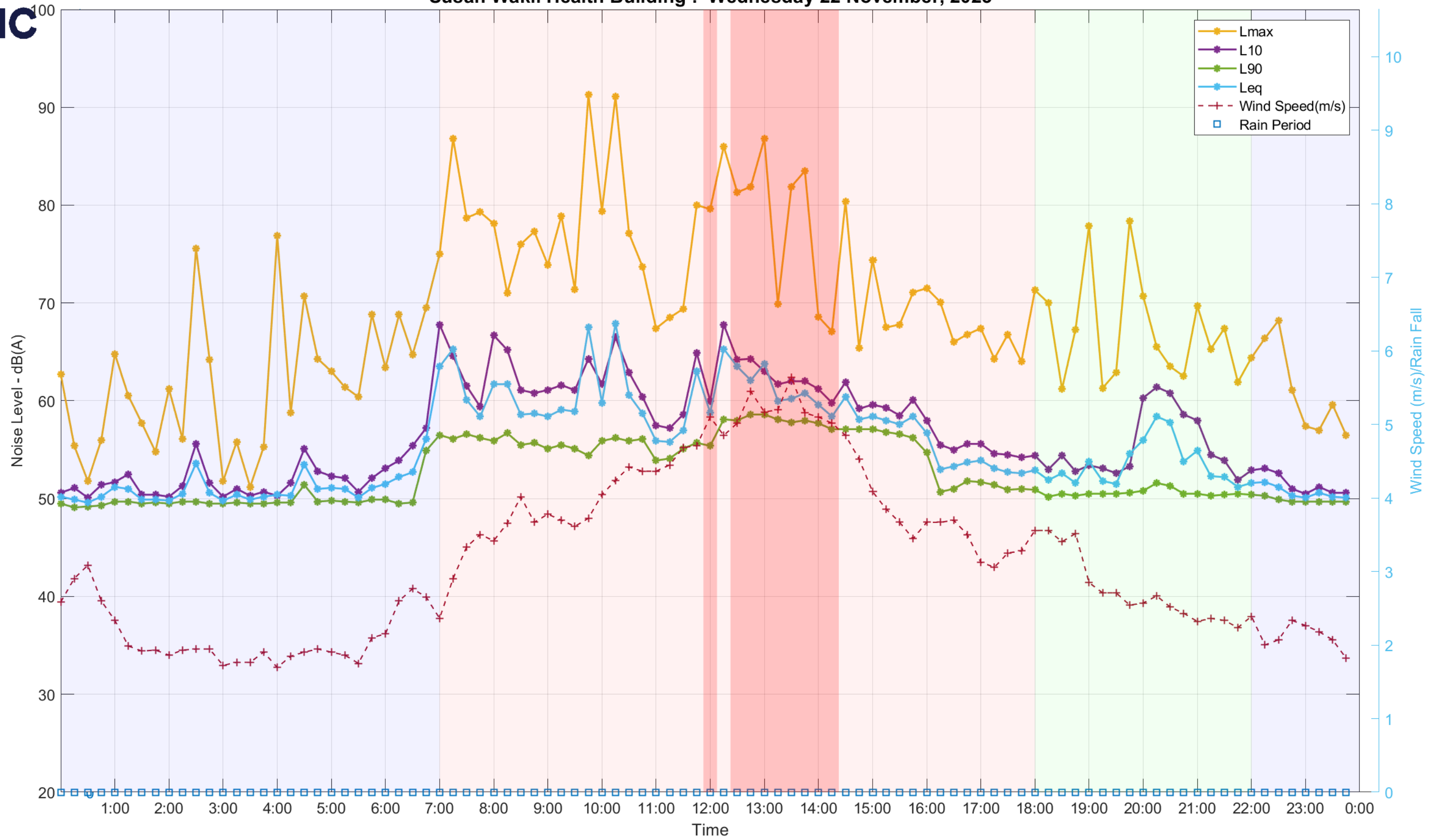


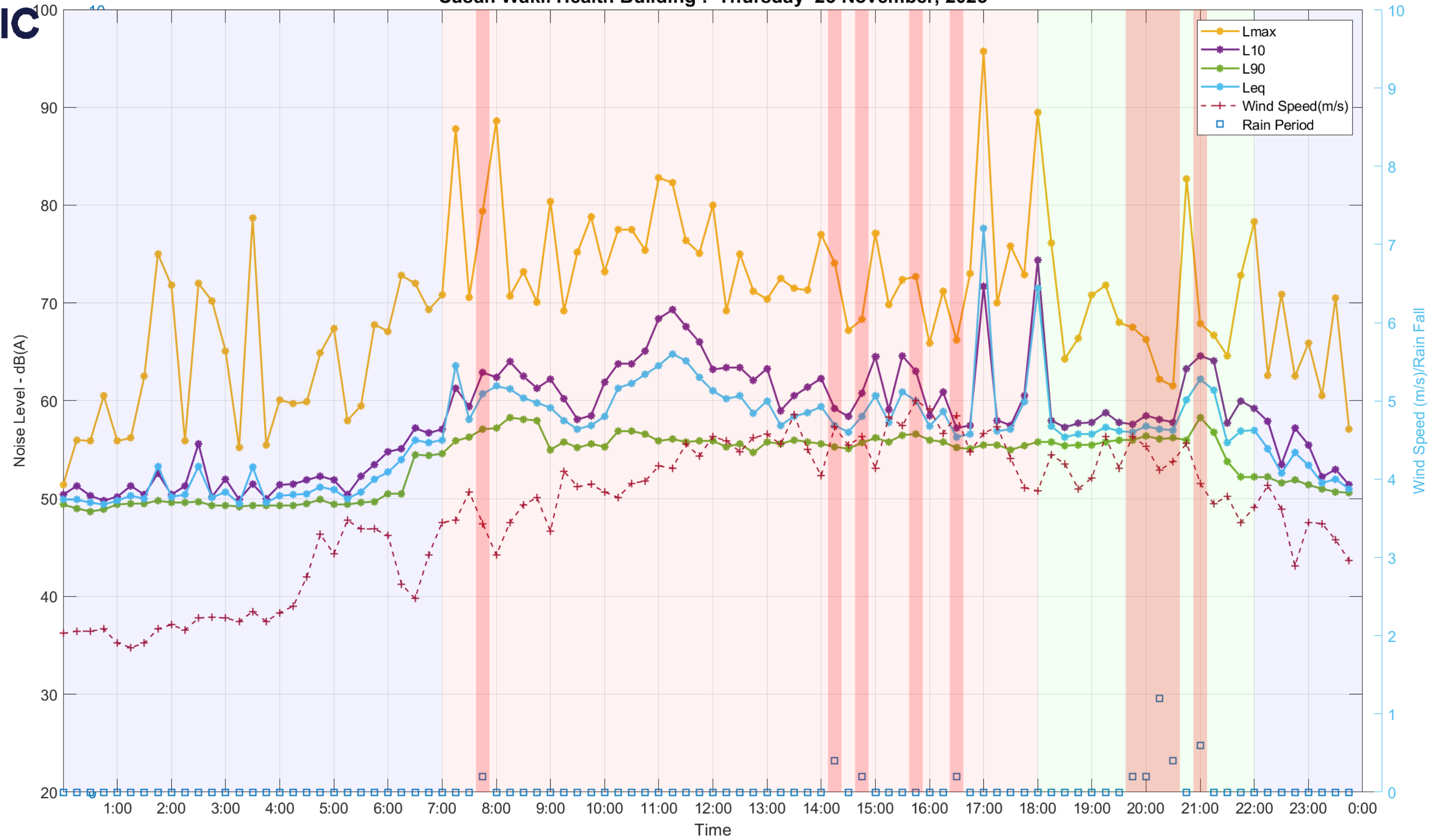


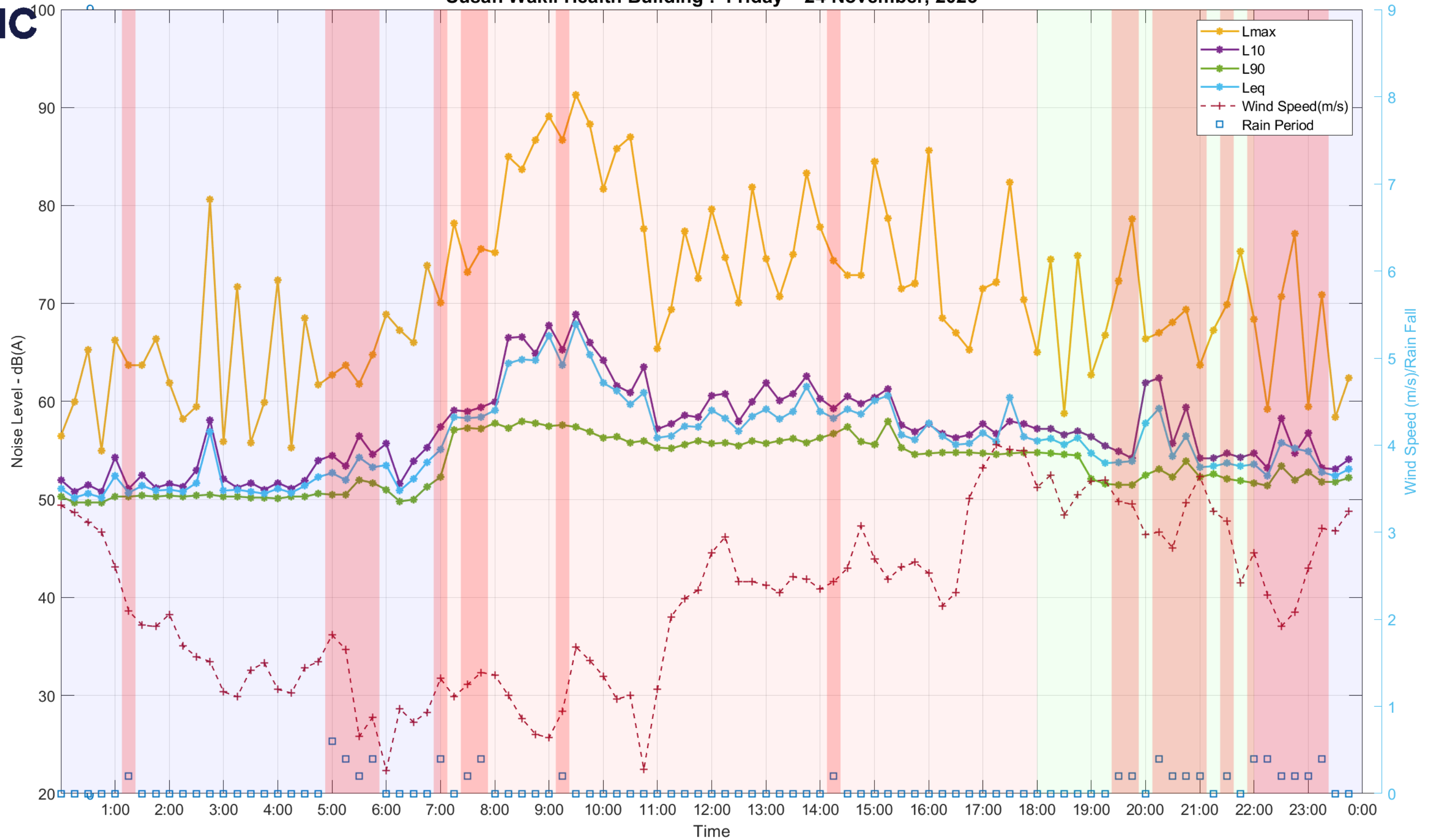


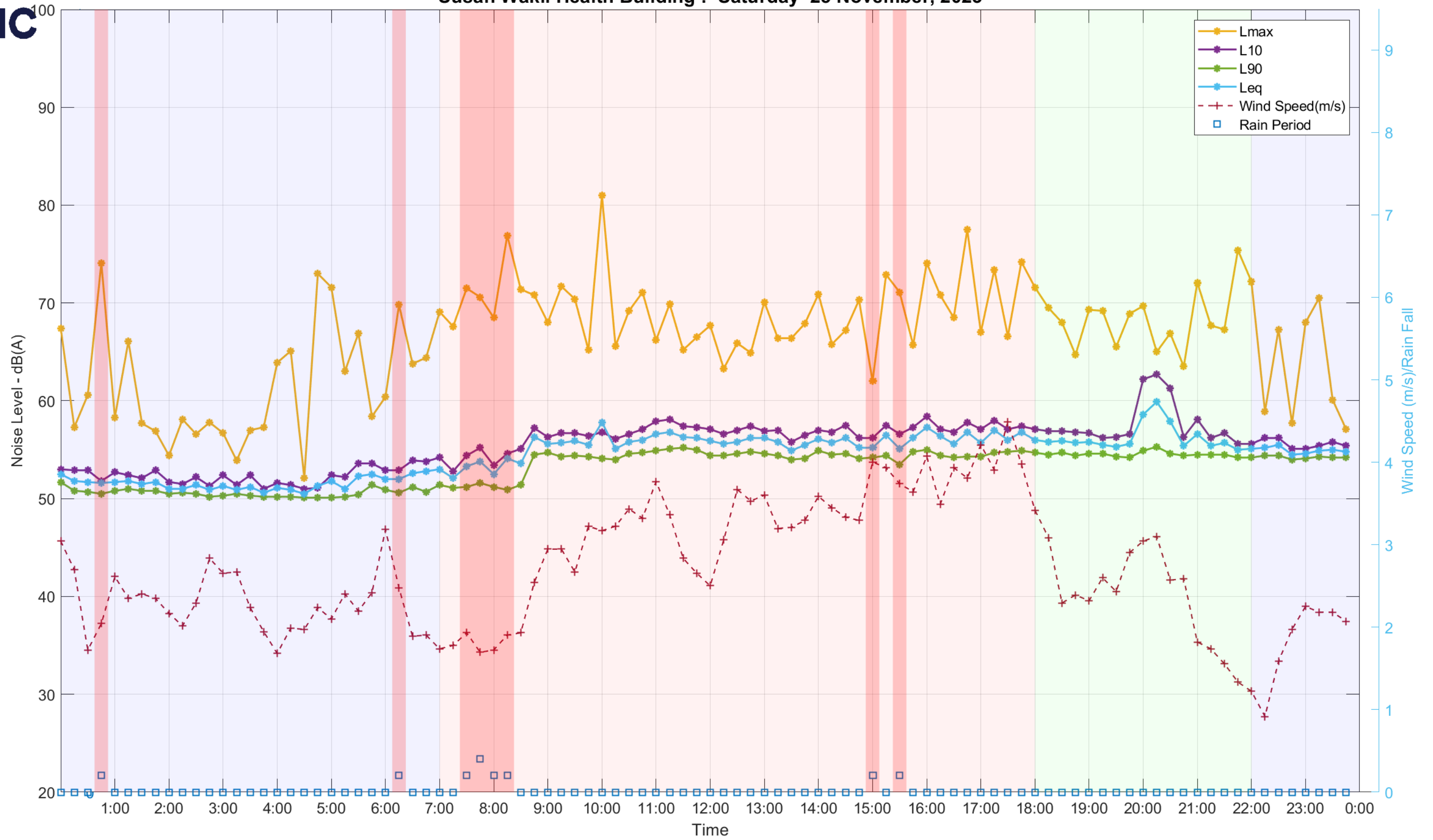


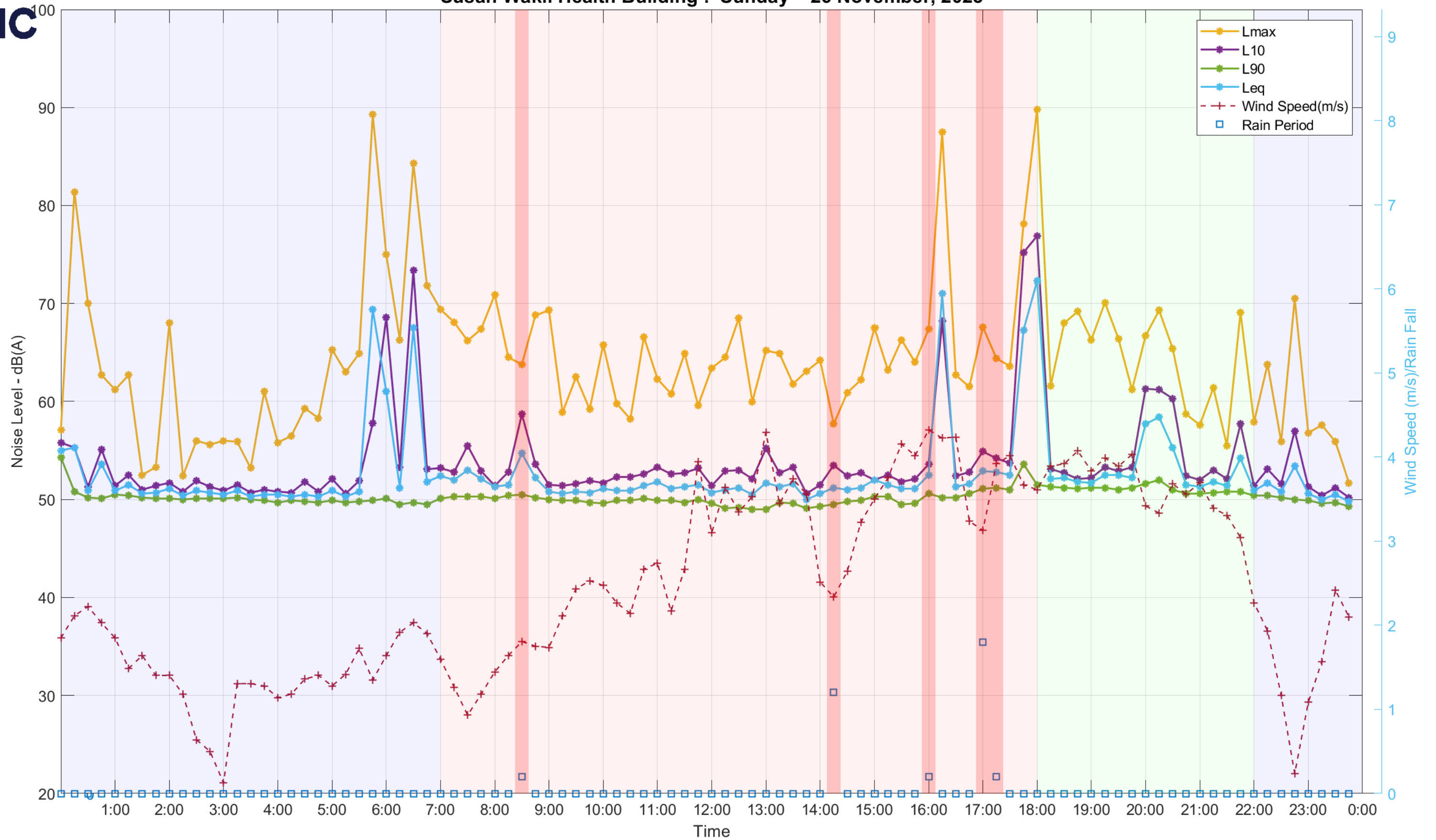


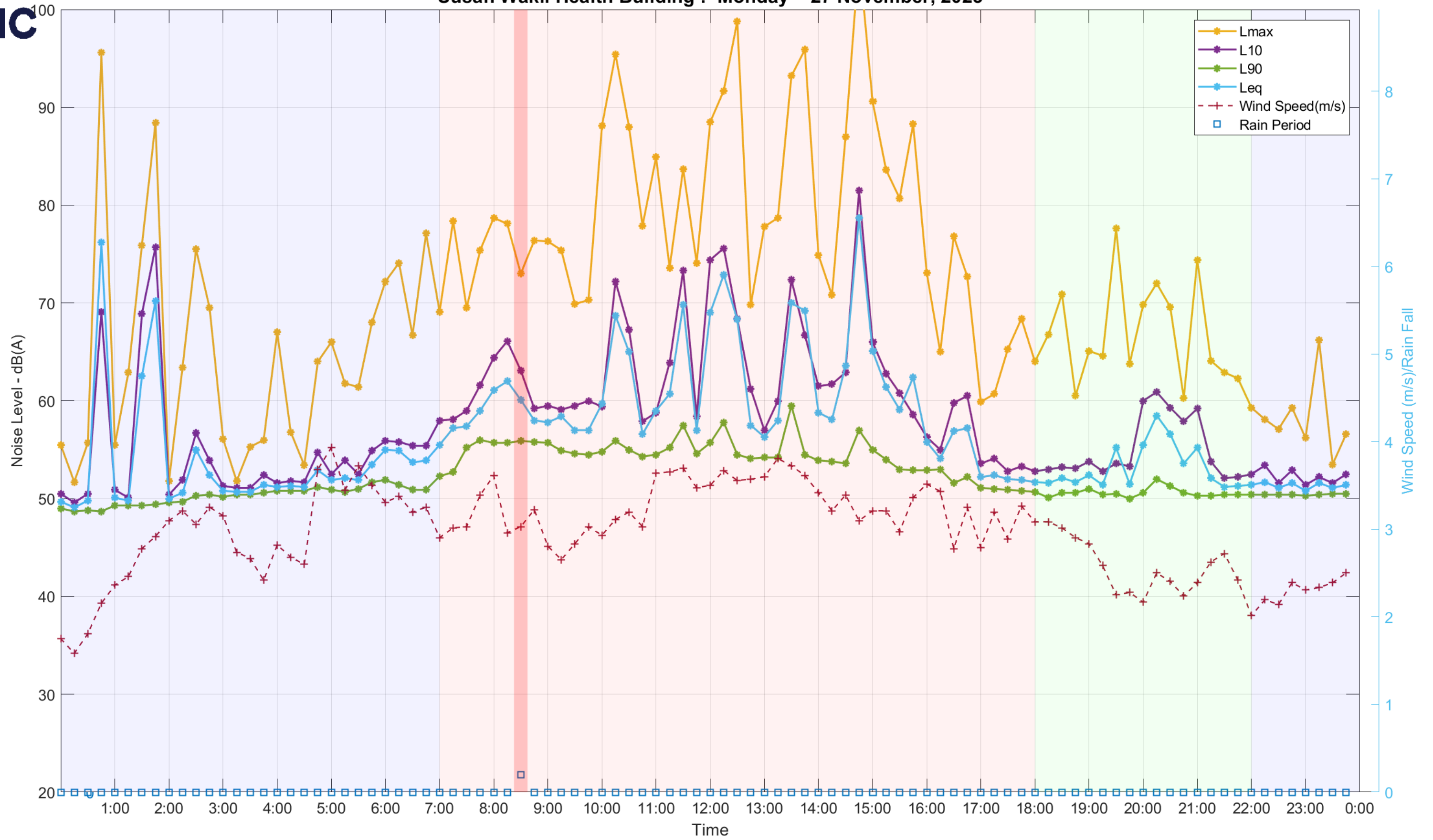


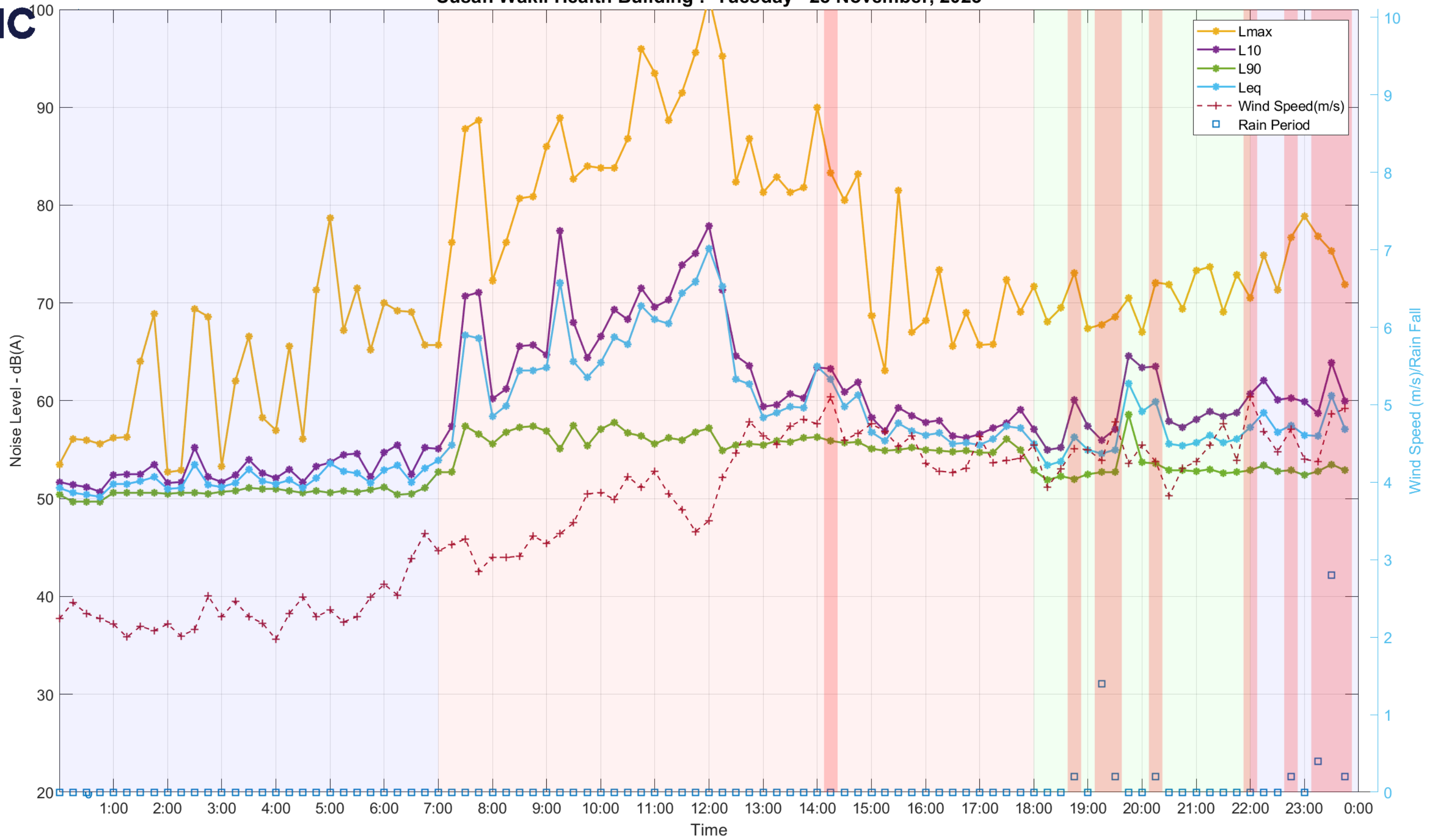


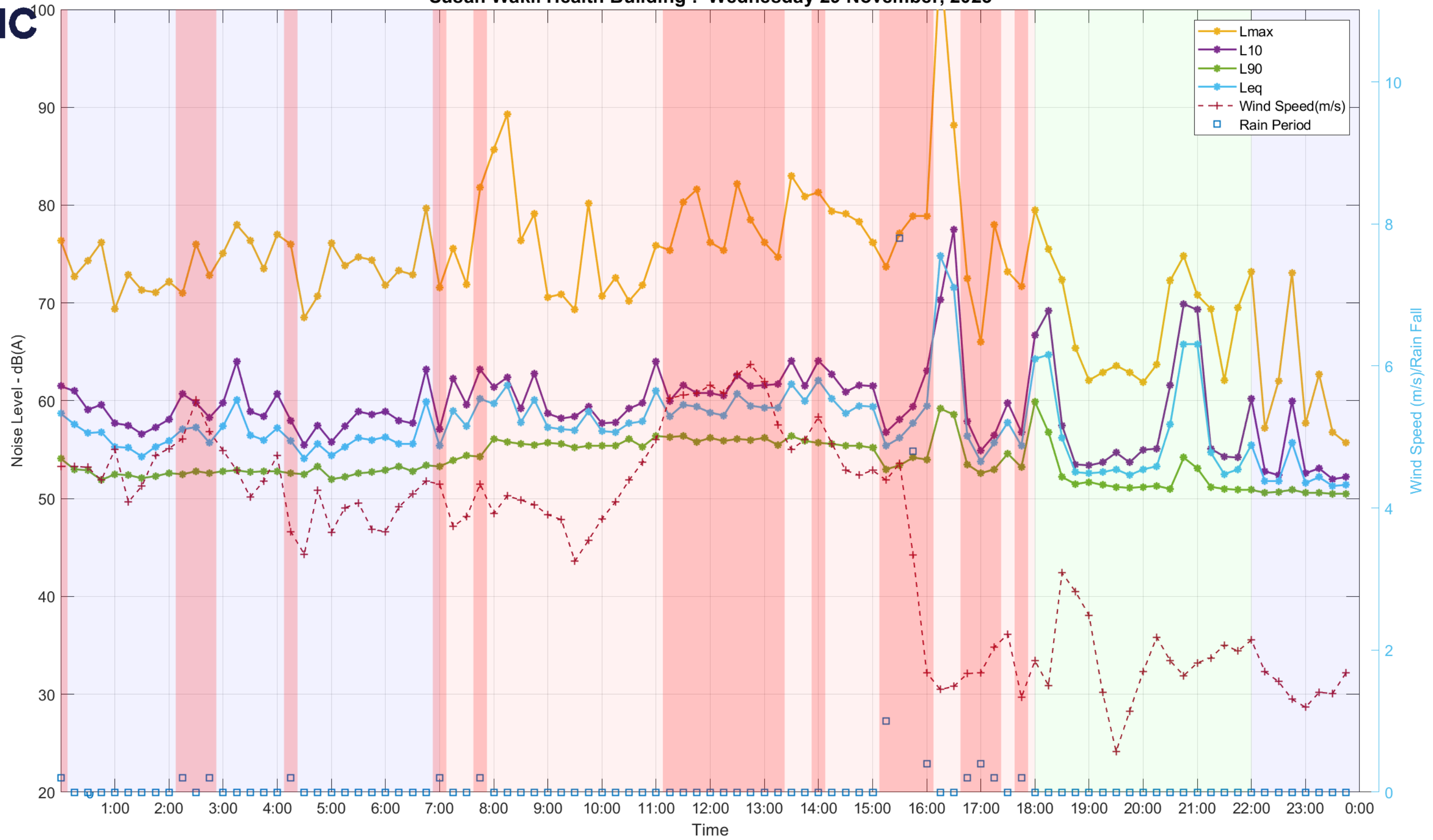




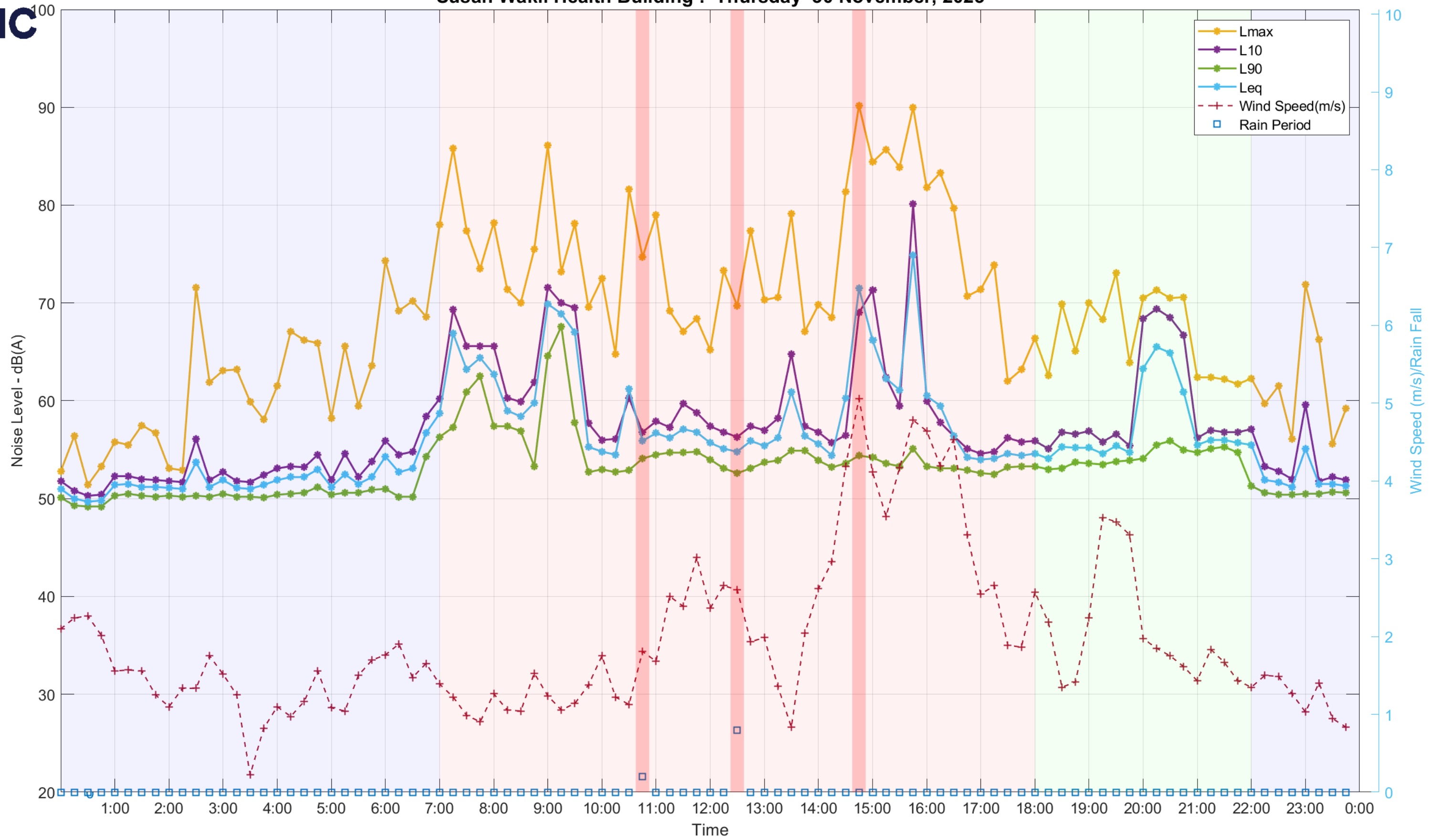


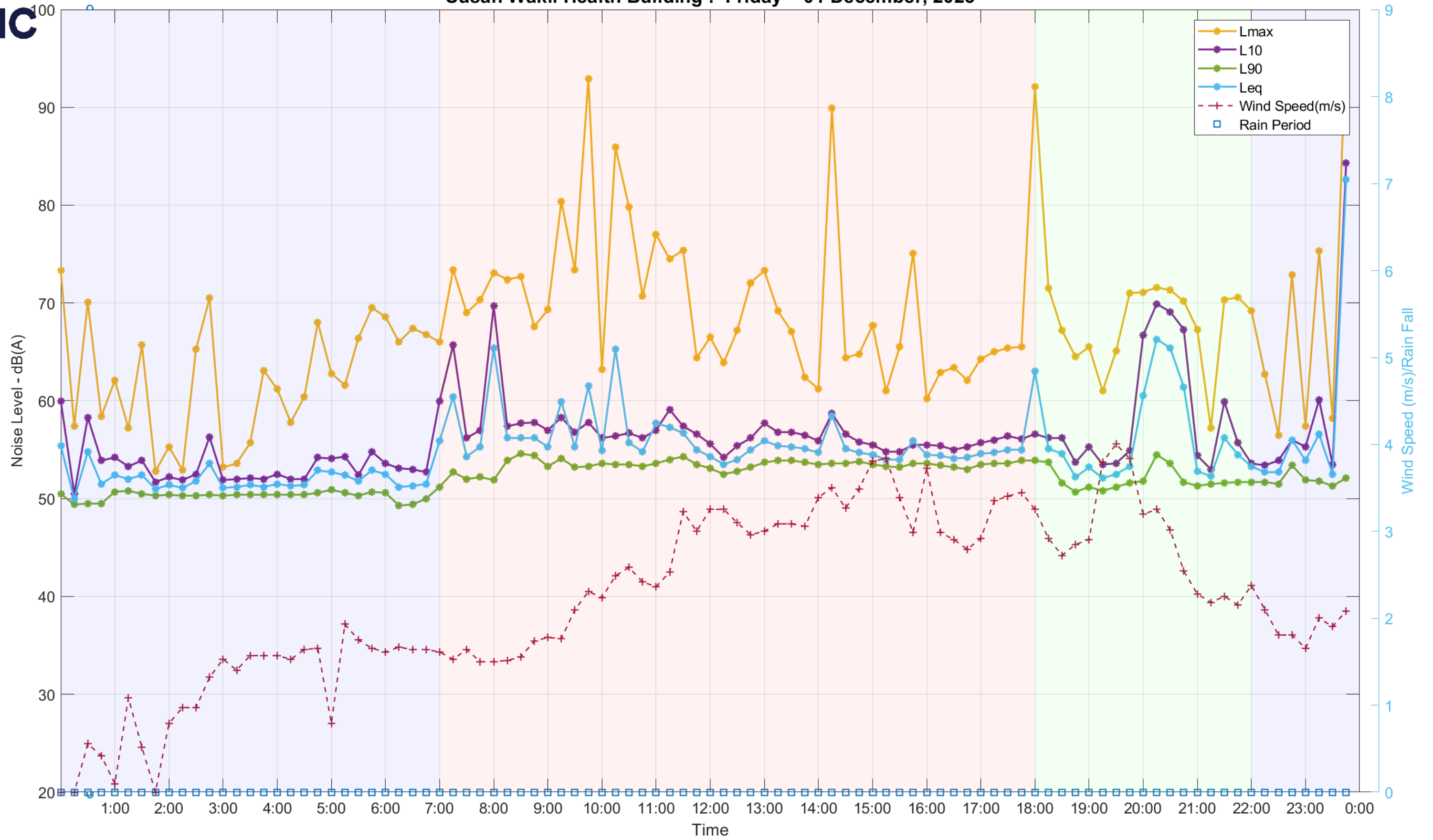


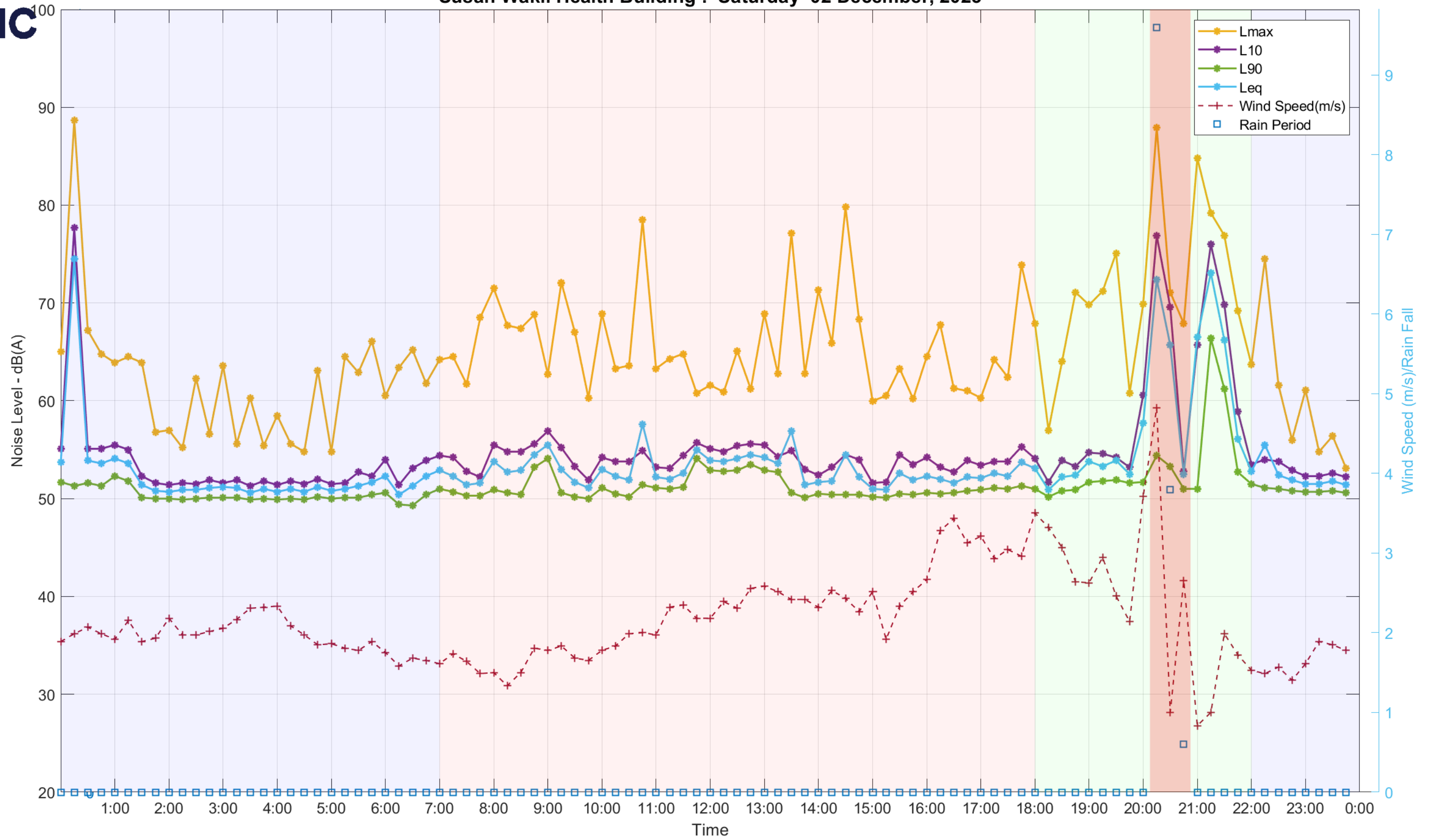


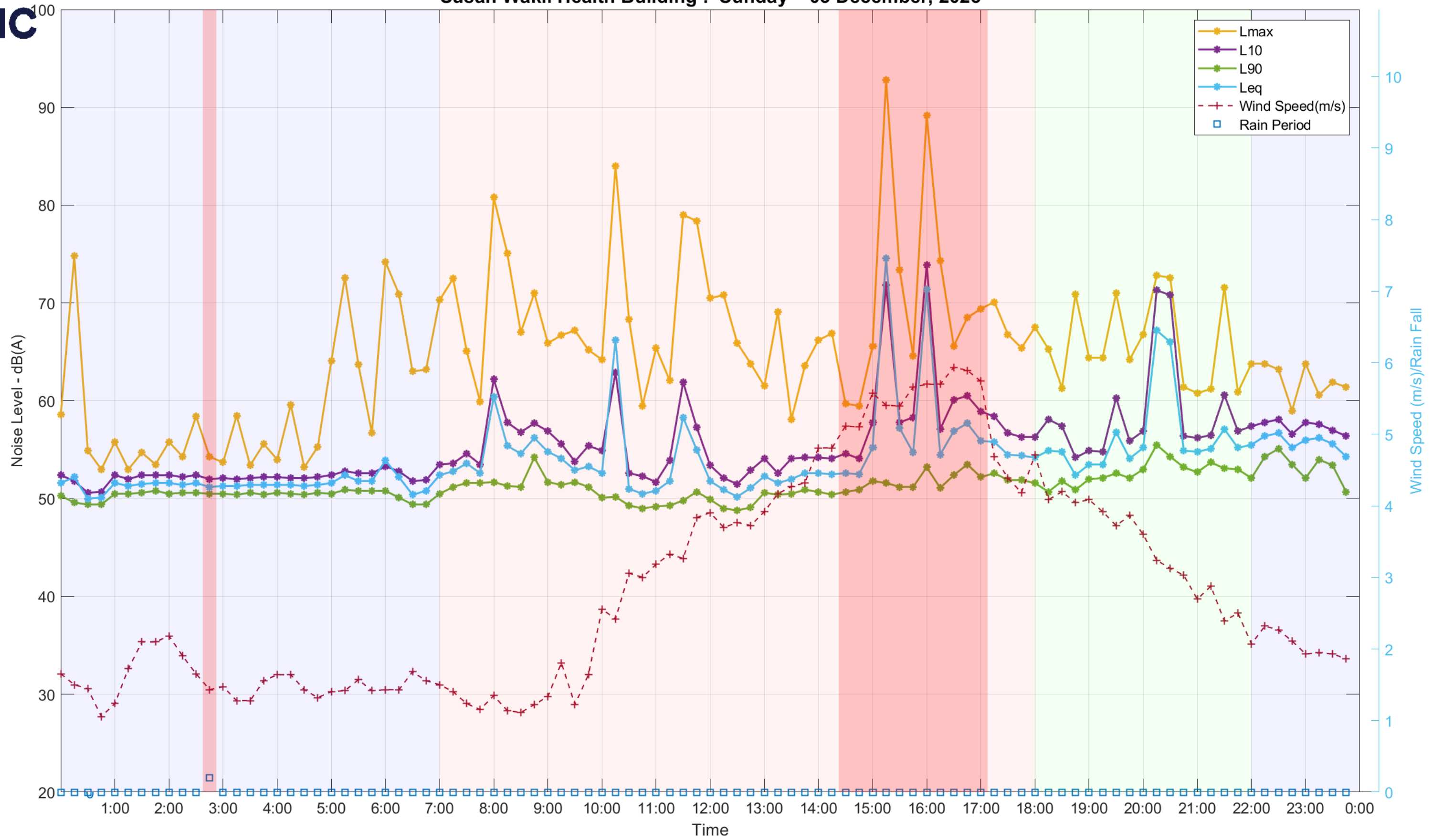


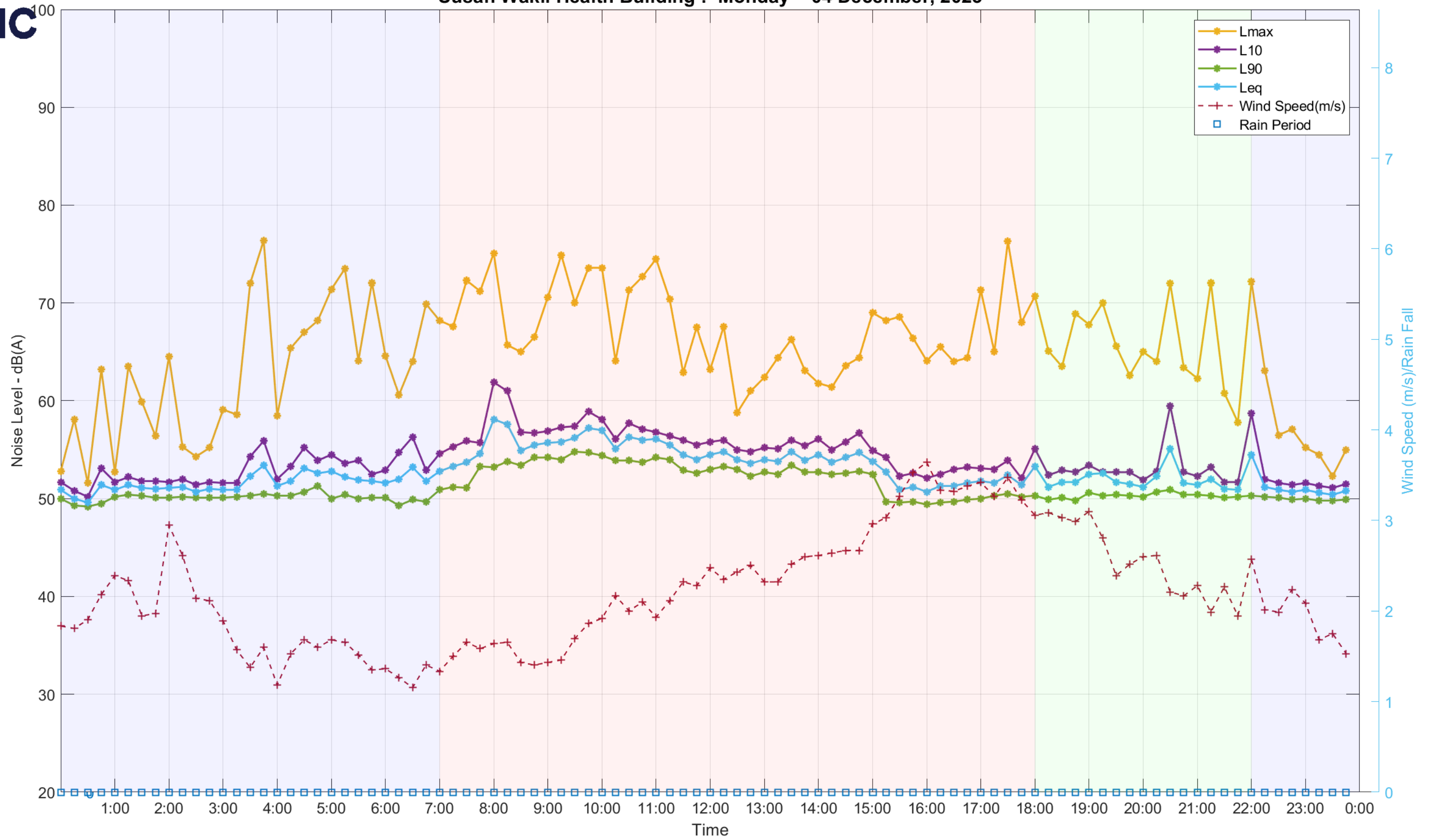
Susan Wakil Health Building : Thursday 30 November, 2023

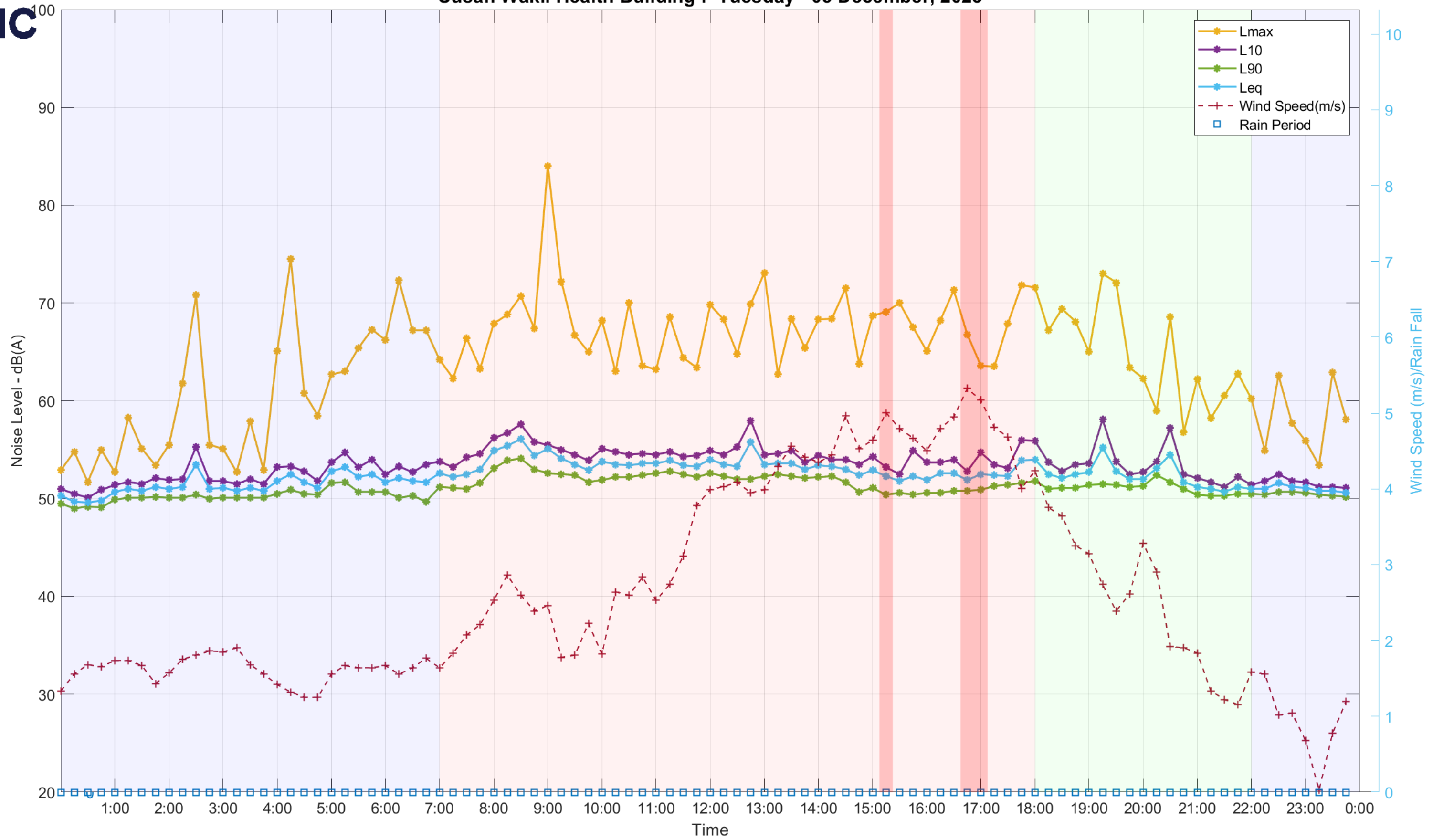


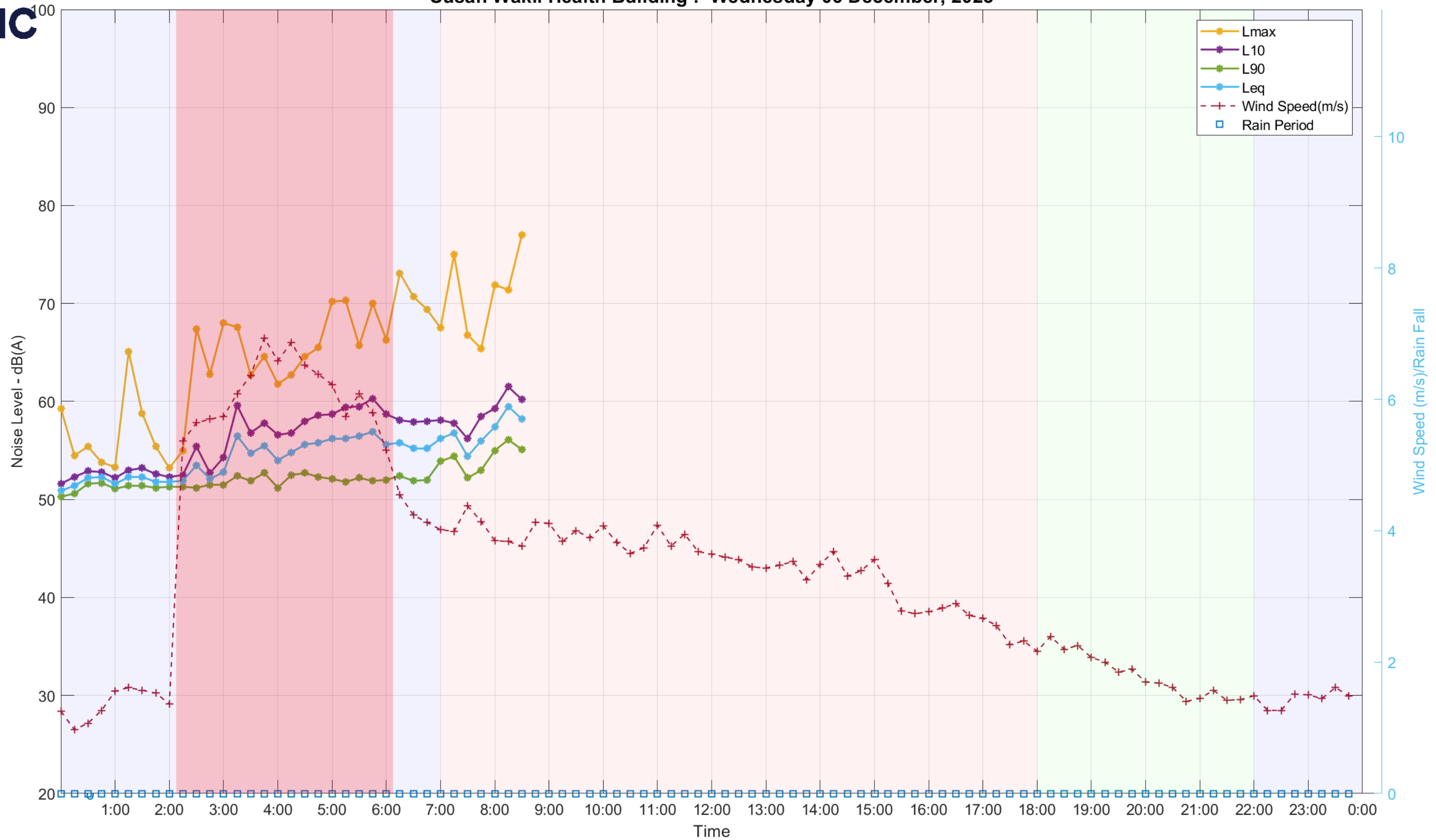








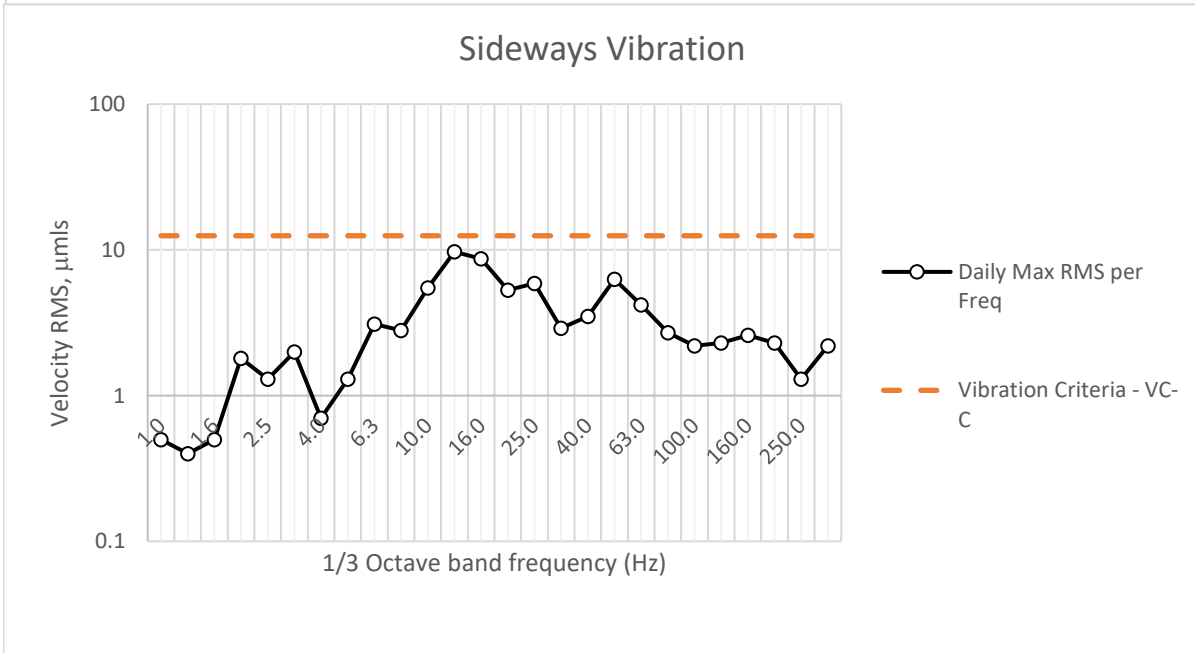
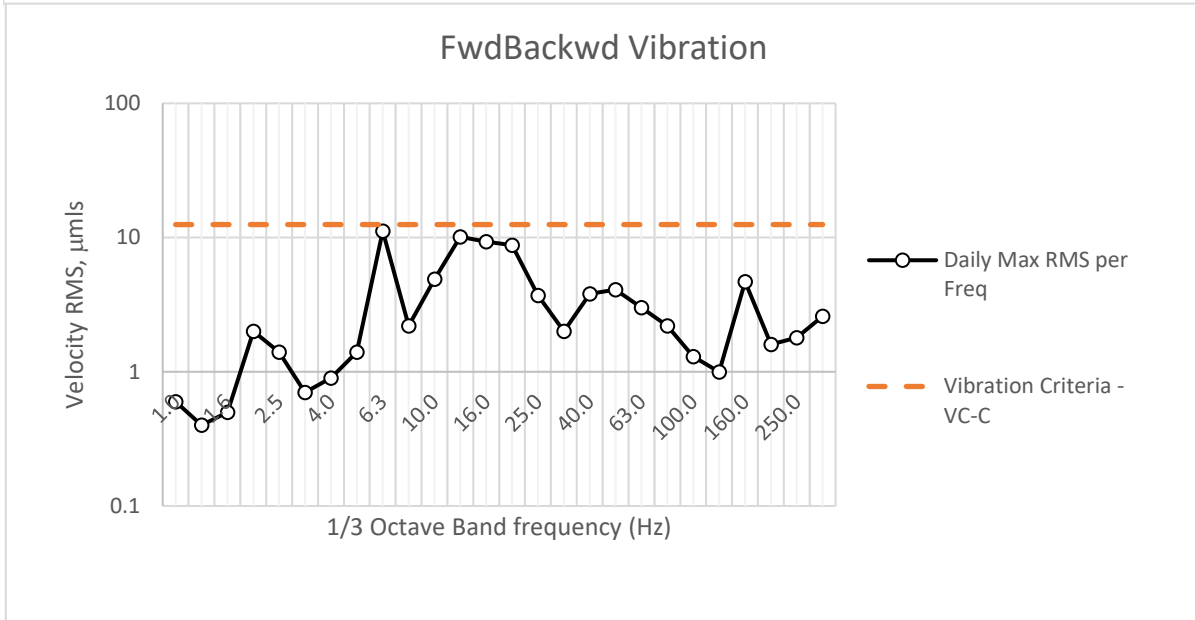
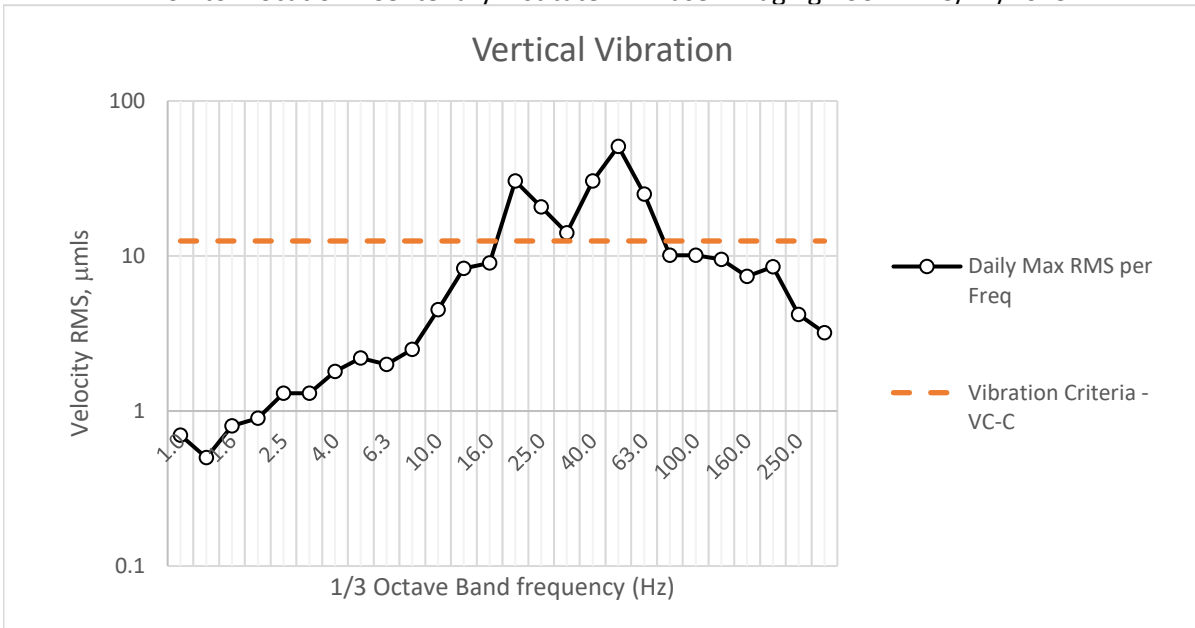


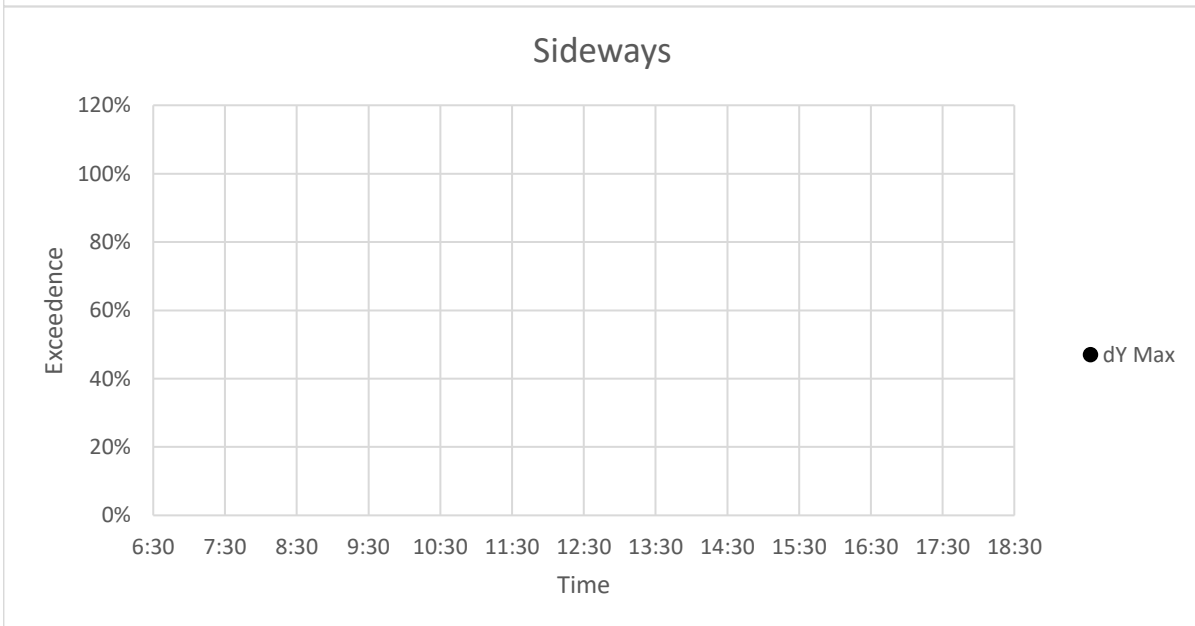
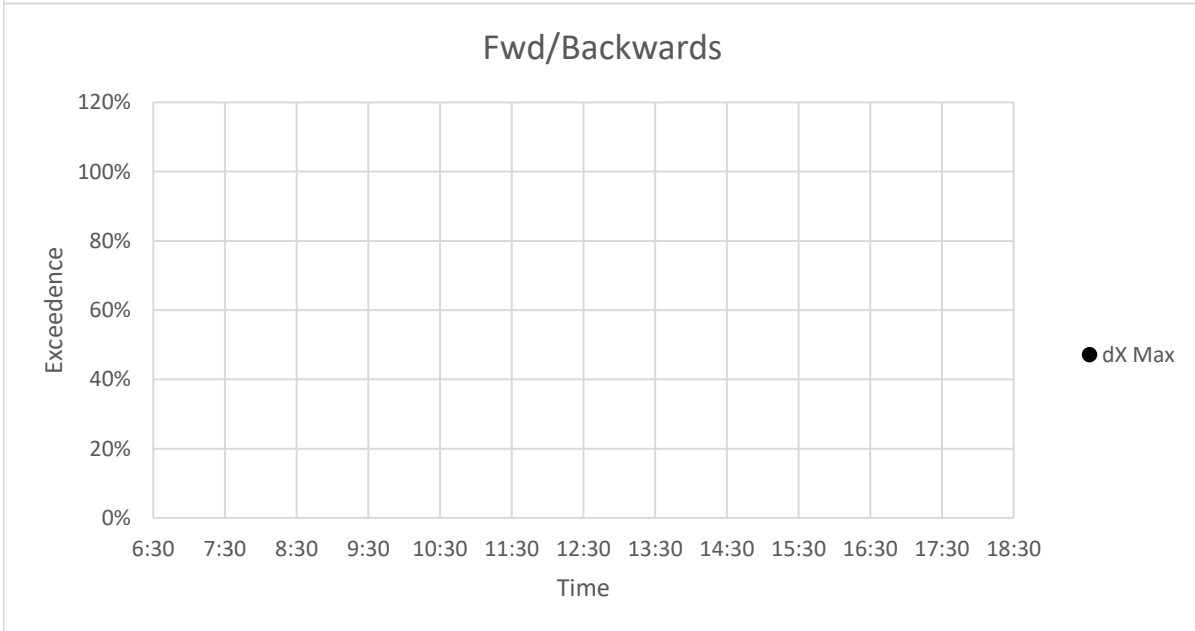
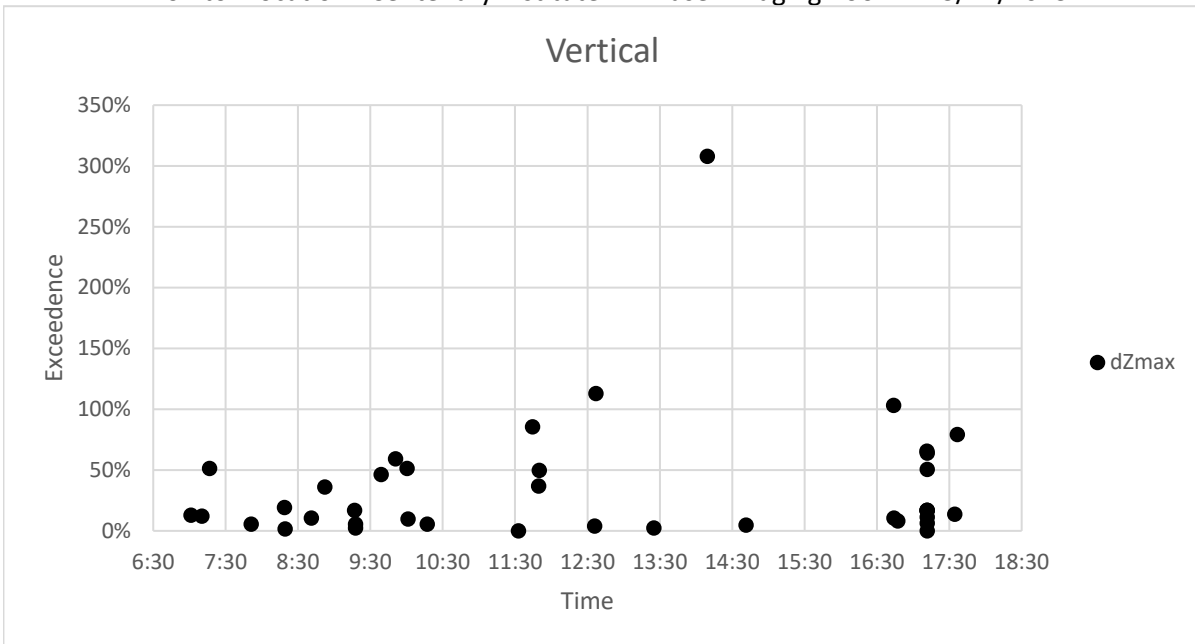


Wind Speed is corrected using factor 0.5000 based on logger location

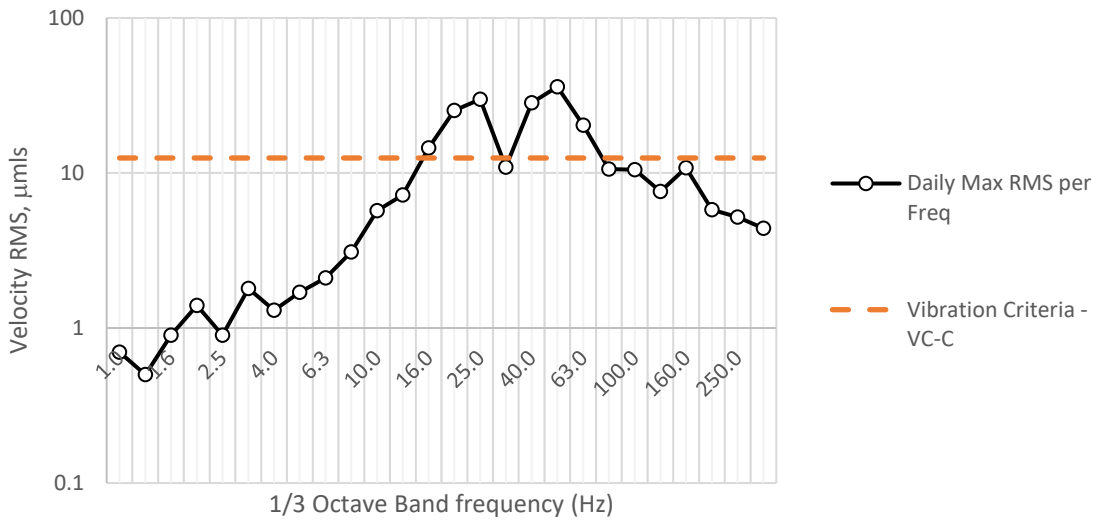
APPENDIX B – VIBRATION MONITORING RESULTS

CENTENARY INSTITUTE – LEVEL 1 LASER IMAGING ROOM

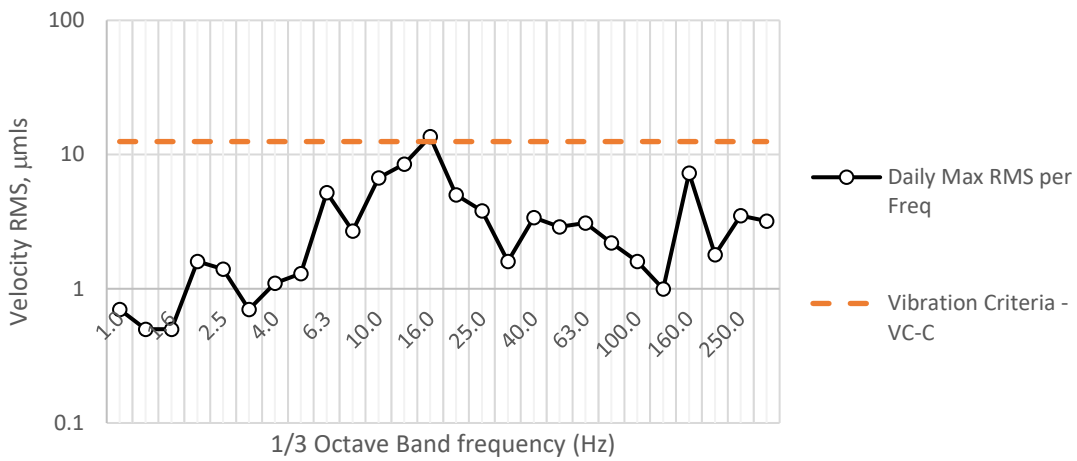




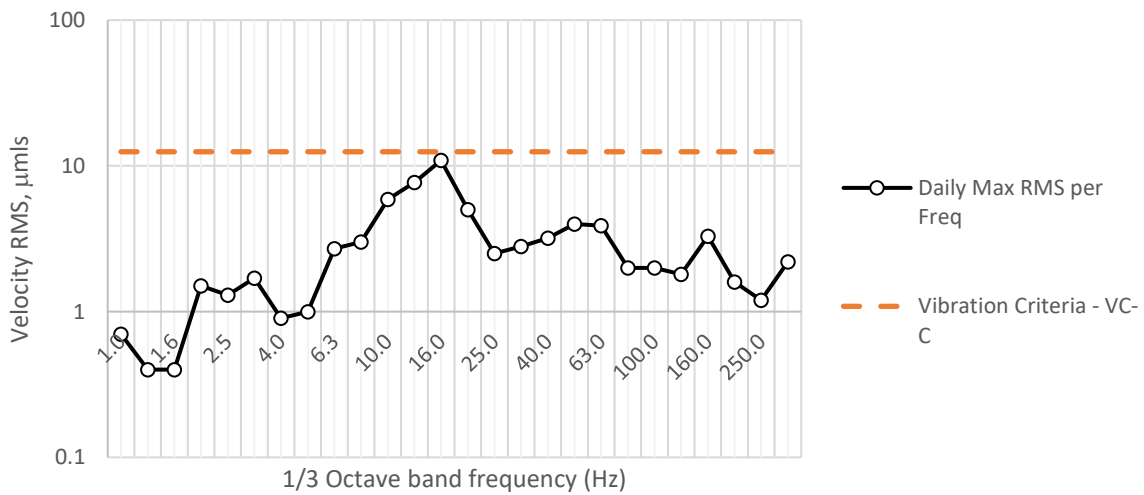
Vertical Vibration

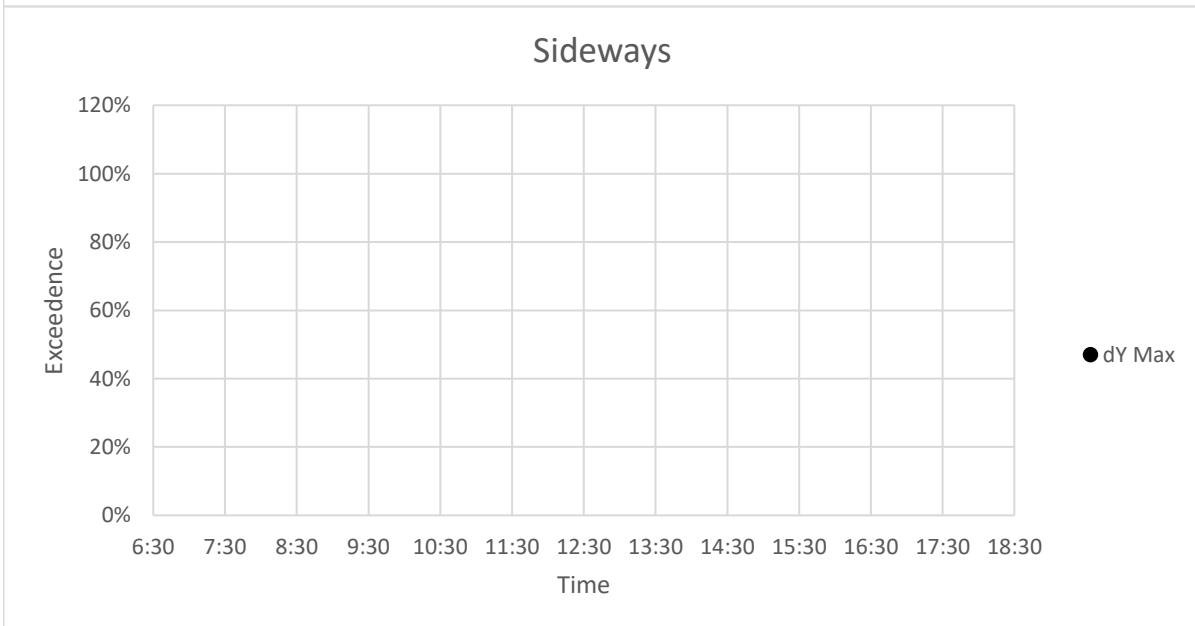
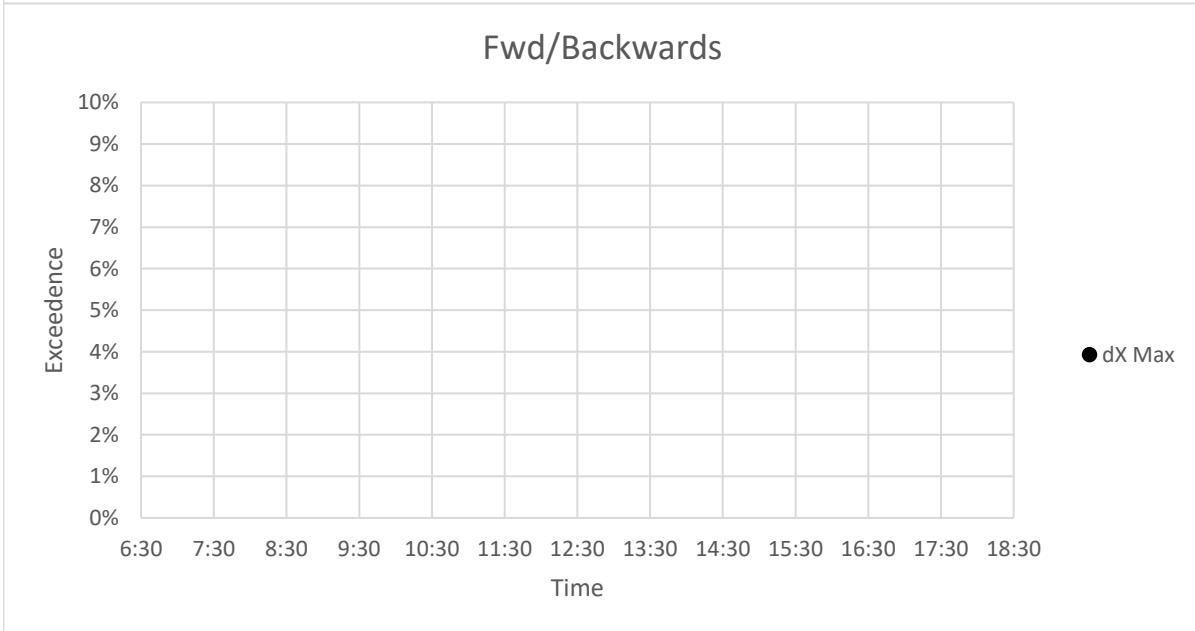
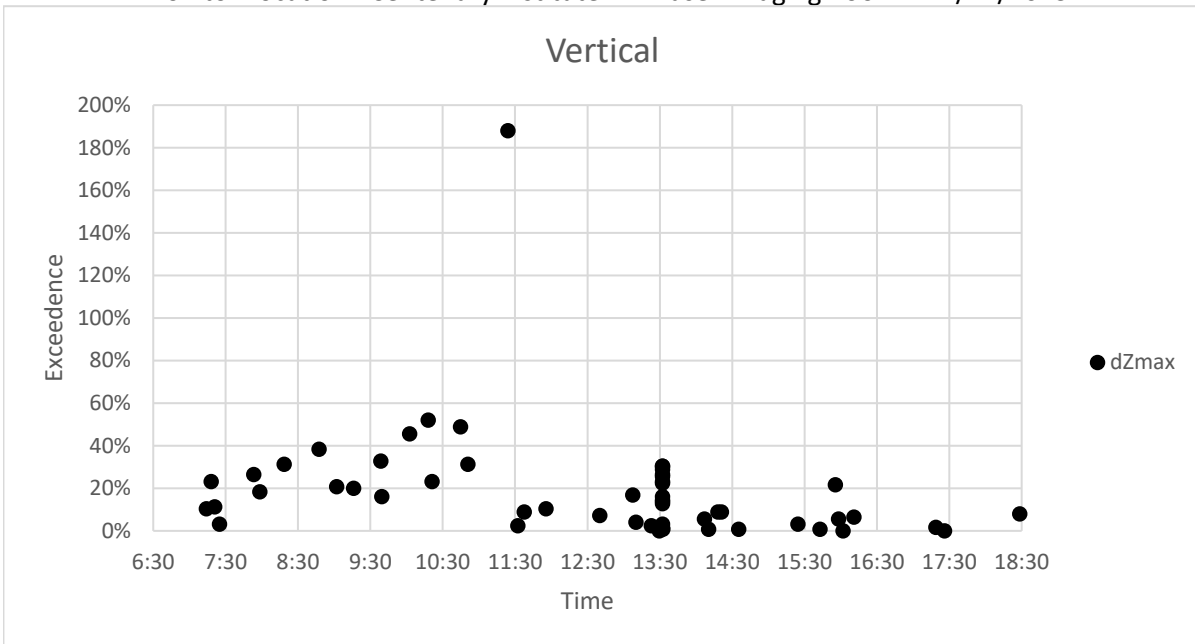


FwdBackwd Vibration

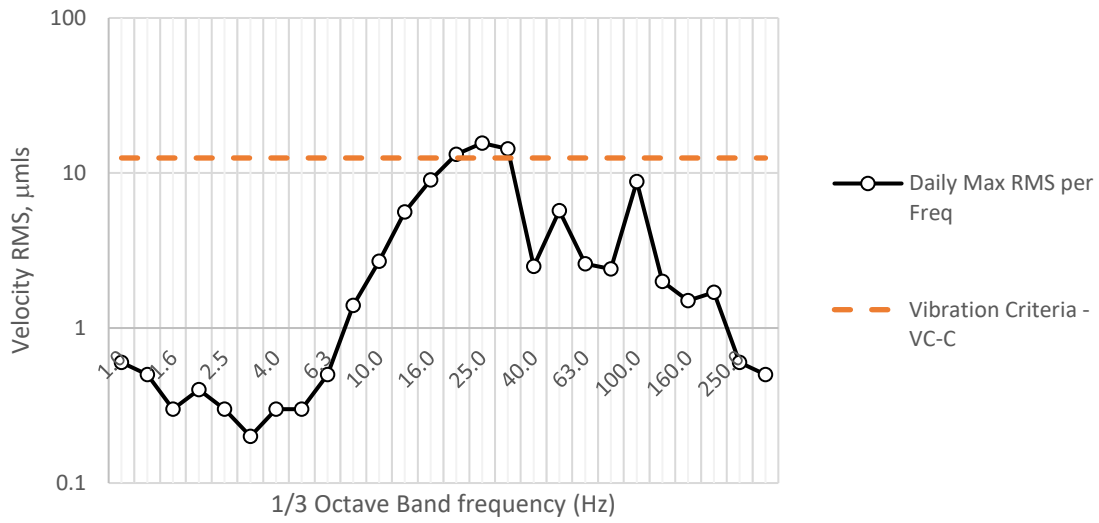


Sideways Vibration

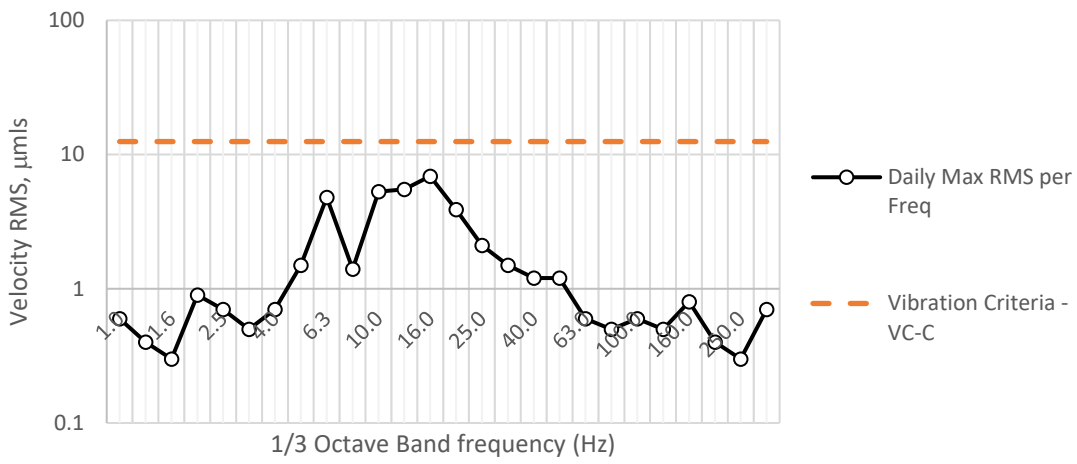




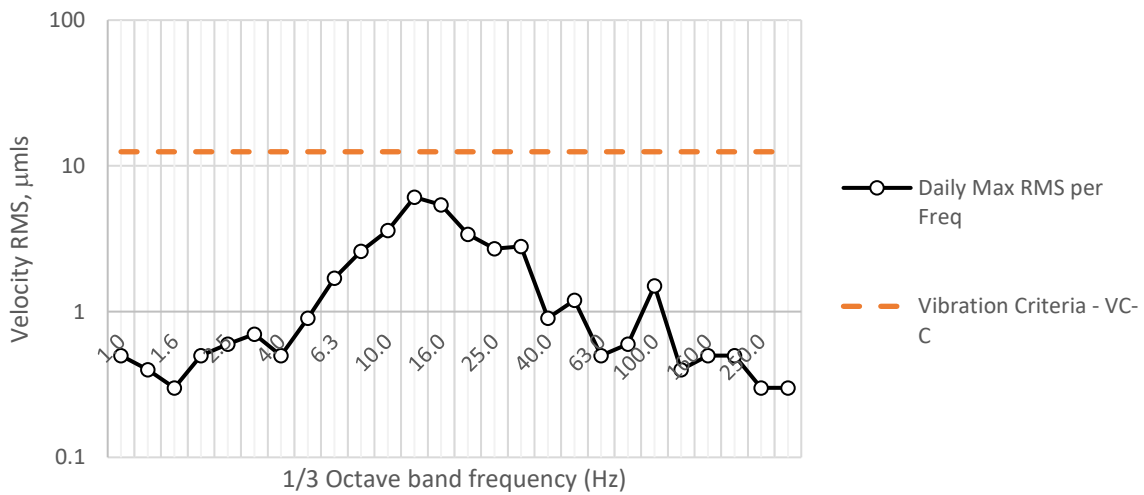
Vertical Vibration



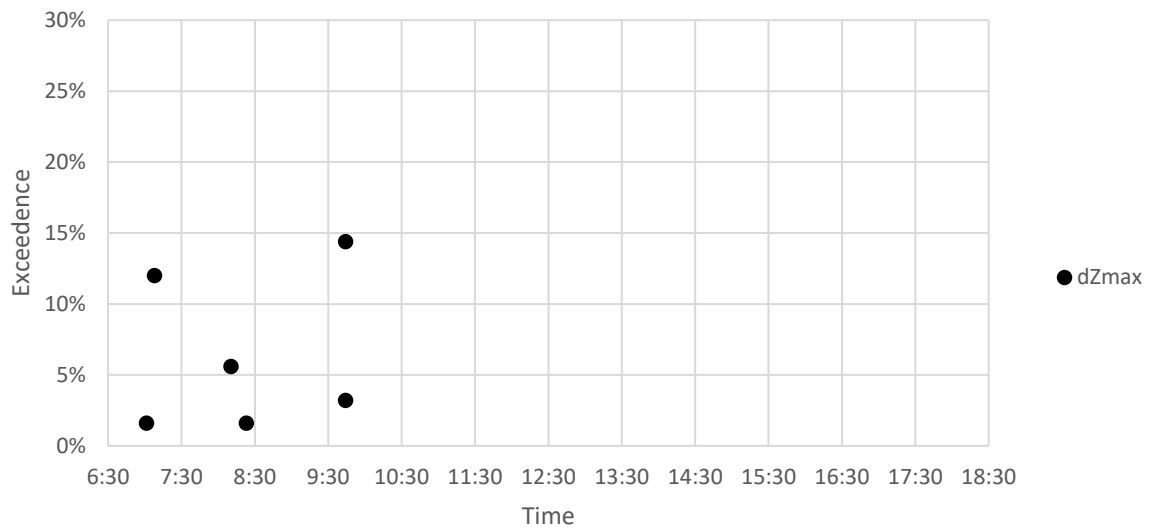
FwdBackwd Vibration



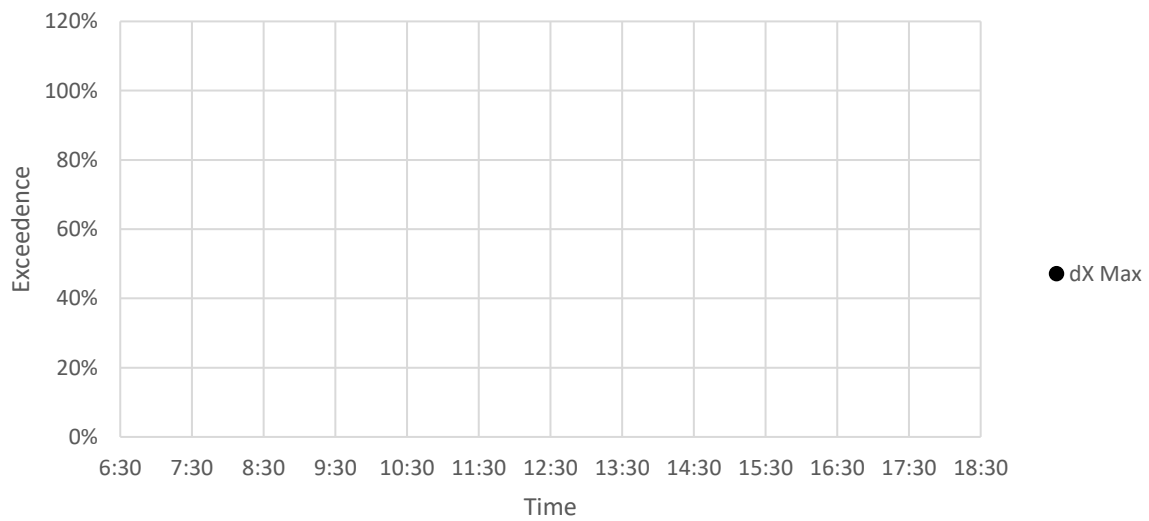
Sideways Vibration



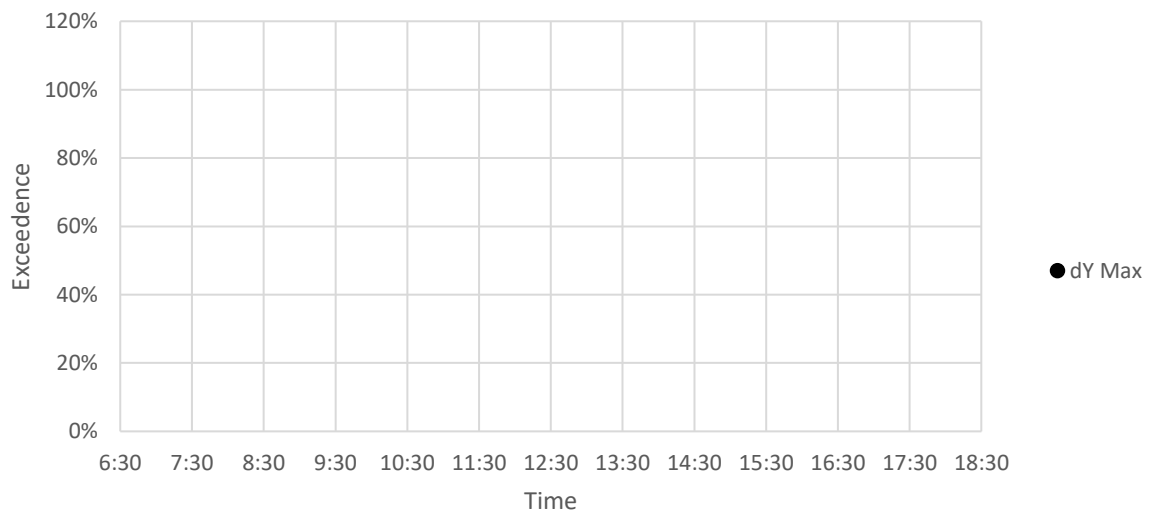
Vertical



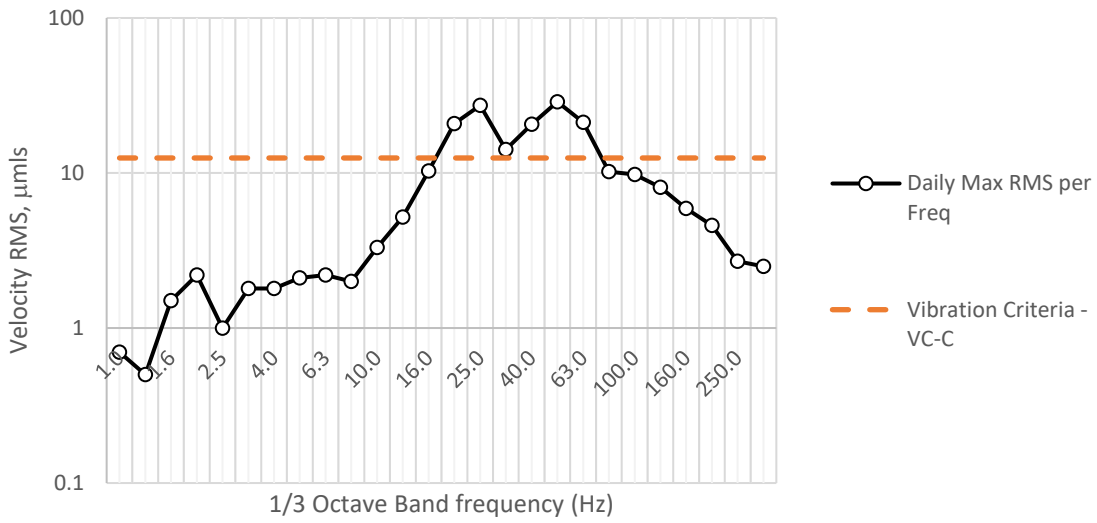
Fwd/Backwards



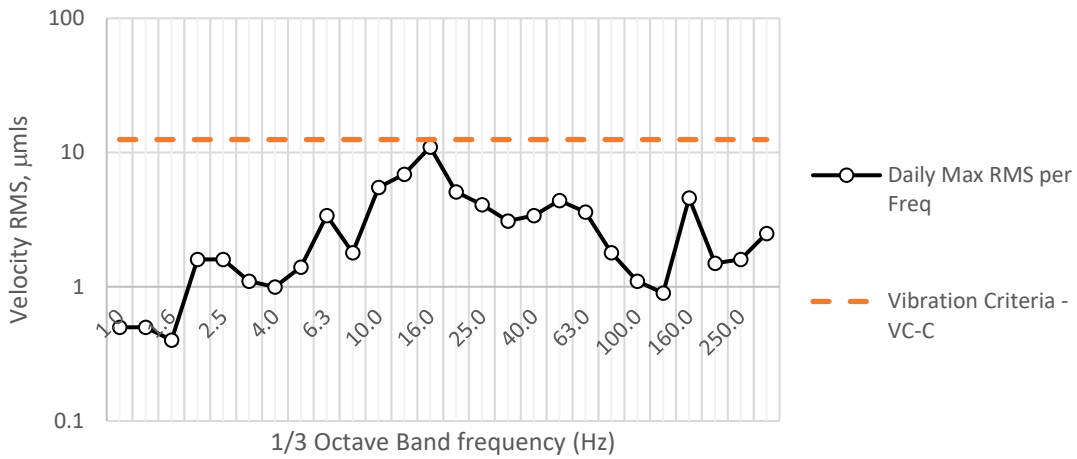
Sideways



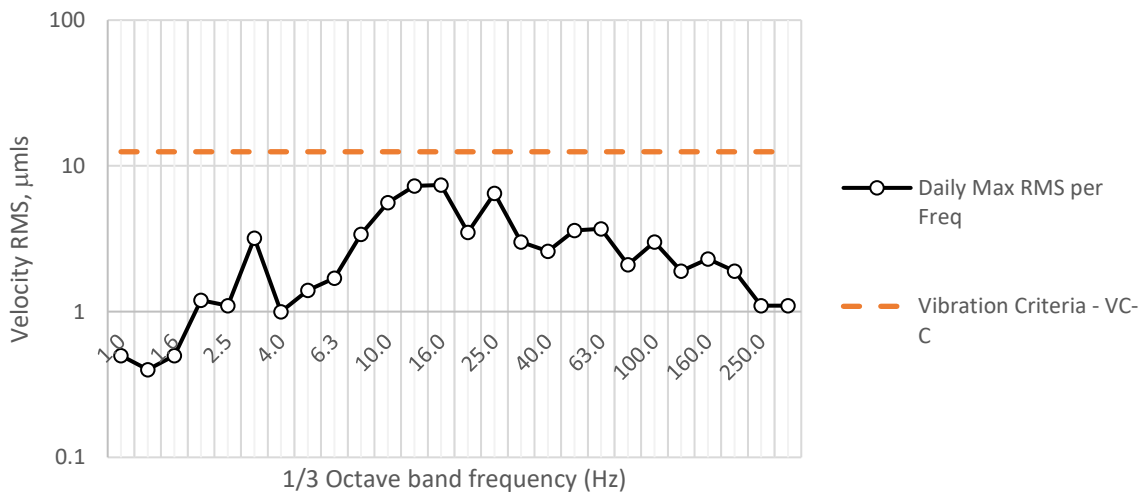
Vertical Vibration

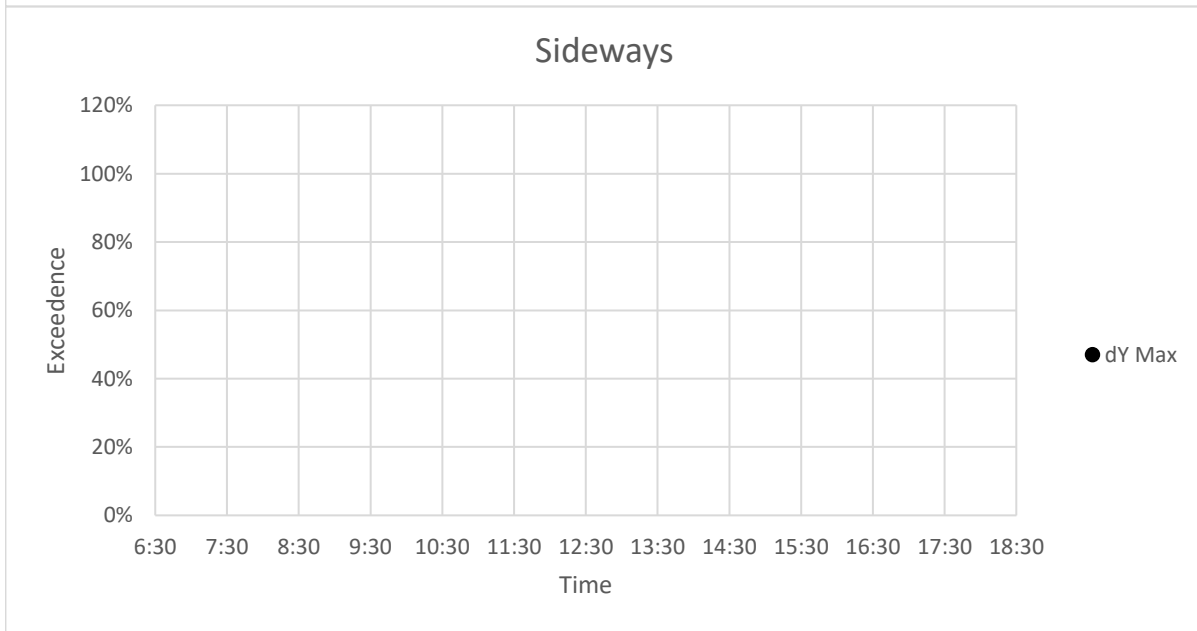
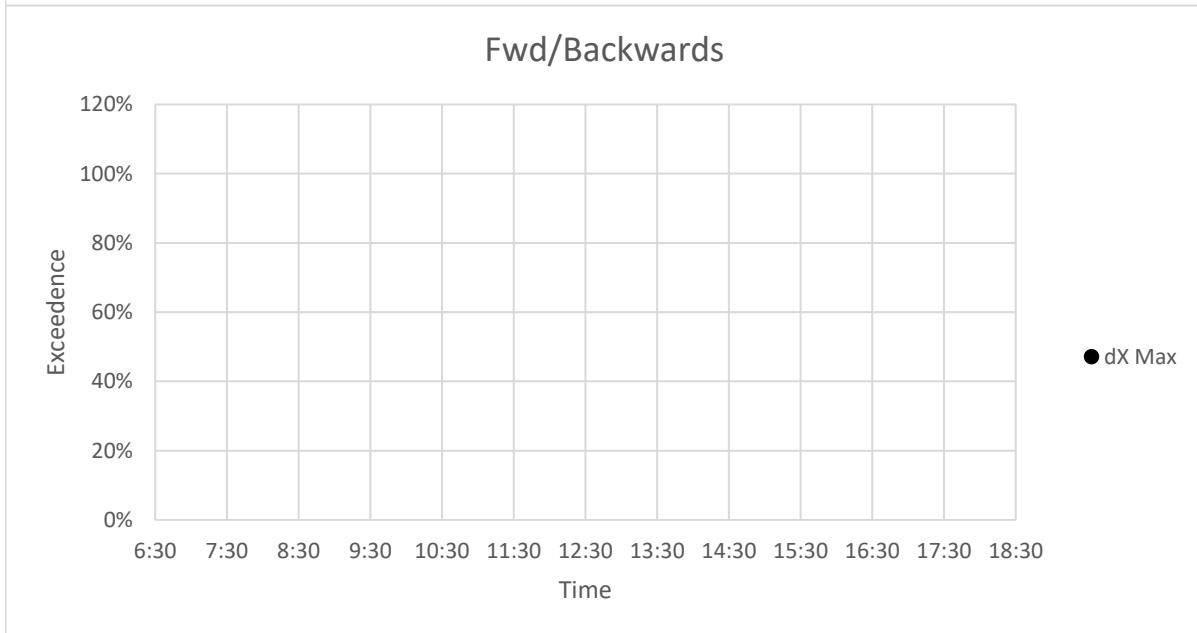
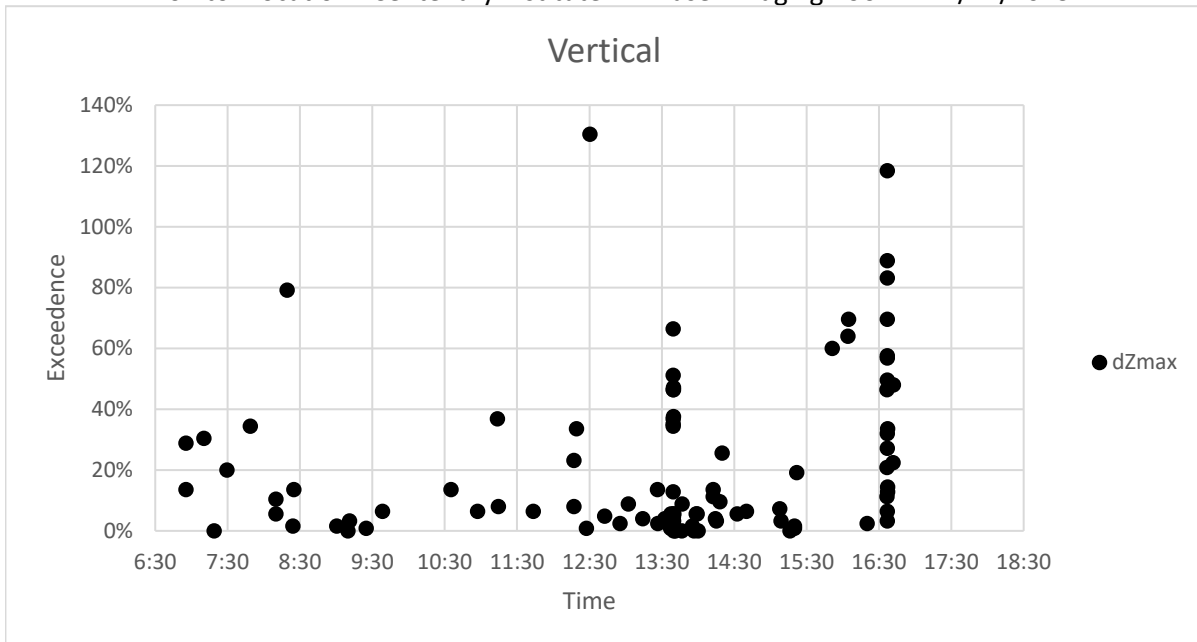


FwdBackwd Vibration

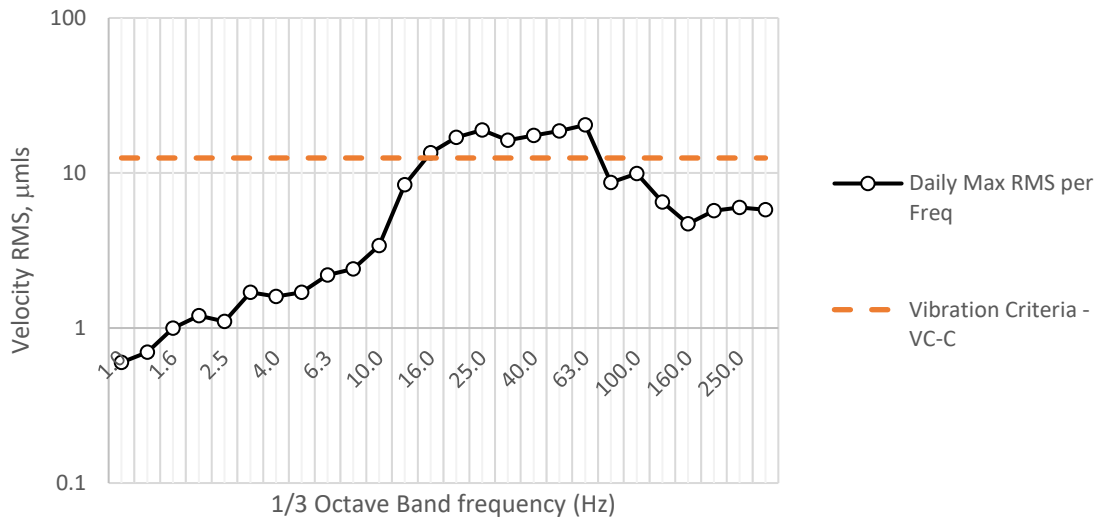


Sideways Vibration

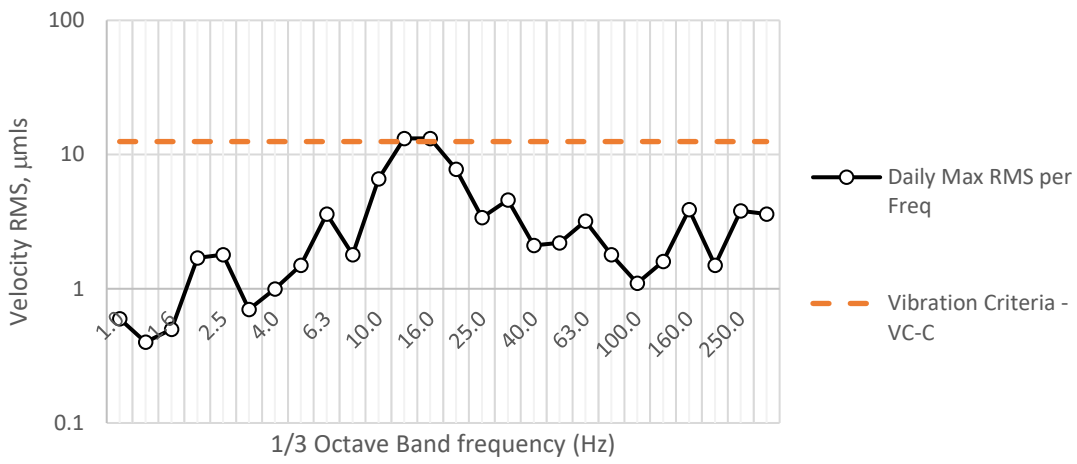




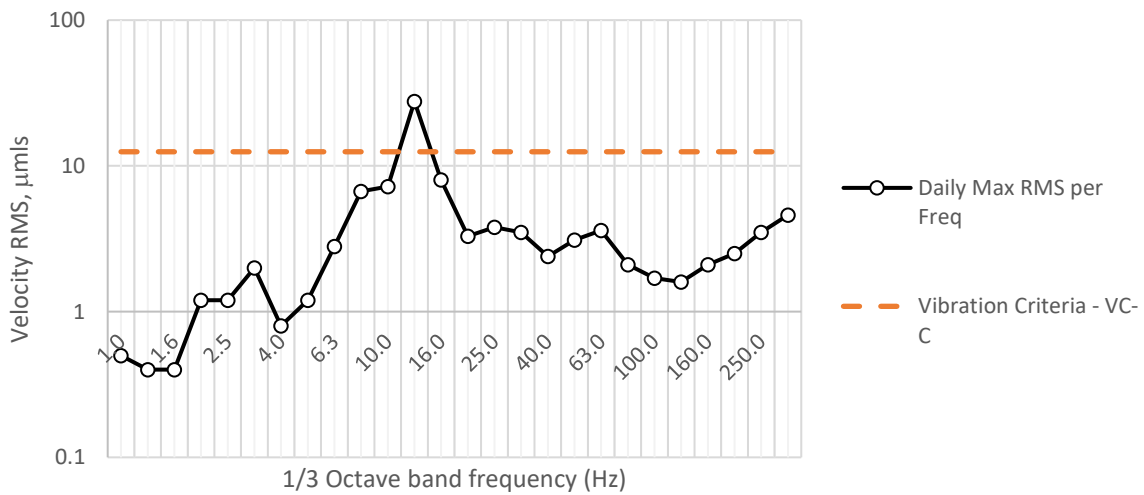
Vertical Vibration

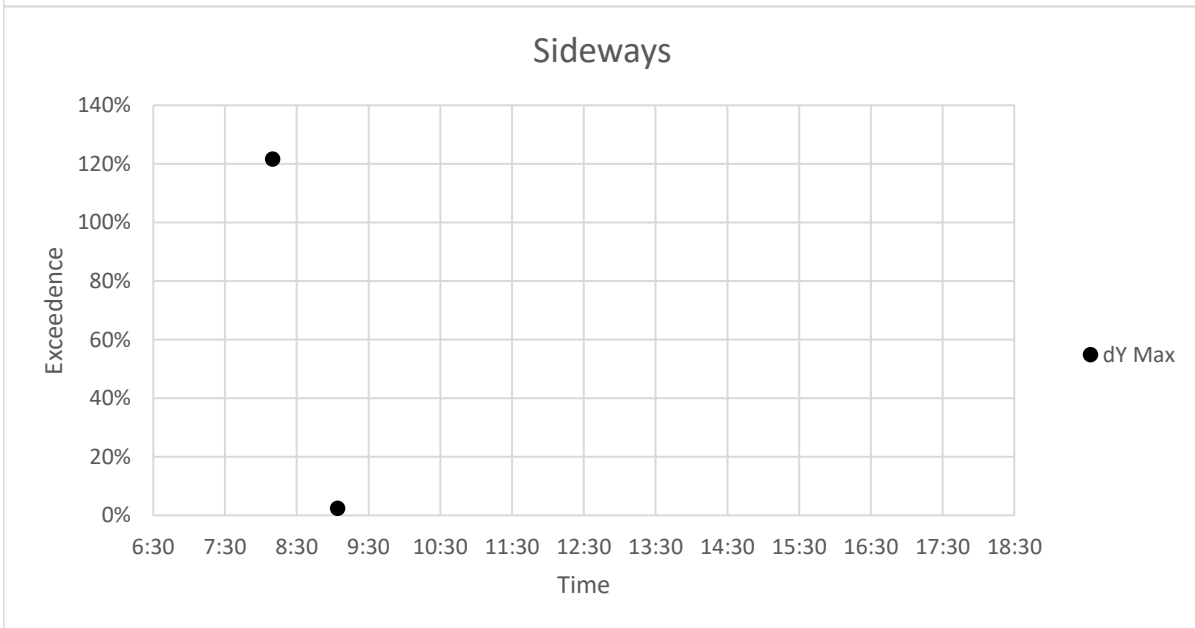
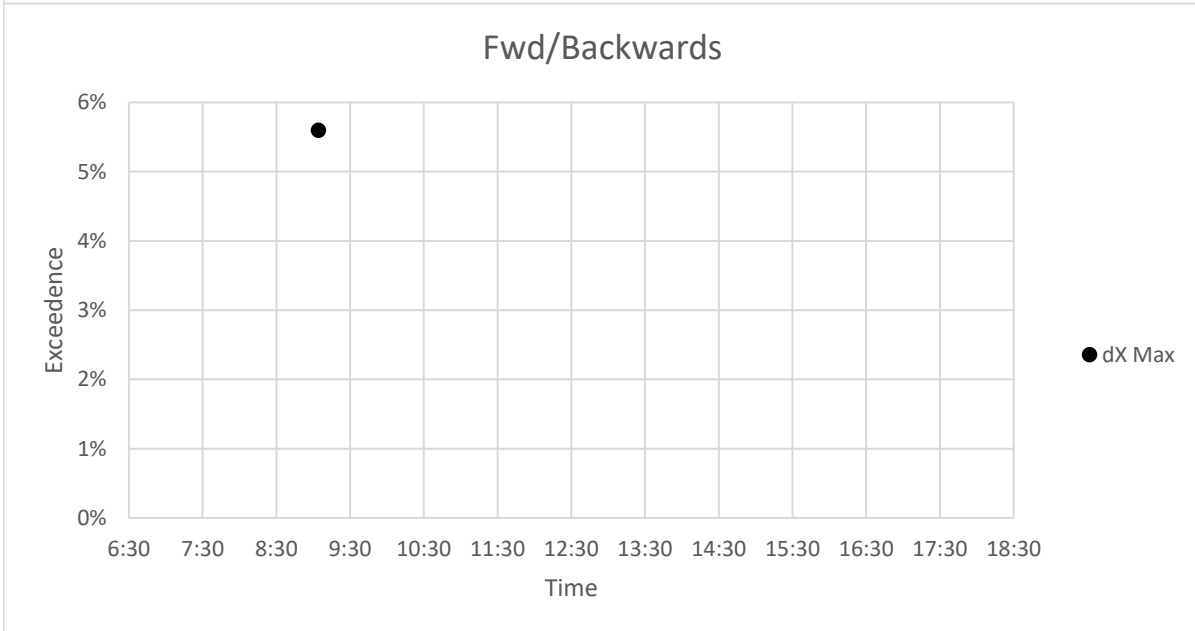
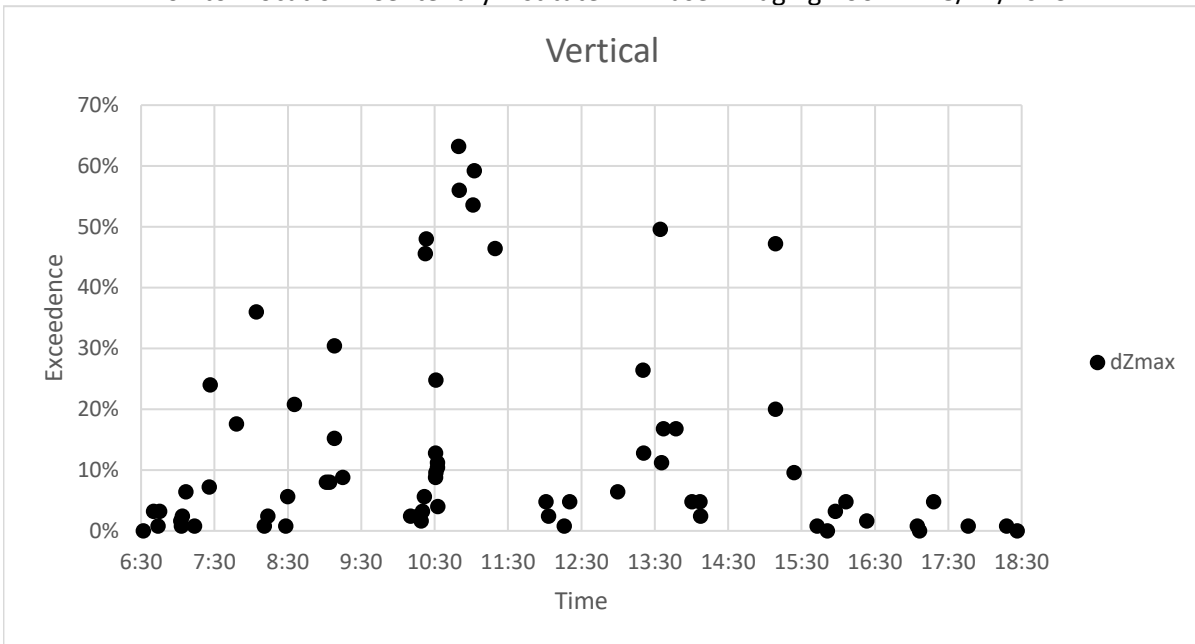


FwdBackwd Vibration

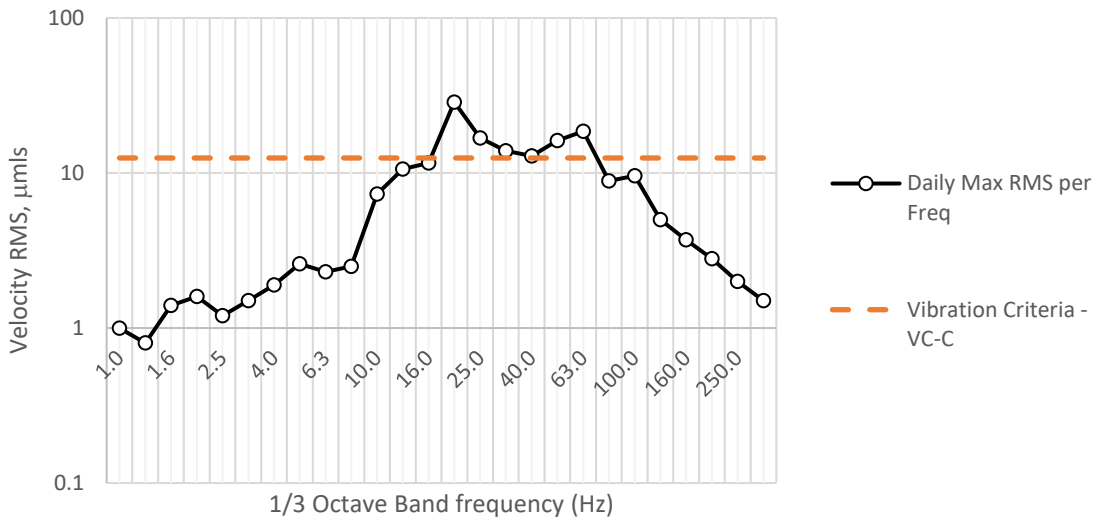


Sideways Vibration

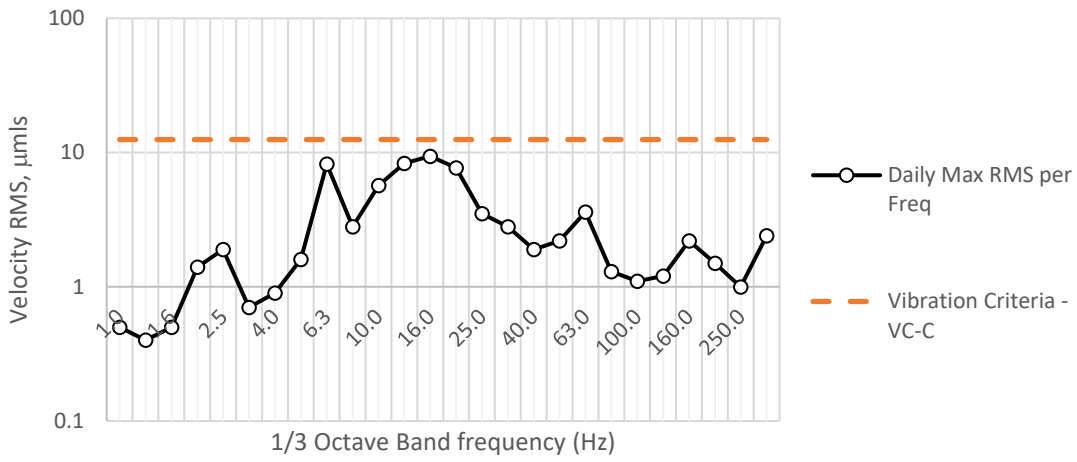




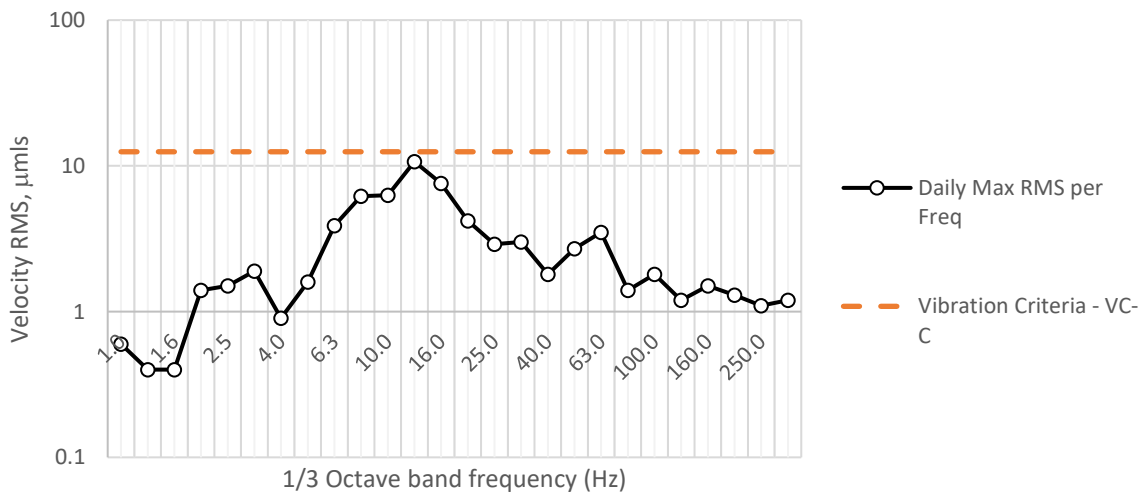
Vertical Vibration



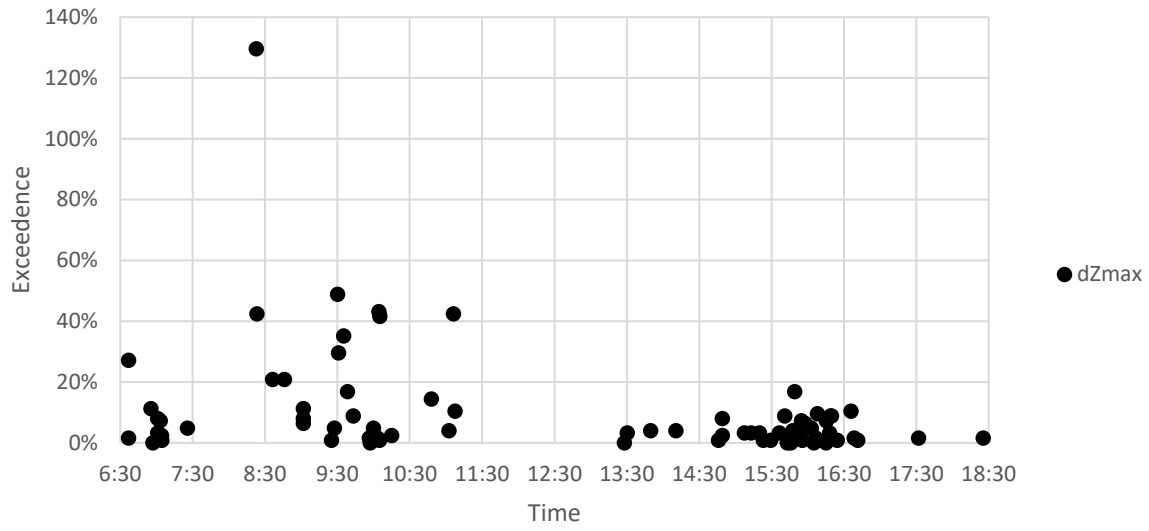
FwdBackwd Vibration



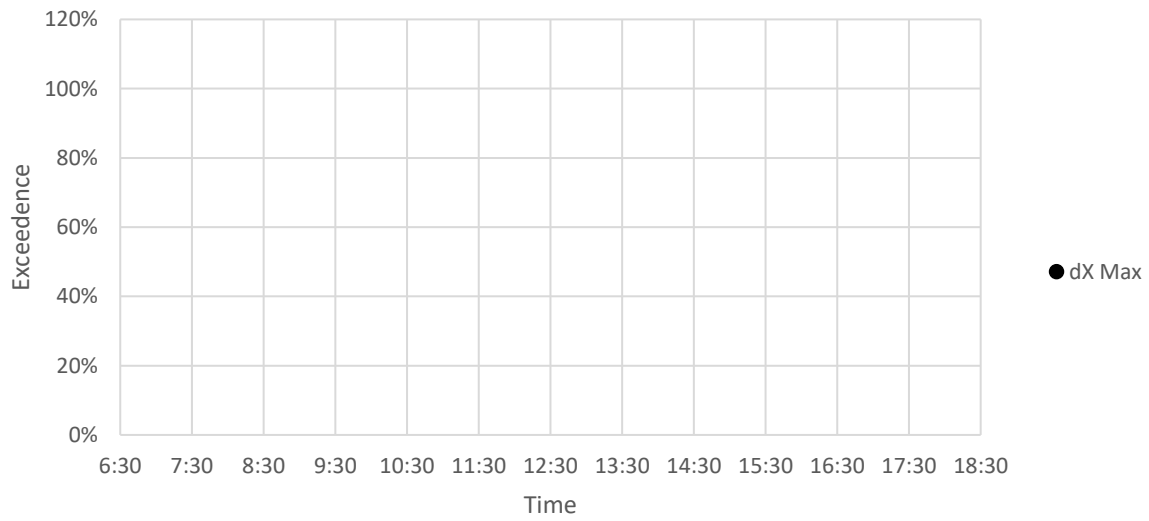
Sideways Vibration



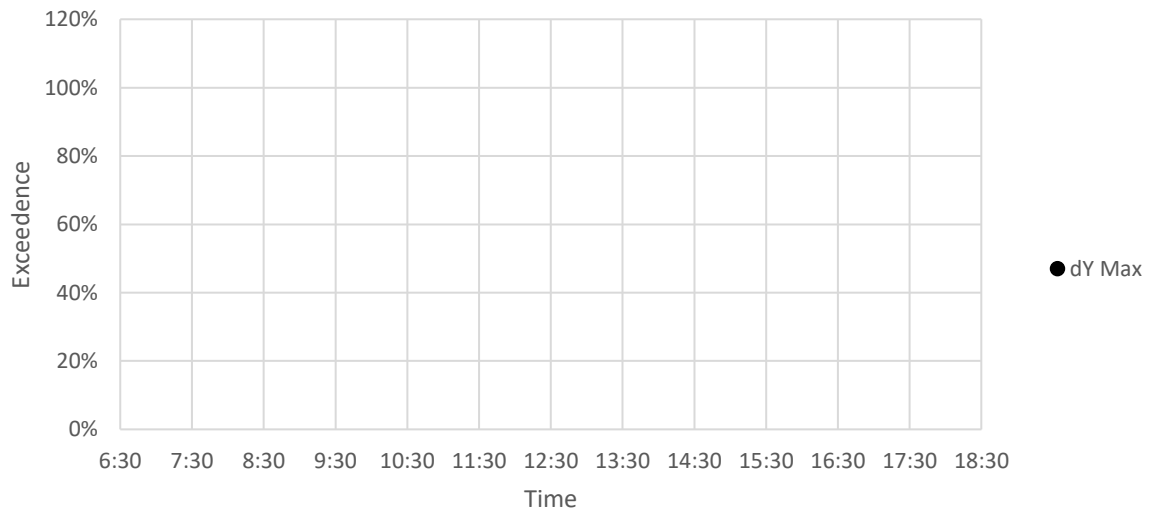
Vertical



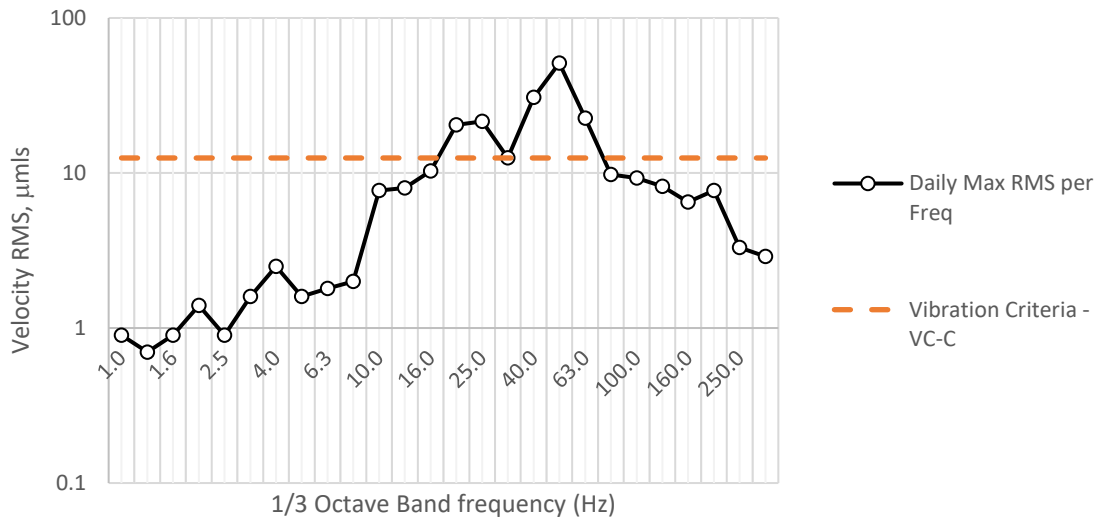
Fwd/Backwards



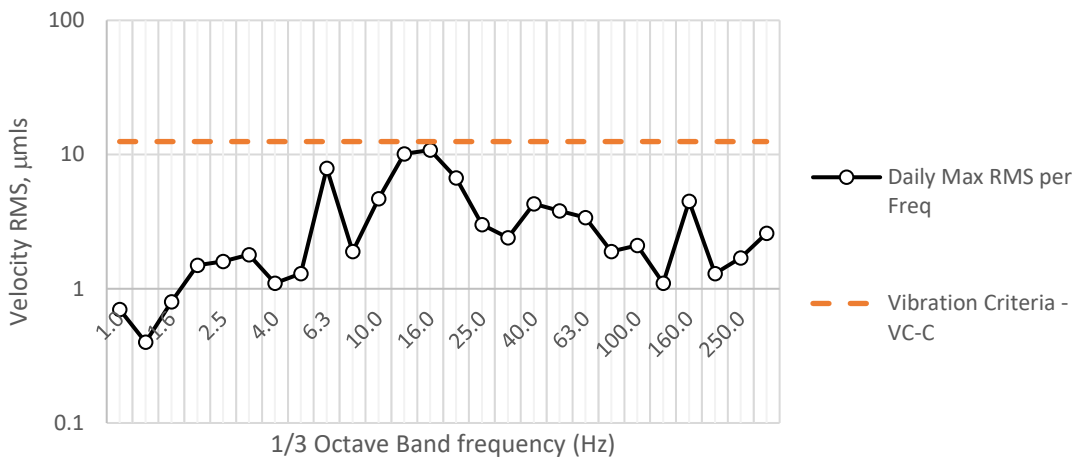
Sideways



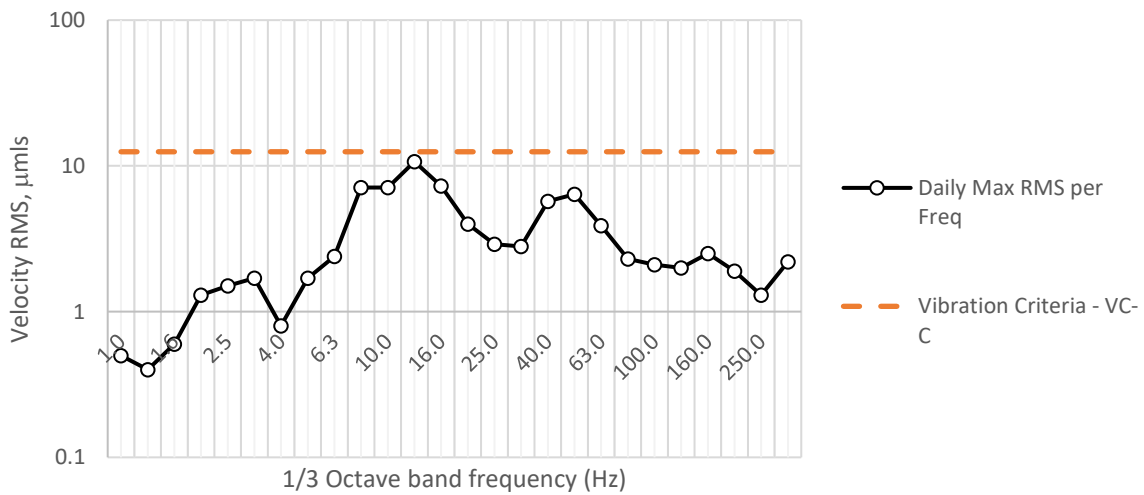
Vertical Vibration

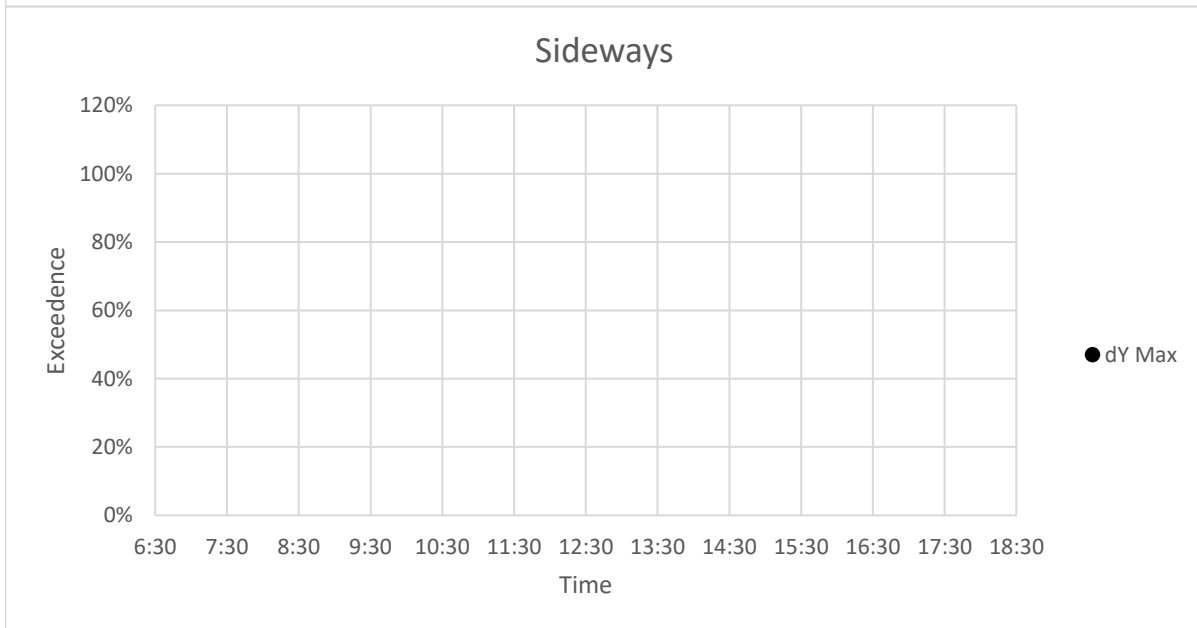
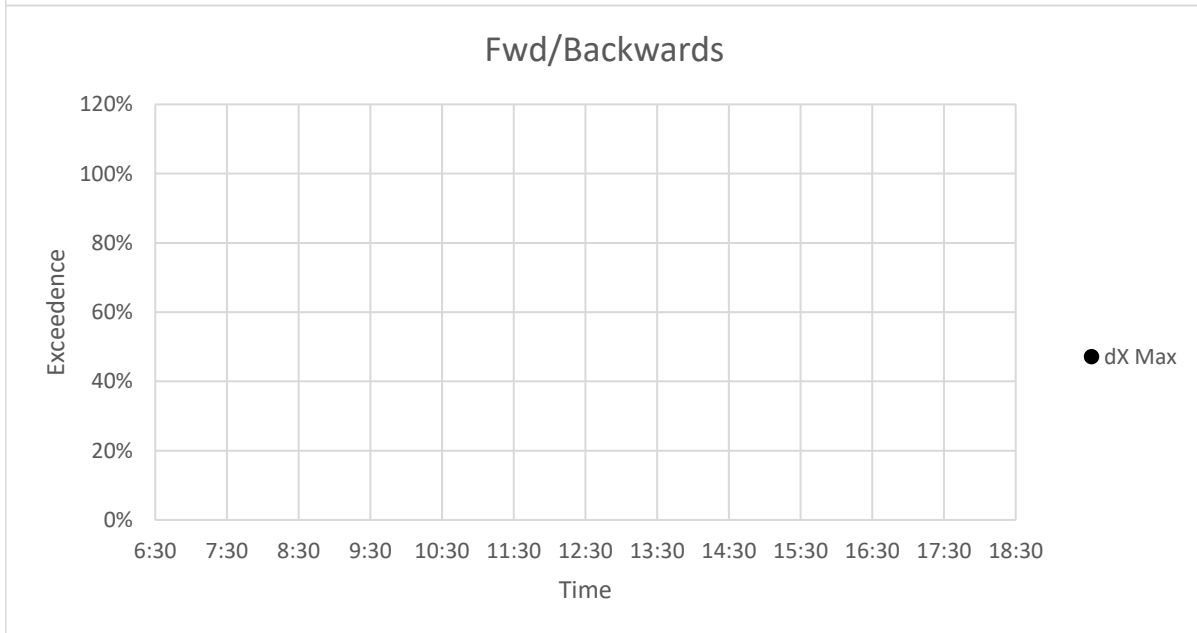
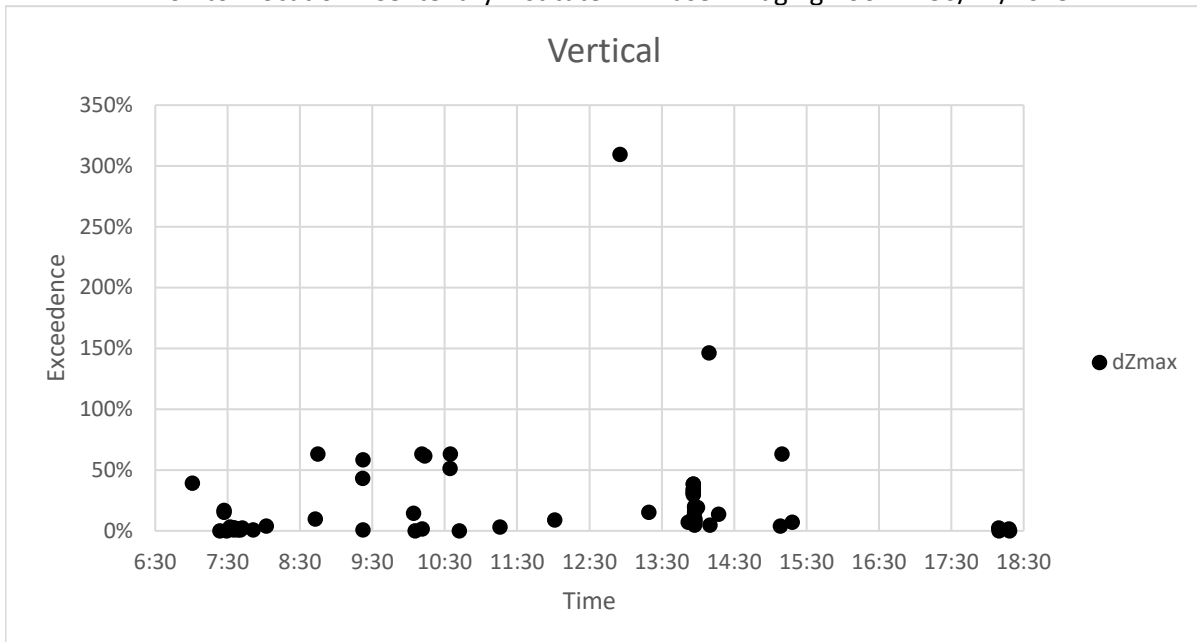


FwdBackwd Vibration

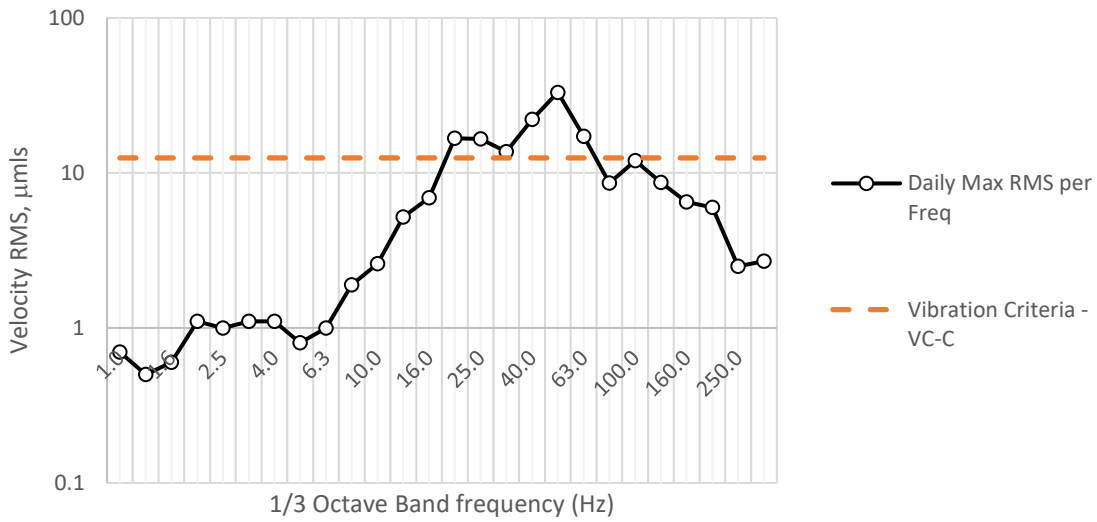


Sideways Vibration

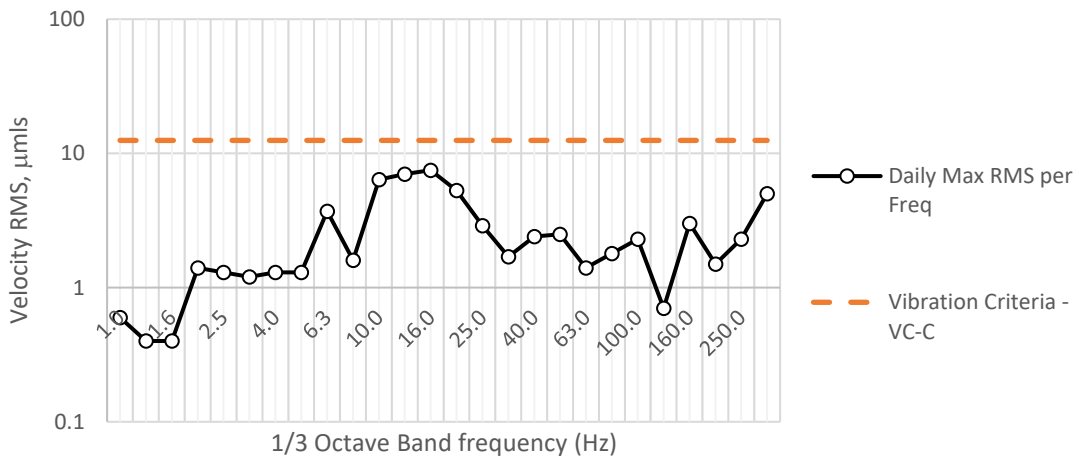




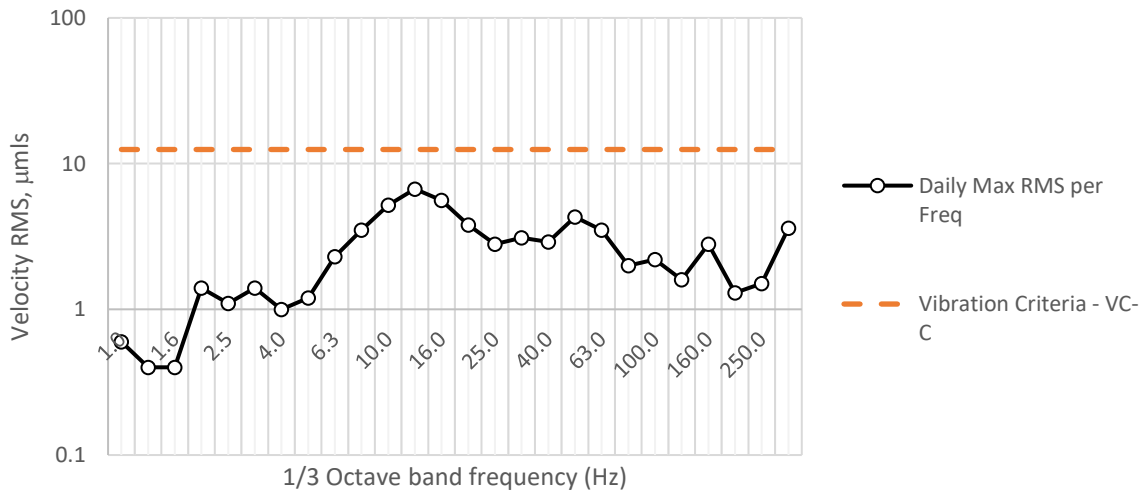
Vertical Vibration



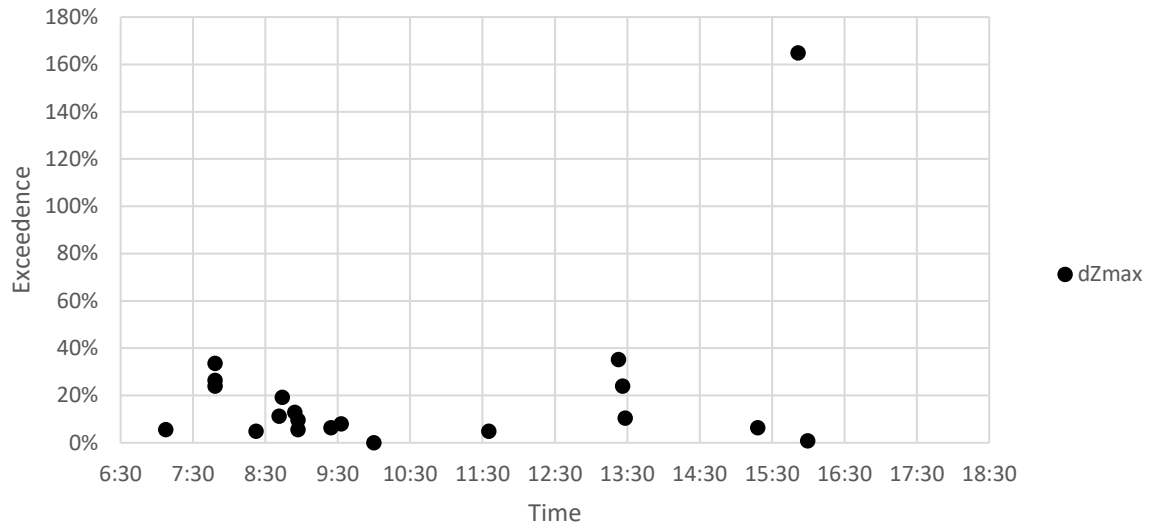
FwdBackwd Vibration



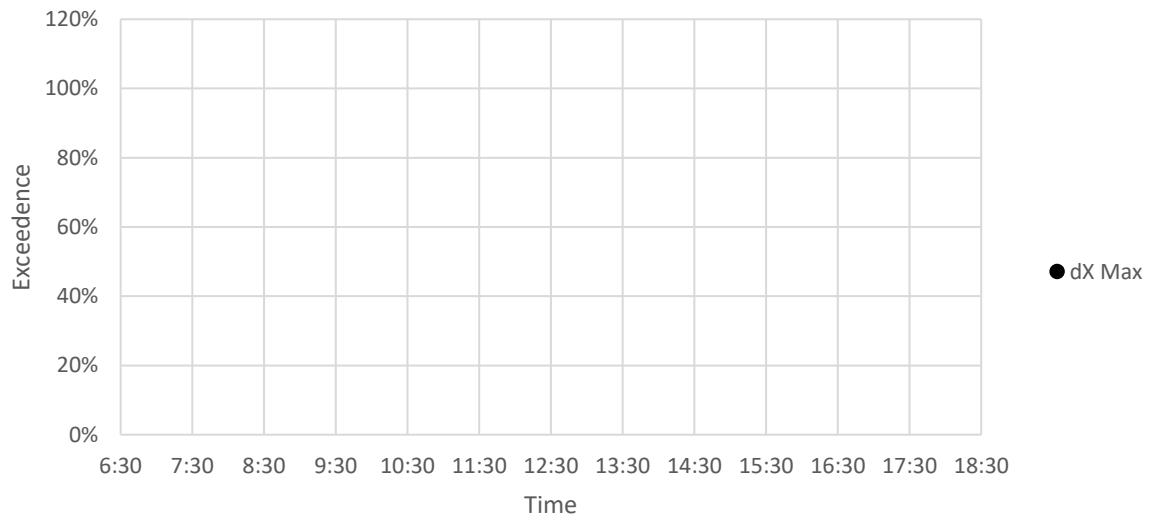
Sideways Vibration



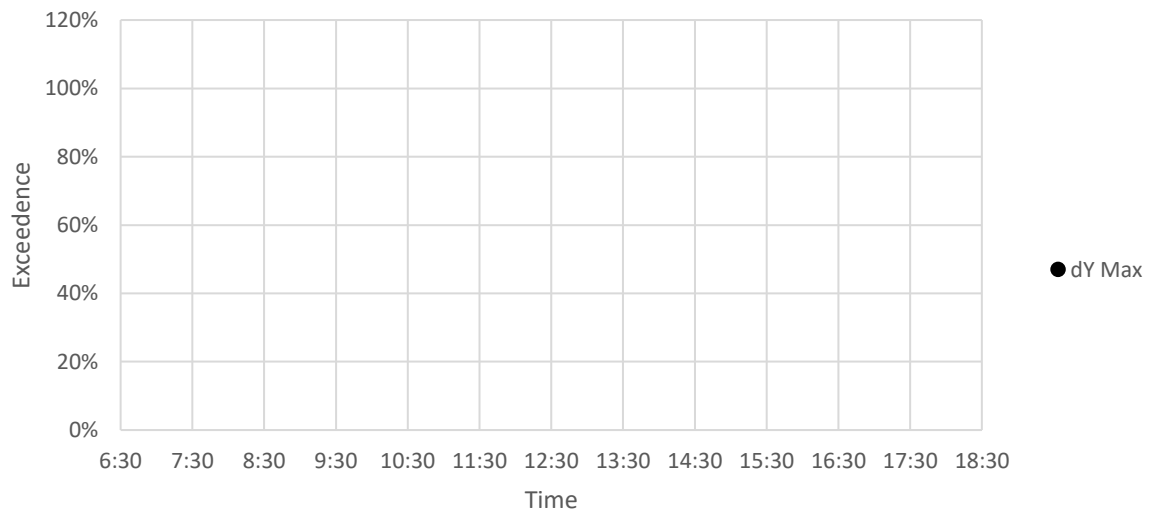
Vertical



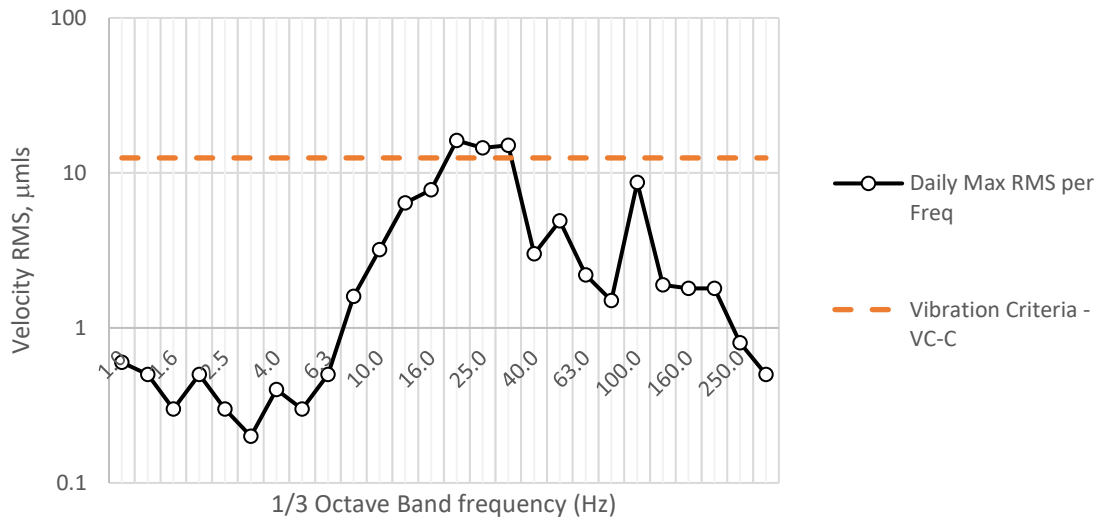
Fwd/Backwards



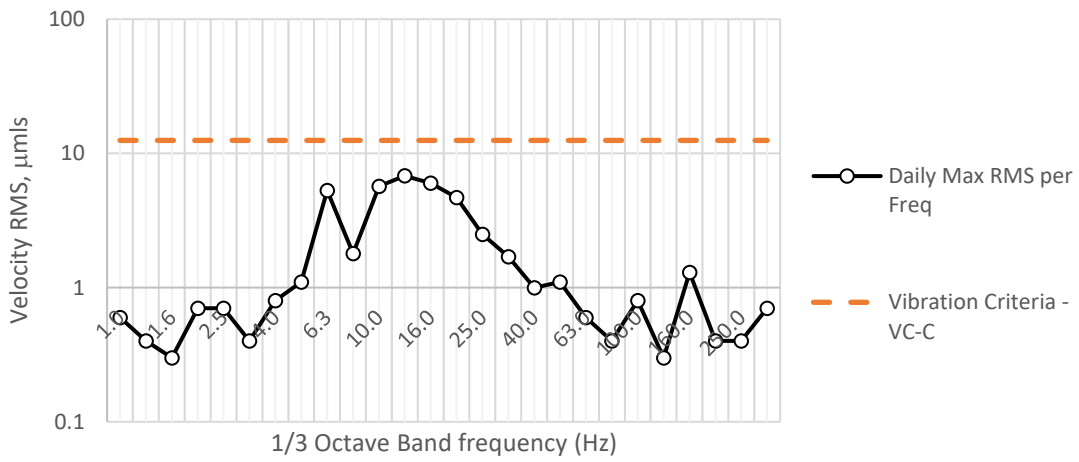
Sideways



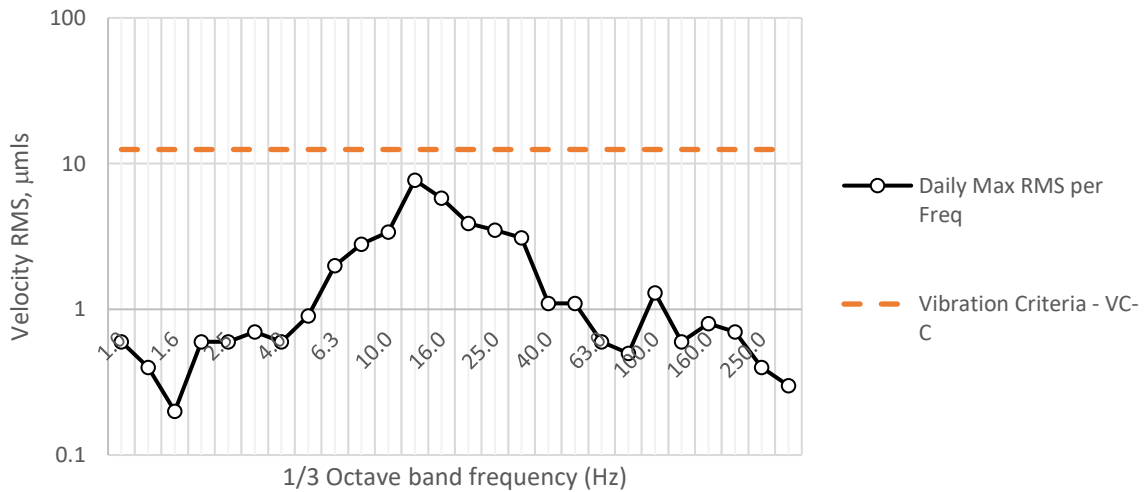
Vertical Vibration



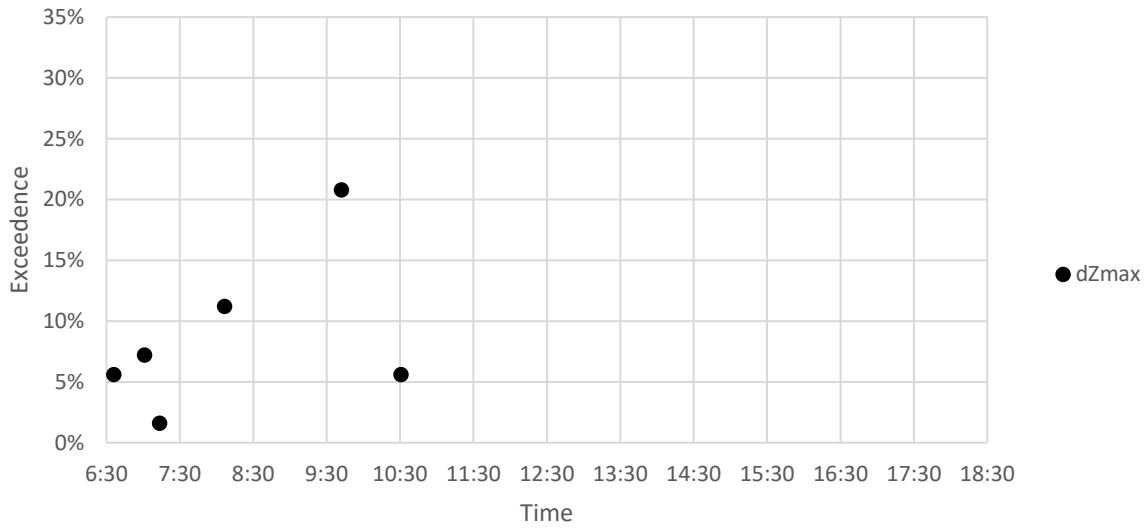
FwdBackwd Vibration



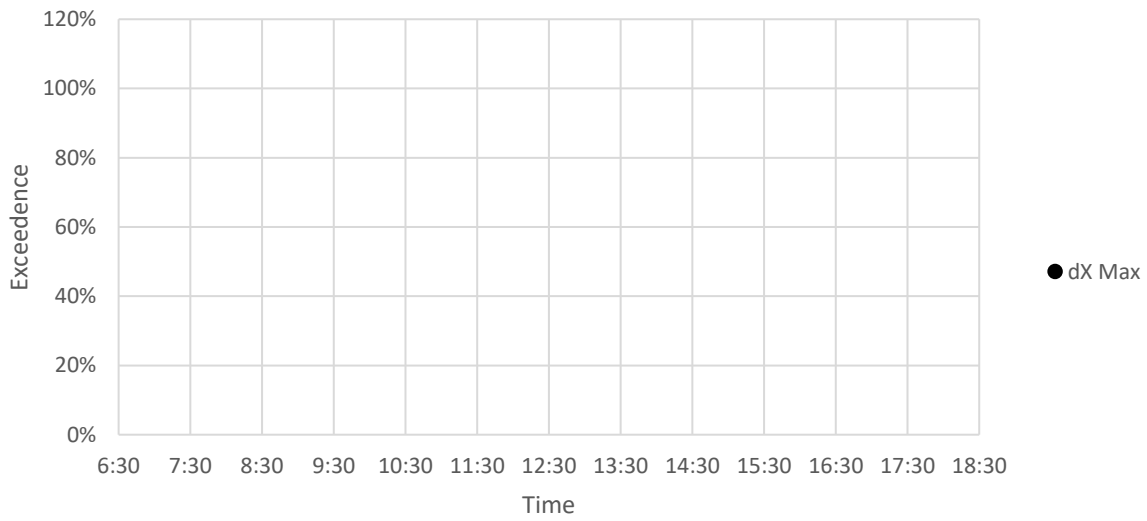
Sideways Vibration



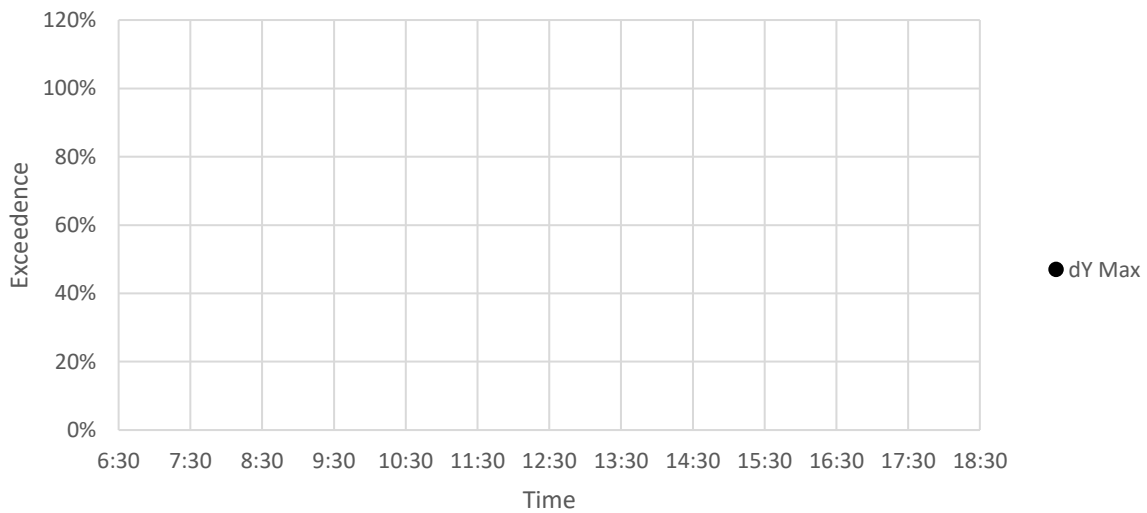
Vertical



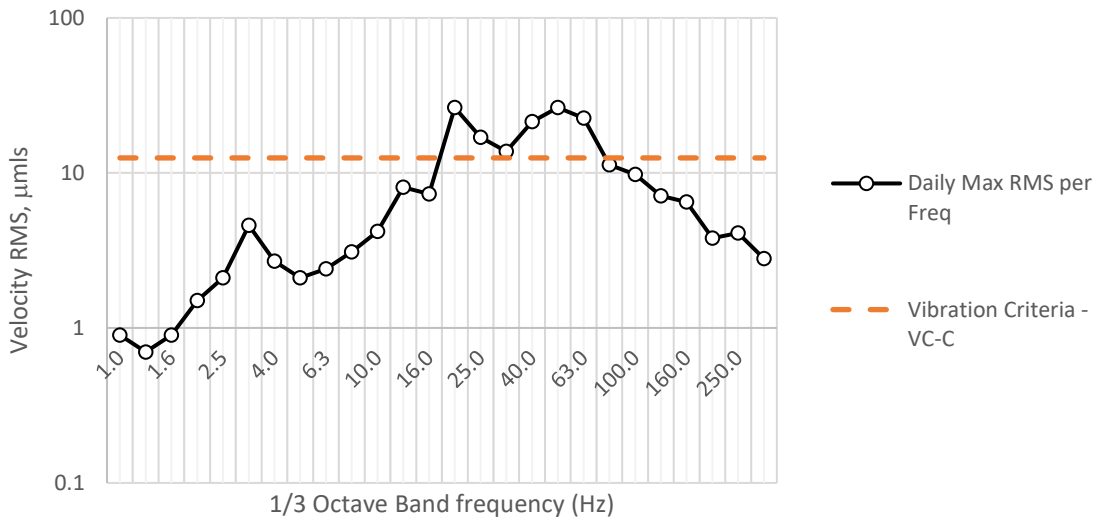
Fwd/Backwards



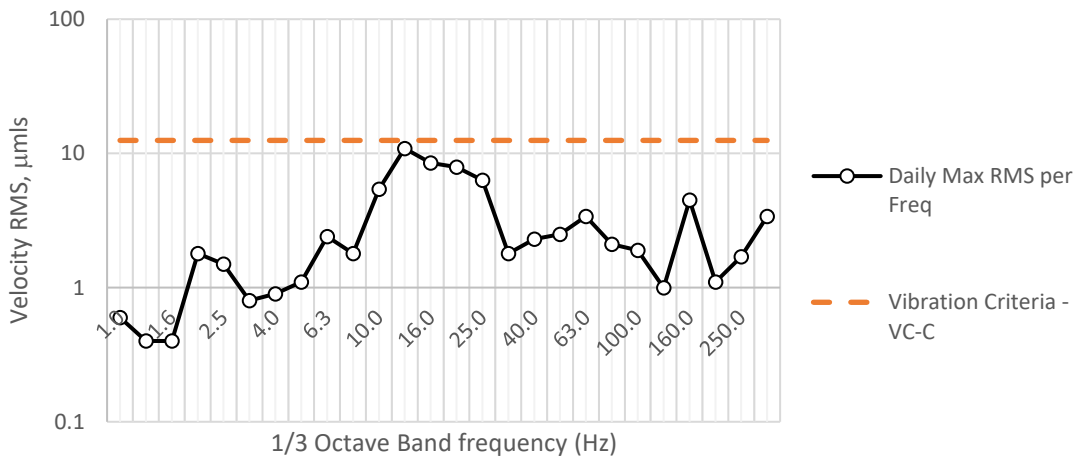
Sideways



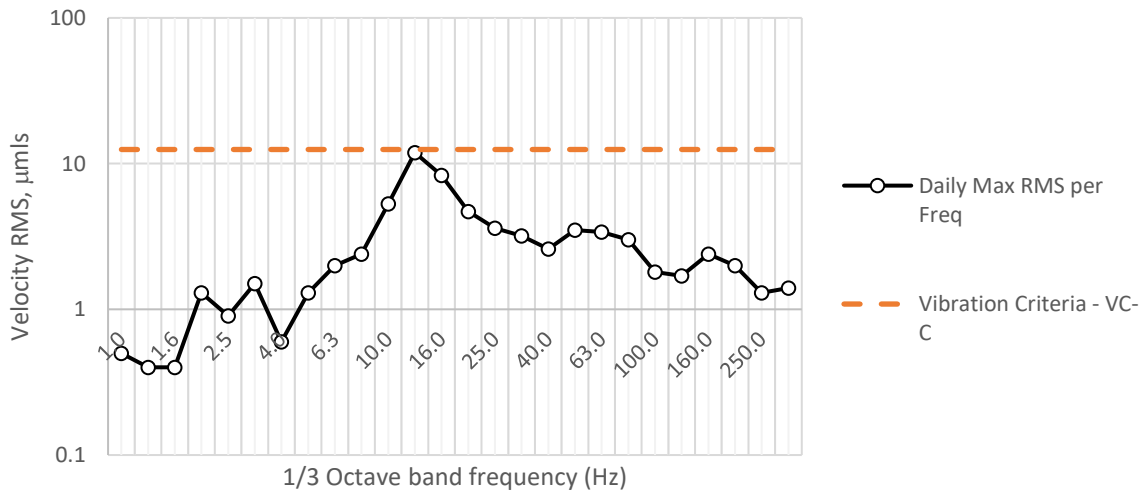
Vertical Vibration

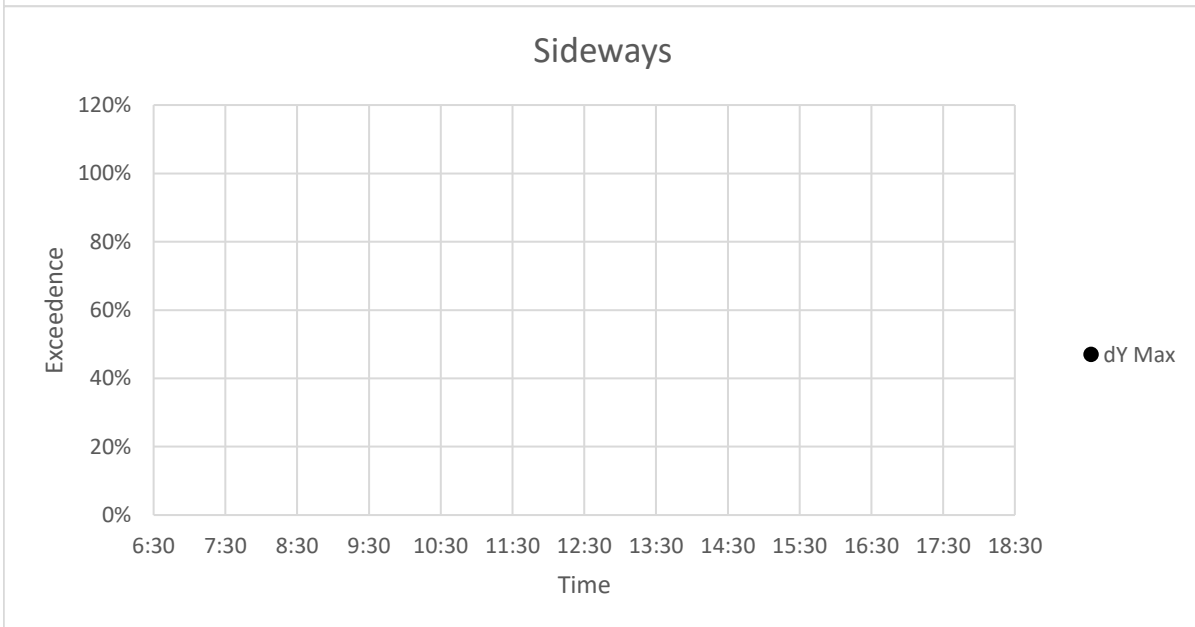
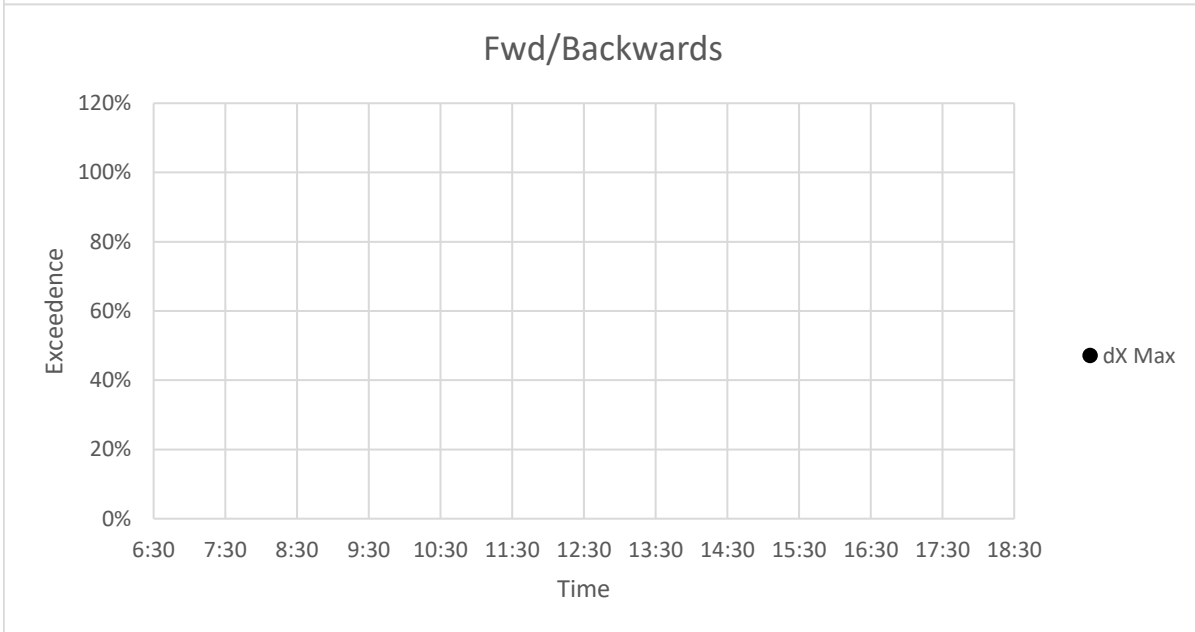
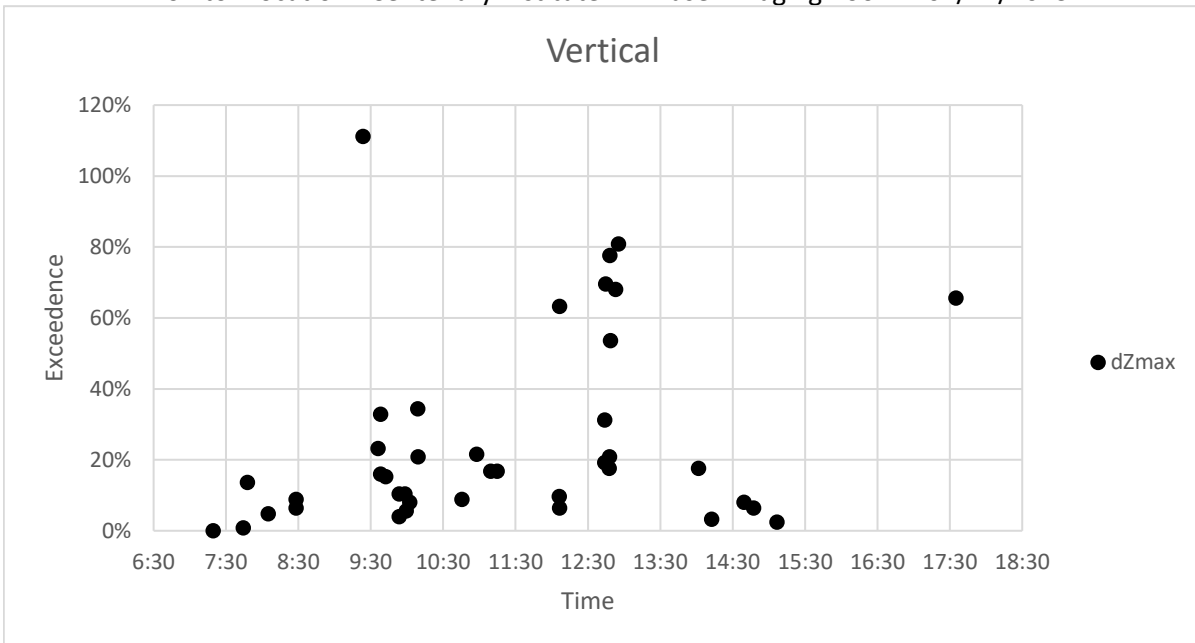


FwdBackwd Vibration

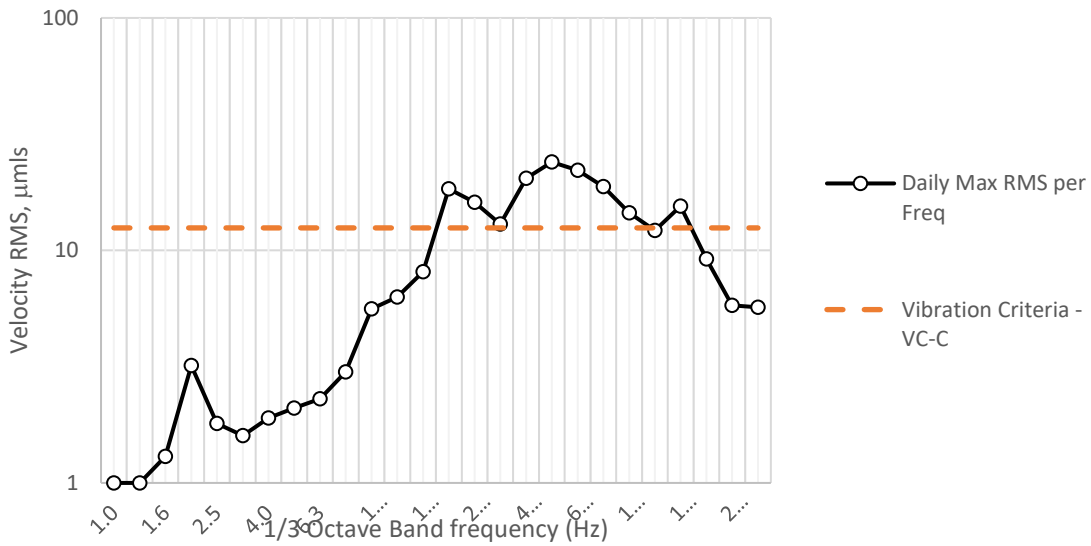


Sideways Vibration

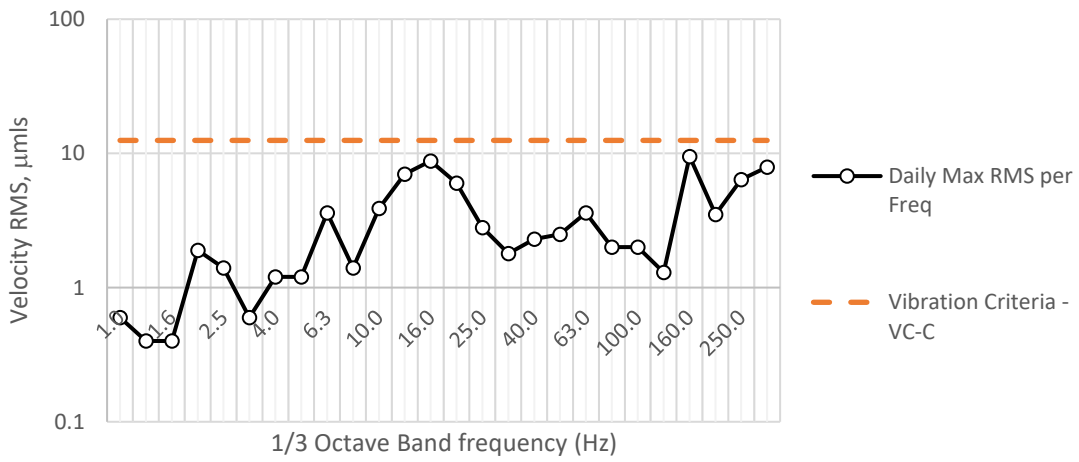




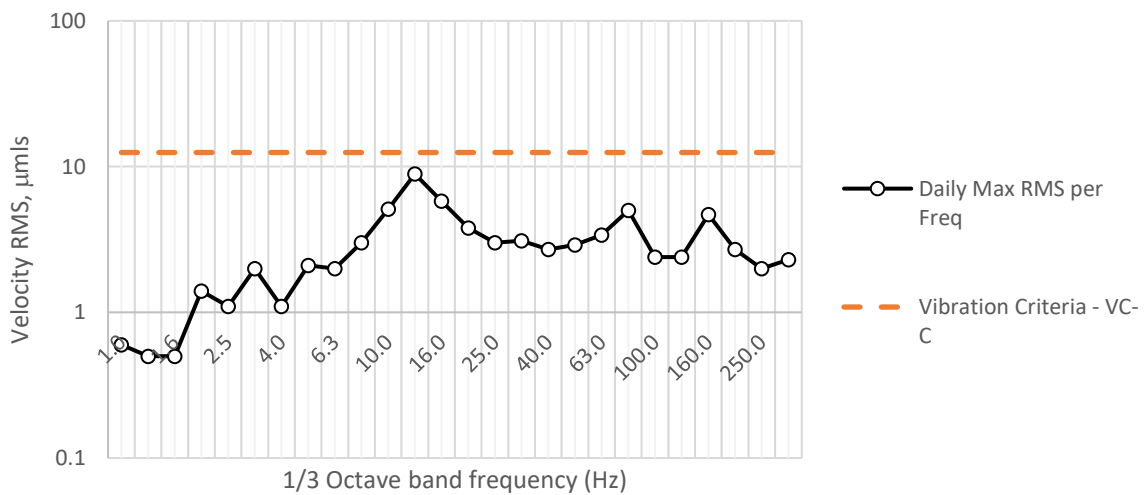
Vertical Vibration

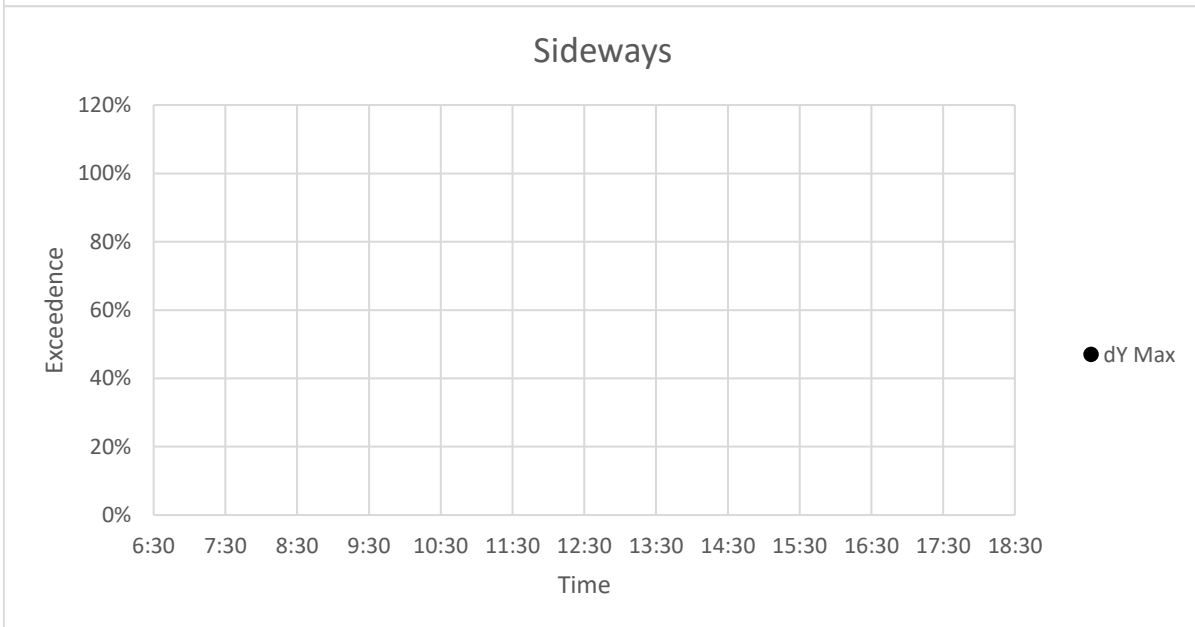
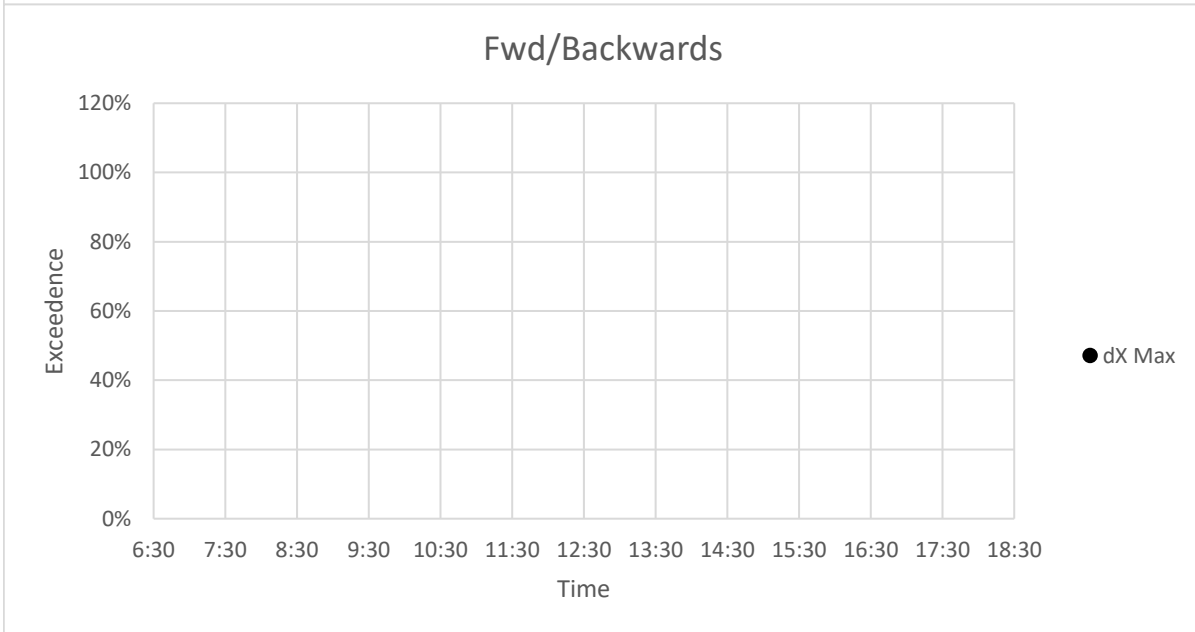
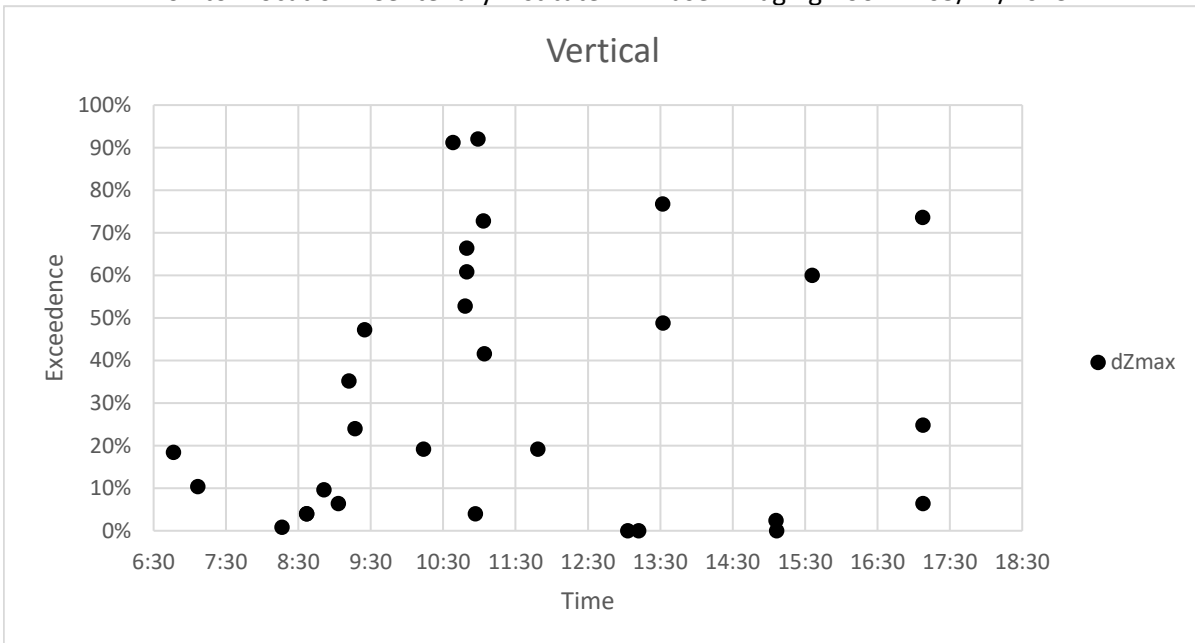


FwdBackwd Vibration

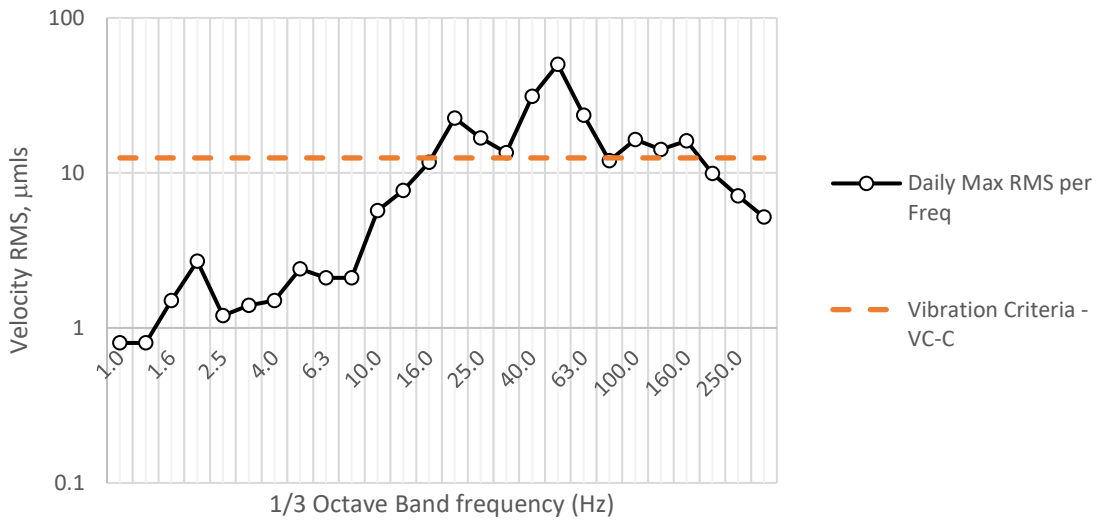


Sideways Vibration

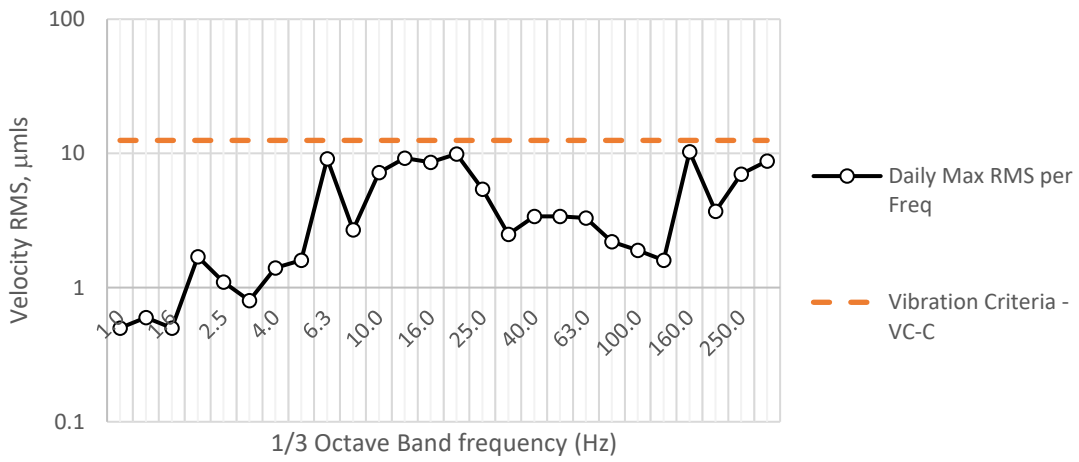




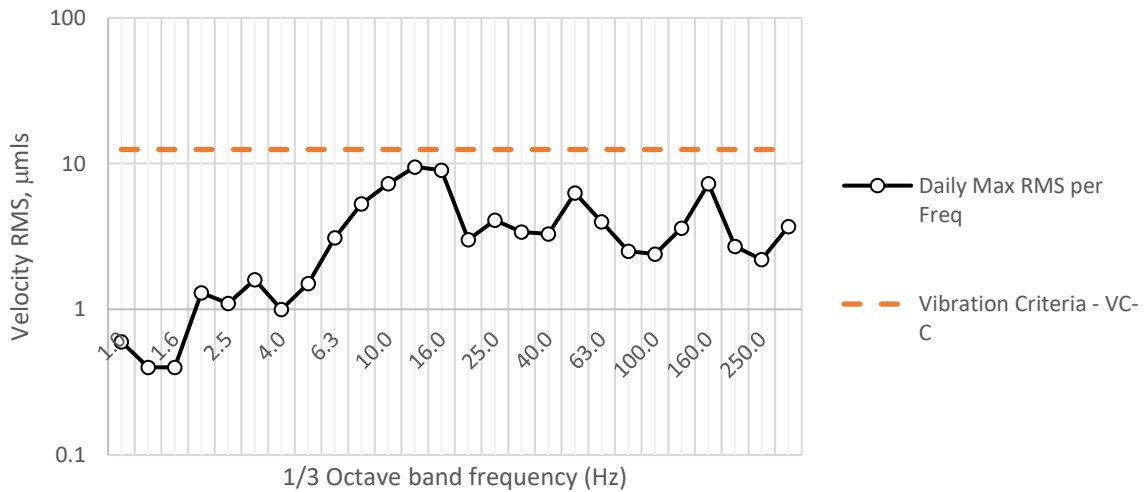
Vertical Vibration

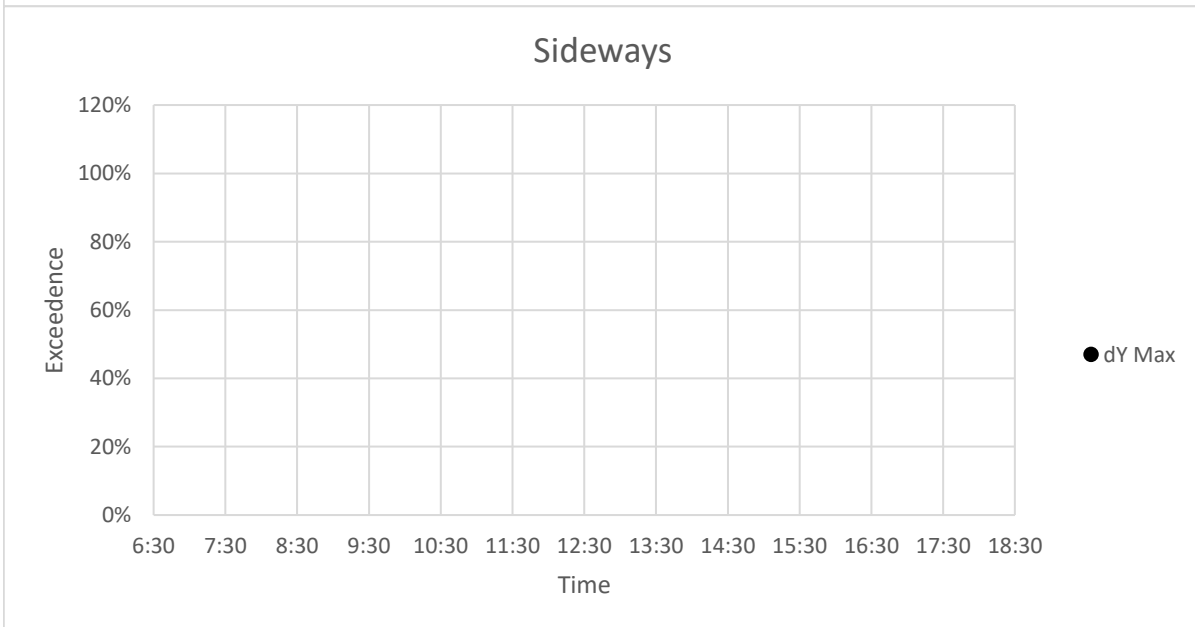
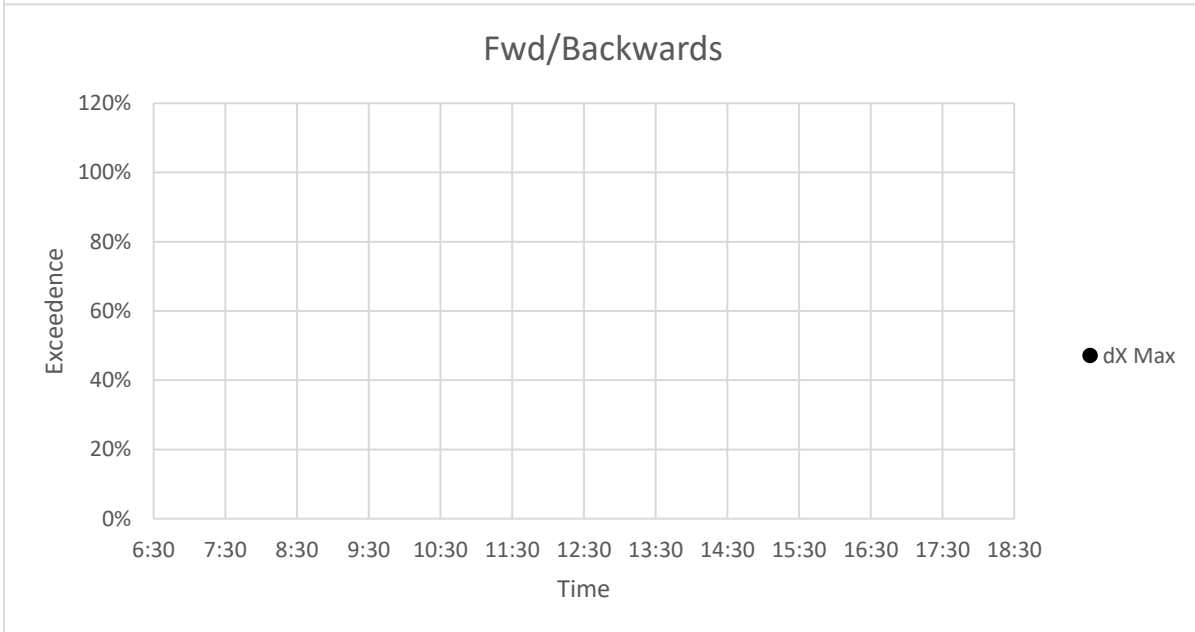
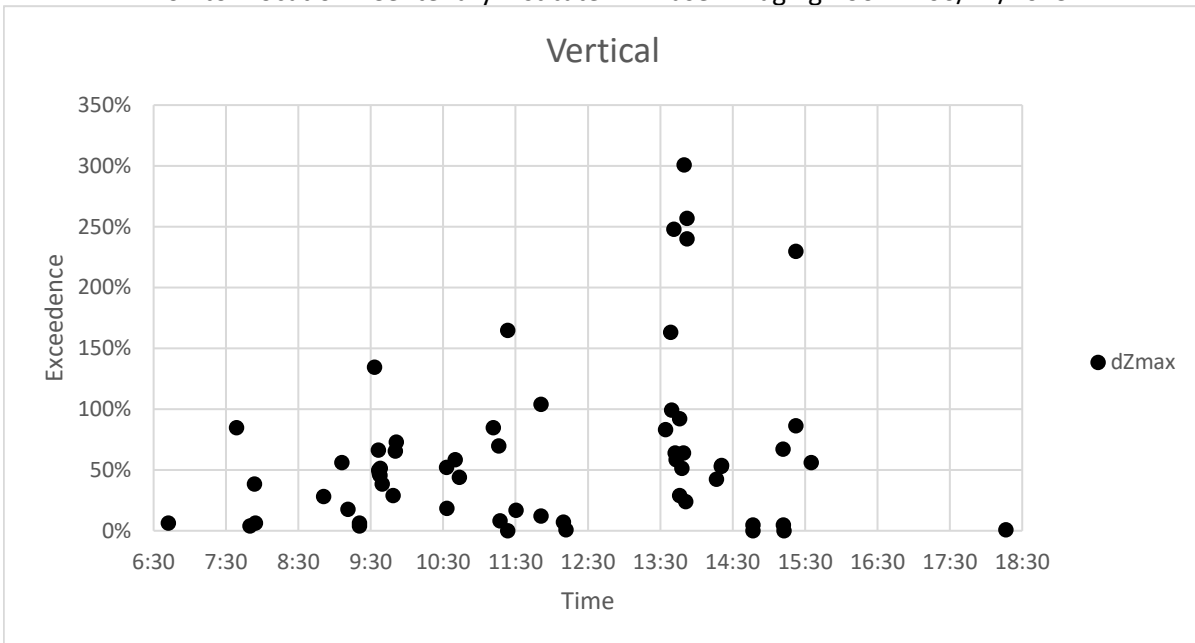


FwdBackwd Vibration



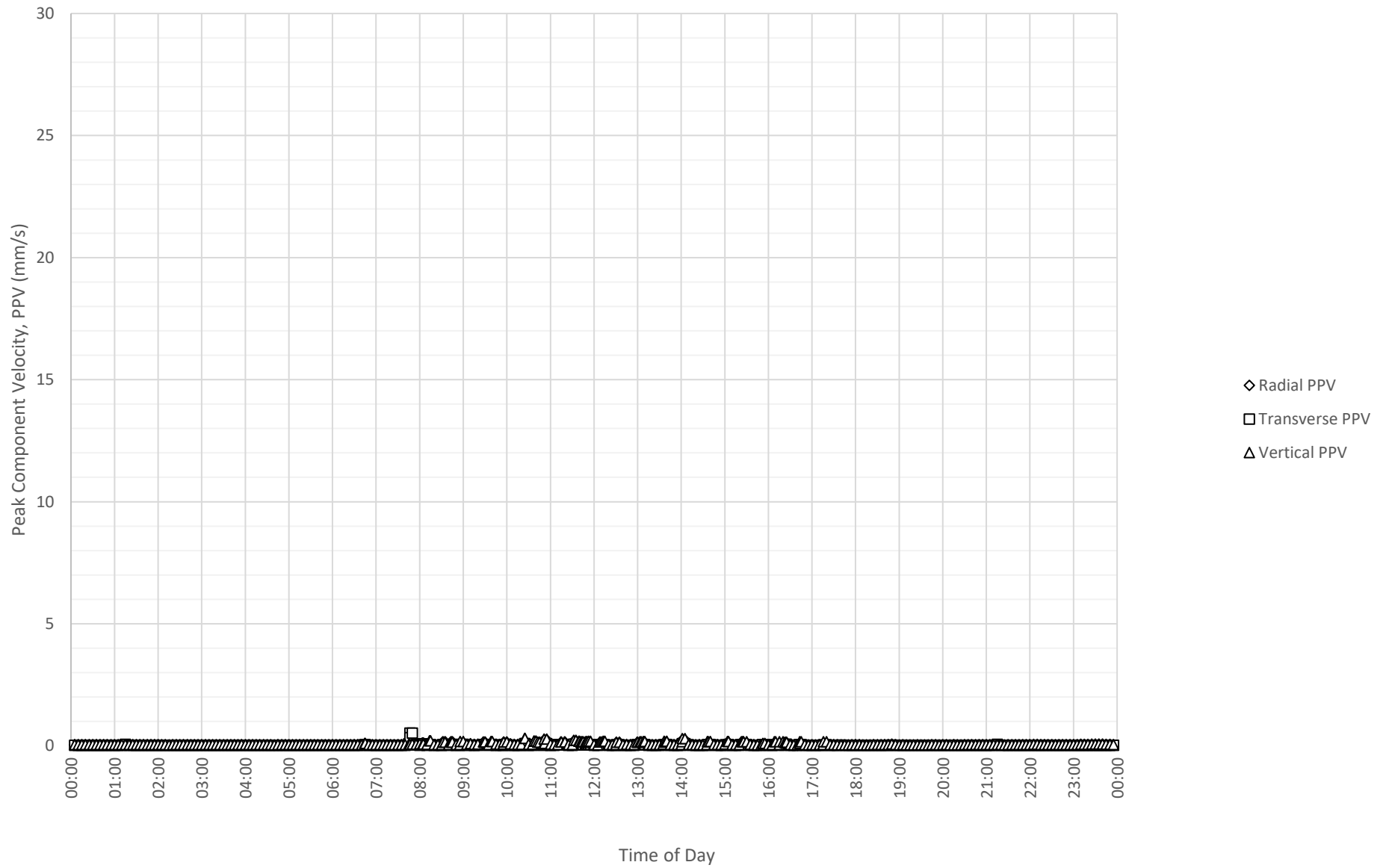
Sideways Vibration



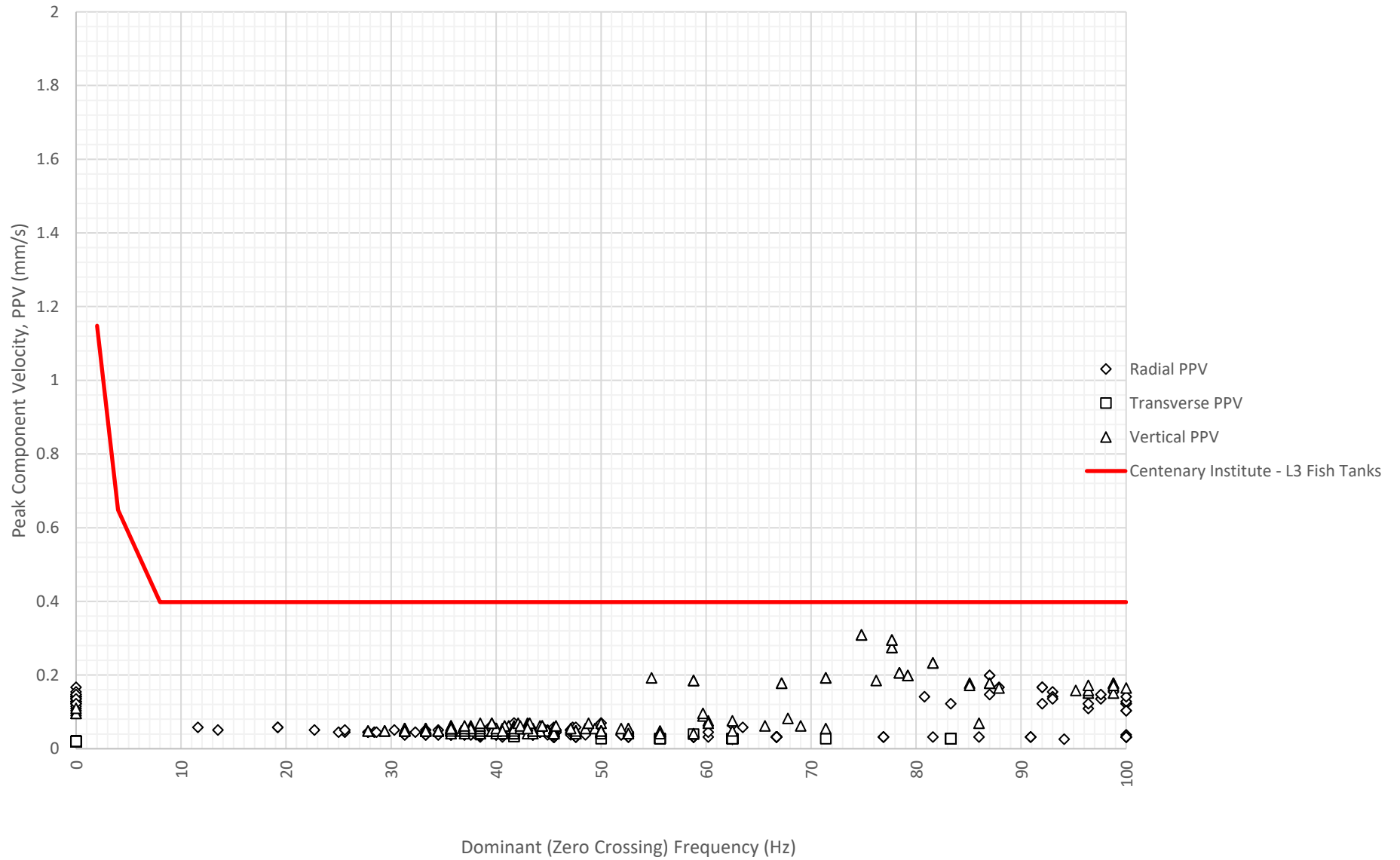


CENTENARY INSTITUTE – LEVEL 3 FISH TANKS

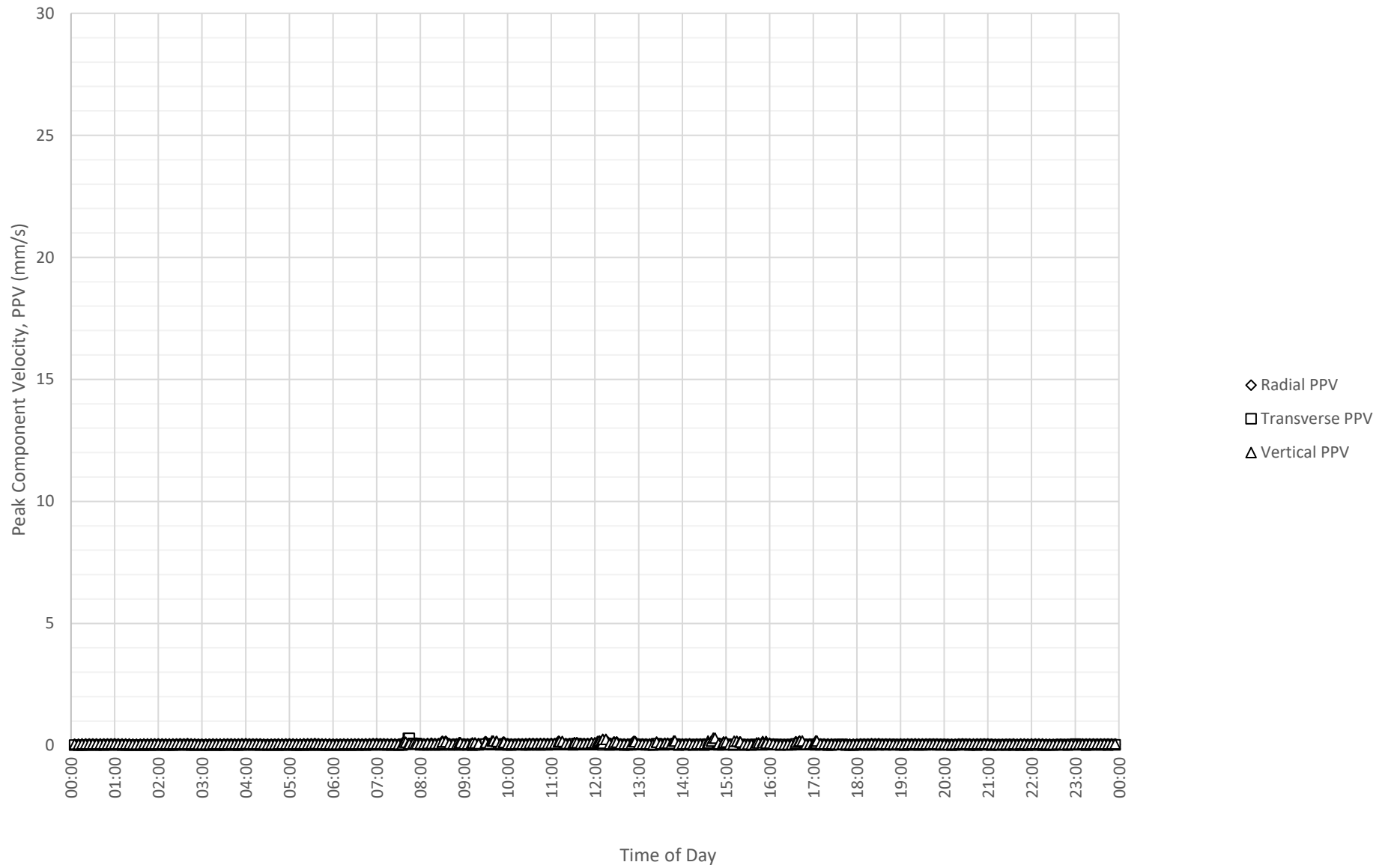
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 23-11-2023



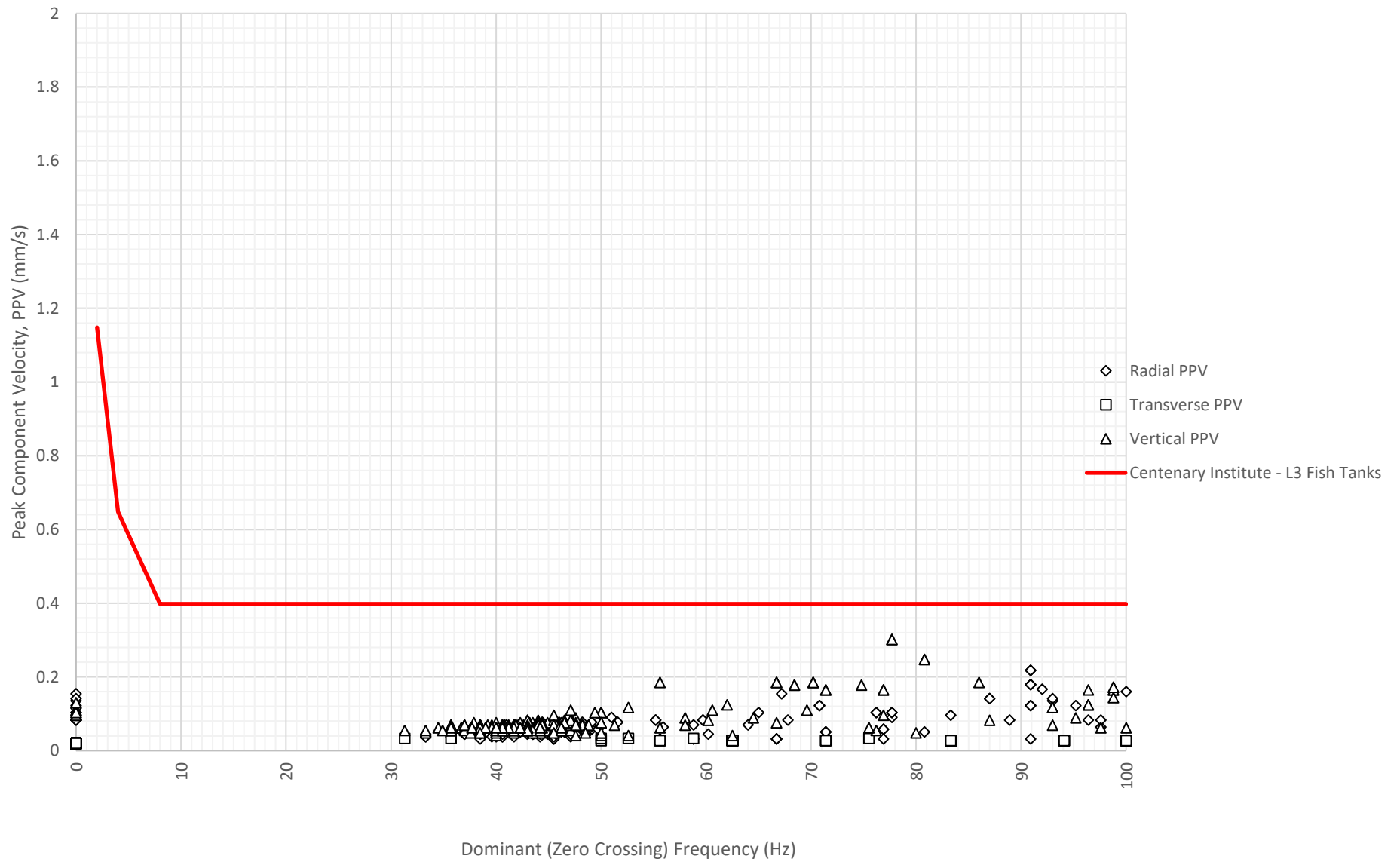
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 23-11-2023



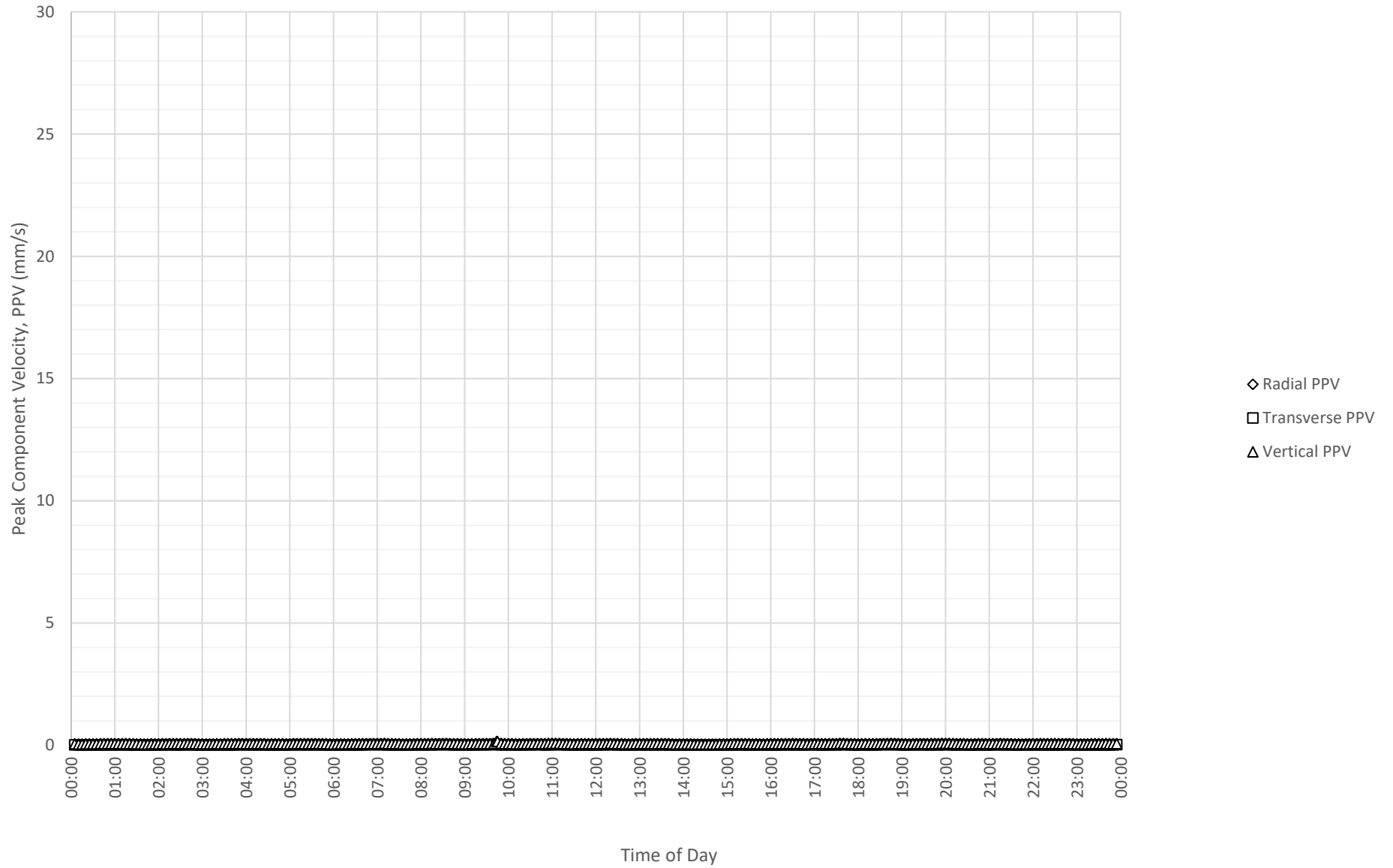
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 24-11-2023



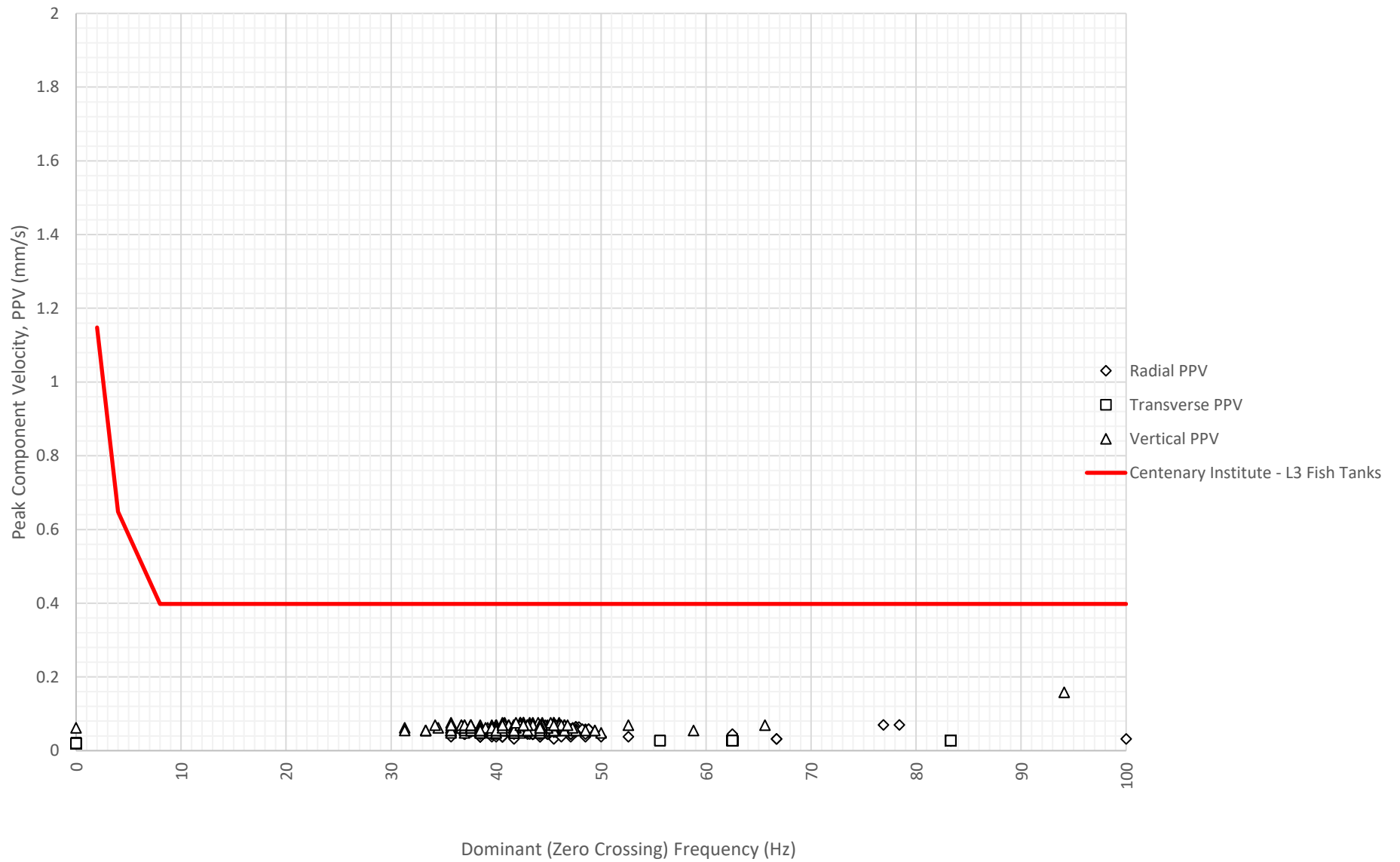
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 24-11-2023



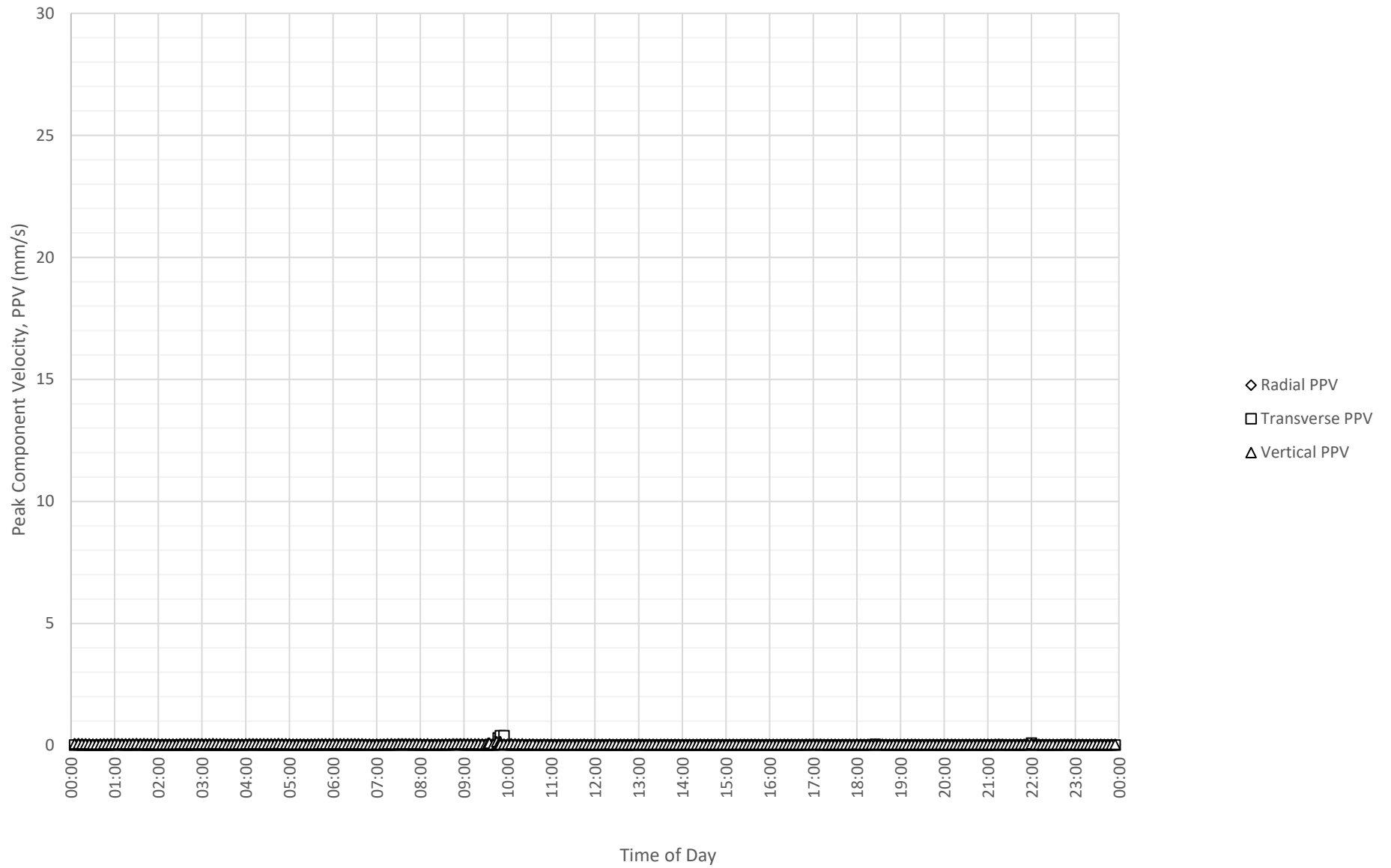
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 25-11-2023



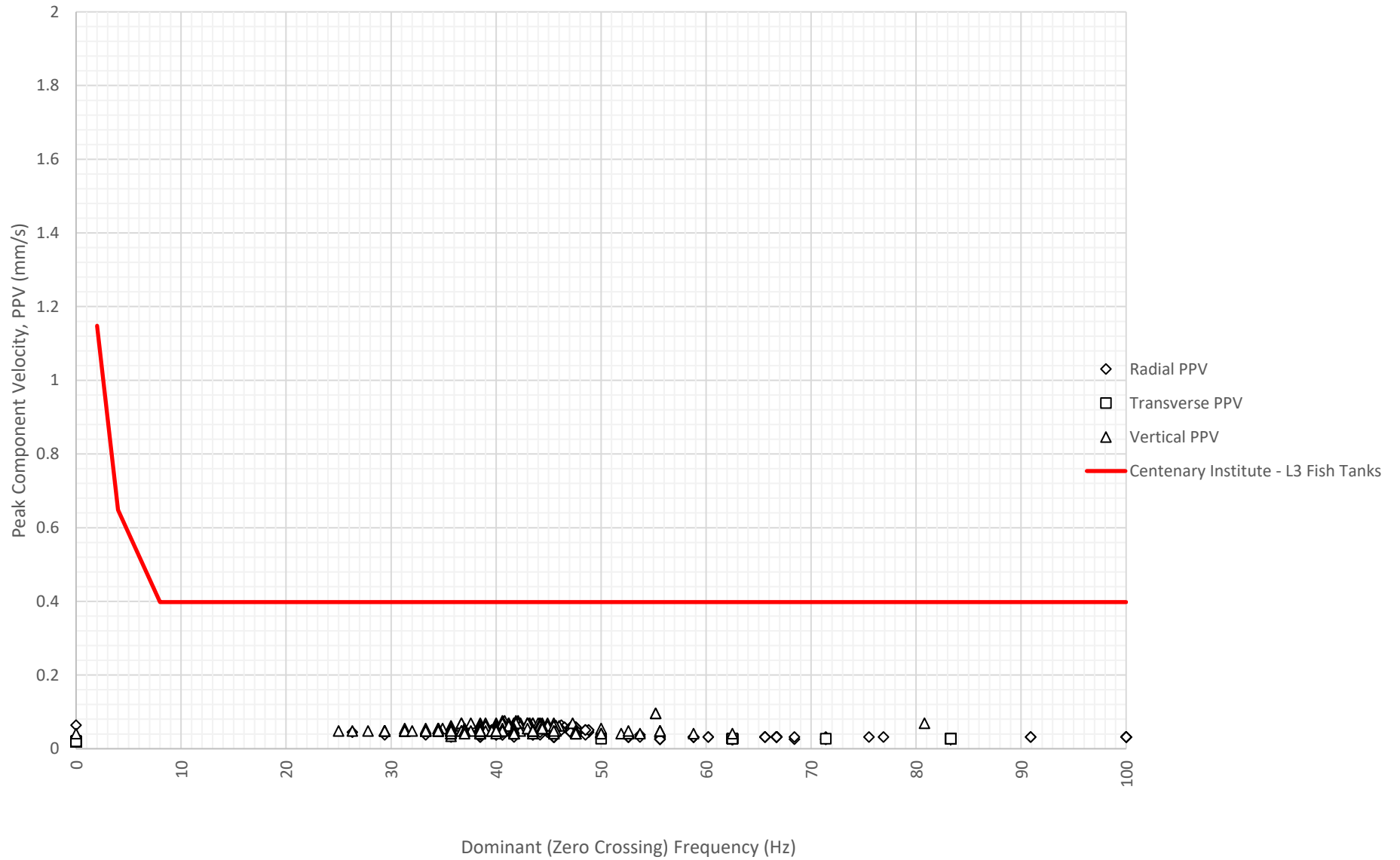
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 25-11-2023



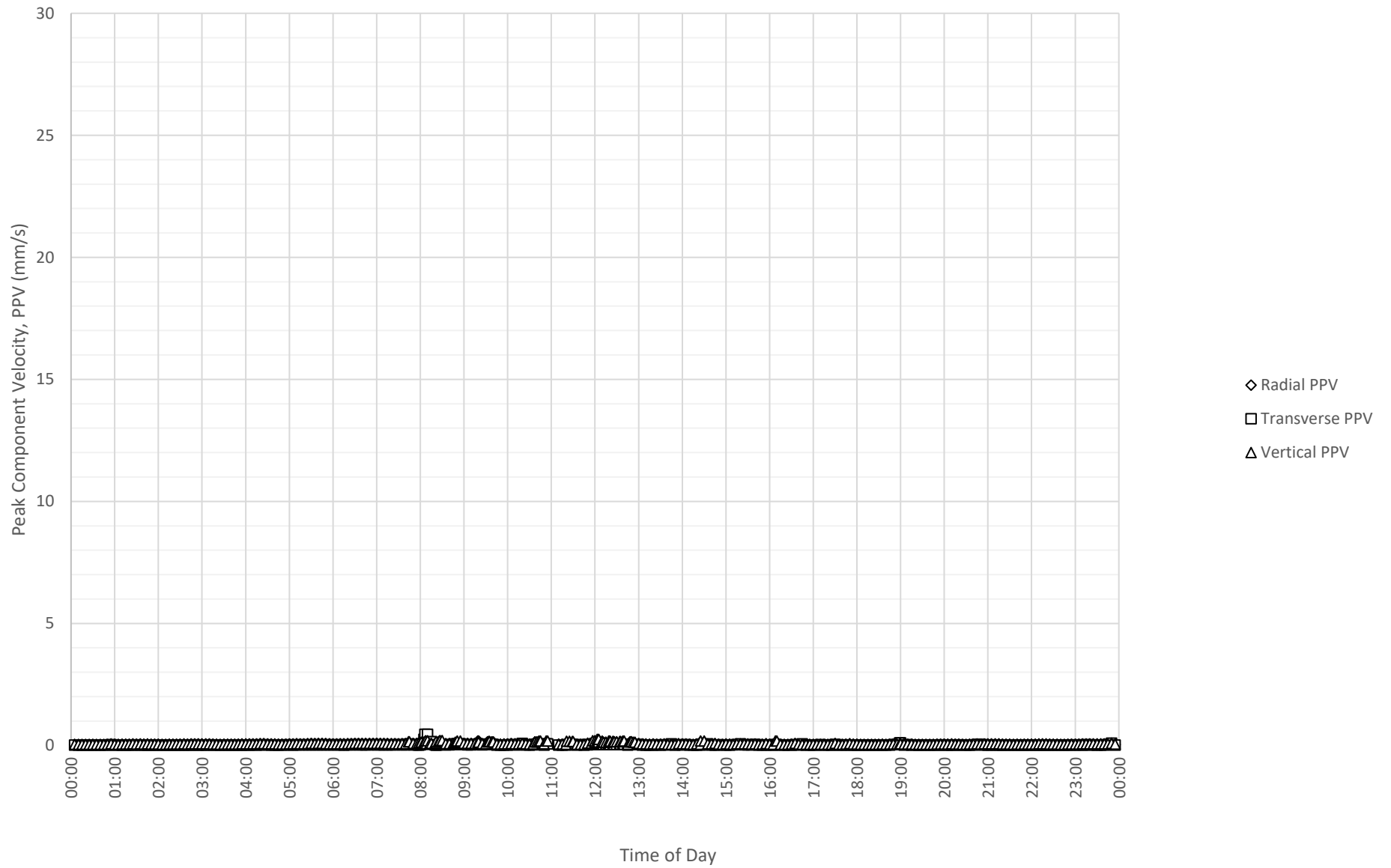
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 26-11-2023



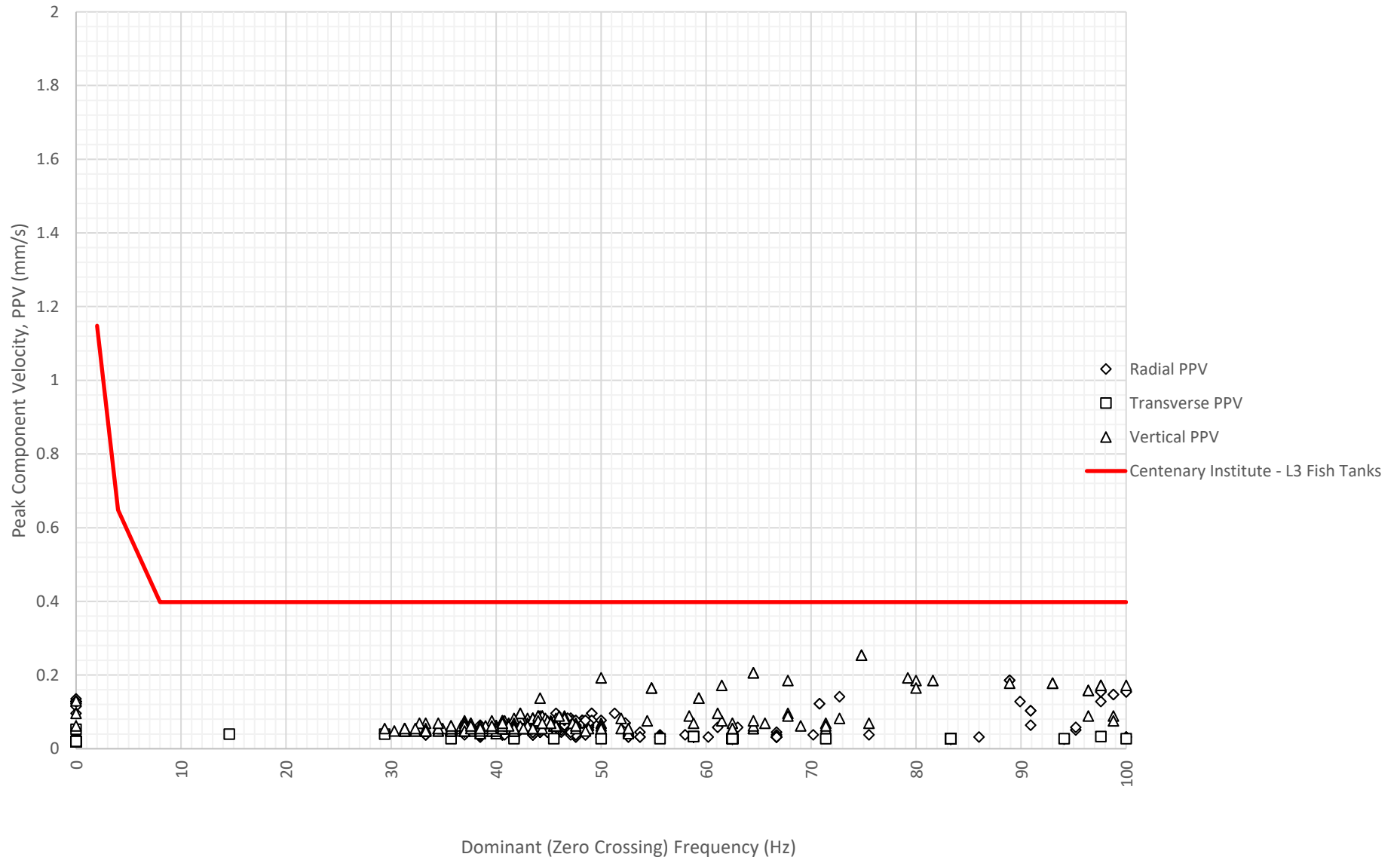
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 26-11-2023



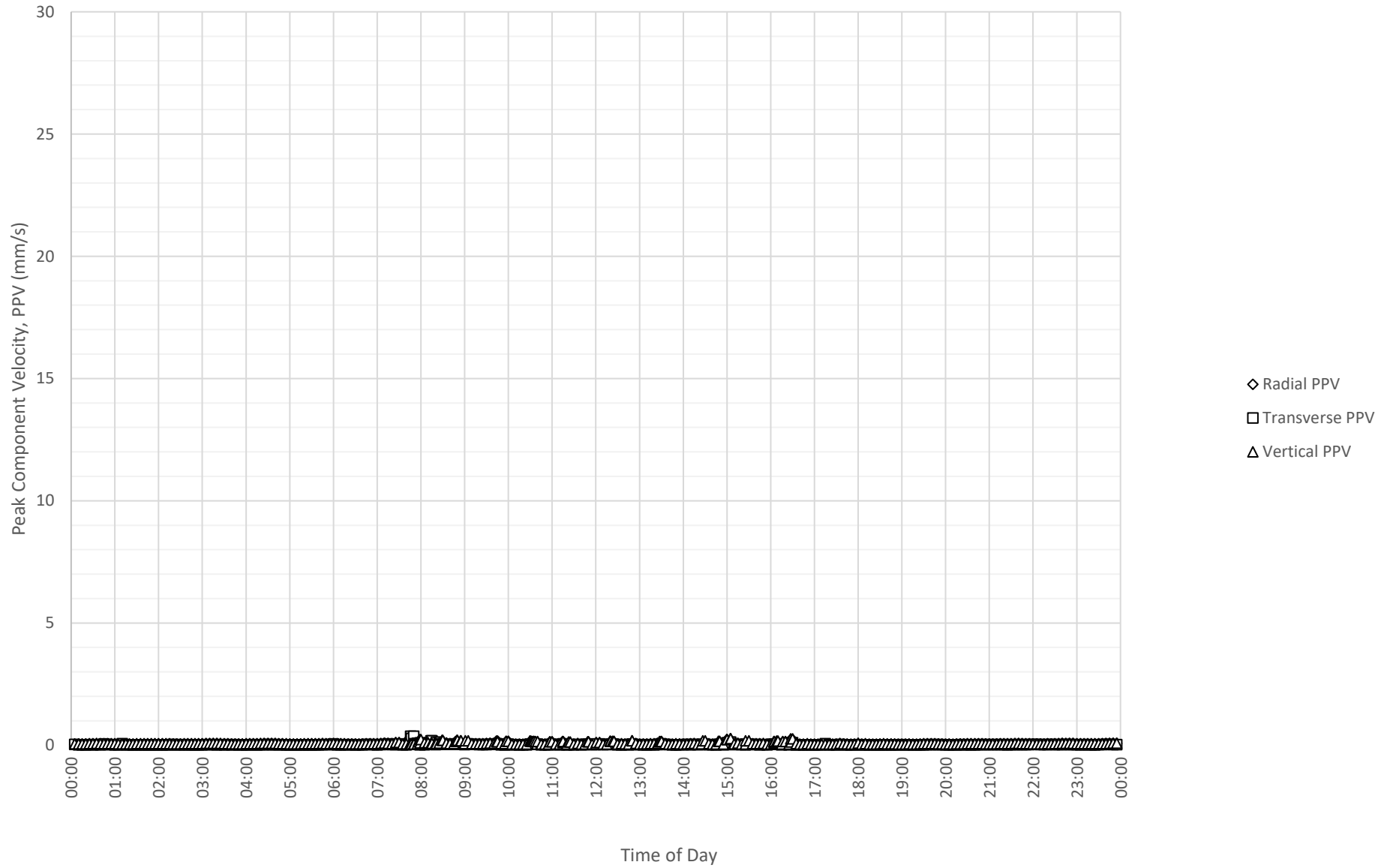
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 27-11-2023



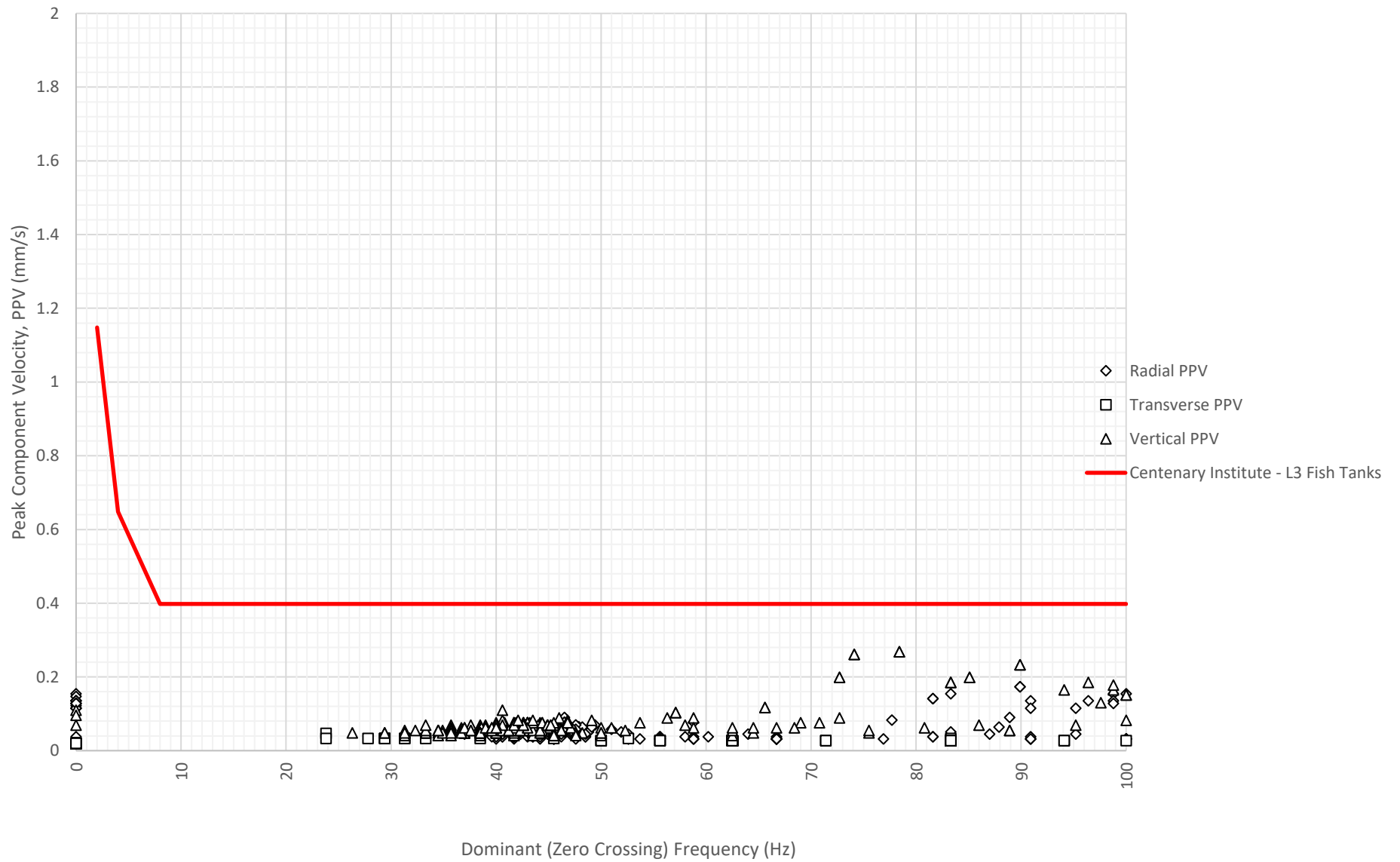
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 27-11-2023



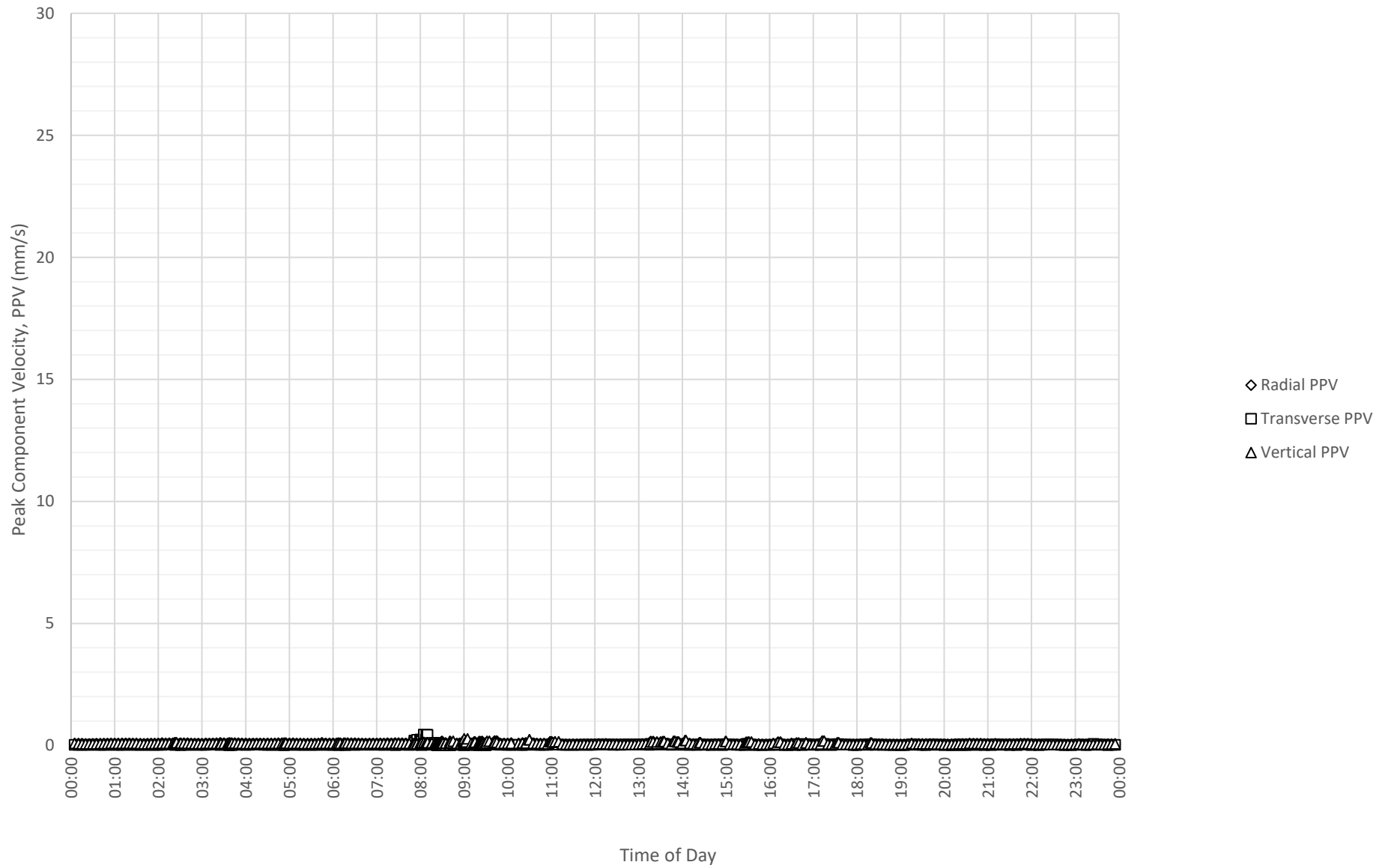
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 28-11-2023



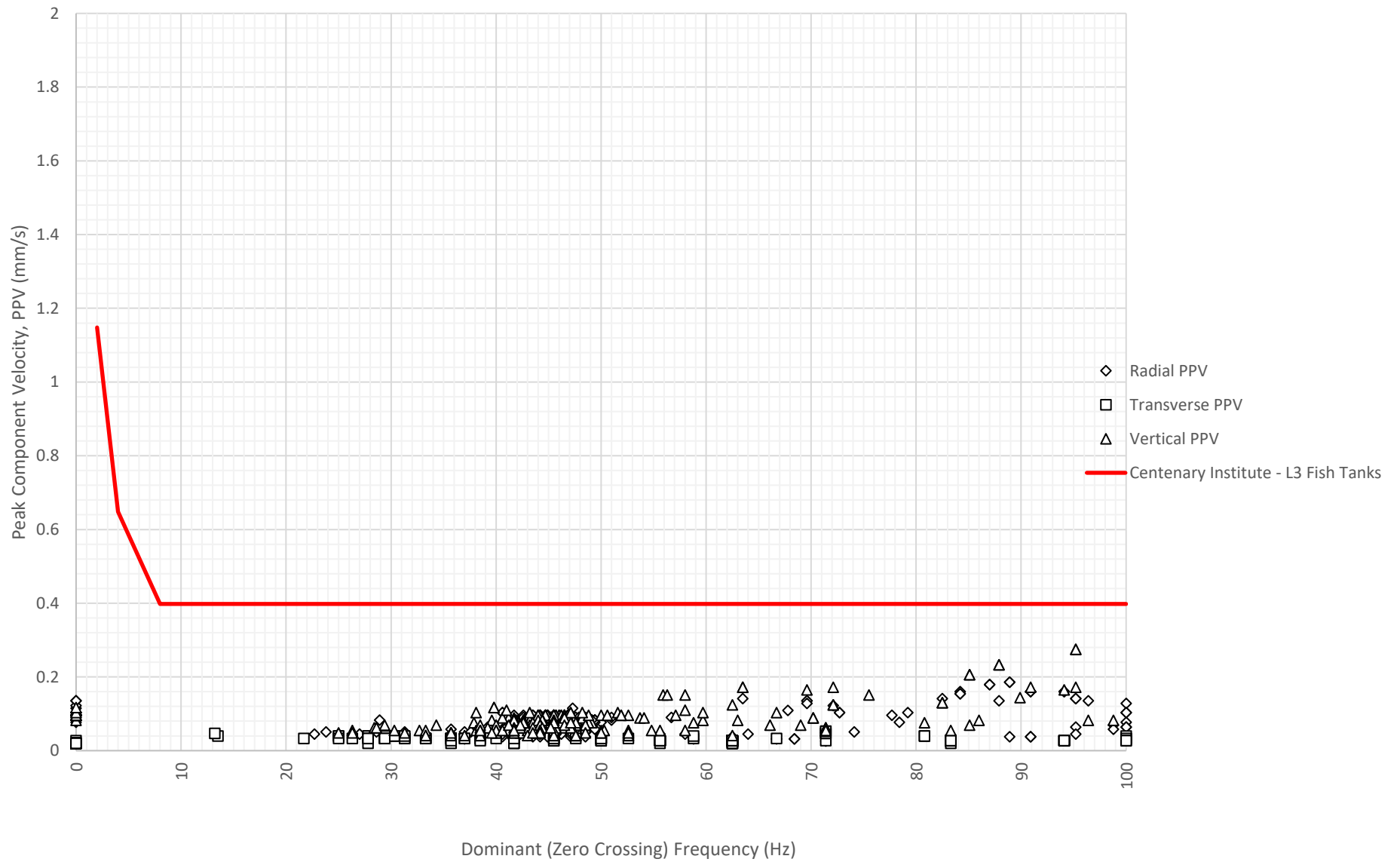
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 28-11-2023



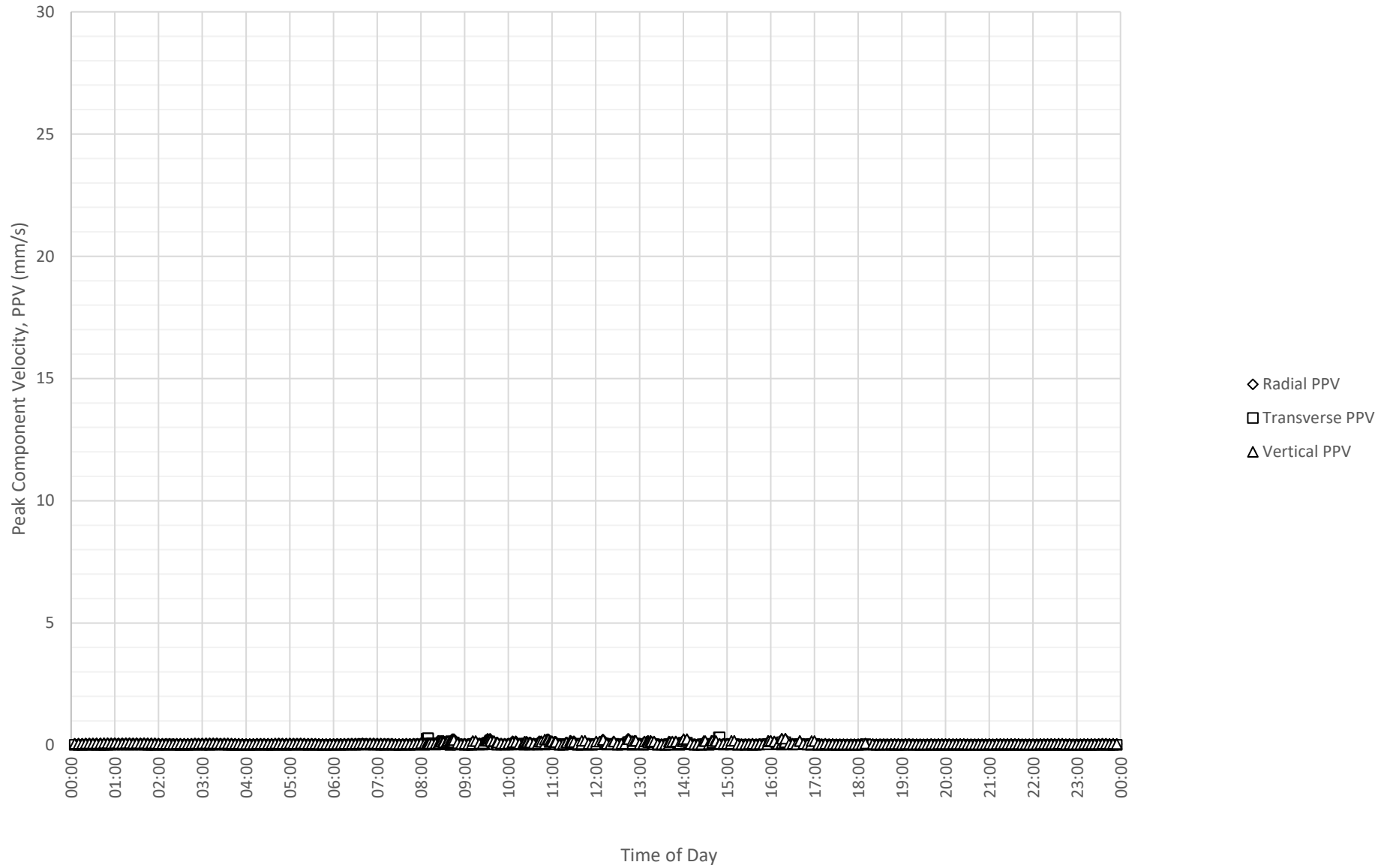
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 29-11-2023



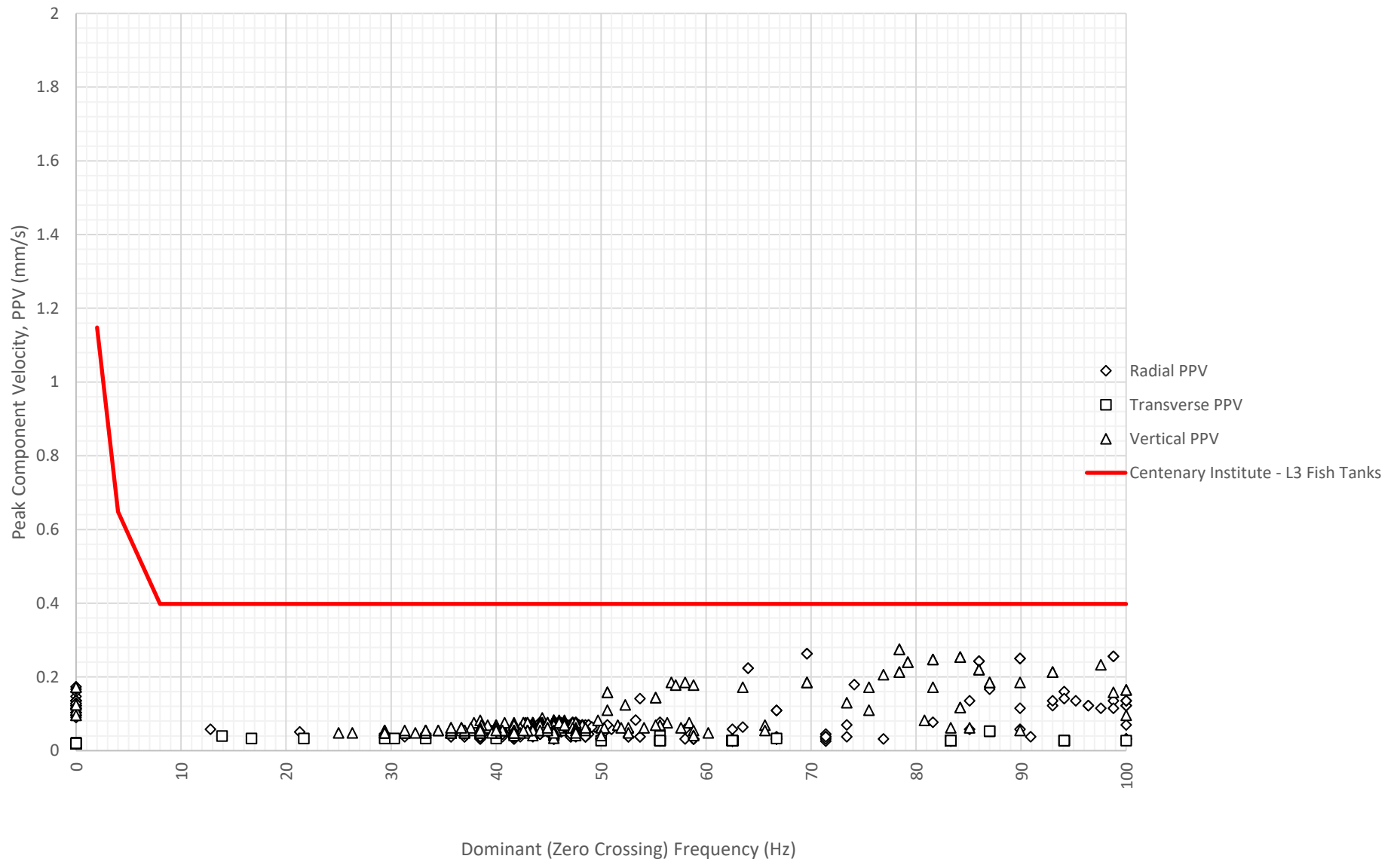
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 29-11-2023



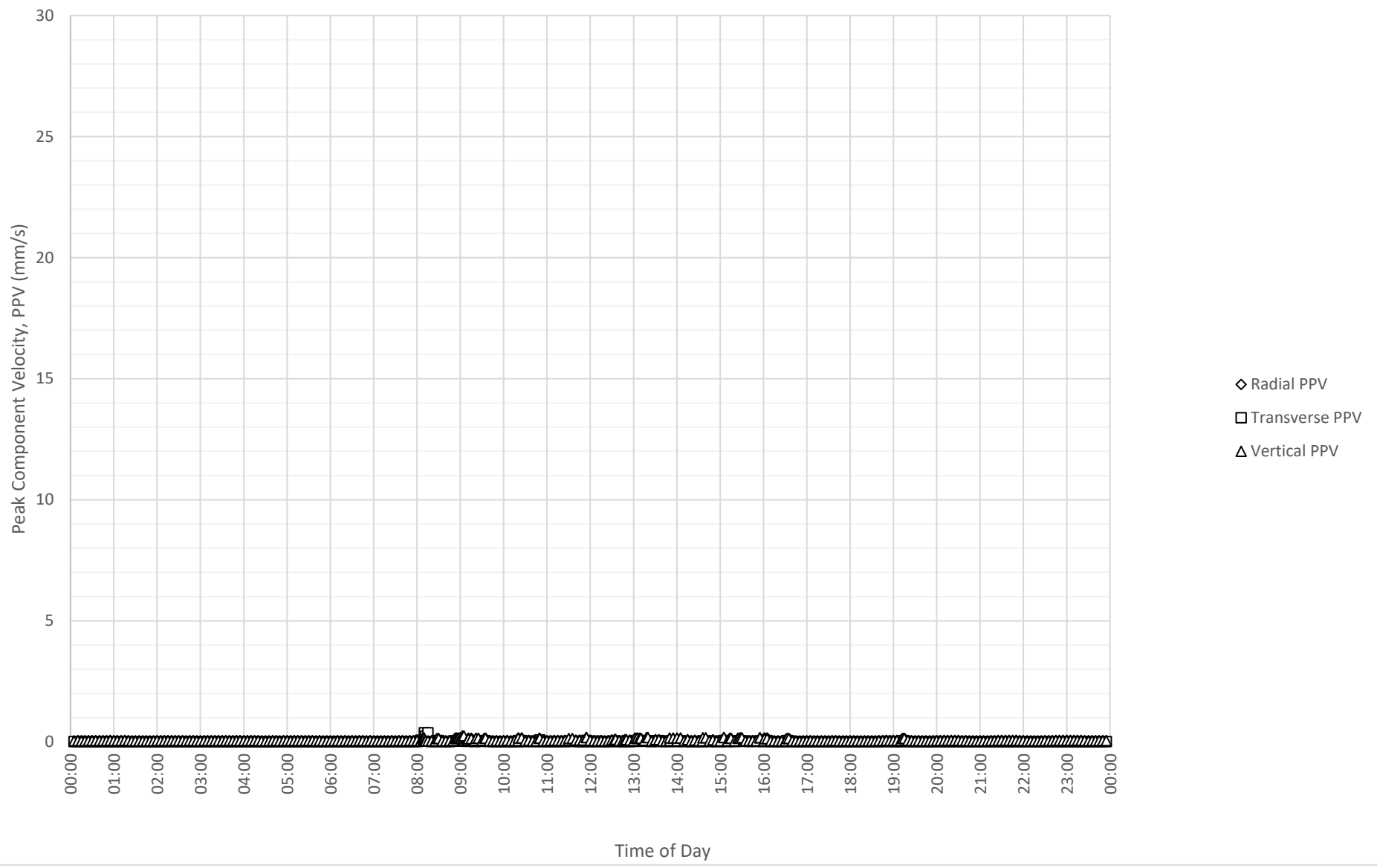
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 30-11-2023



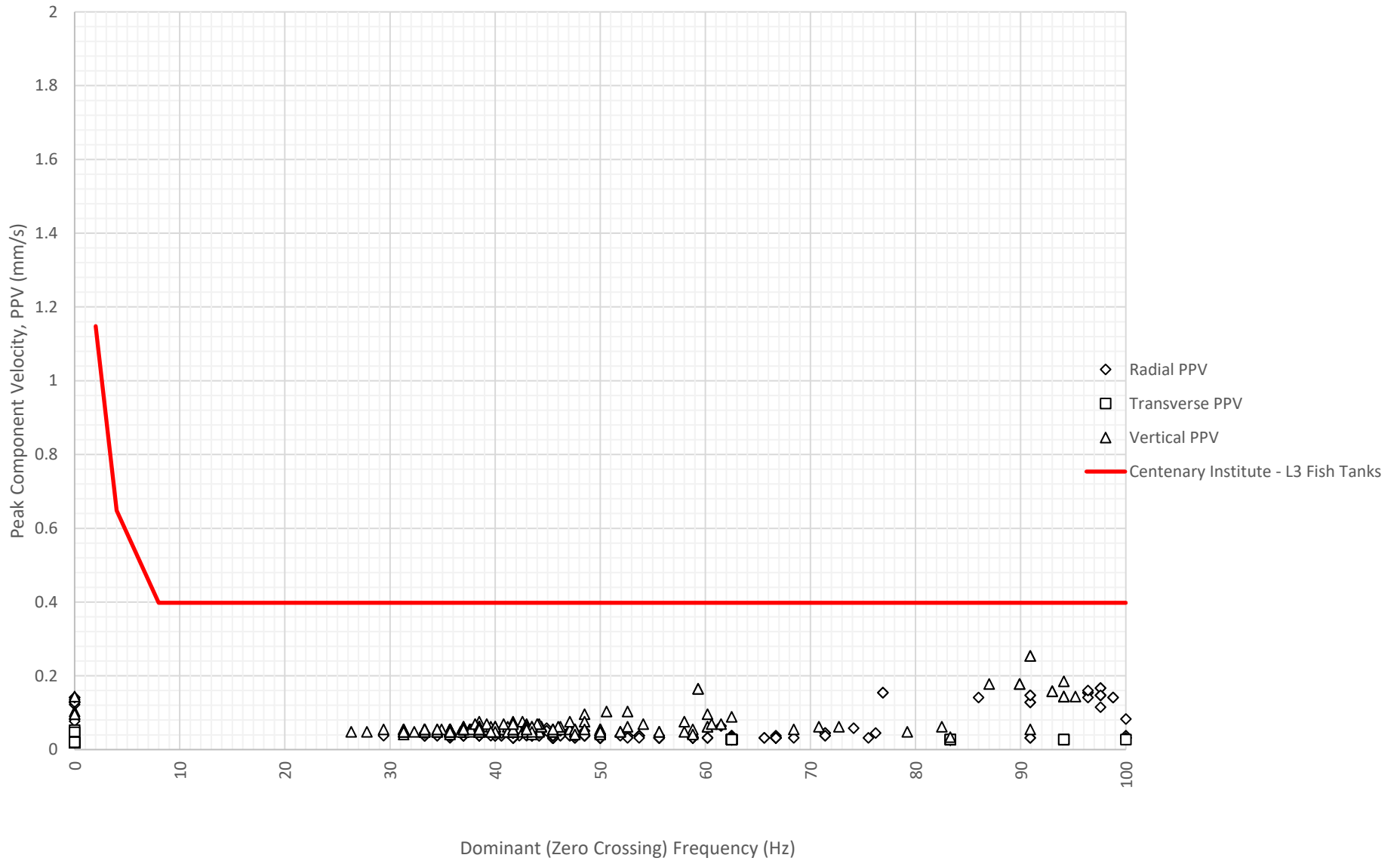
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 30-11-2023



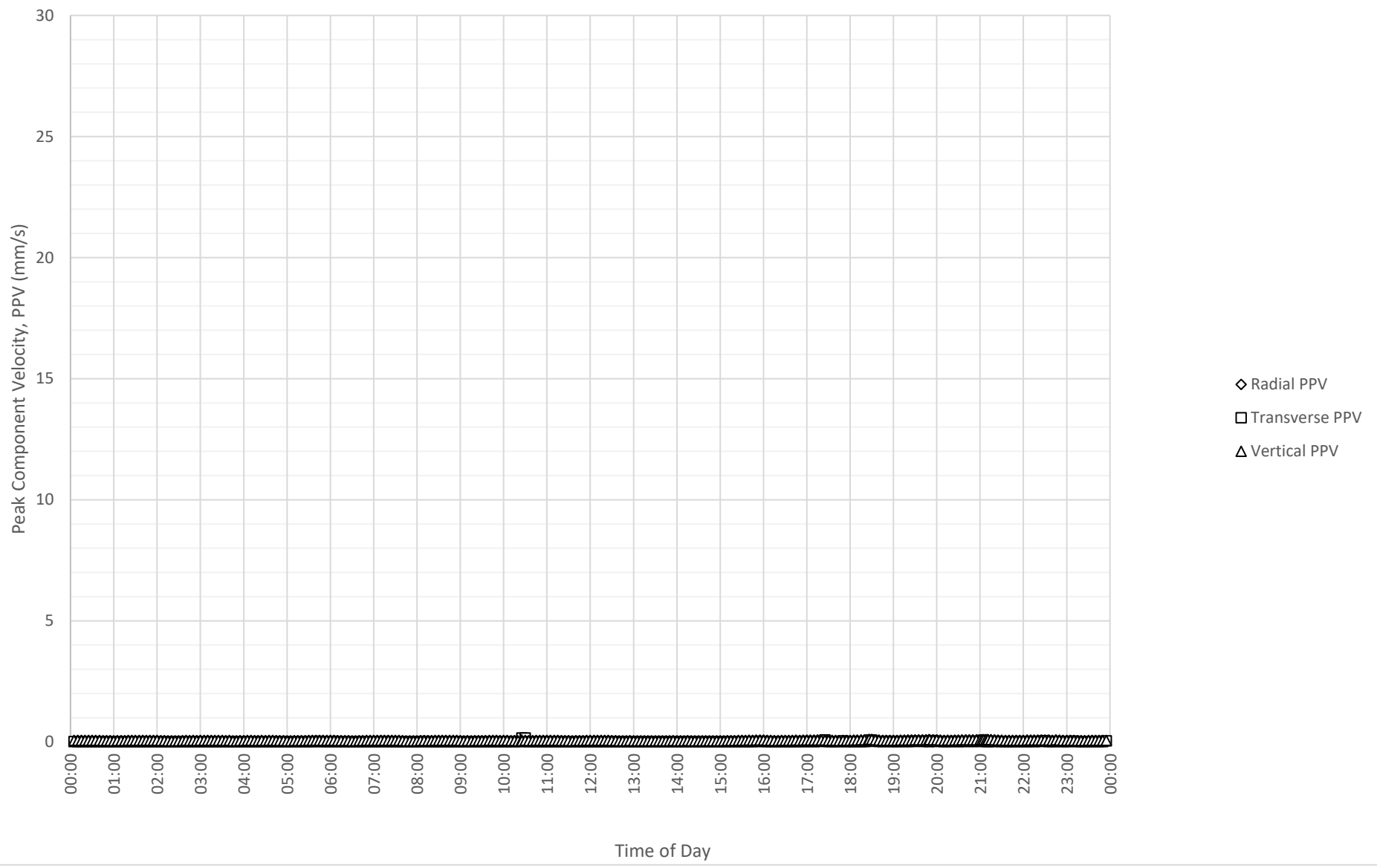
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 1-12-2023



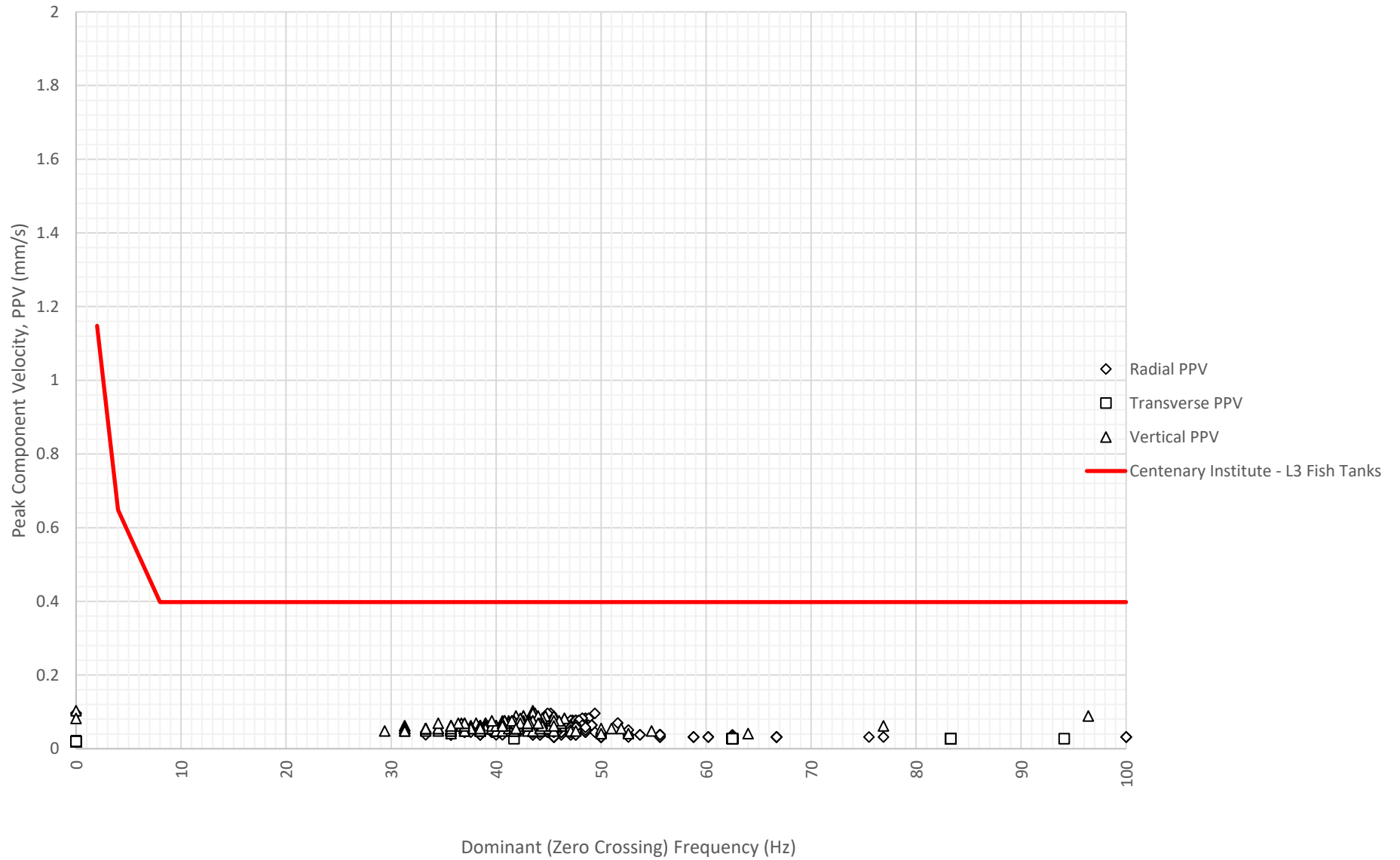
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 1-12-2023



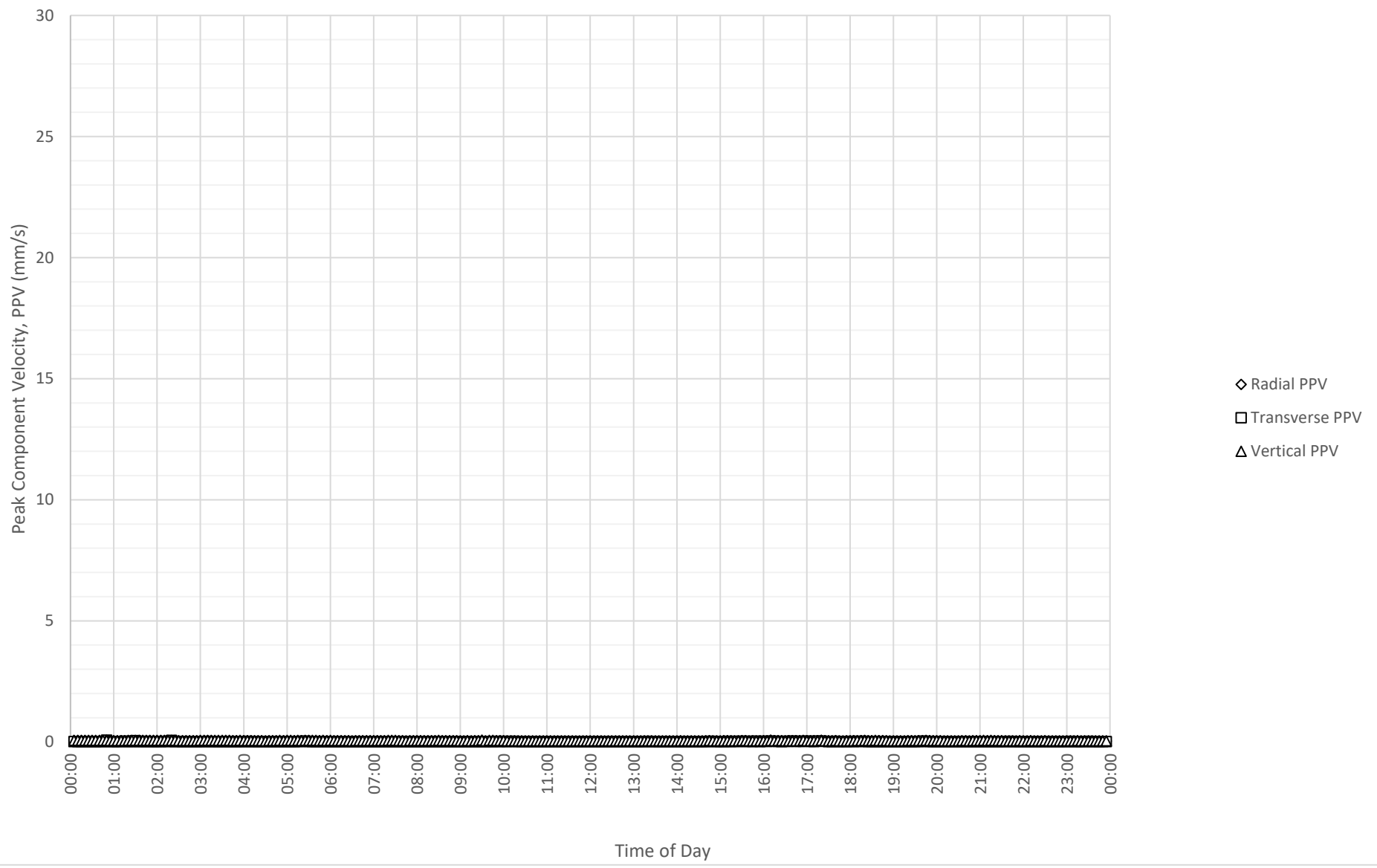
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 2-12-2023



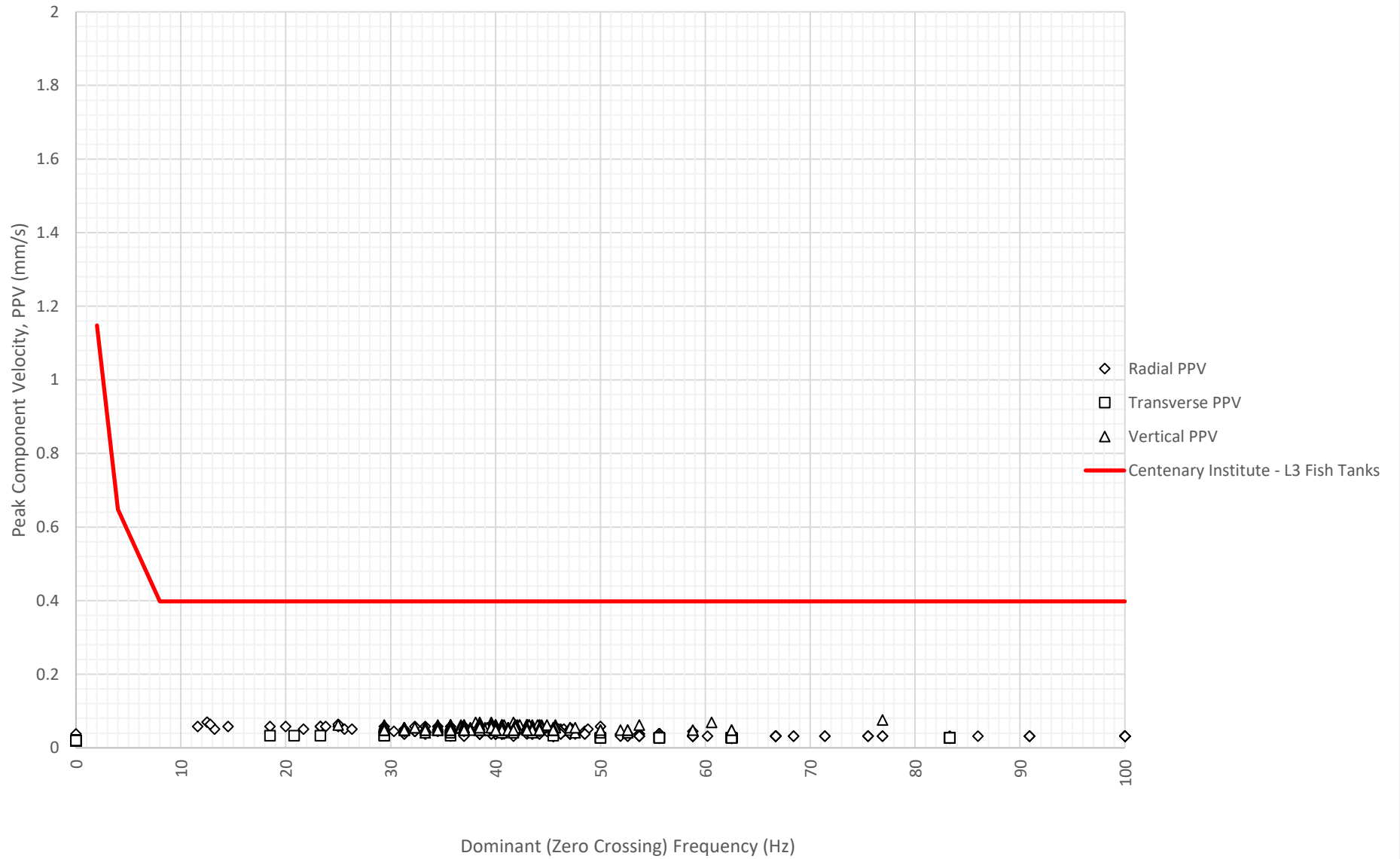
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 2-12-2023



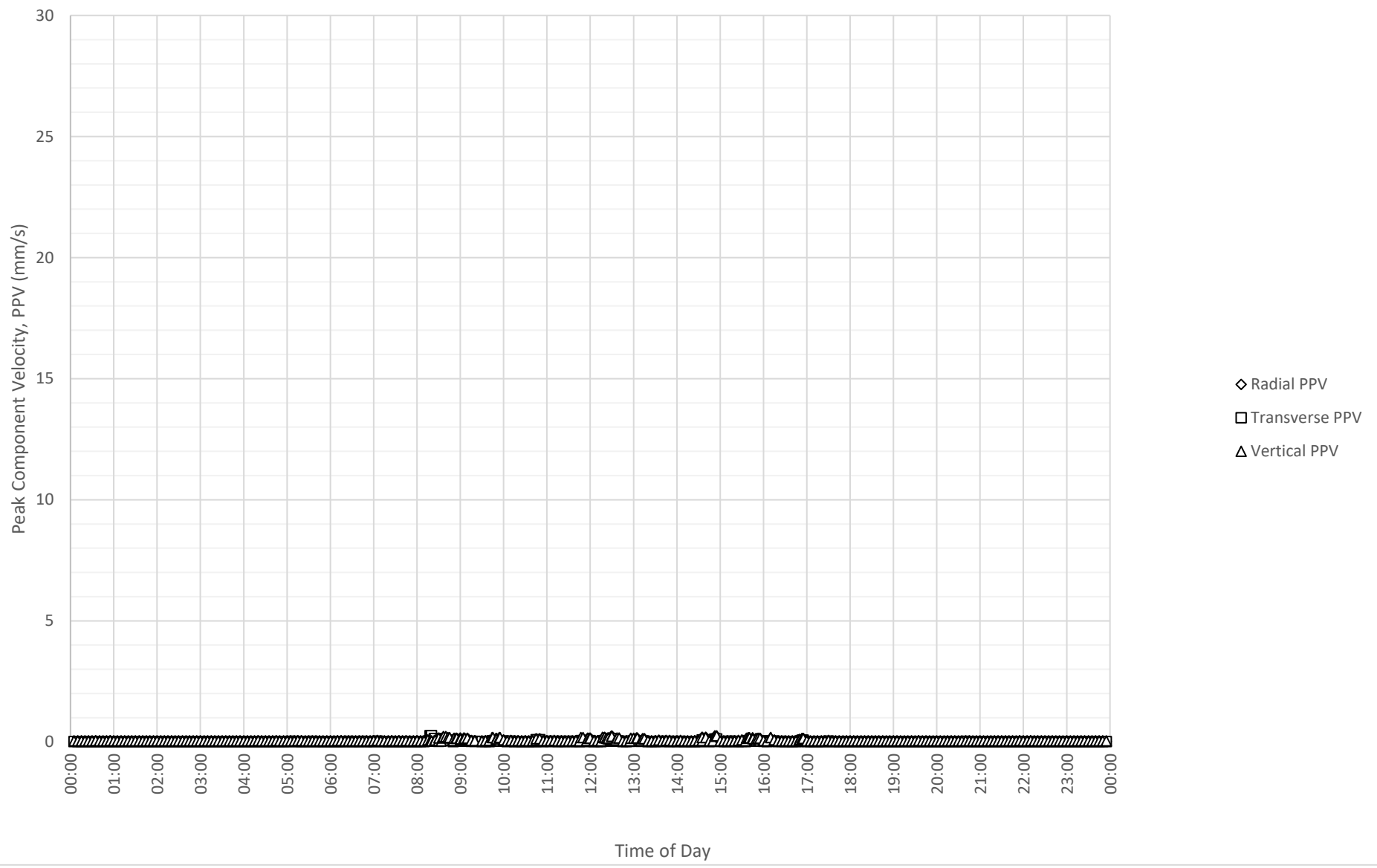
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 3-12-2023



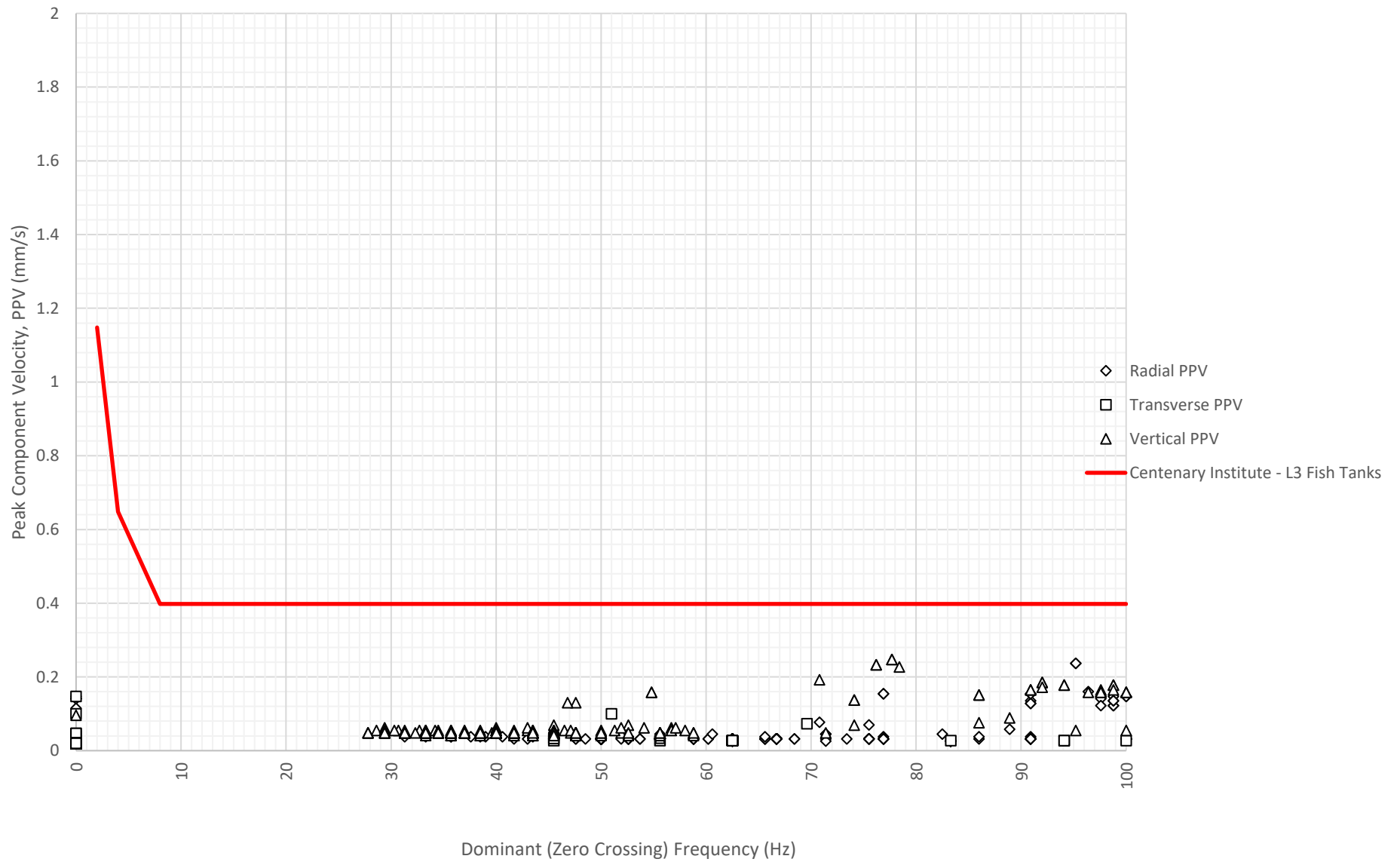
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 3-12-2023



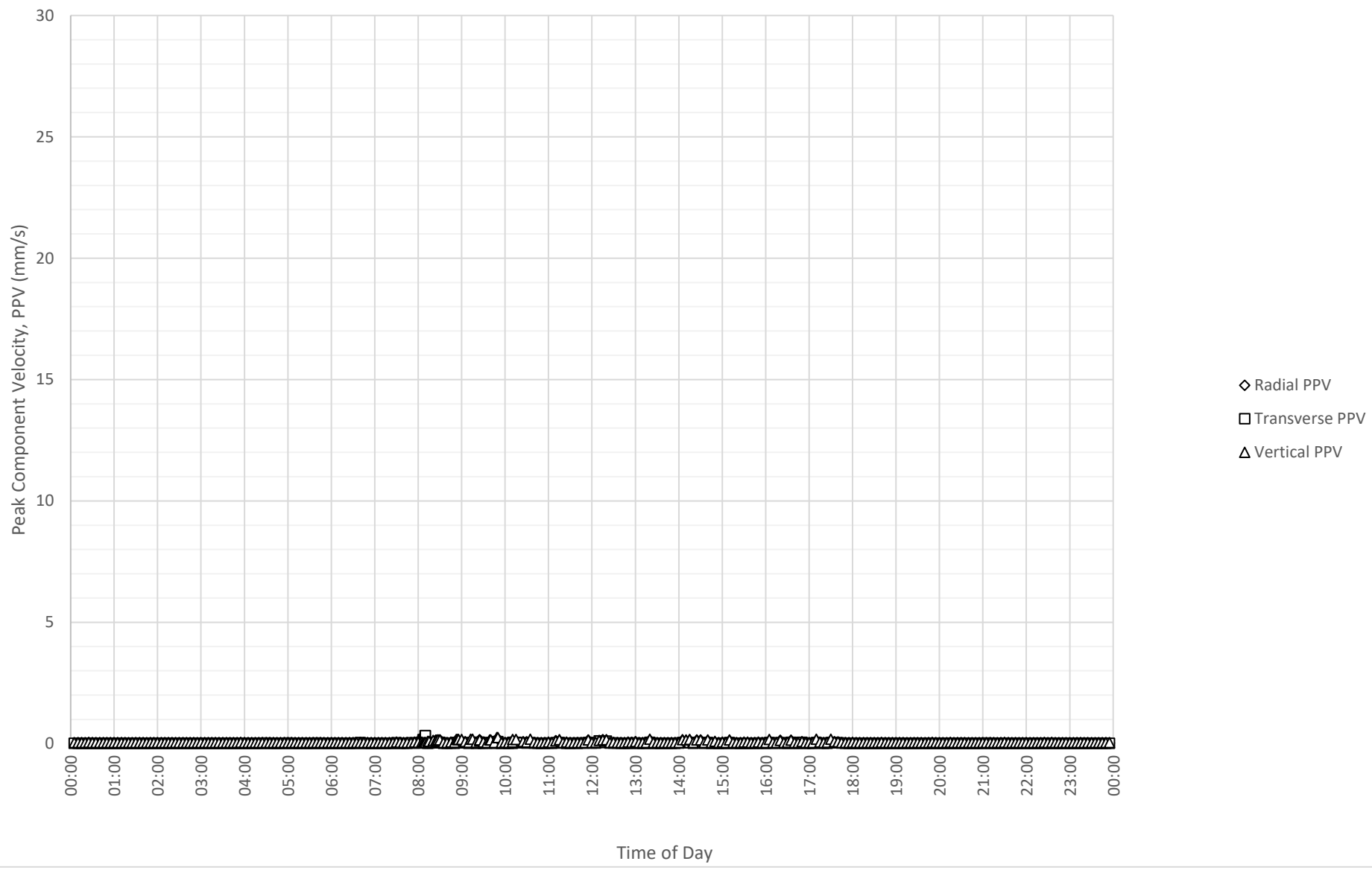
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 4-12-2023



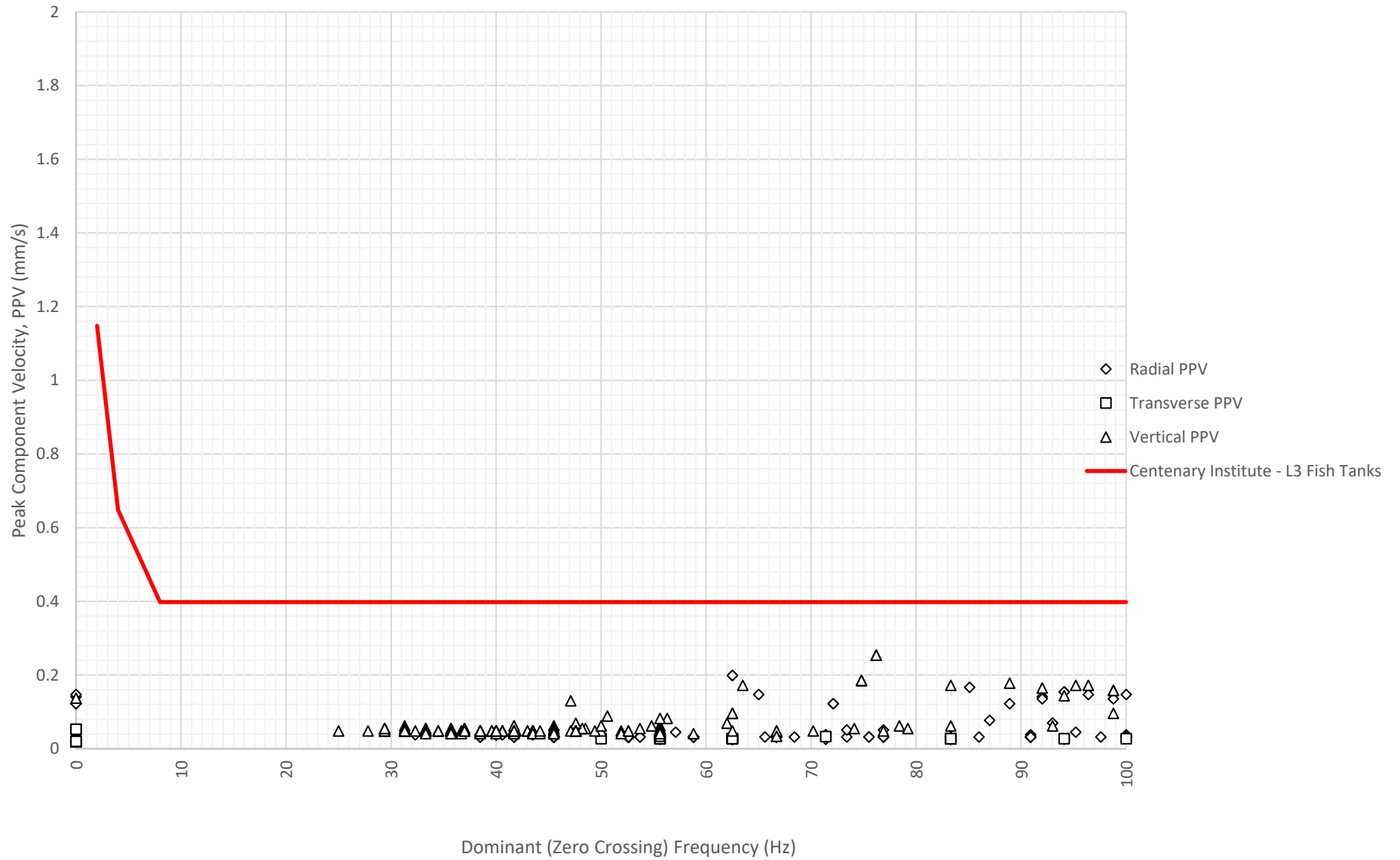
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 4-12-2023



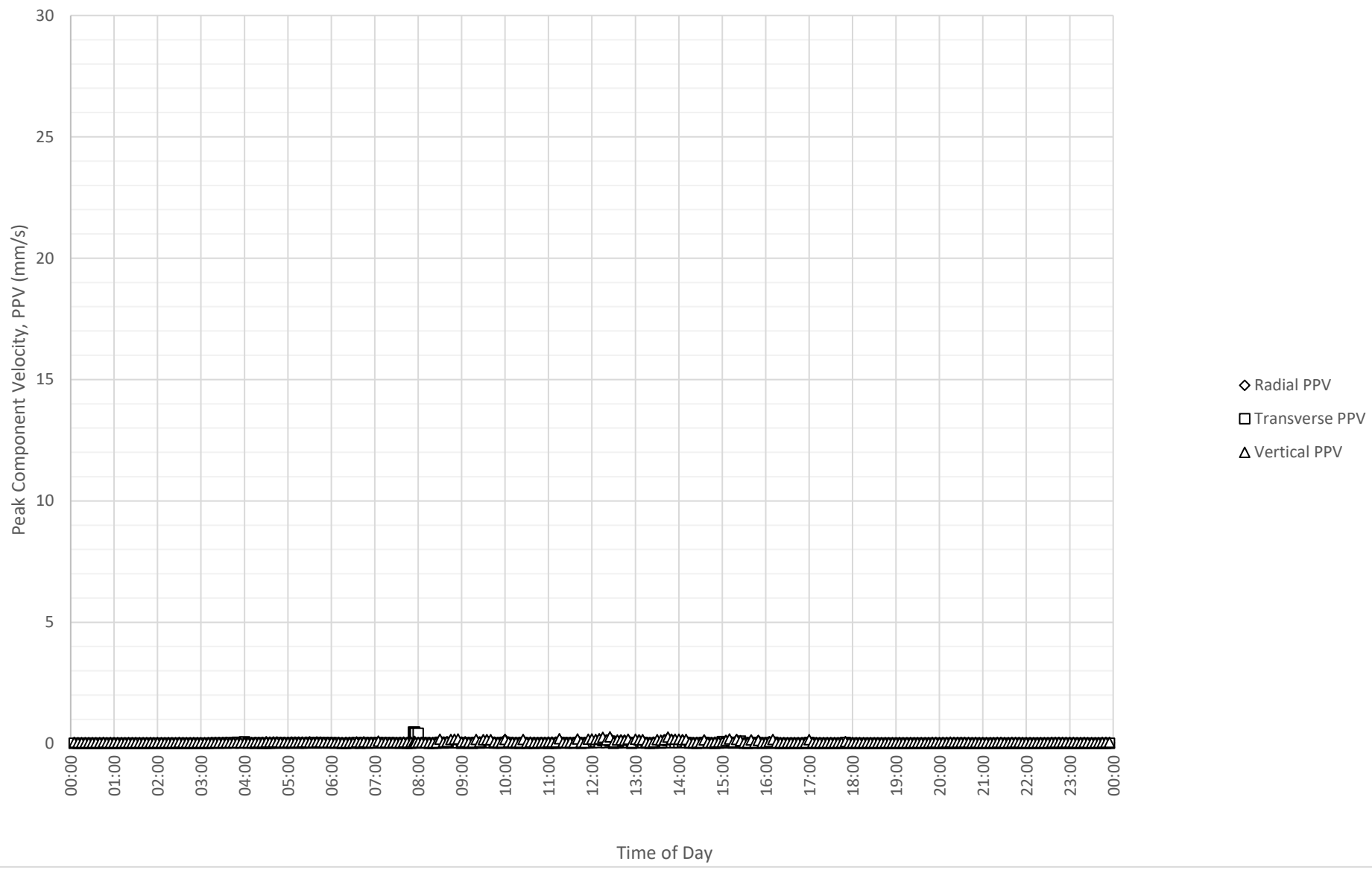
Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 5-12-2023



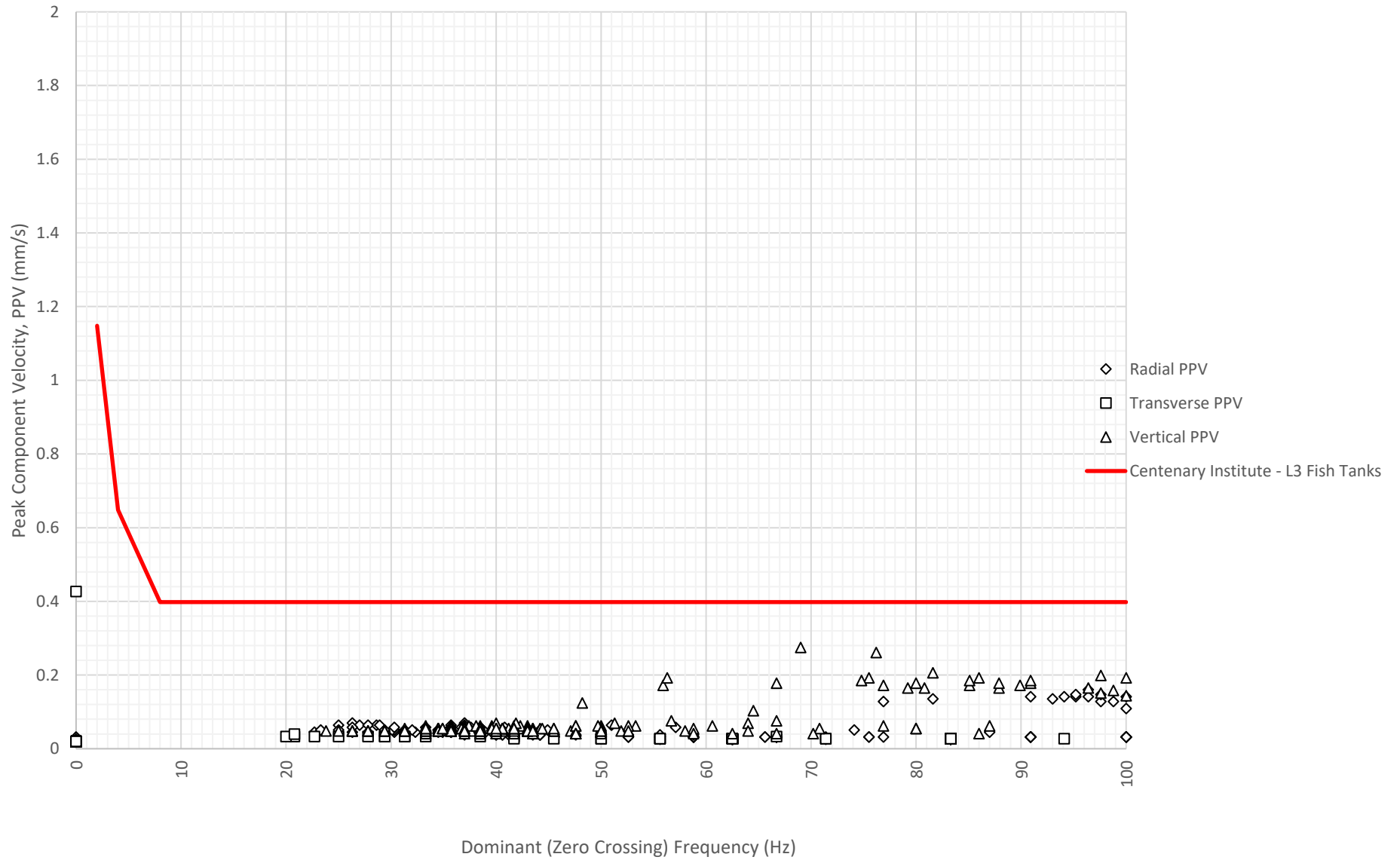
Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 5-12-2023



Daily Monitored Vibration Levels at Centenary Institute L3 Fish Tanks on 6-12-2023

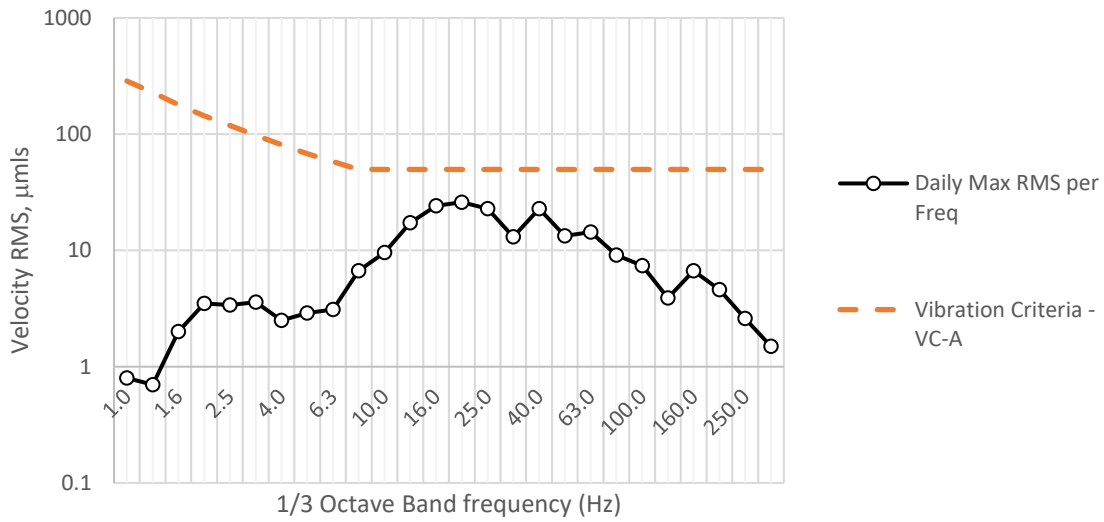


Frequency Content of Vibration Levels at Centenary Institute L3 Fish Tanks on 6-12-2023

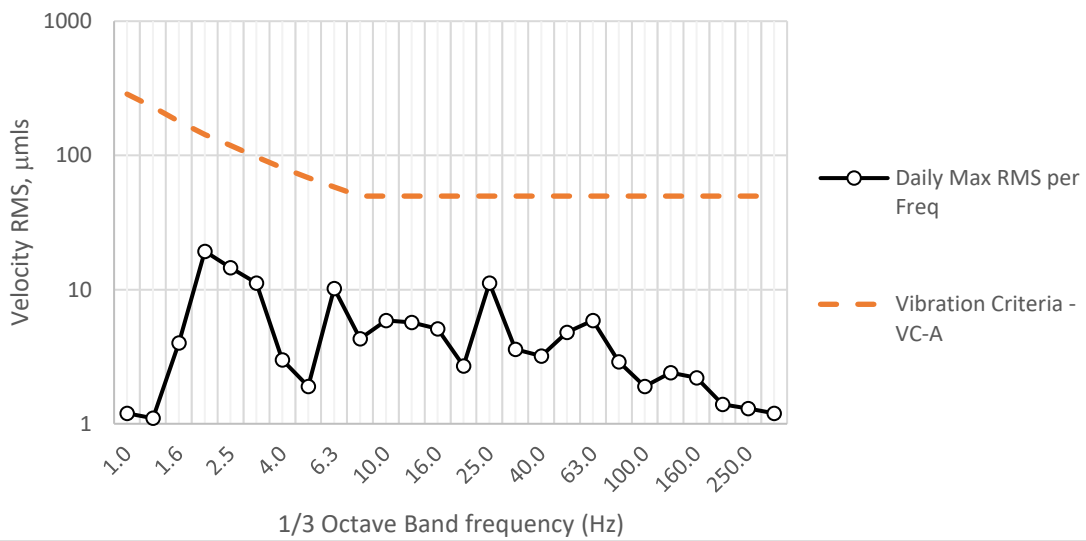


CENTENARY INSTITUTE – LEVEL 4 SURGERY ROOM (SOUTHERN FAÇADE)

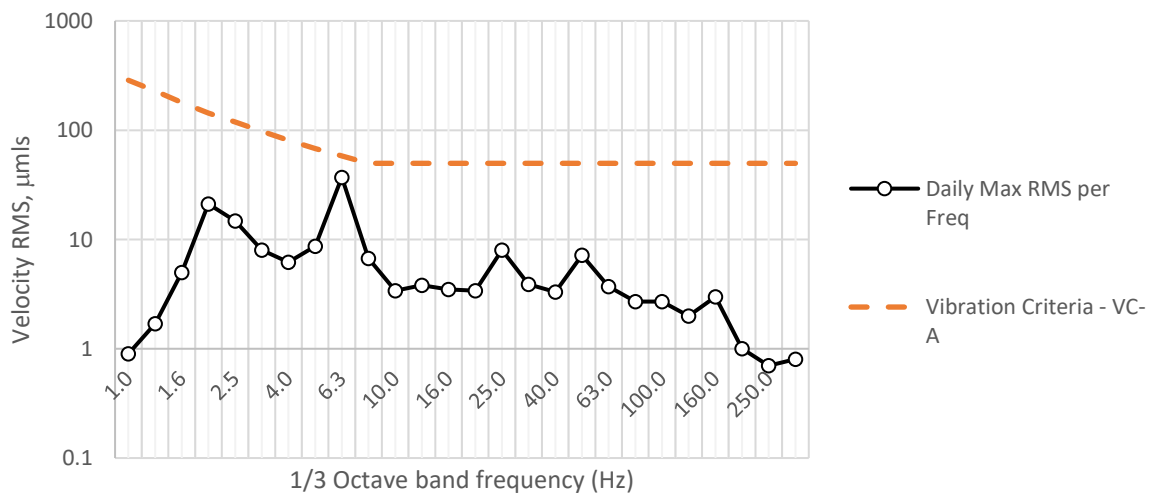
Vertical Vibration



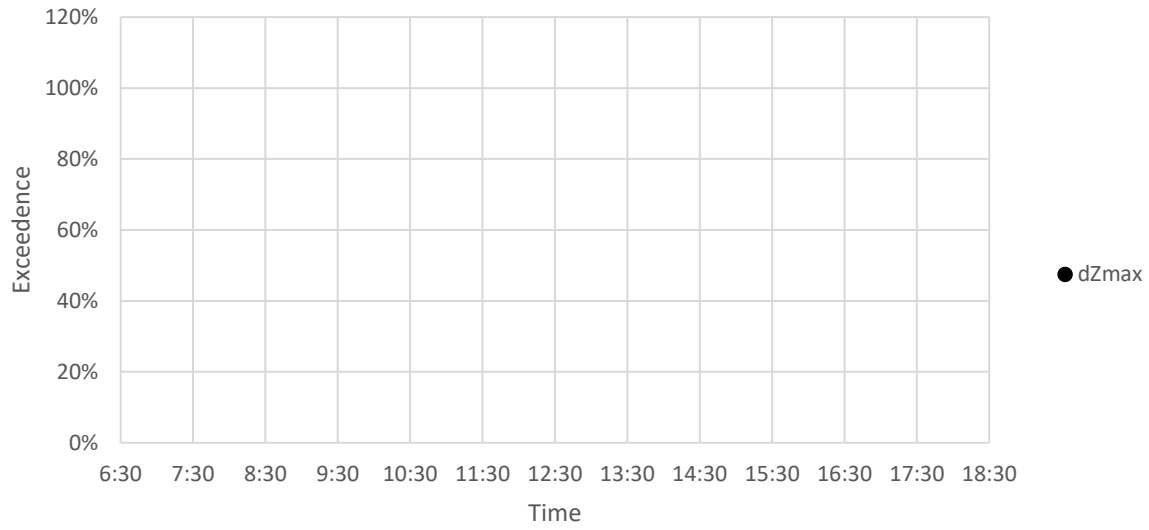
FwdBackwd Vibration



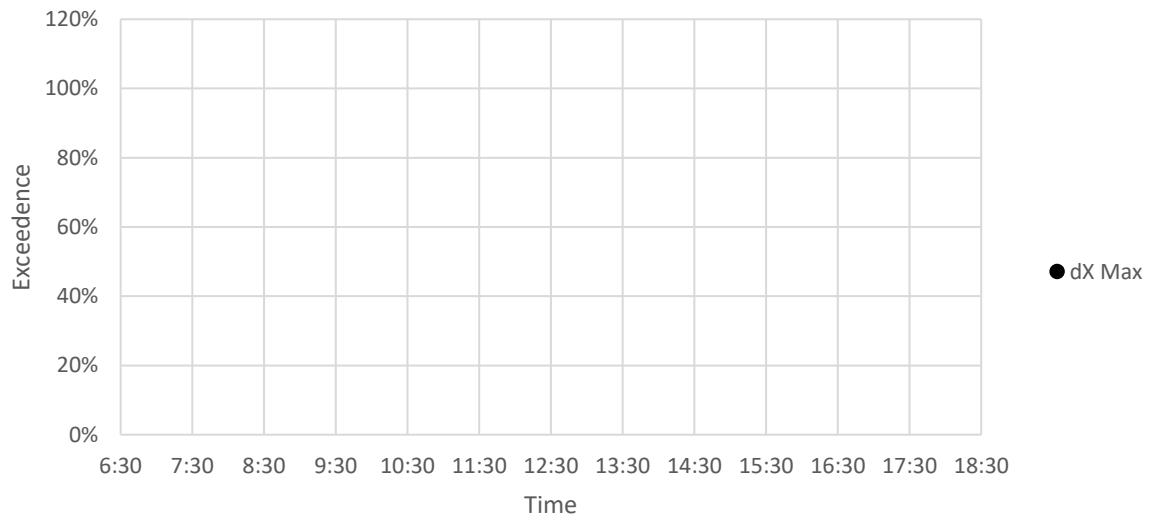
Sideways Vibration



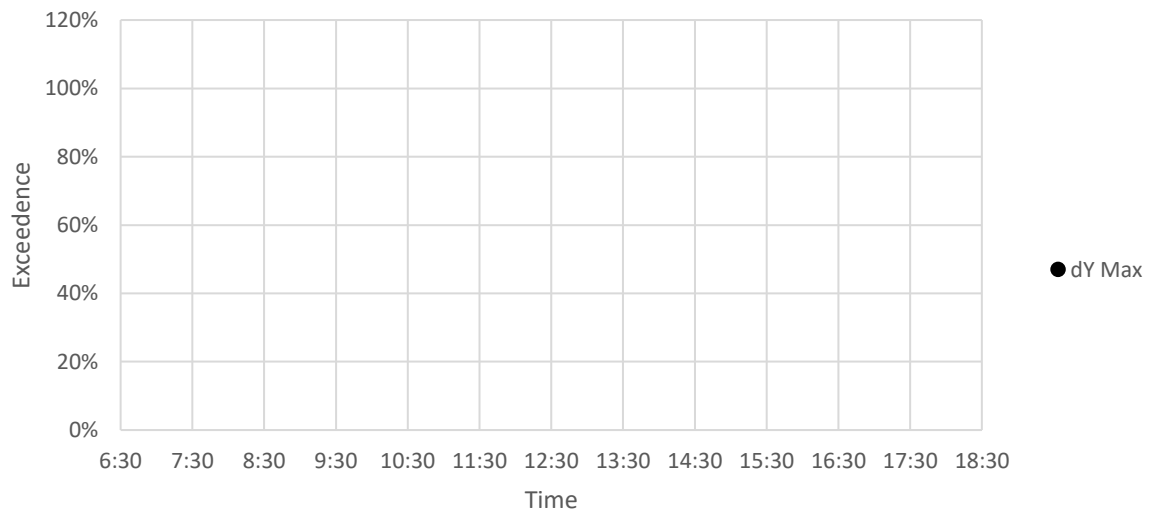
Vertical



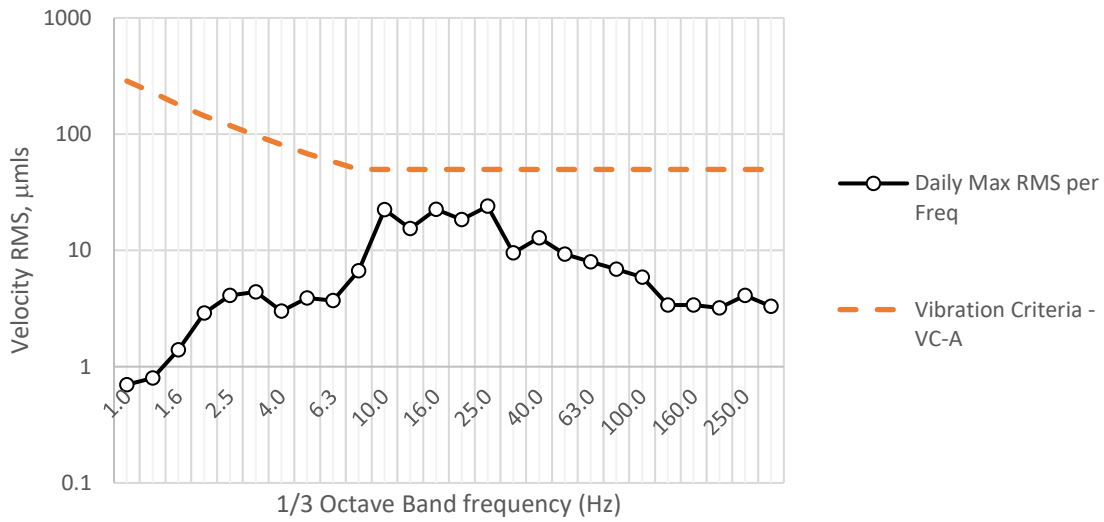
Fwd/Backwards



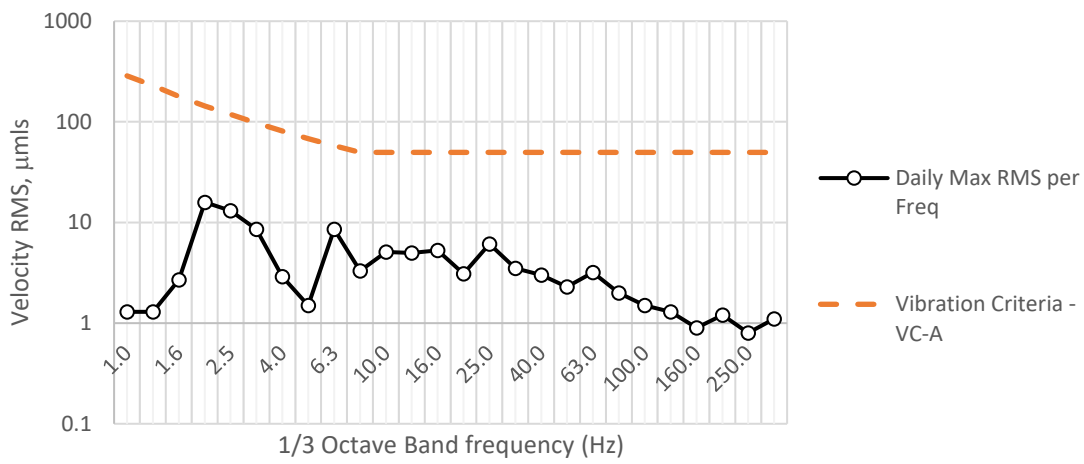
Sideways



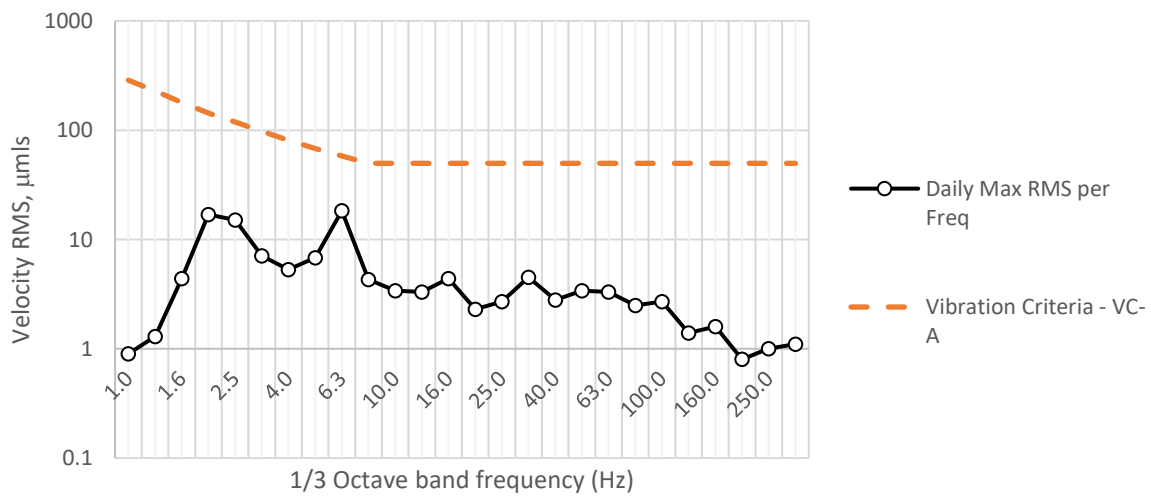
Vertical Vibration



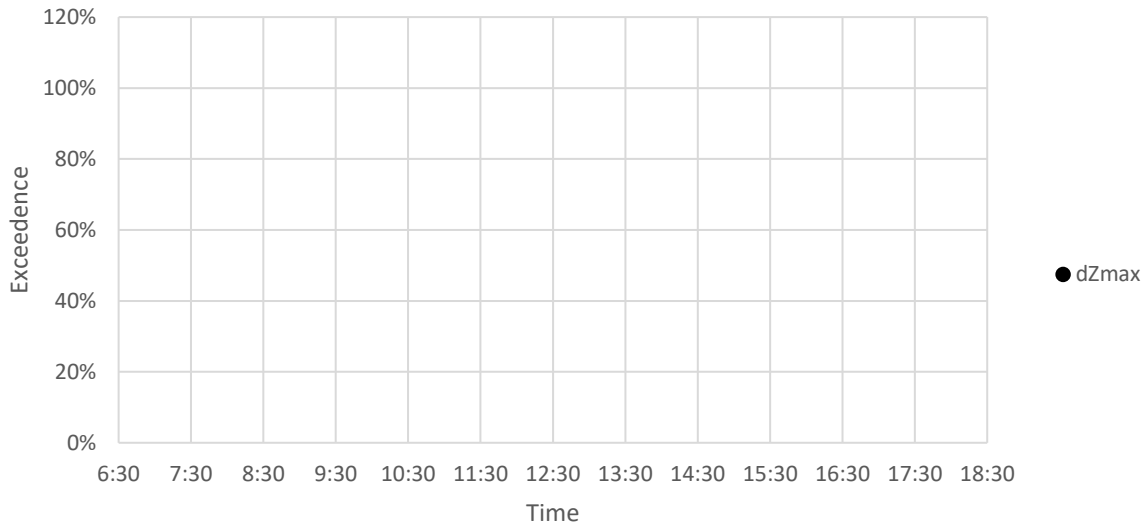
FwdBackwd Vibration



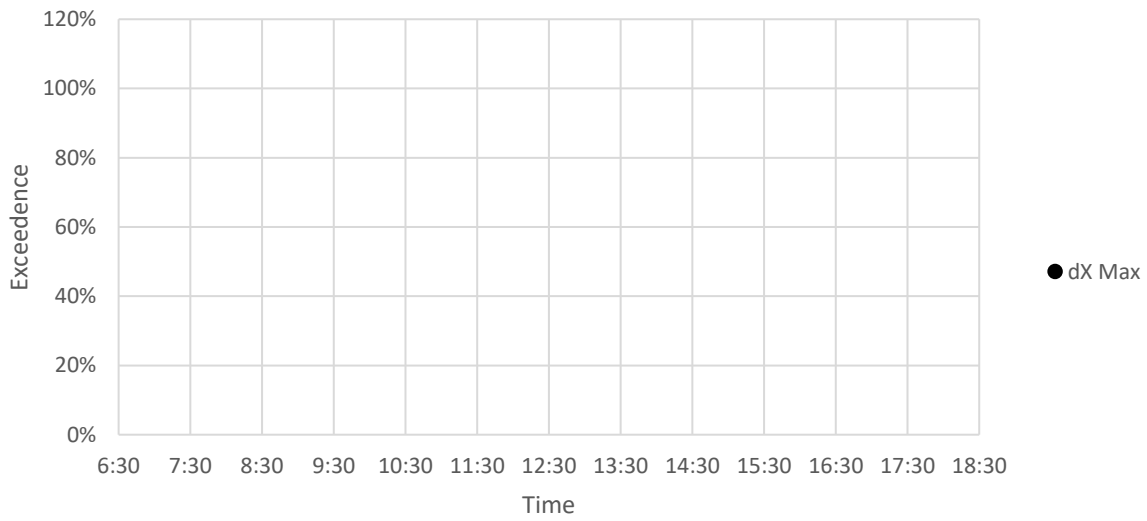
Sideways Vibration



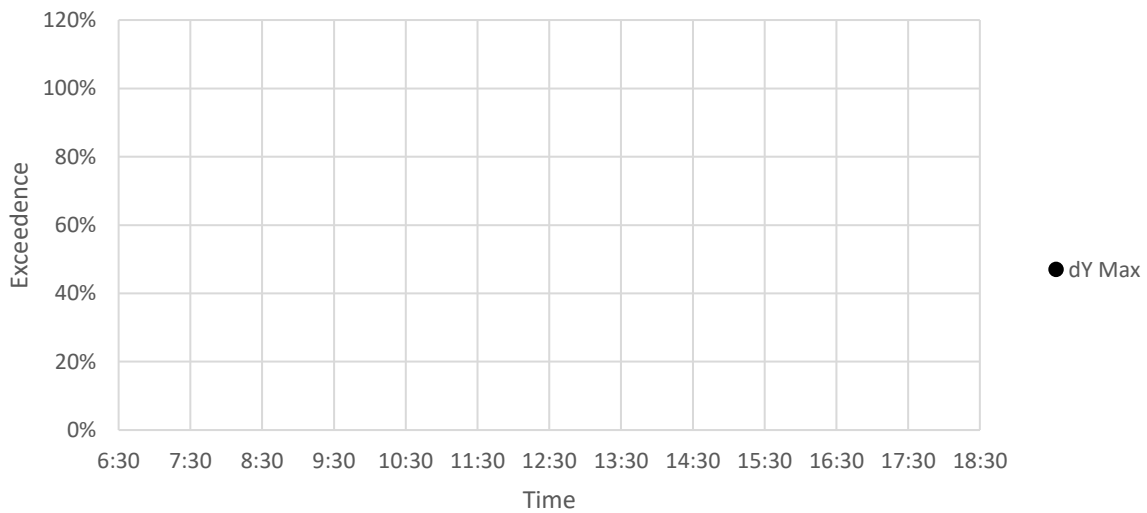
Vertical

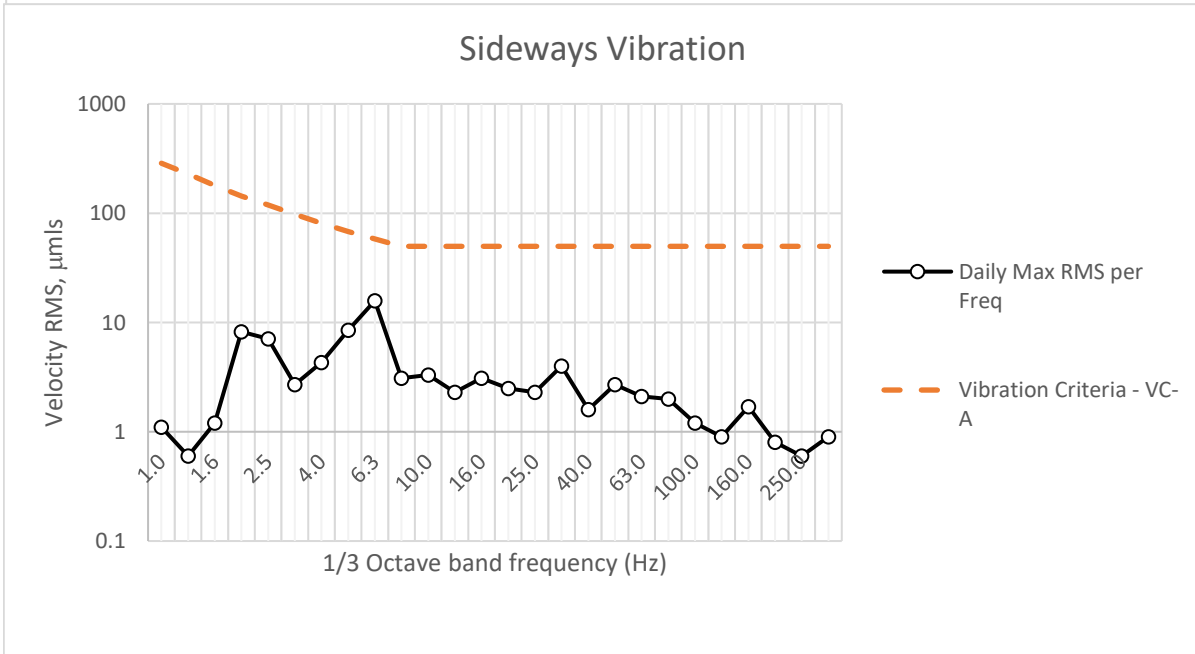
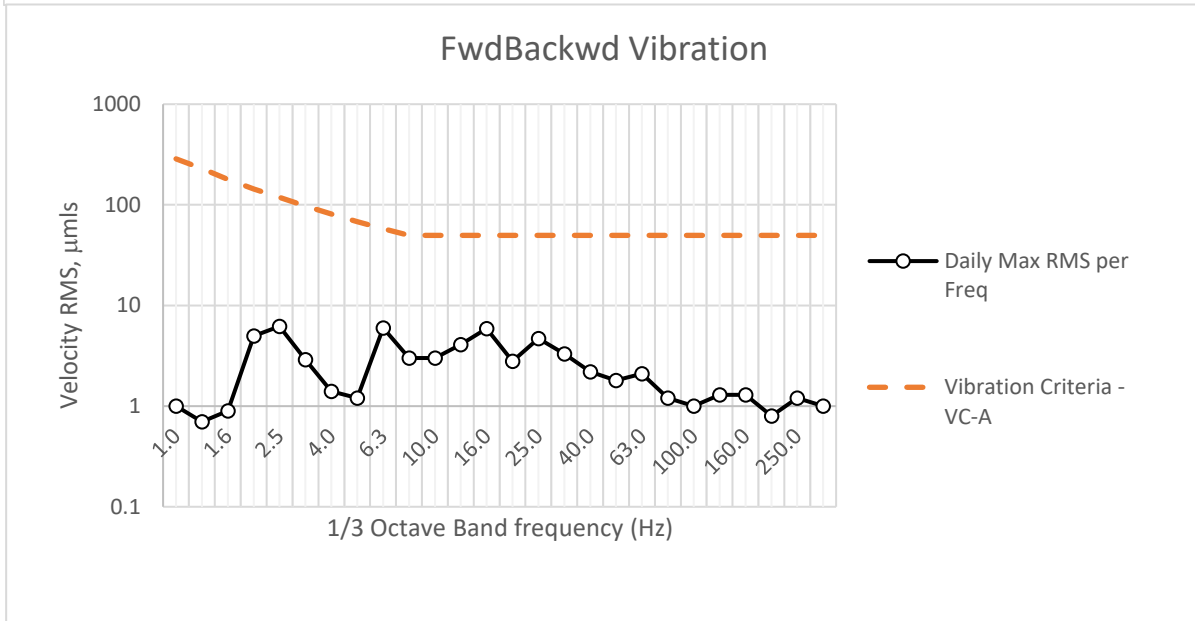
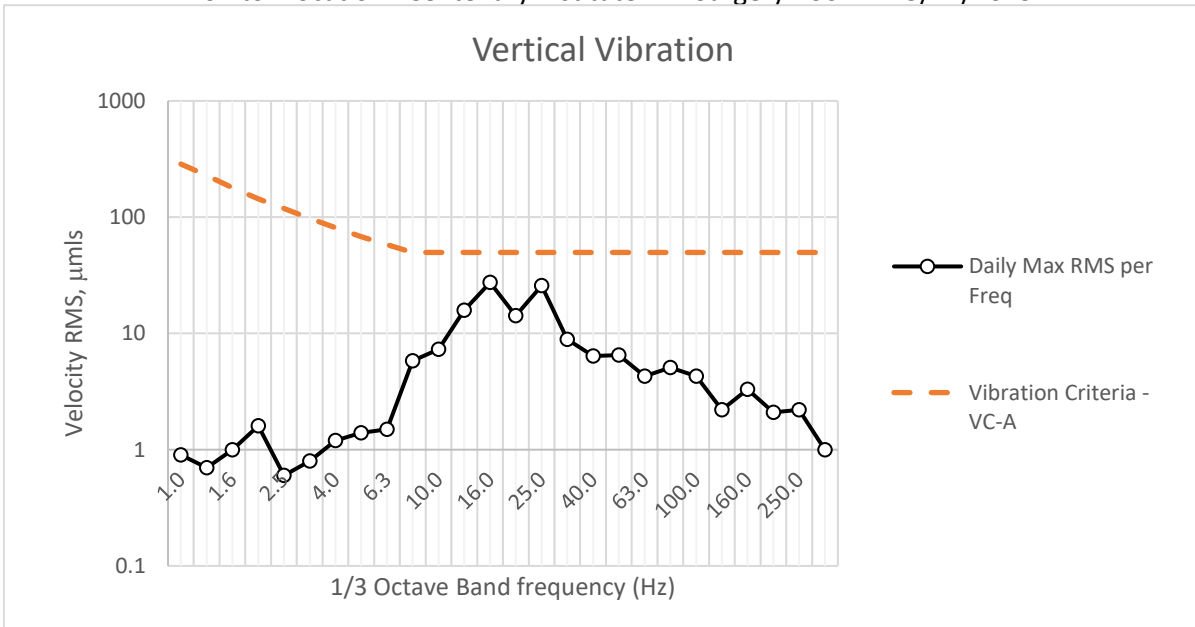


Fwd/Backwards

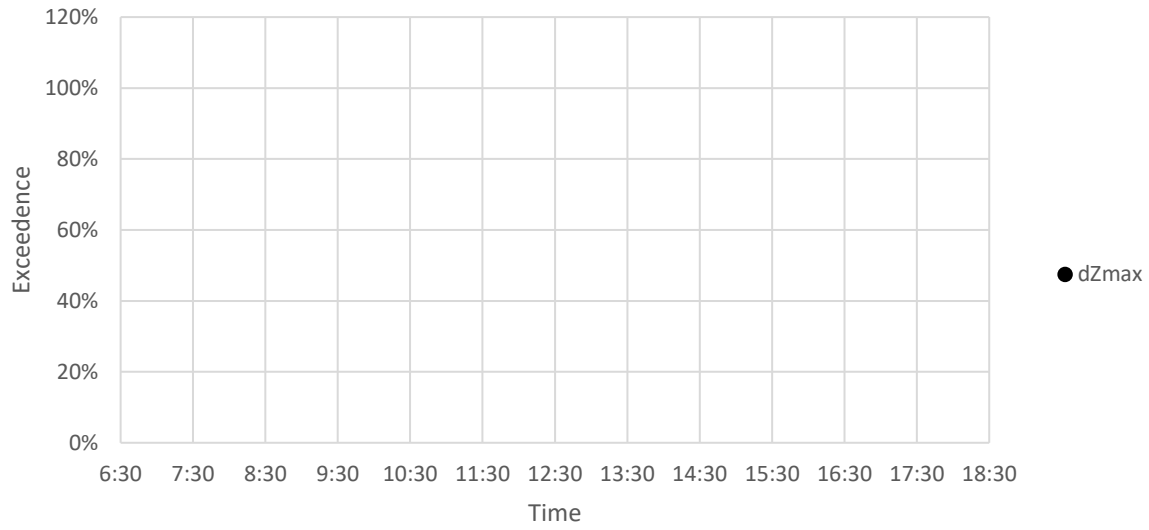


Sideways

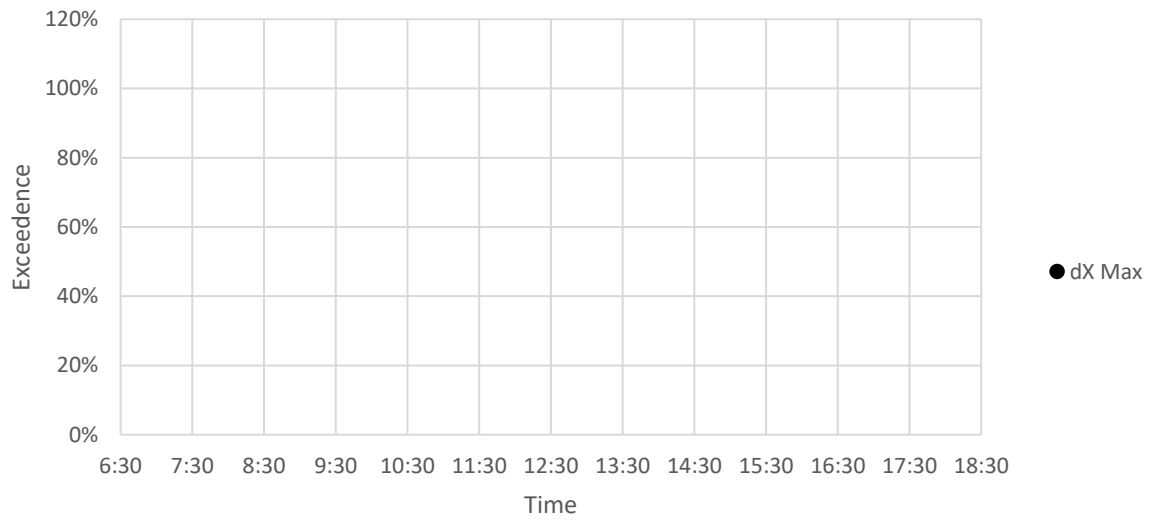




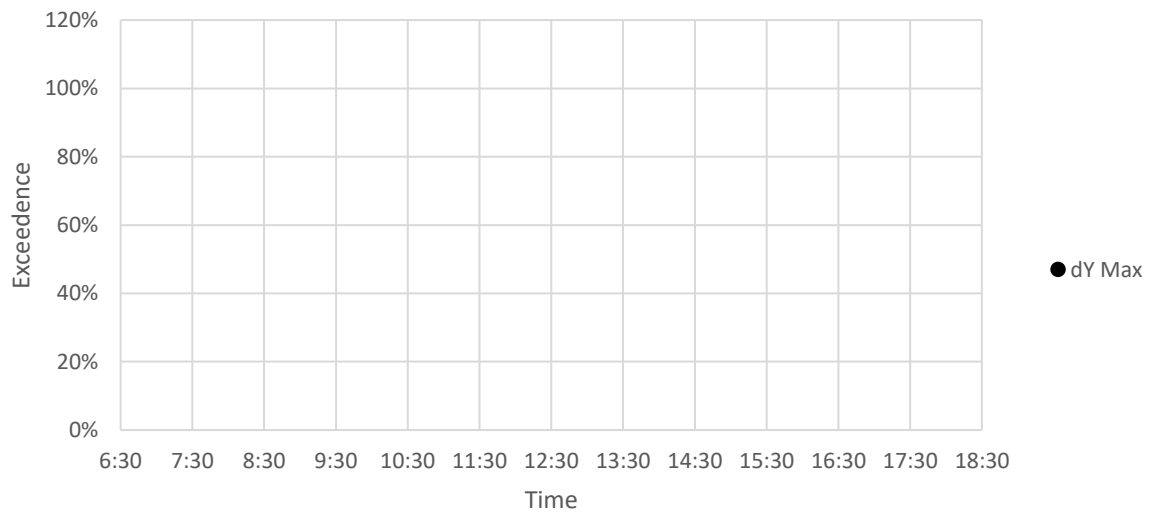
Vertical



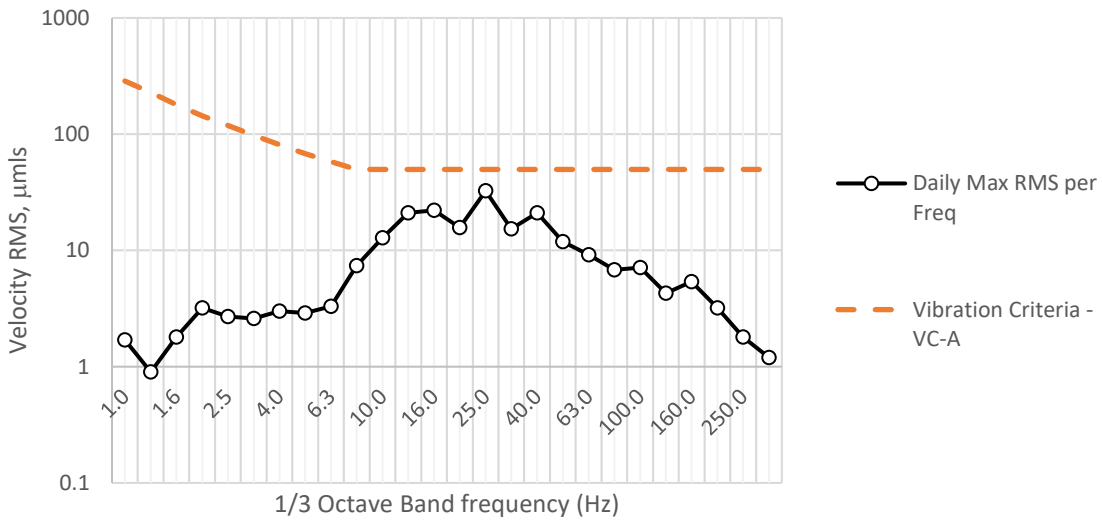
Fwd/Backwards



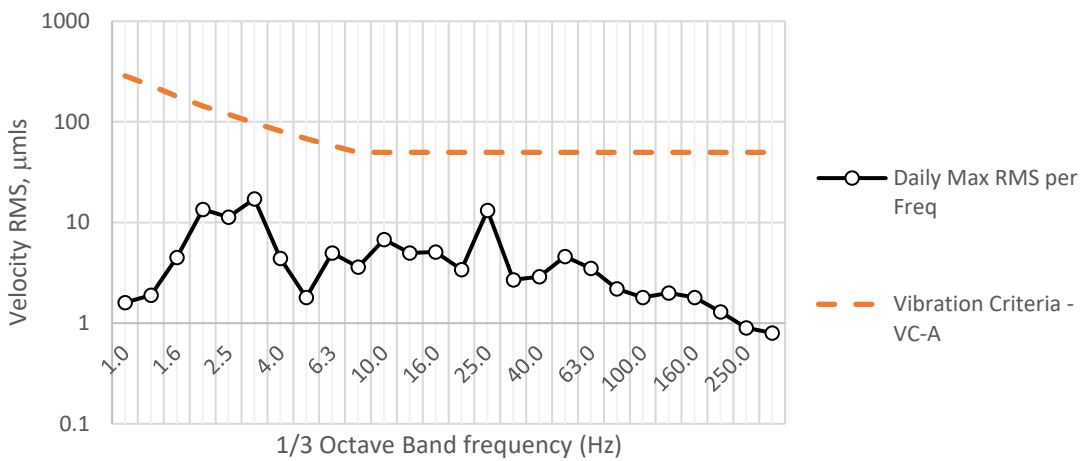
Sideways



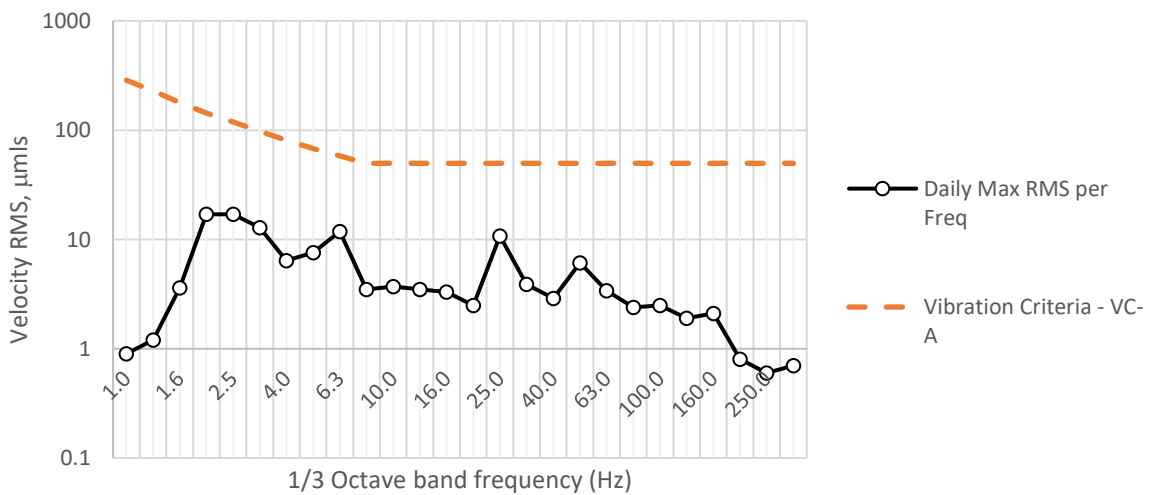
Vertical Vibration



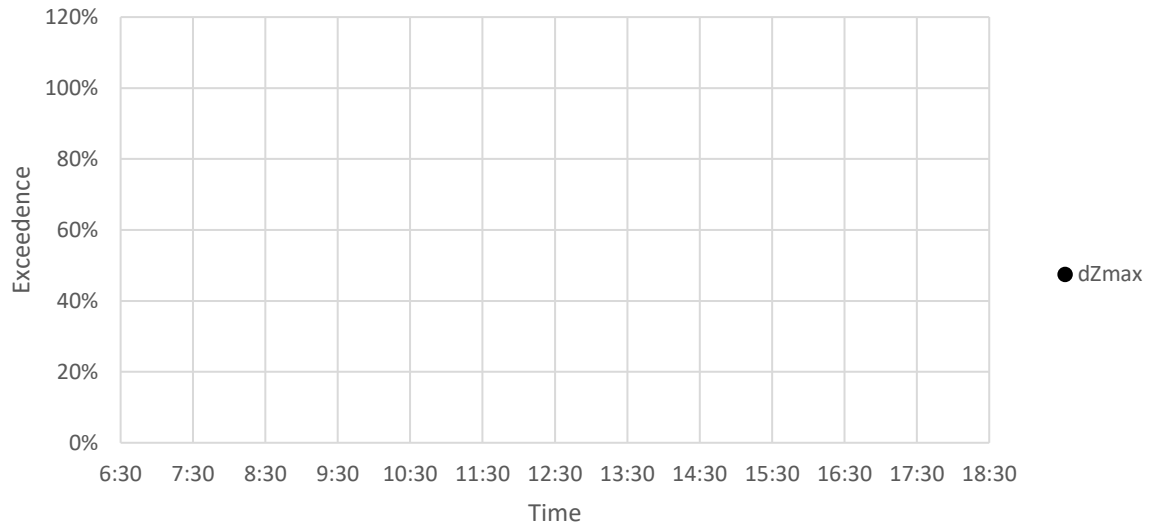
FwdBackwd Vibration



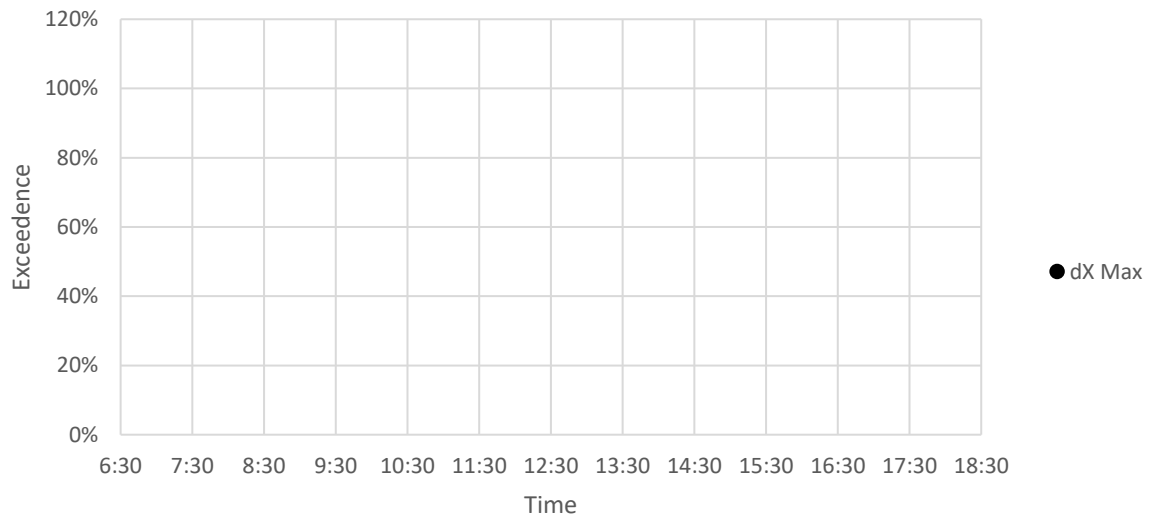
Sideways Vibration



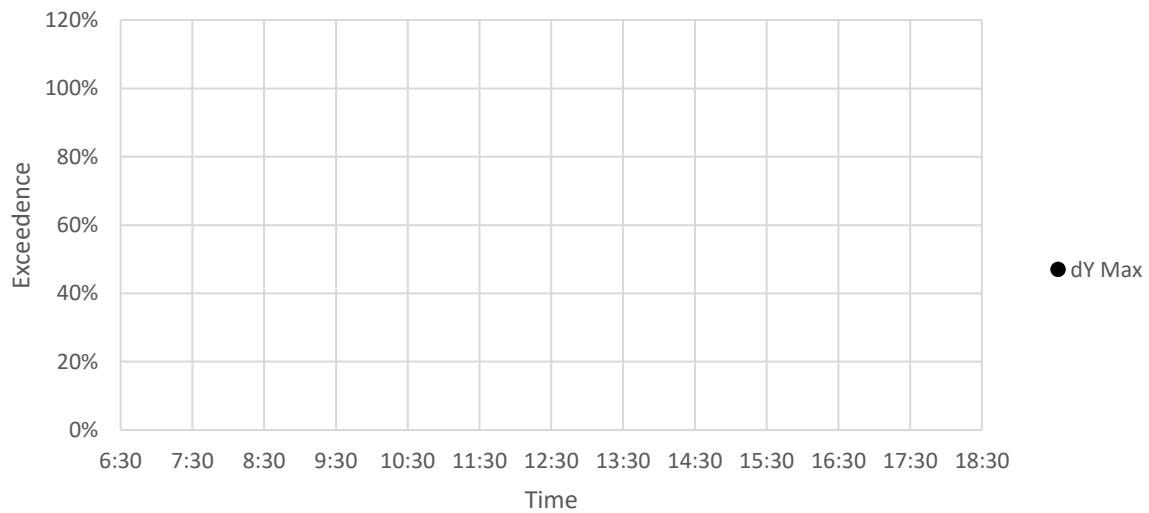
Vertical



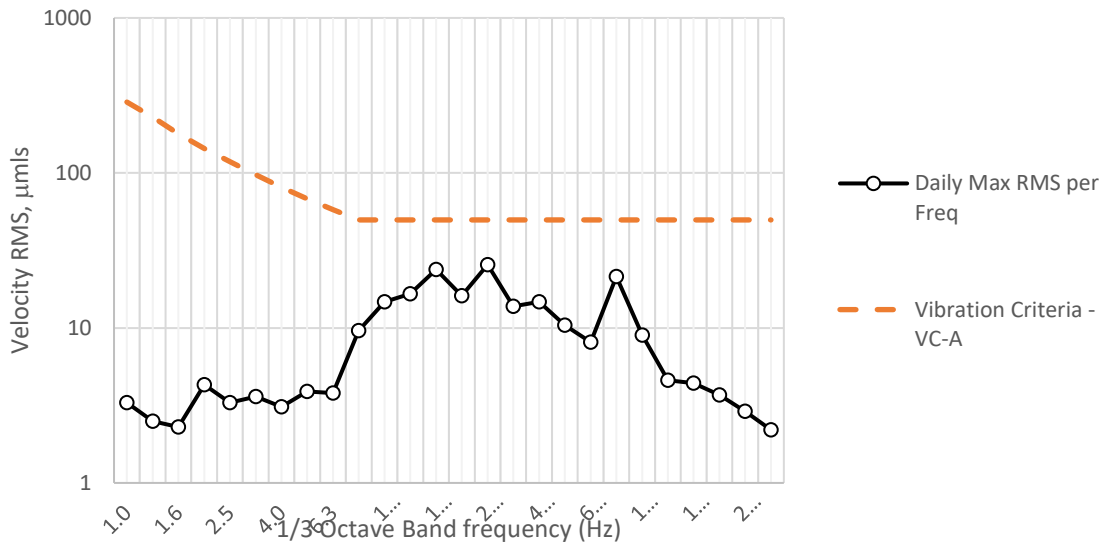
Fwd/Backwards



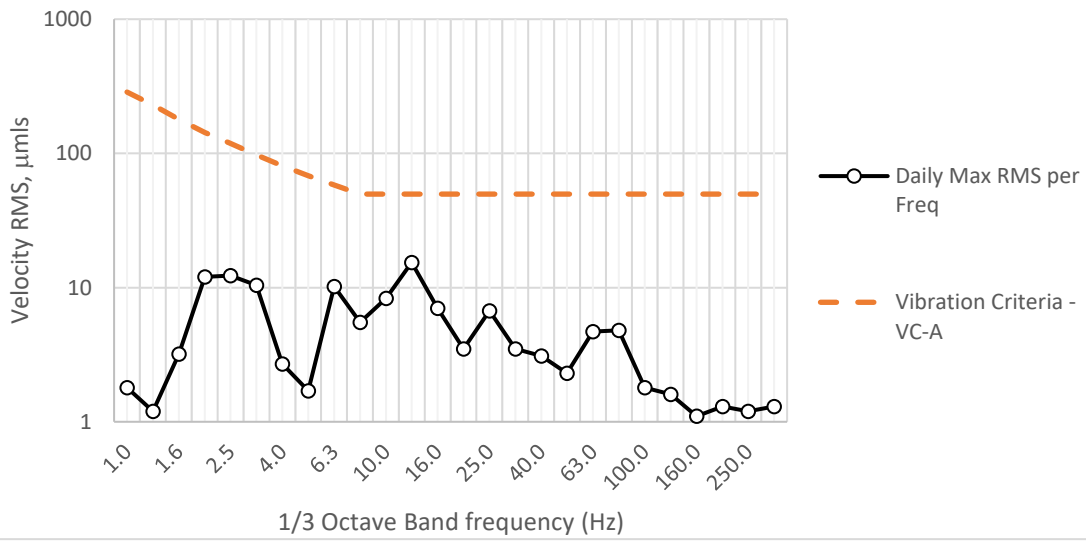
Sideways



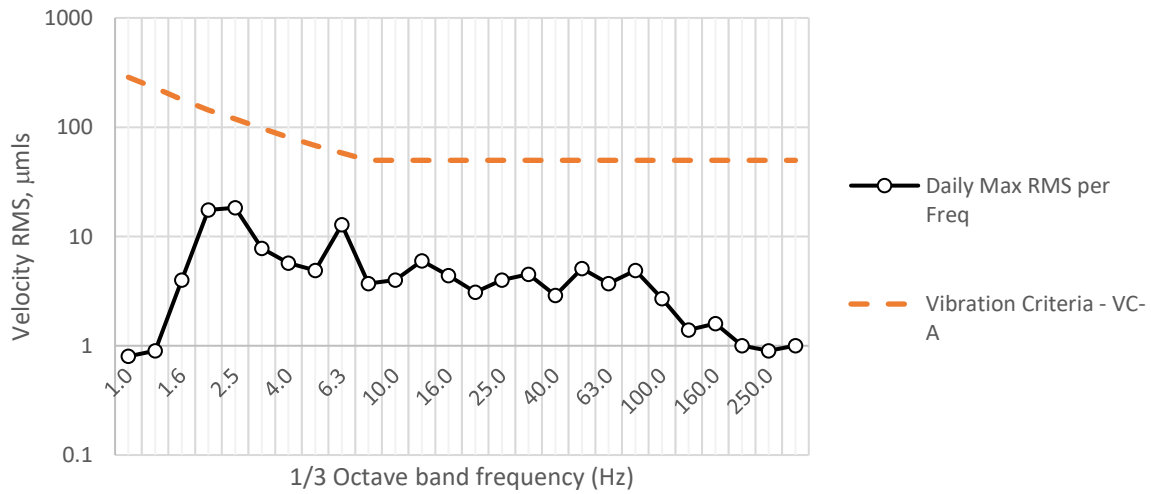
Vertical Vibration



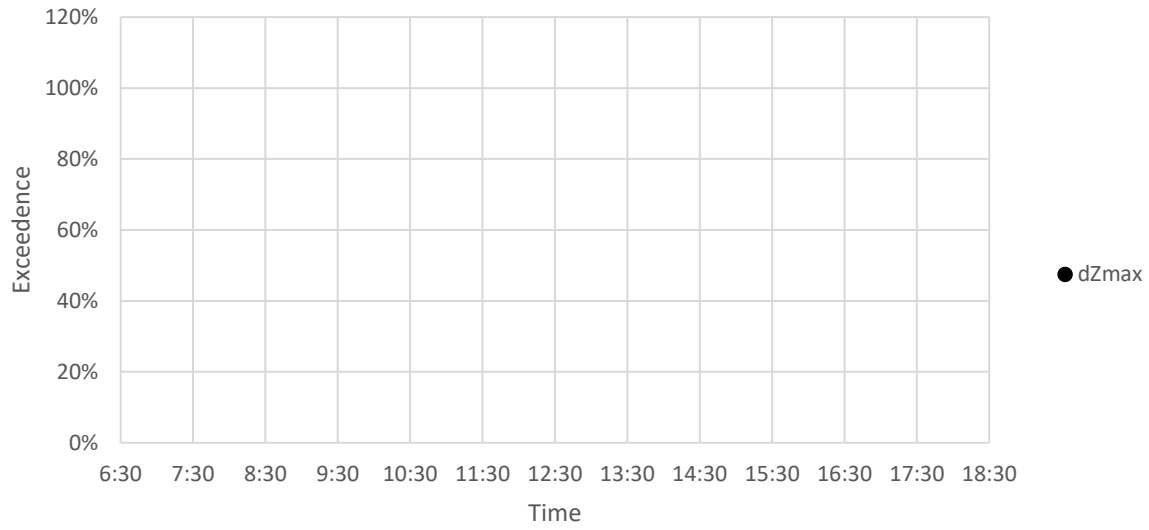
FwdBackwd Vibration



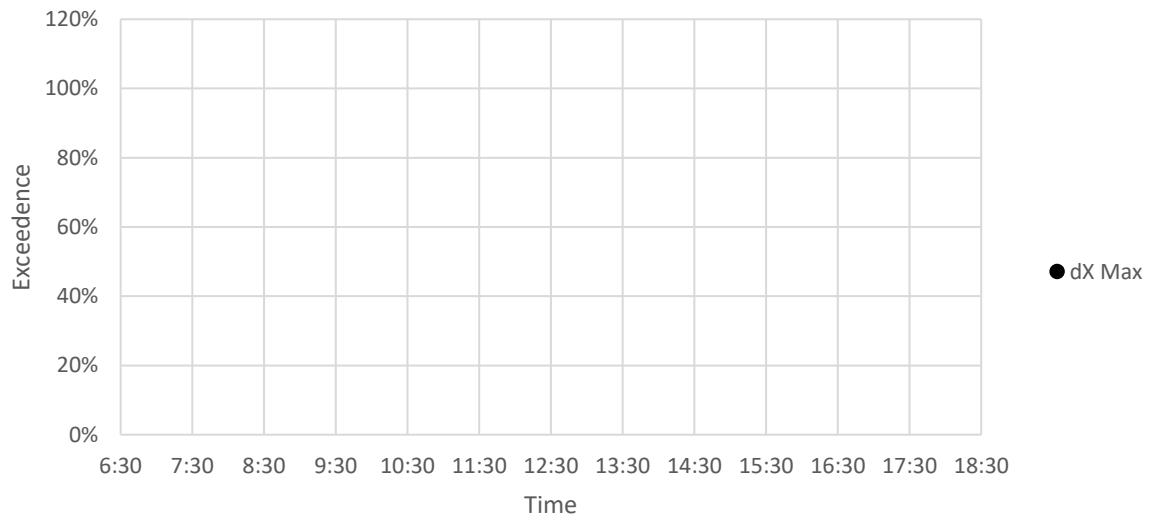
Sideways Vibration



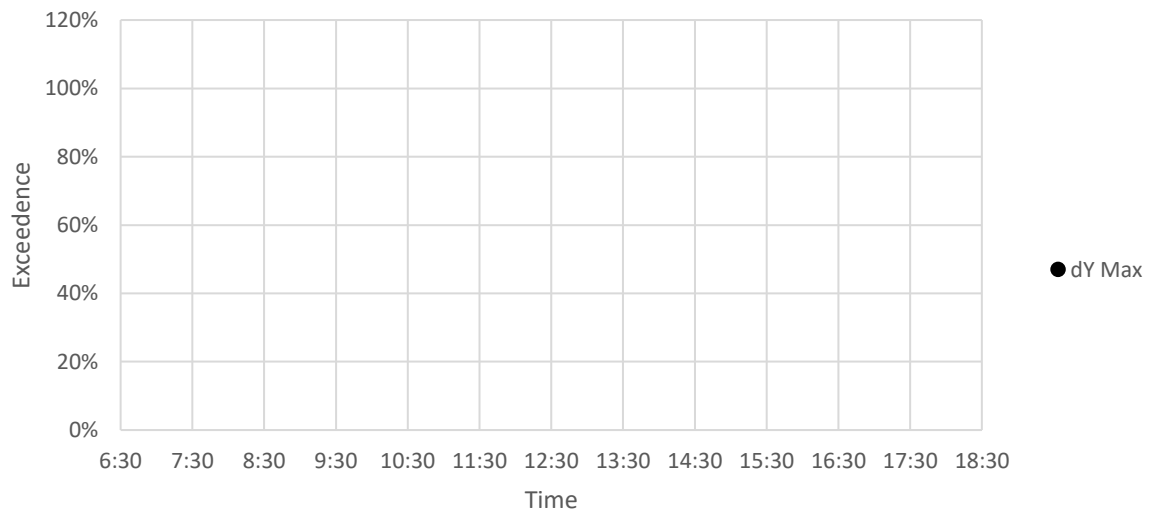
Vertical



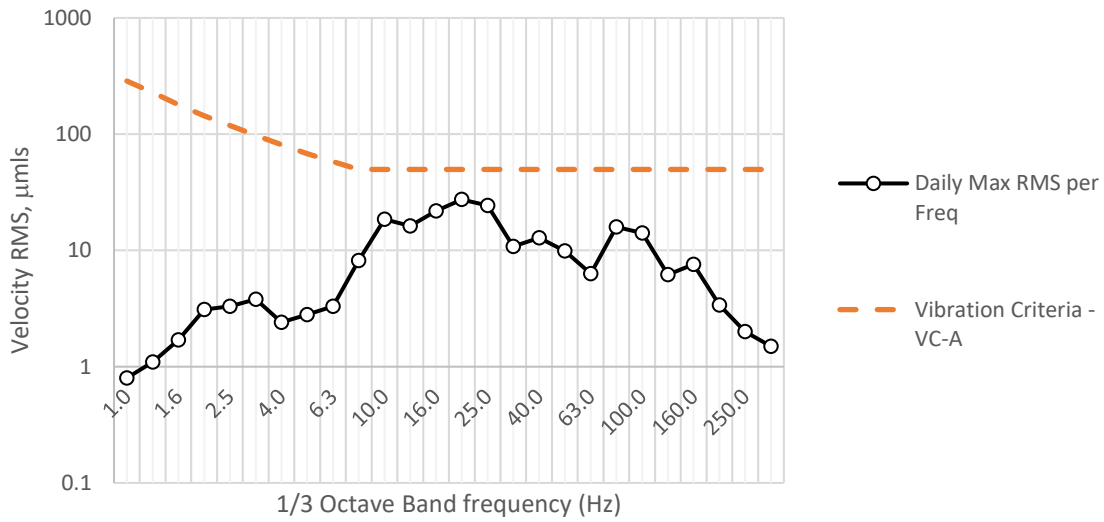
Fwd/Backwards



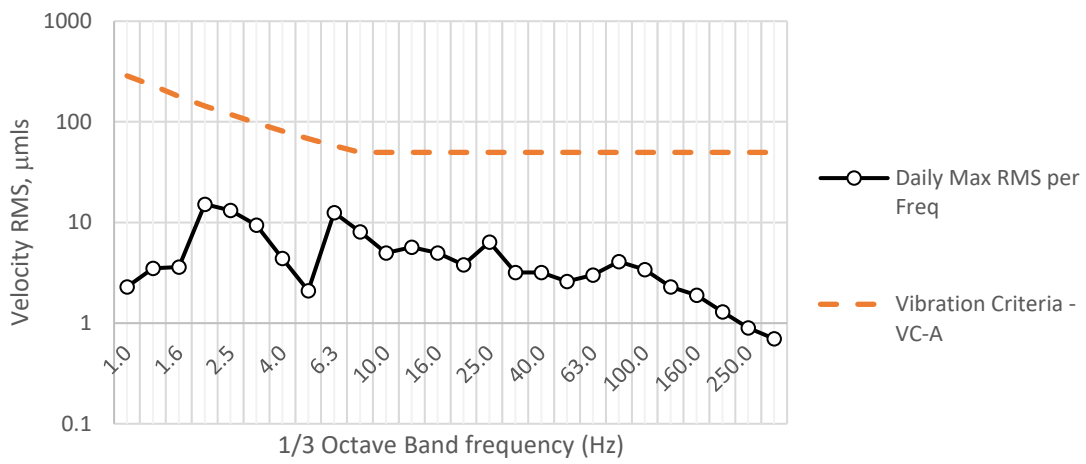
Sideways



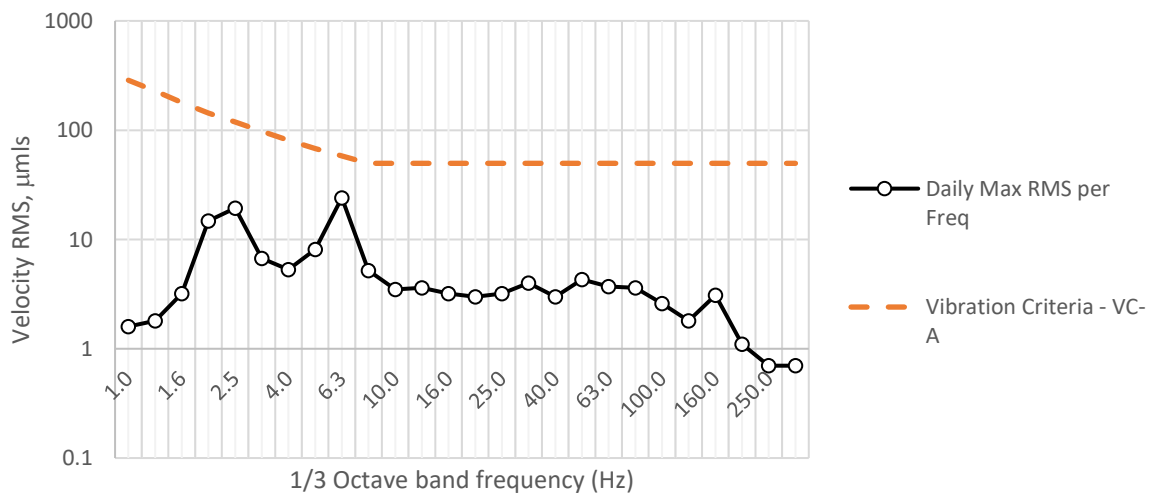
Vertical Vibration



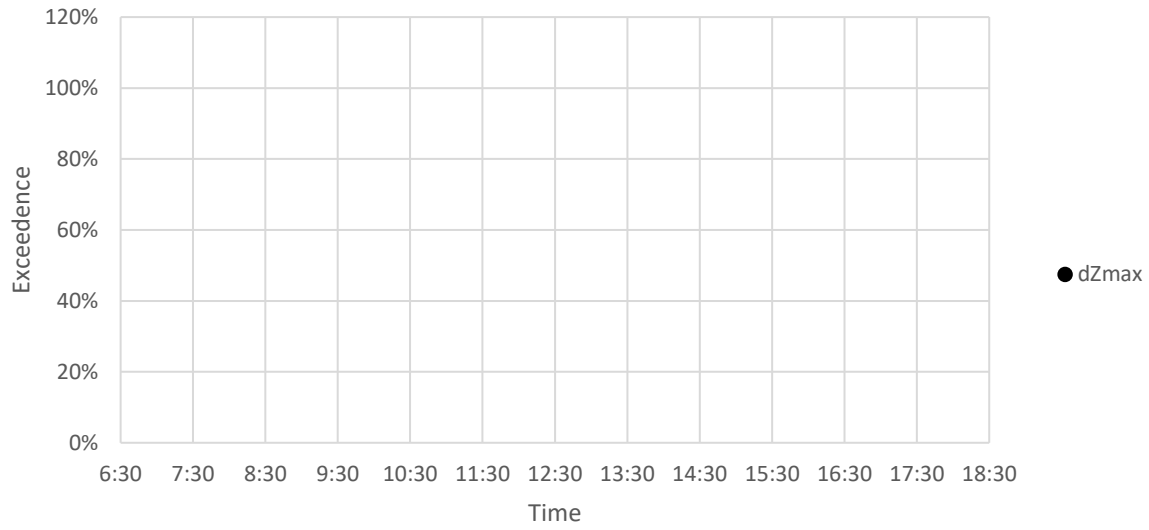
FwdBackwd Vibration



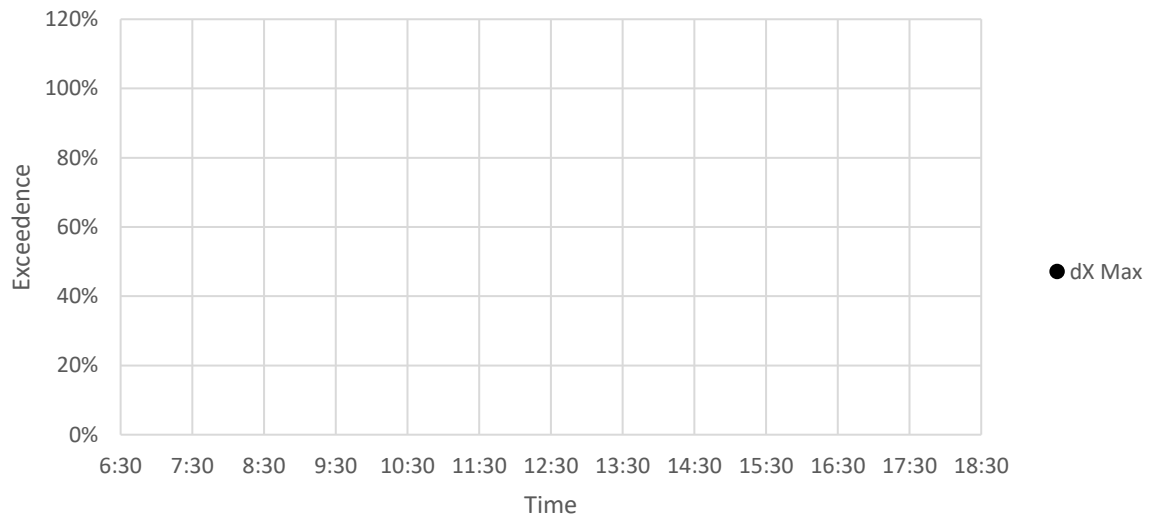
Sideways Vibration



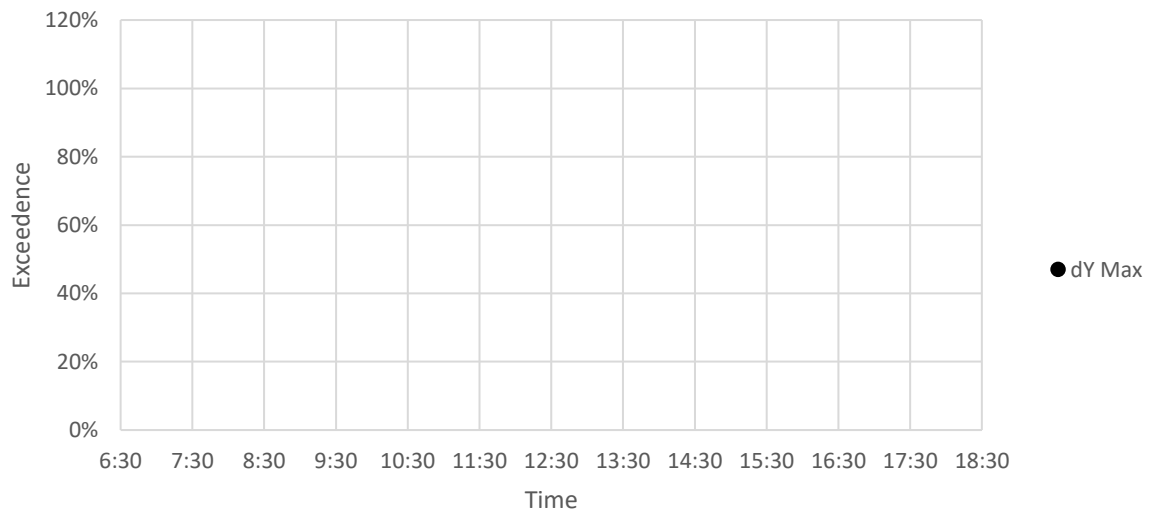
Vertical



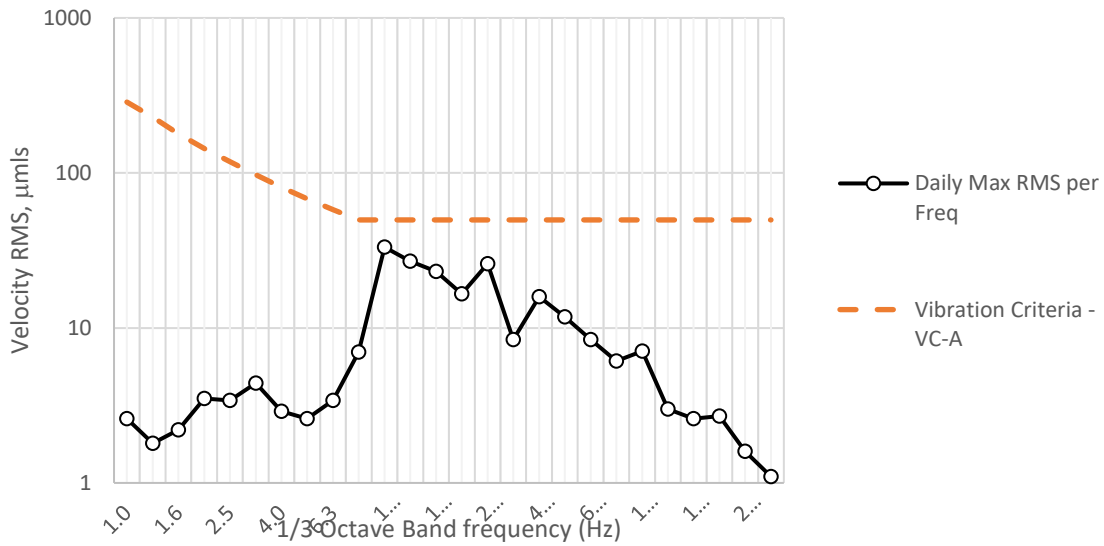
Fwd/Backwards



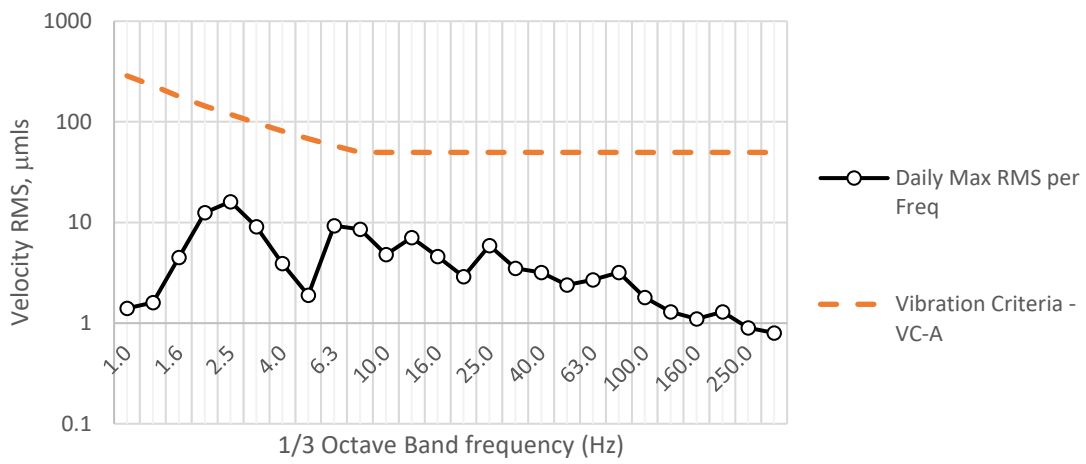
Sideways



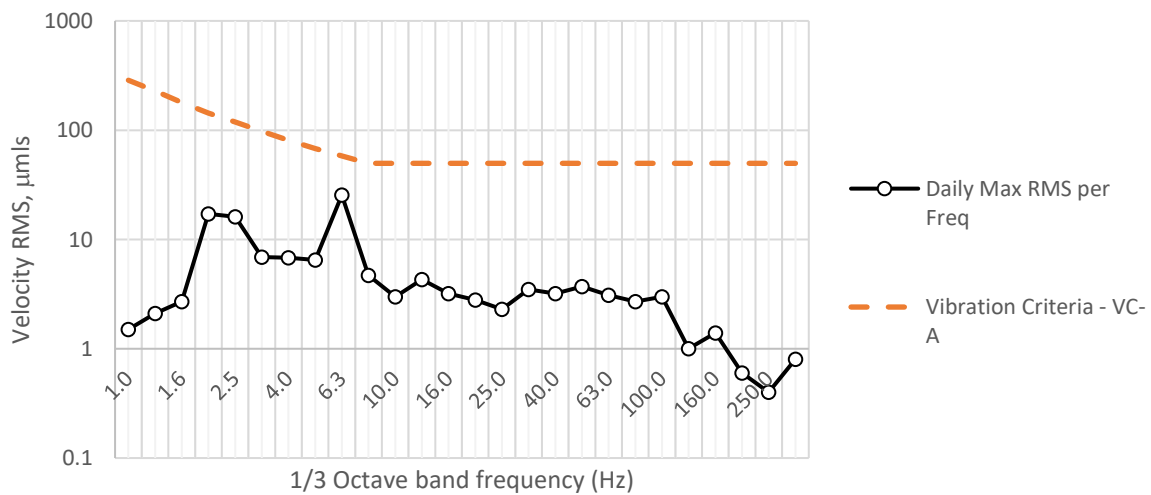
Vertical Vibration



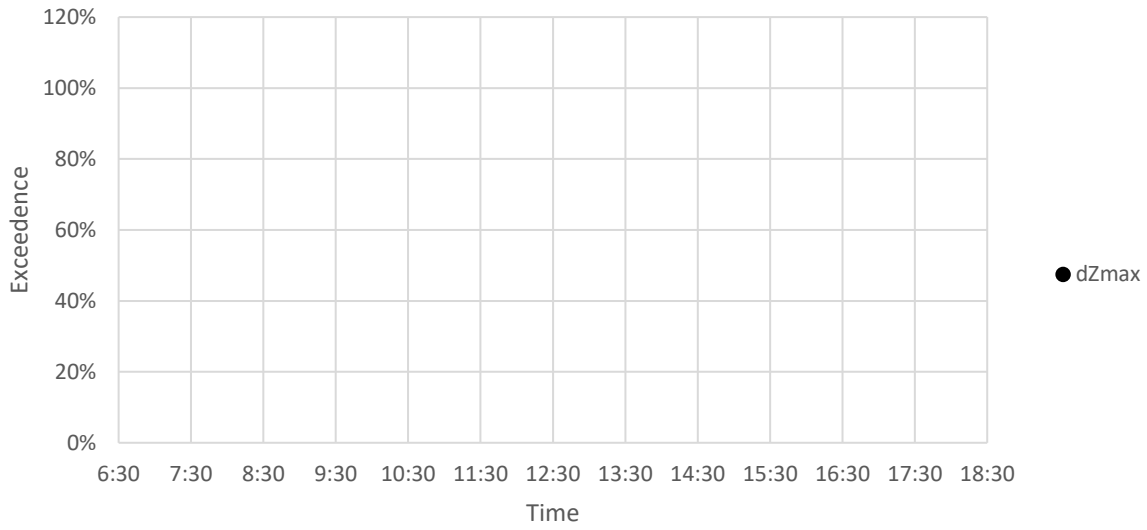
FwdBackwd Vibration



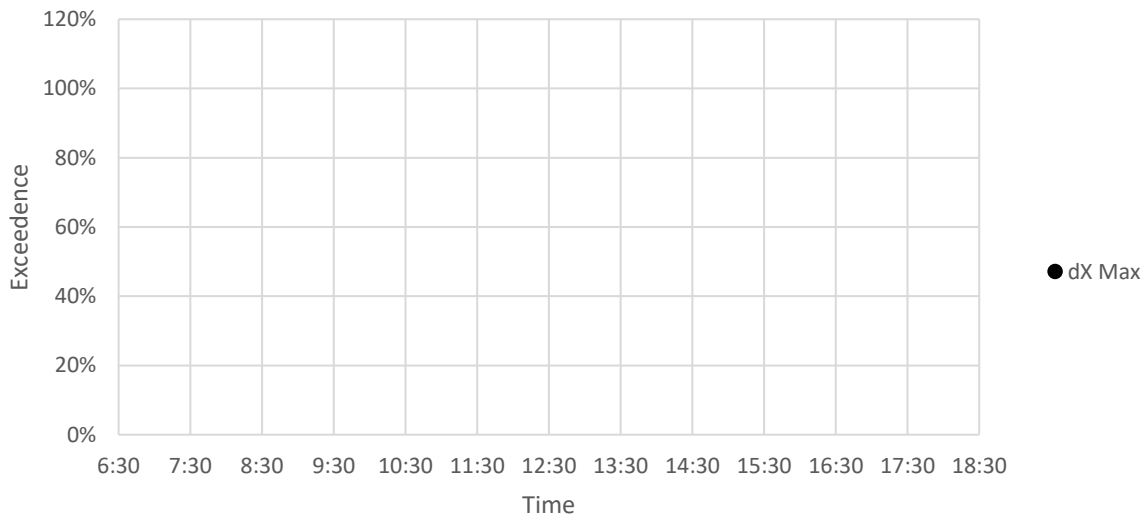
Sideways Vibration



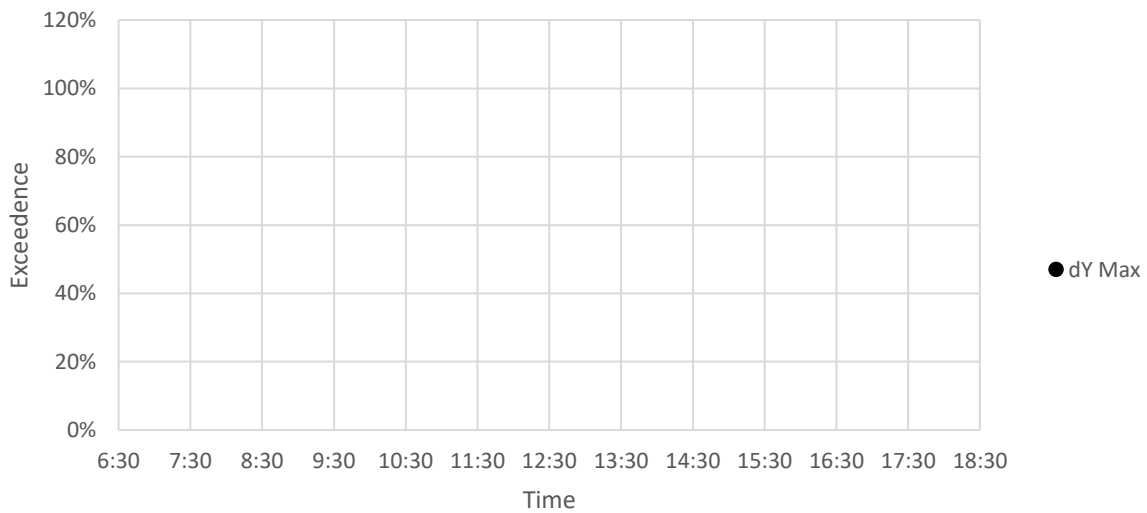
Vertical



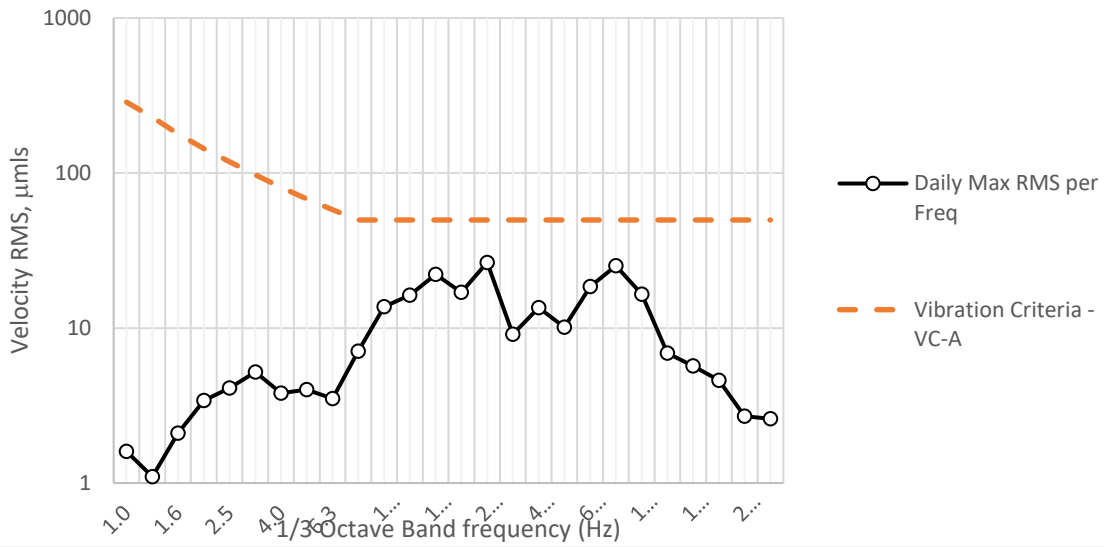
Fwd/Backwards



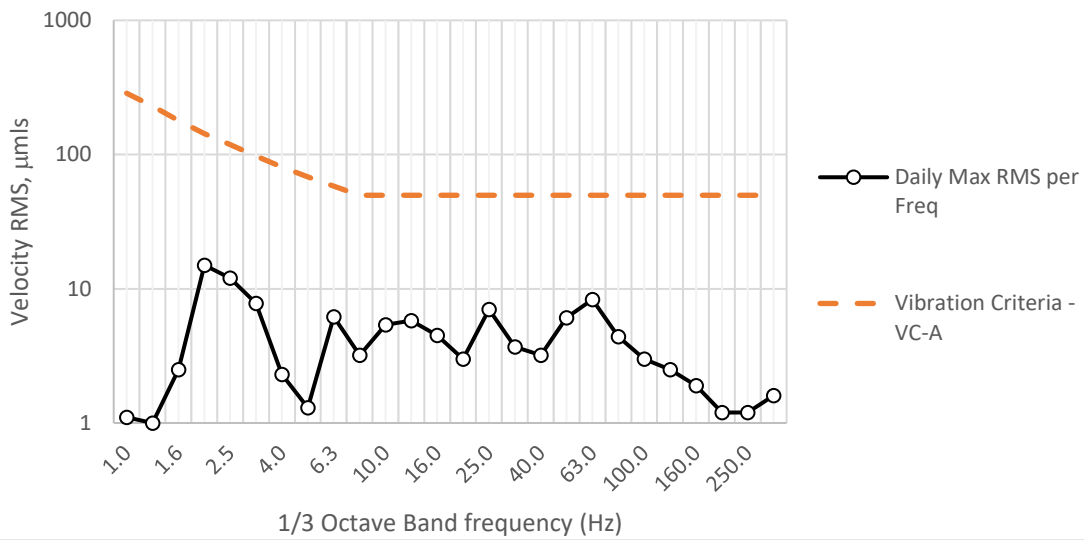
Sideways



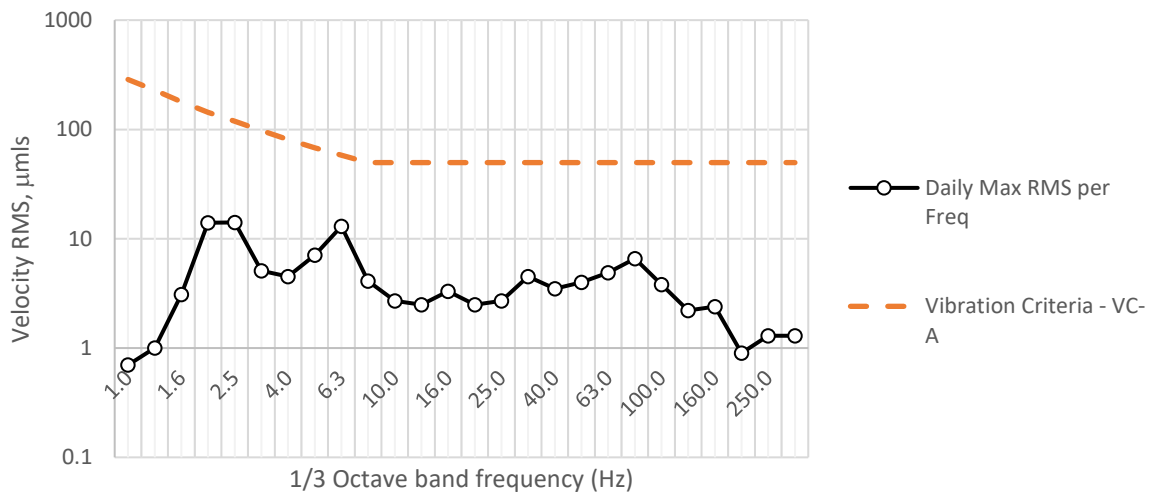
Vertical Vibration



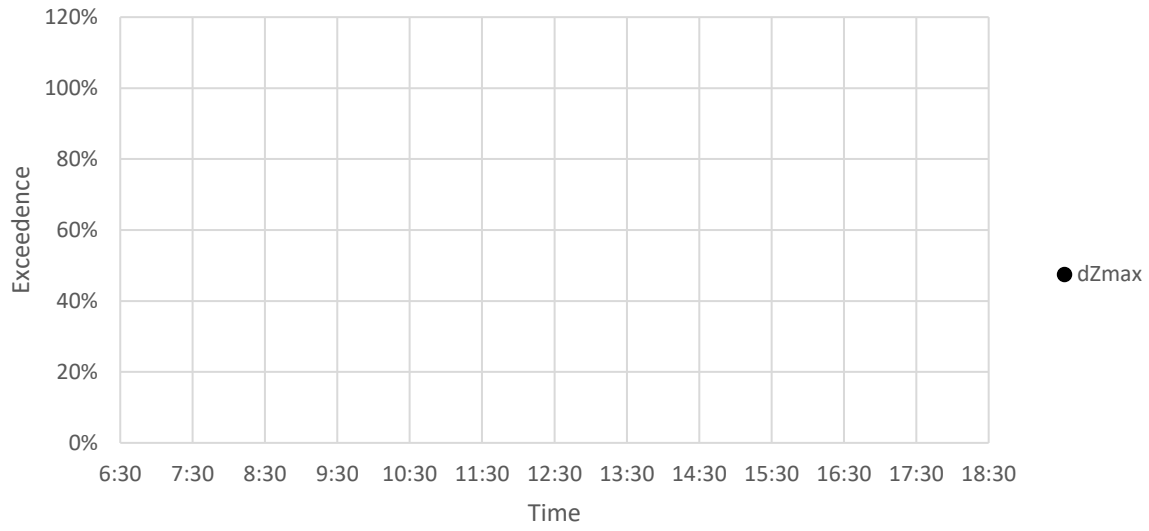
FwdBackwd Vibration



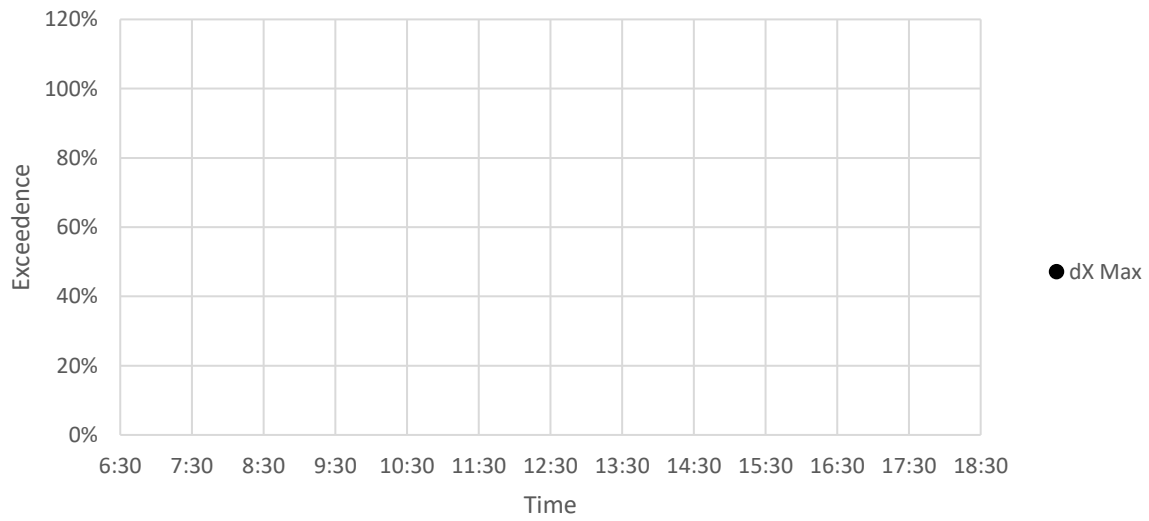
Sideways Vibration



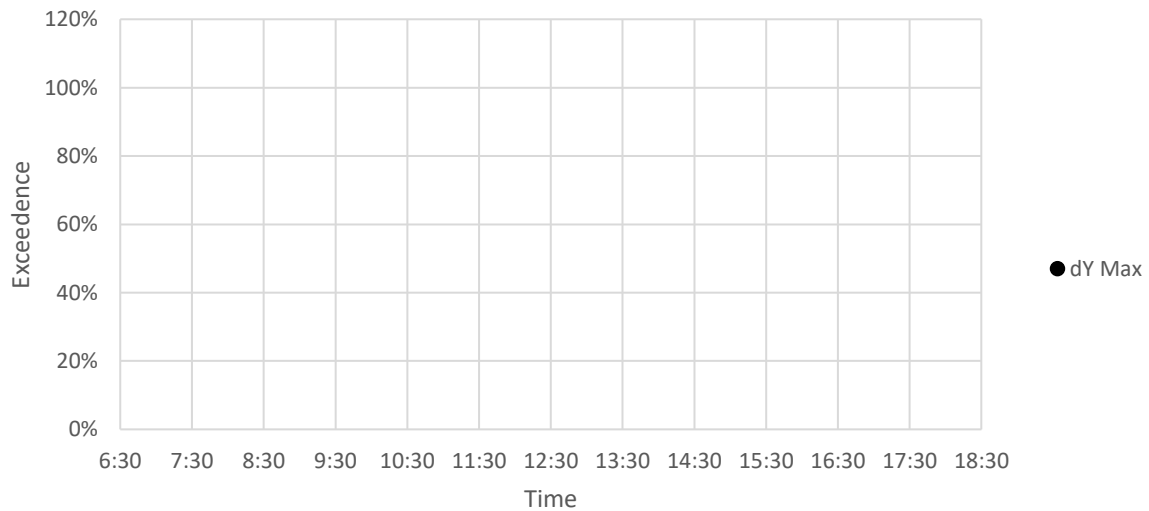
Vertical



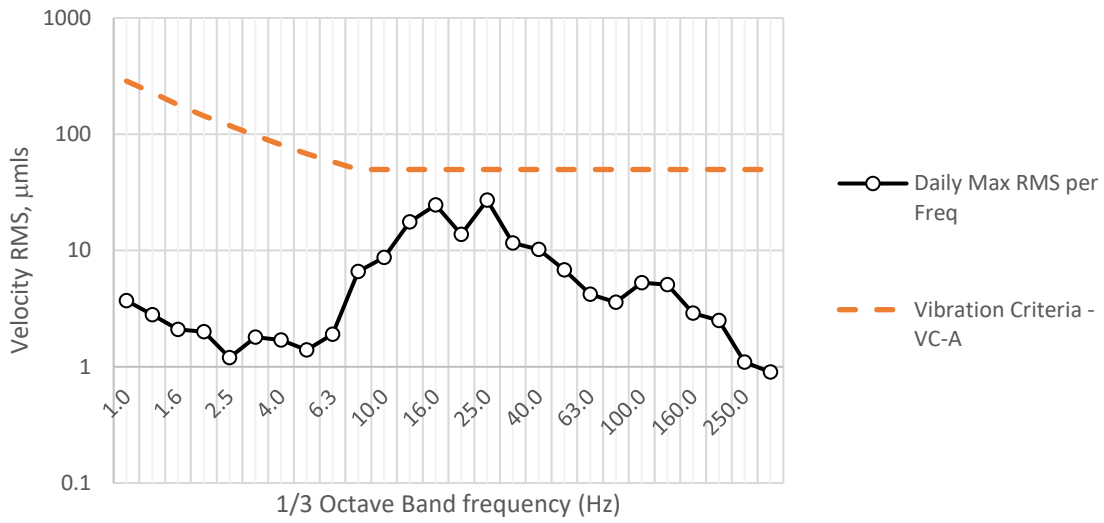
Fwd/Backwards



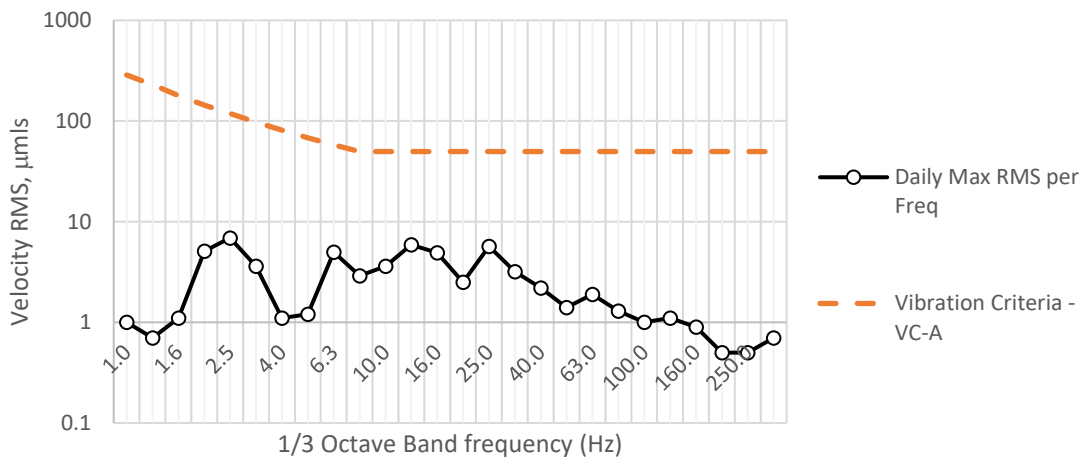
Sideways



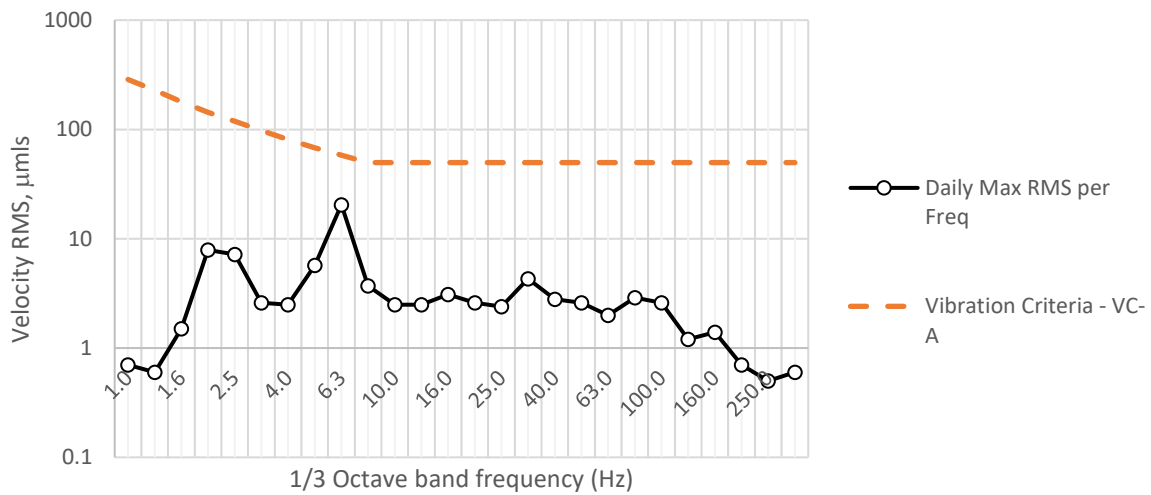
Vertical Vibration



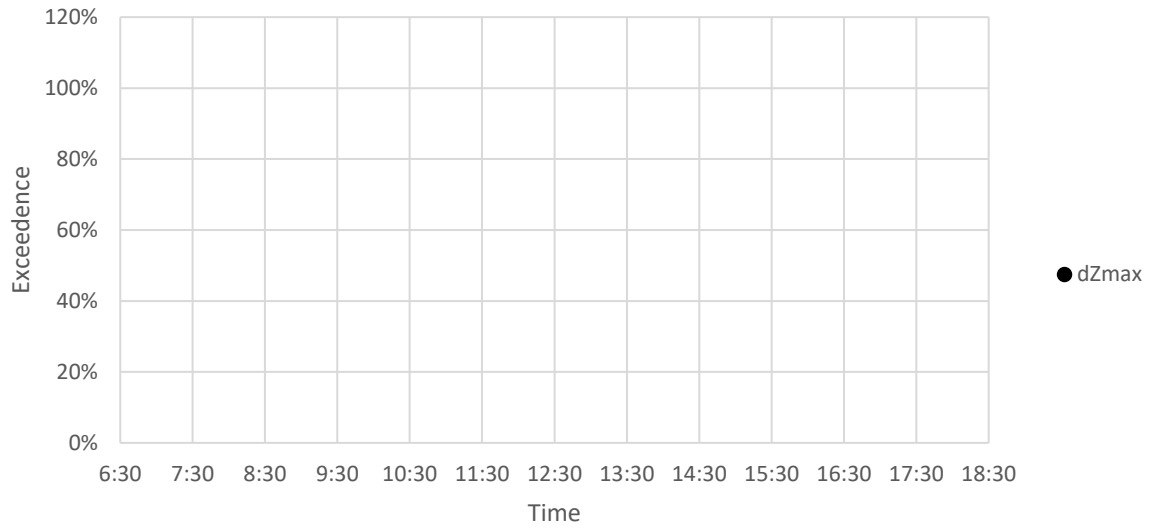
FwdBackwd Vibration



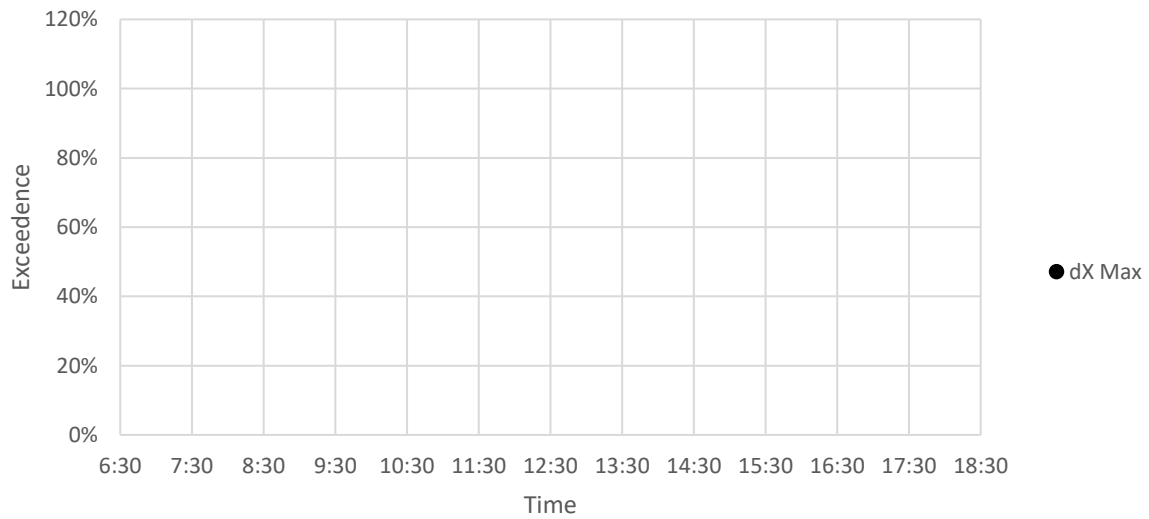
Sideways Vibration



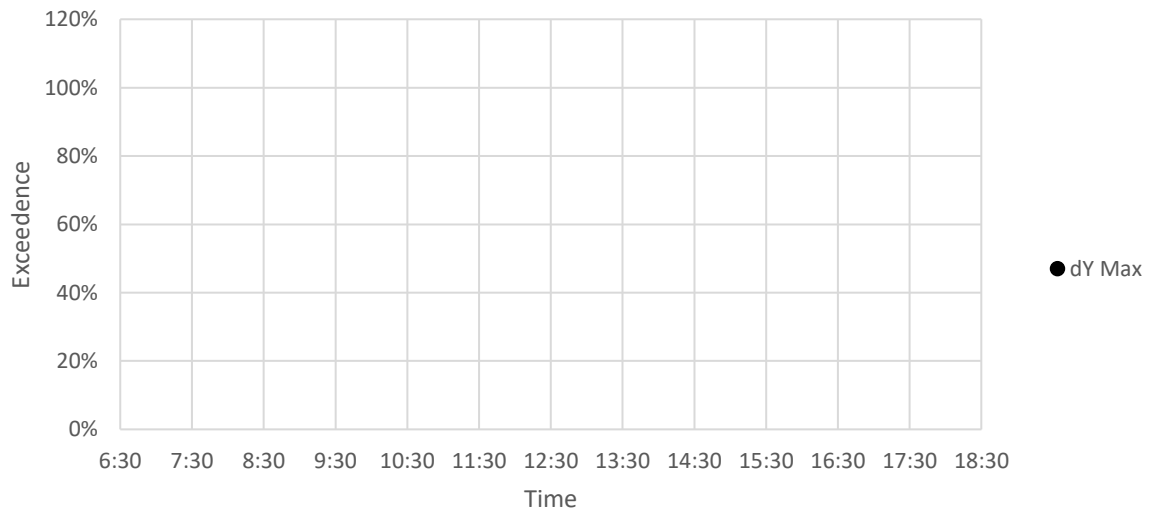
Vertical



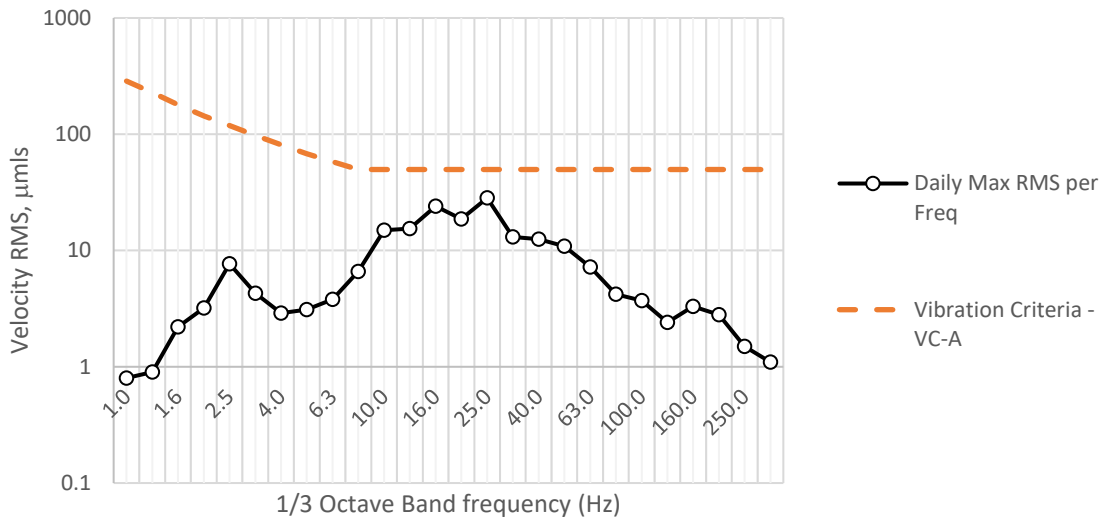
Fwd/Backwards



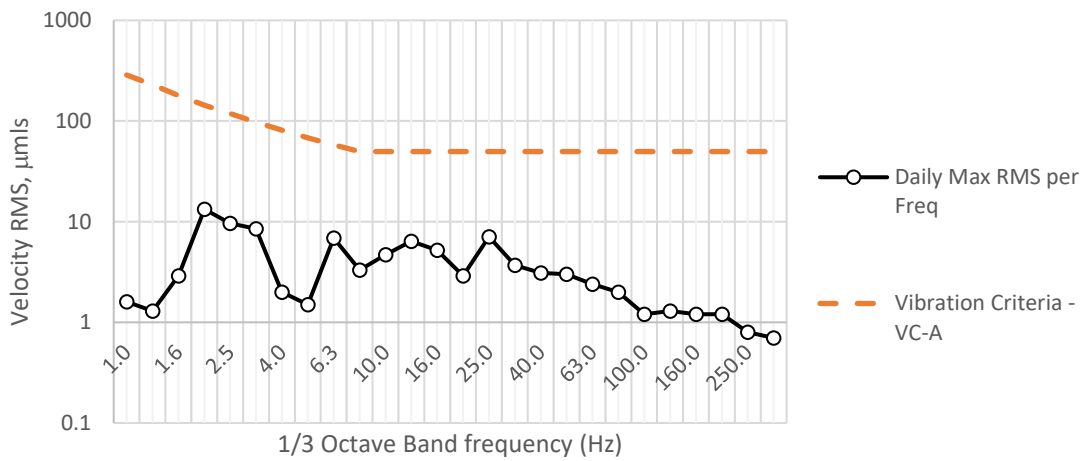
Sideways



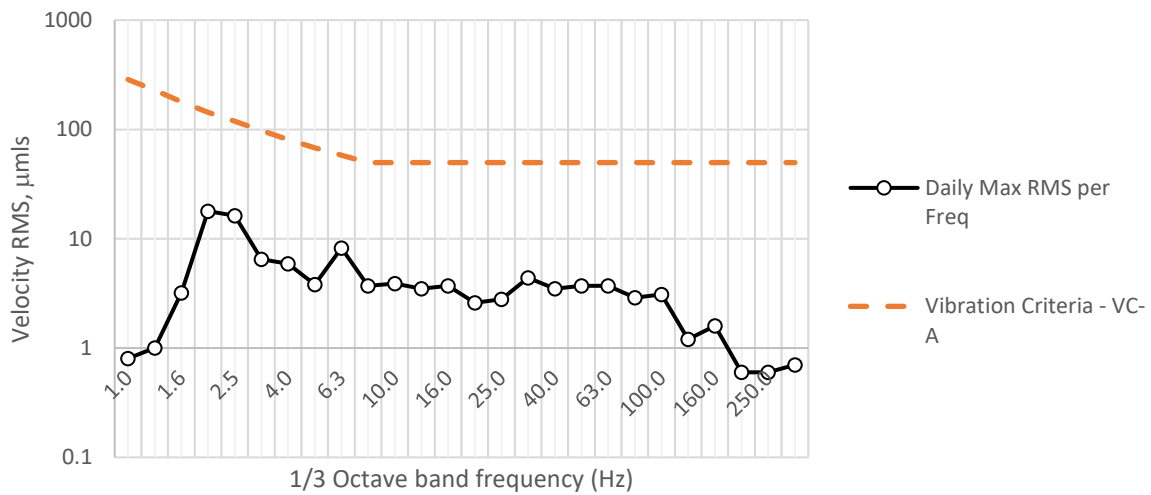
Vertical Vibration



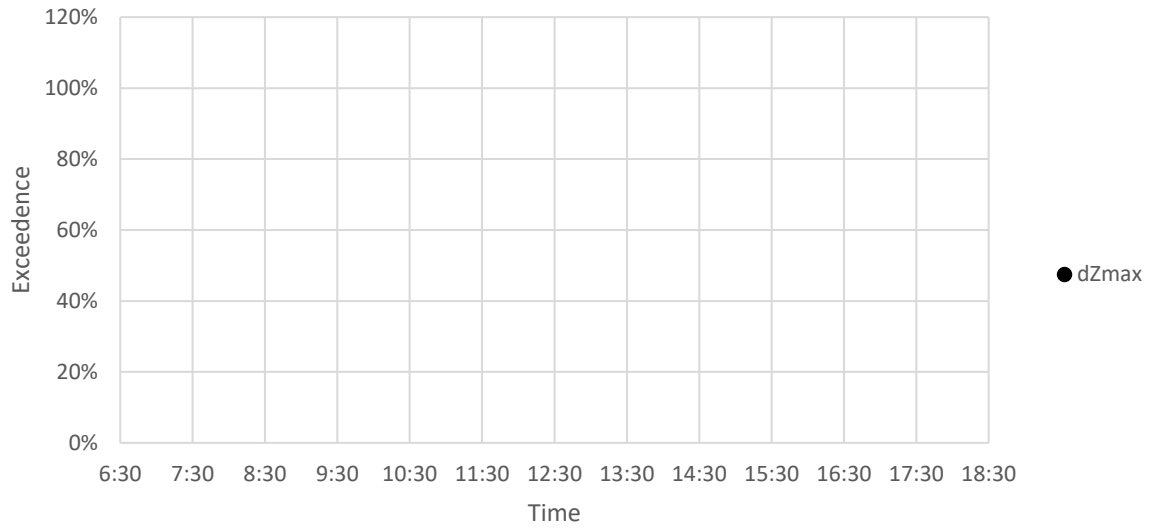
FwdBackwd Vibration



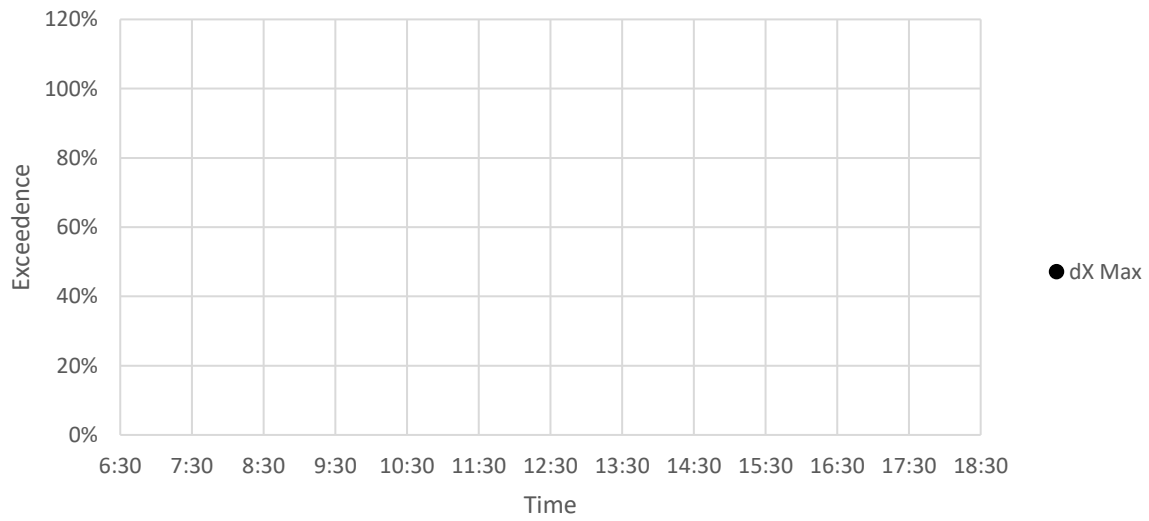
Sideways Vibration



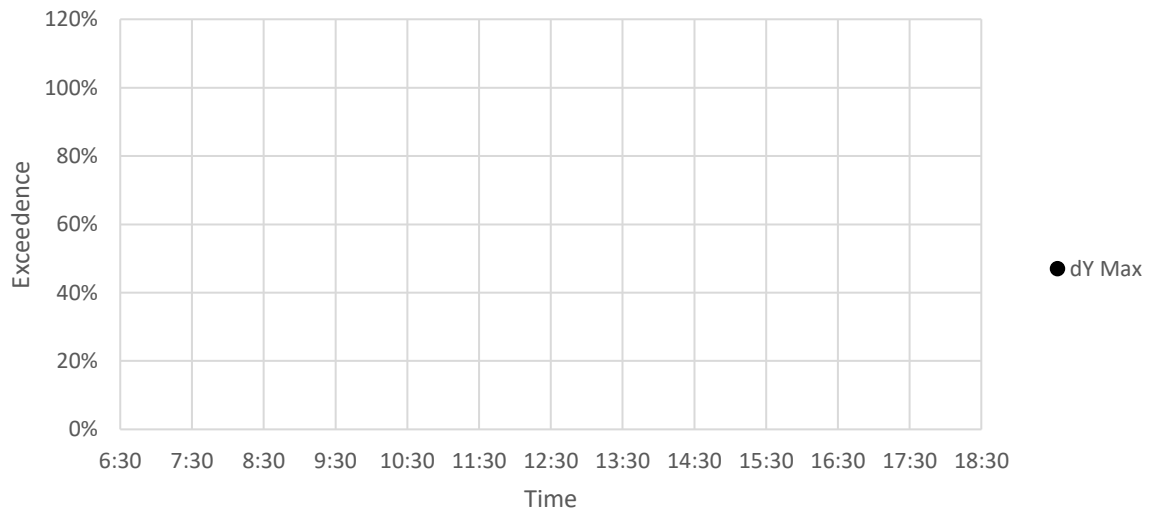
Vertical

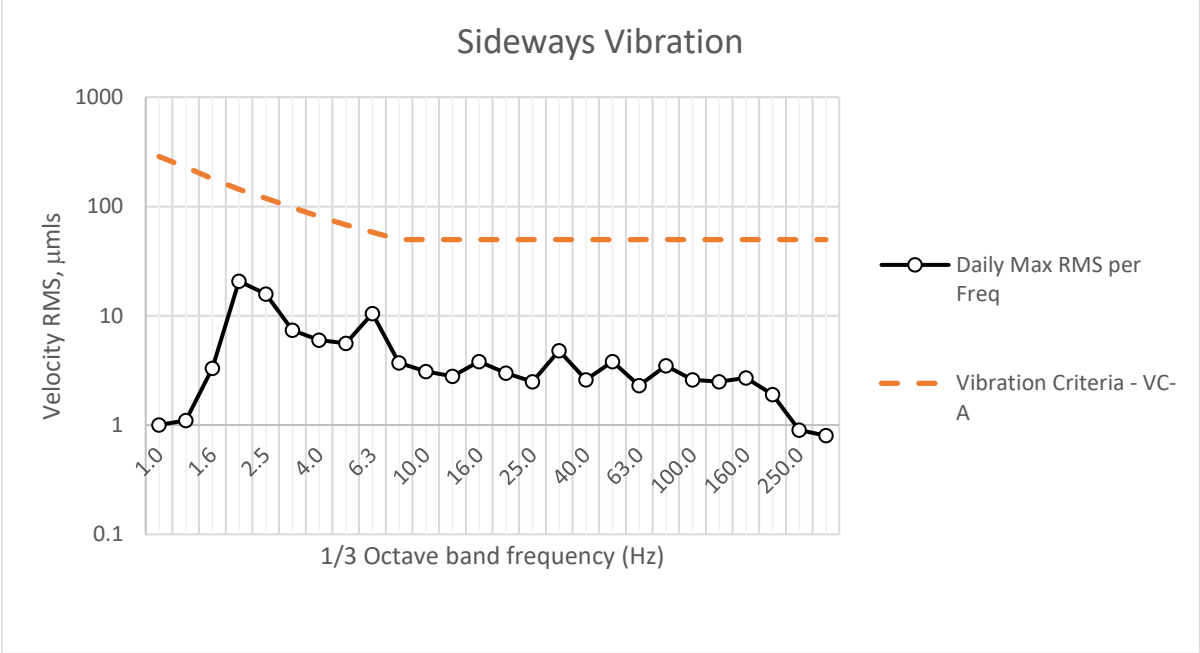
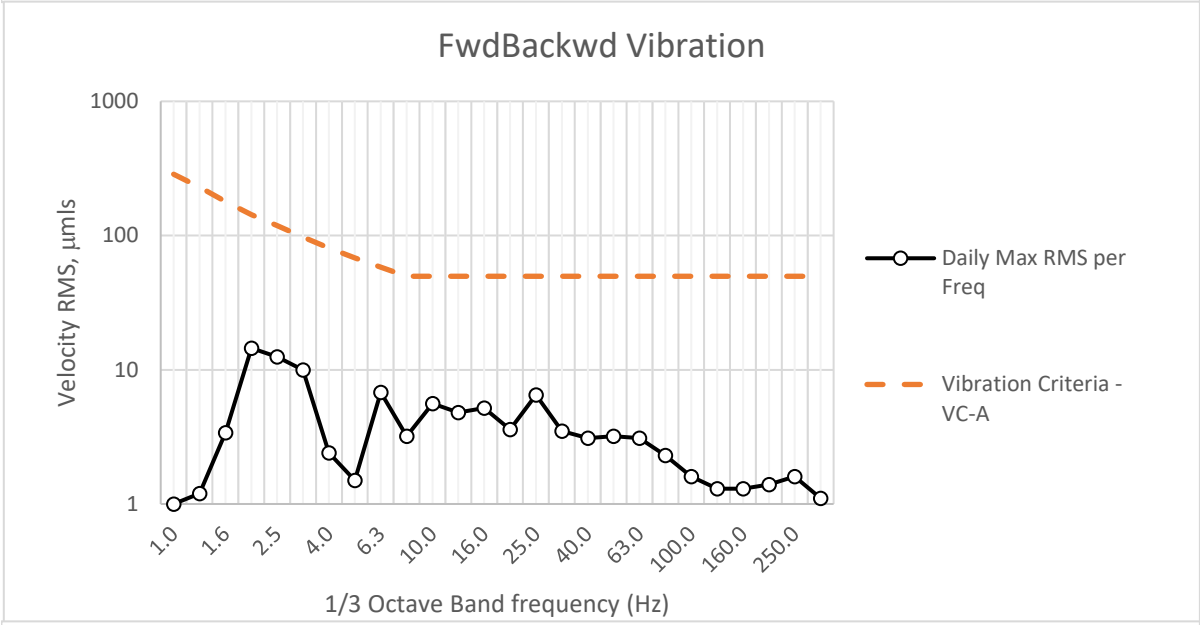
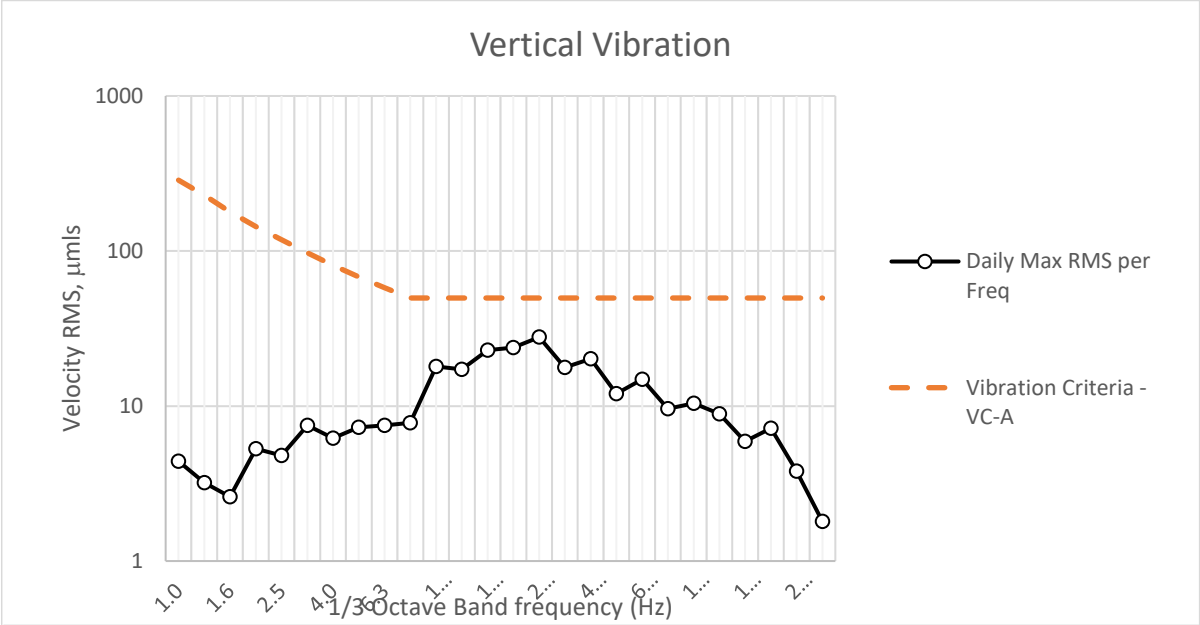


Fwd/Backwards

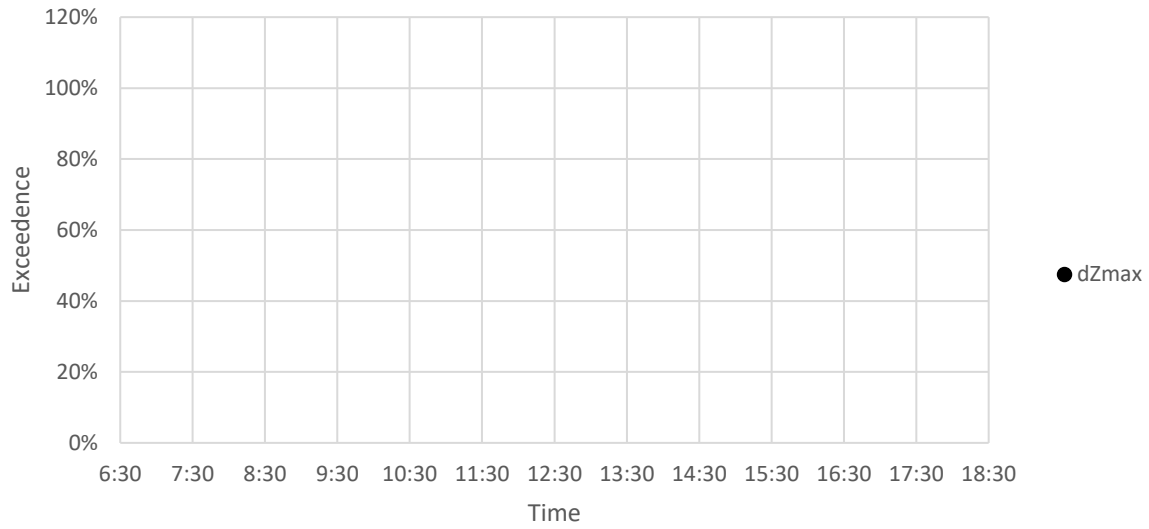


Sideways

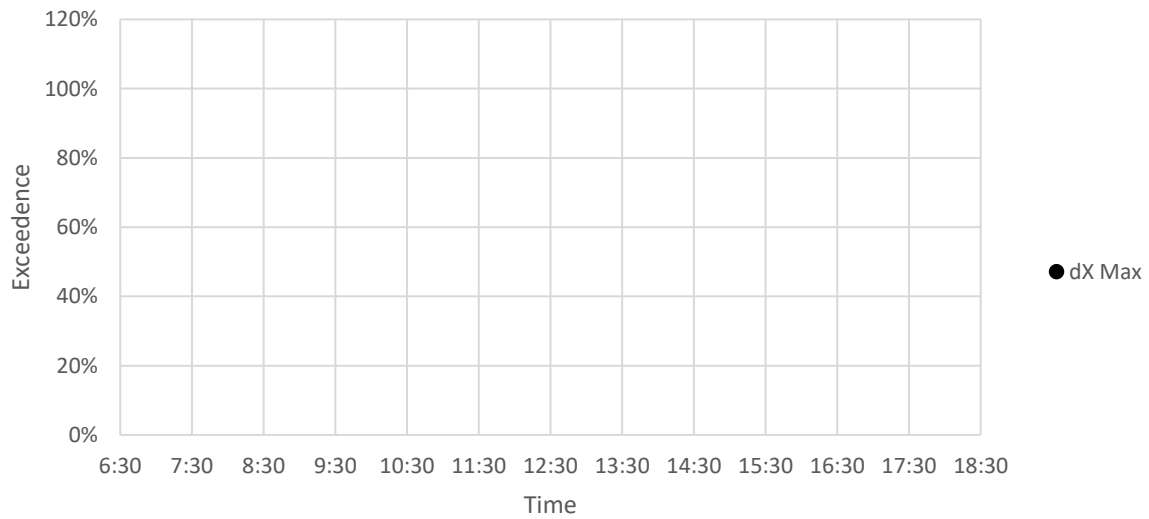




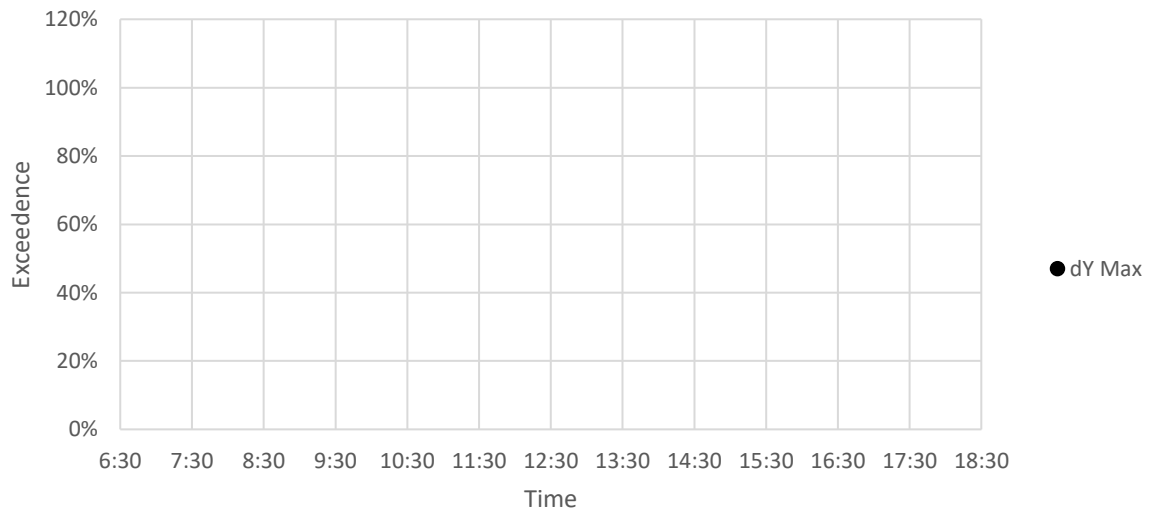
Vertical



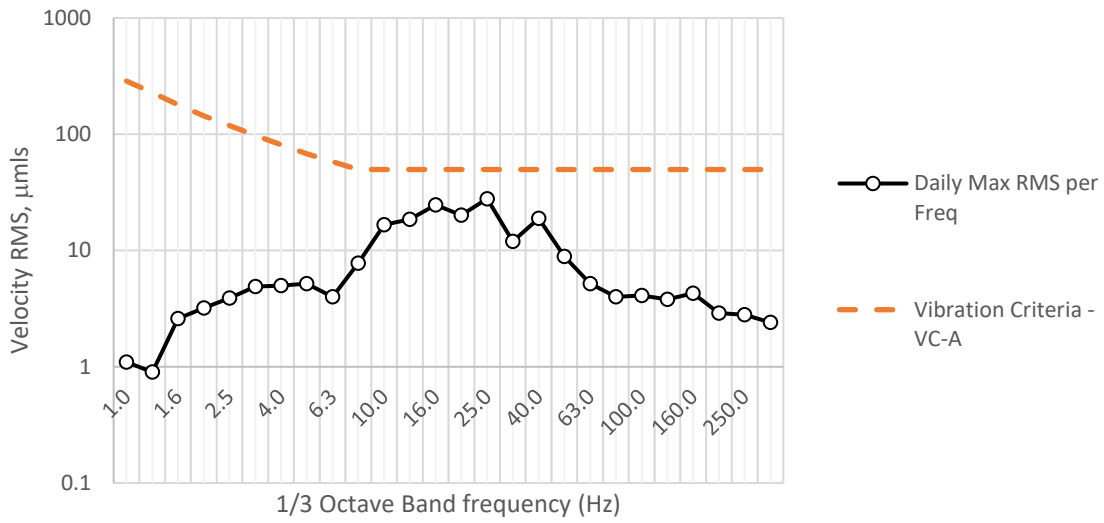
Fwd/Backwards



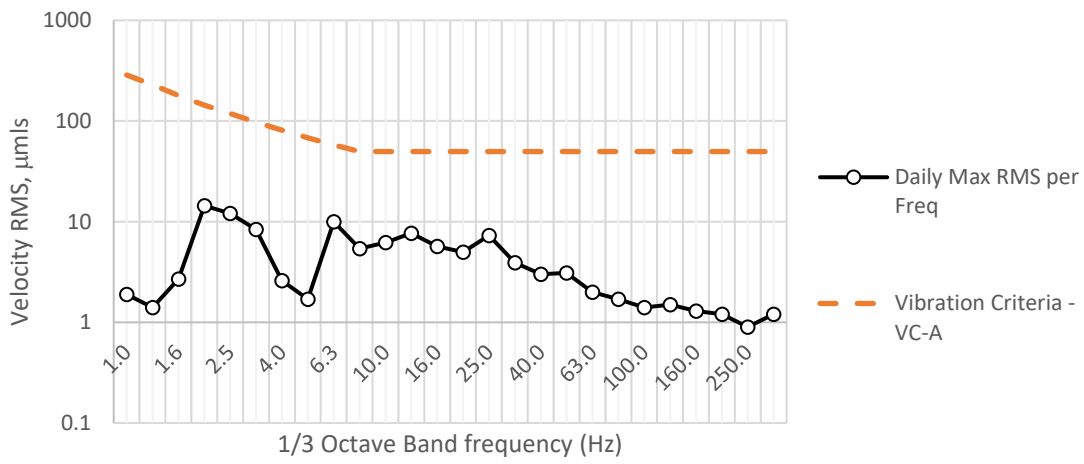
Sideways



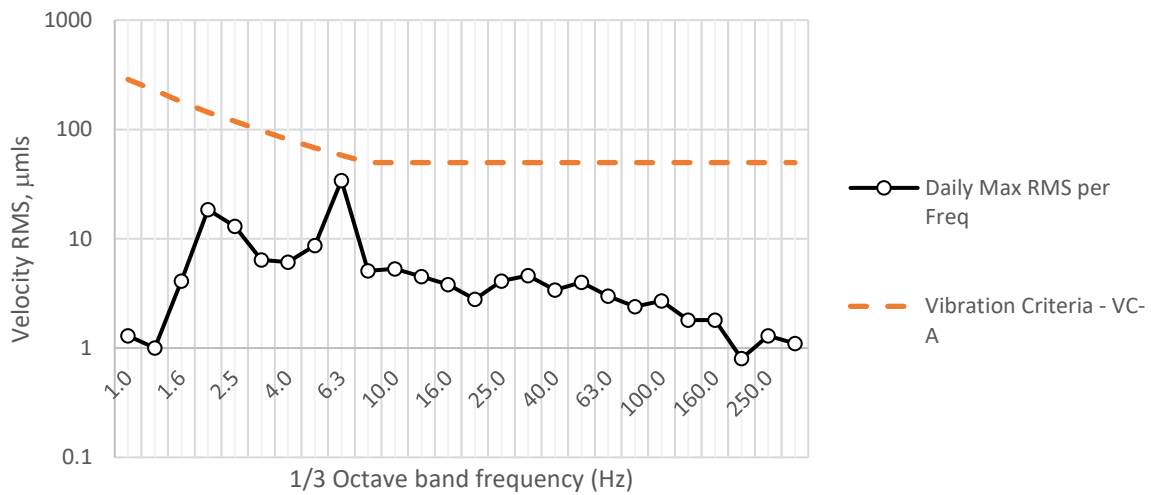
Vertical Vibration



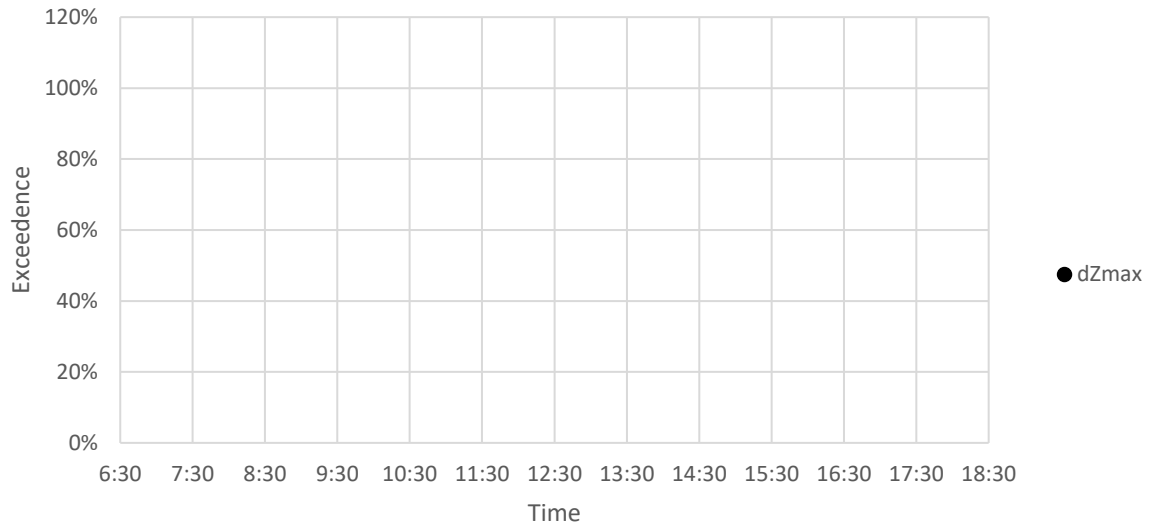
FwdBackwd Vibration



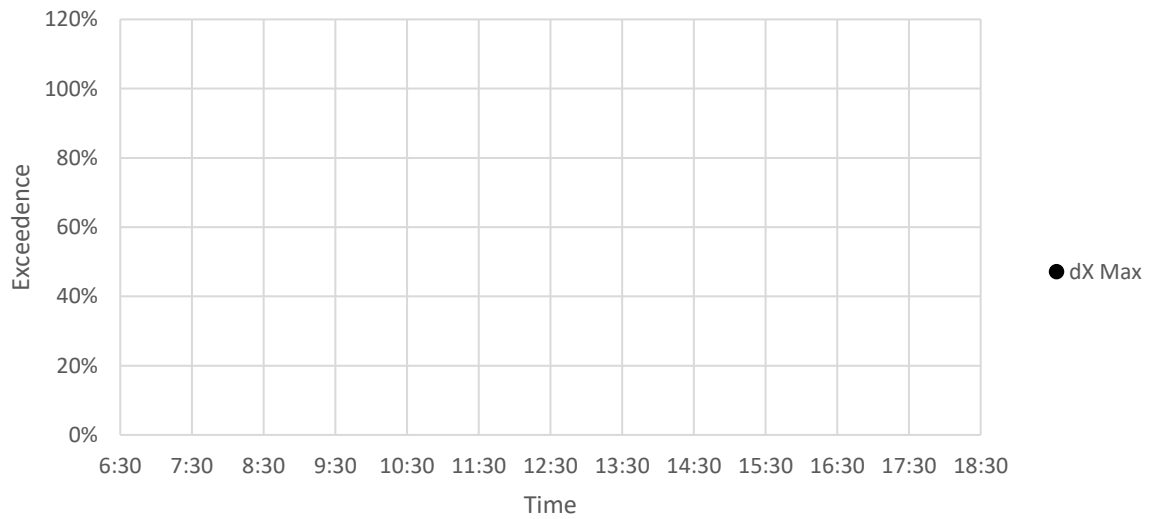
Sideways Vibration



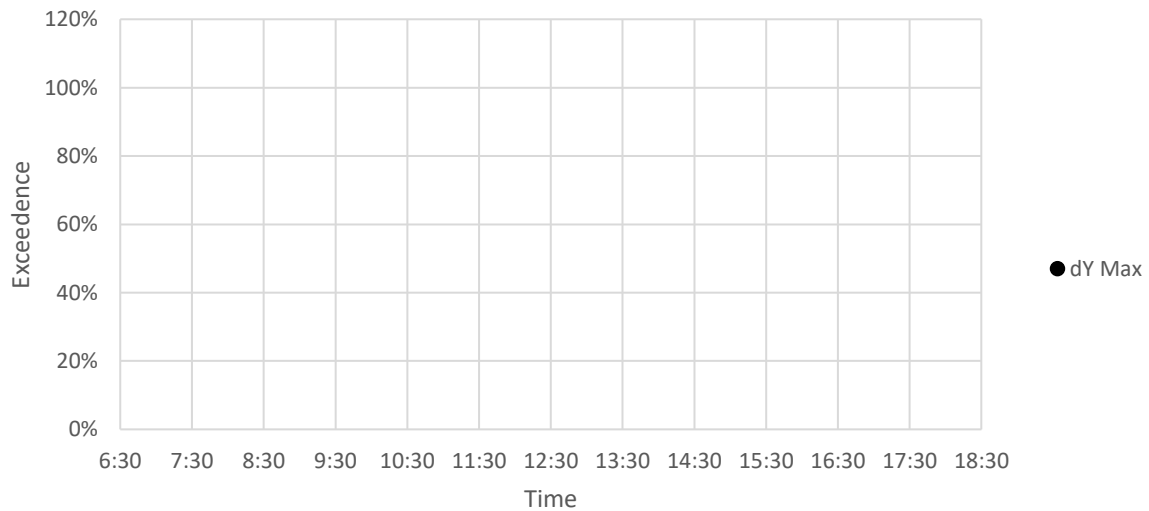
Vertical



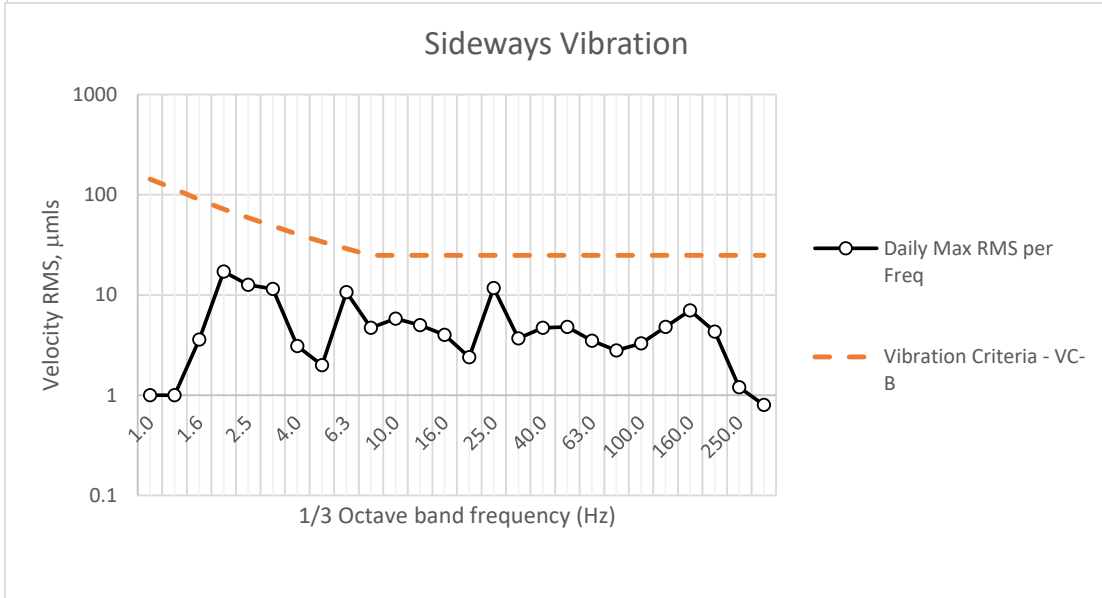
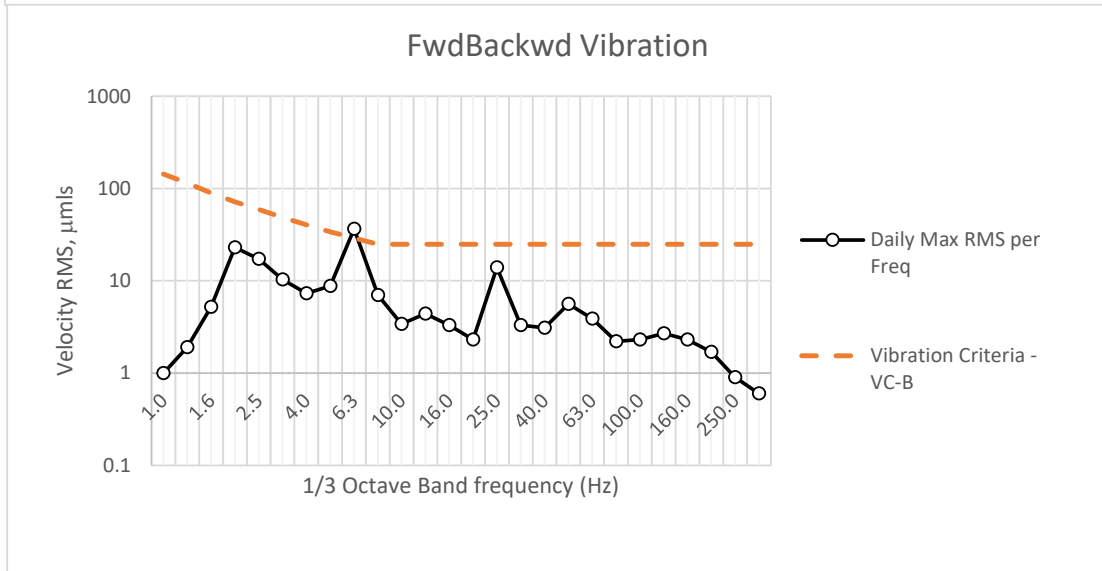
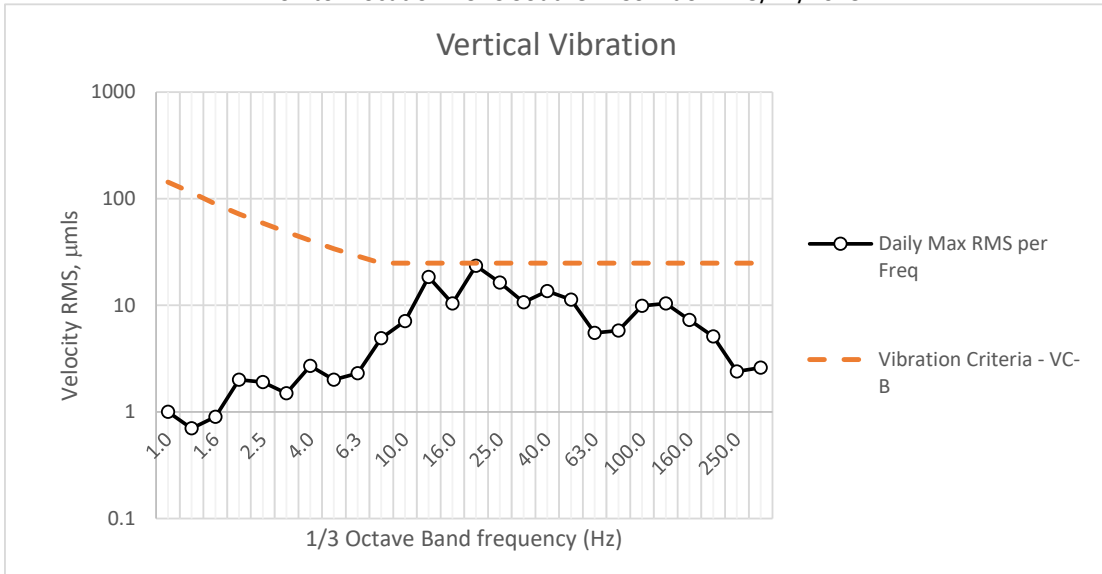
Fwd/Backwards



Sideways

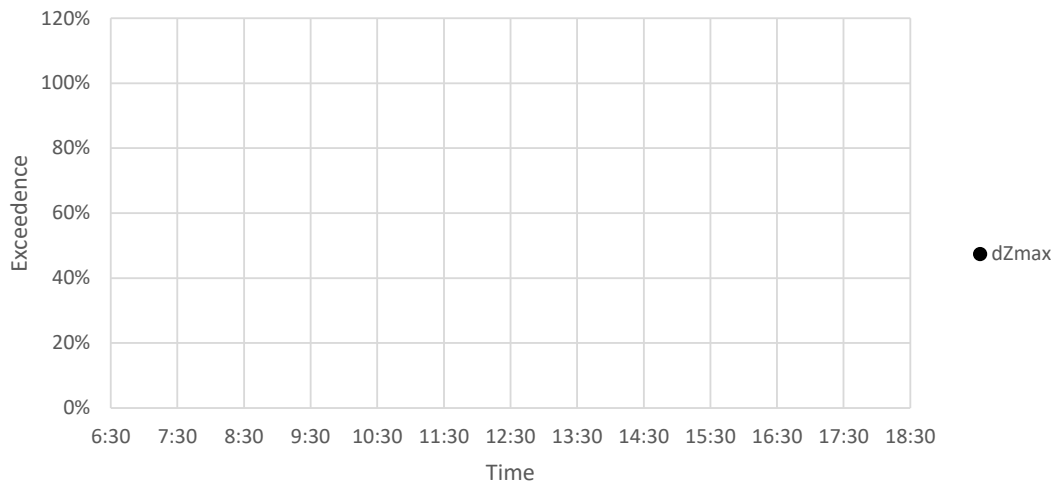


CENTENARY INSTITUTE – LEVEL 4 BATHROOM (NORTHERN FAÇADE)

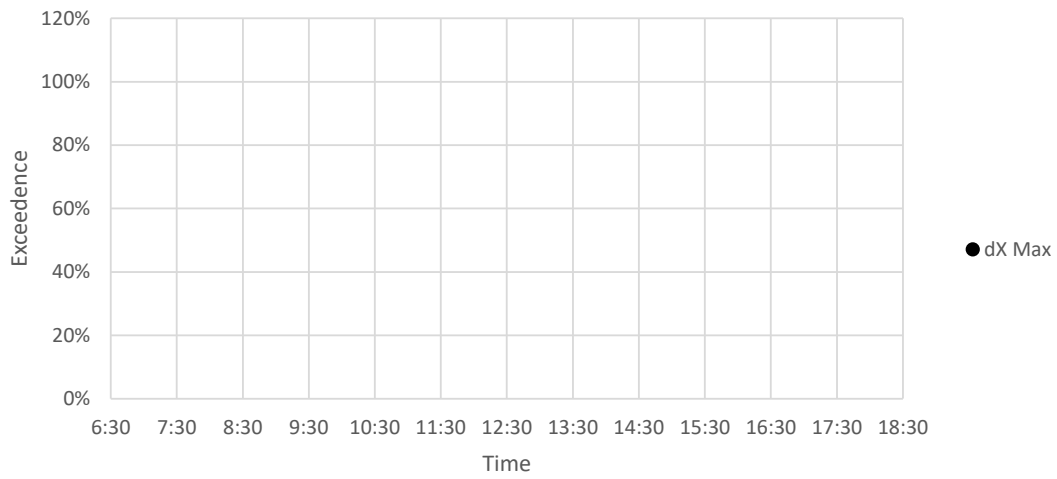


Yes

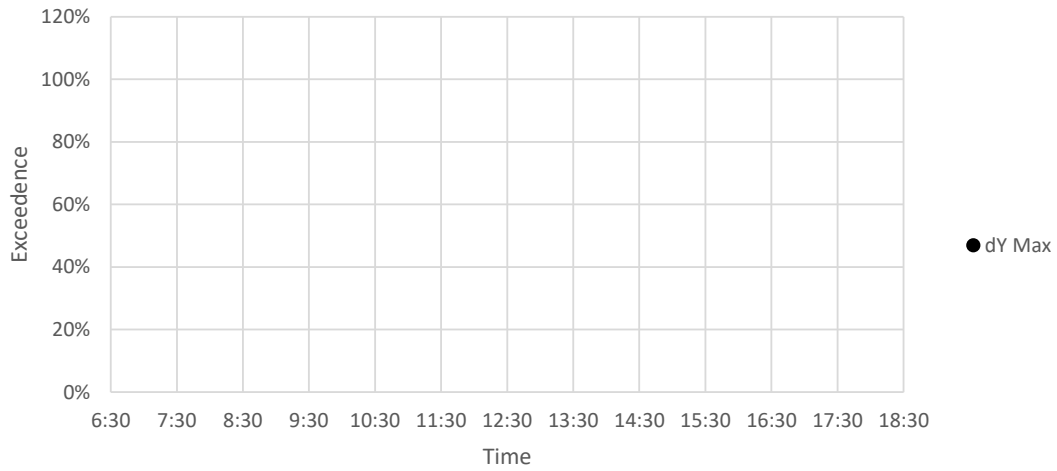
Vertical

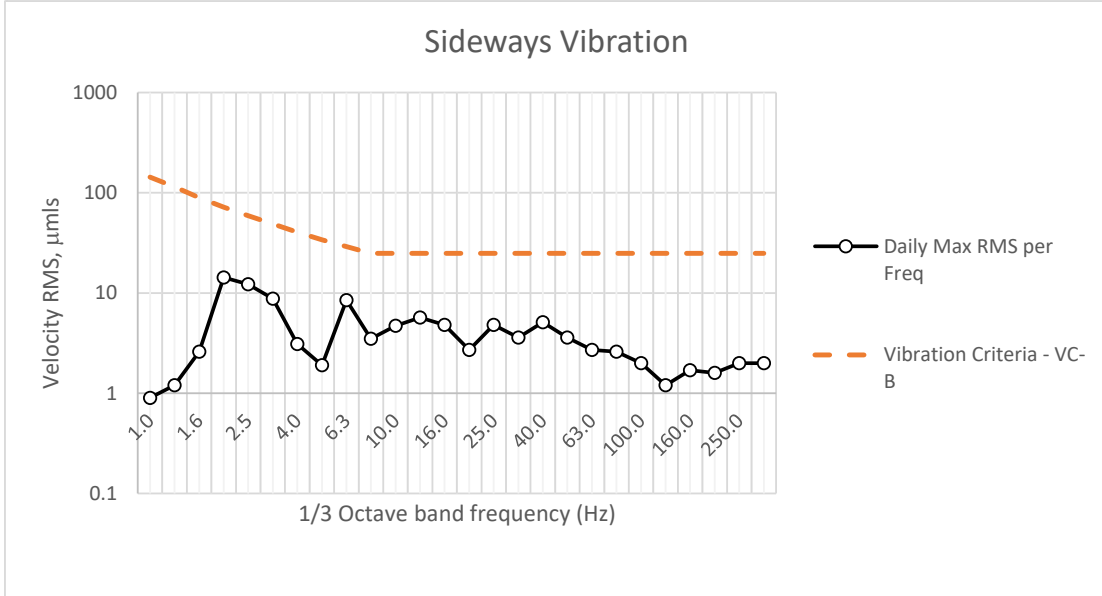
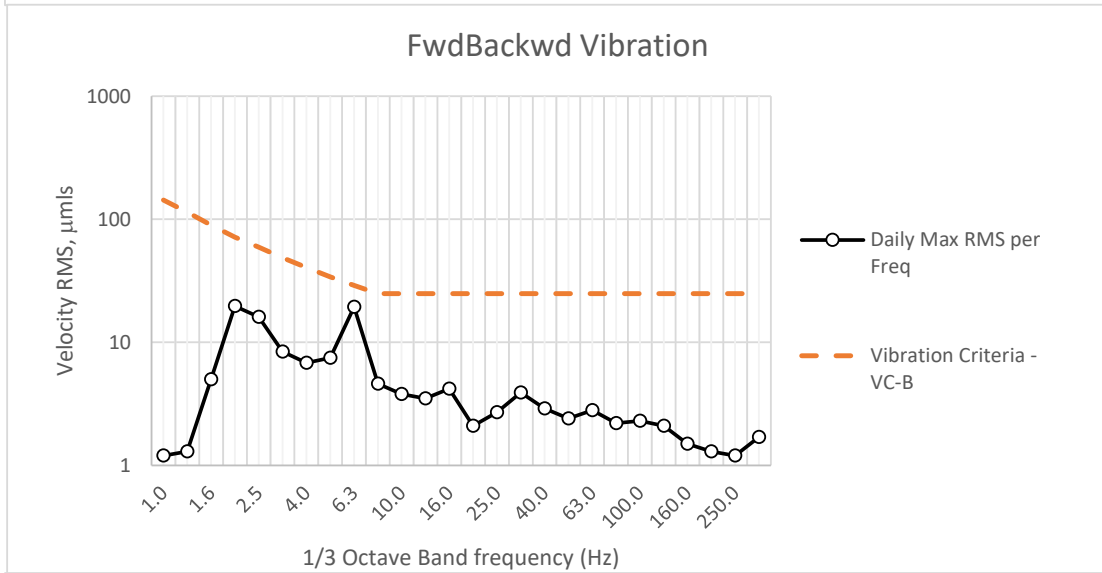
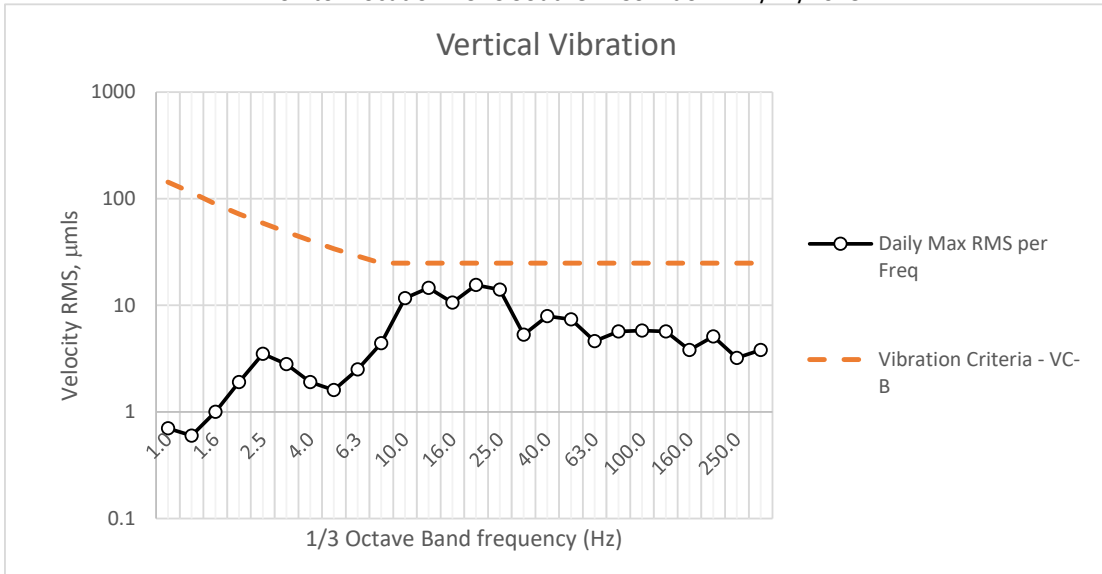


Fwd/Backwards



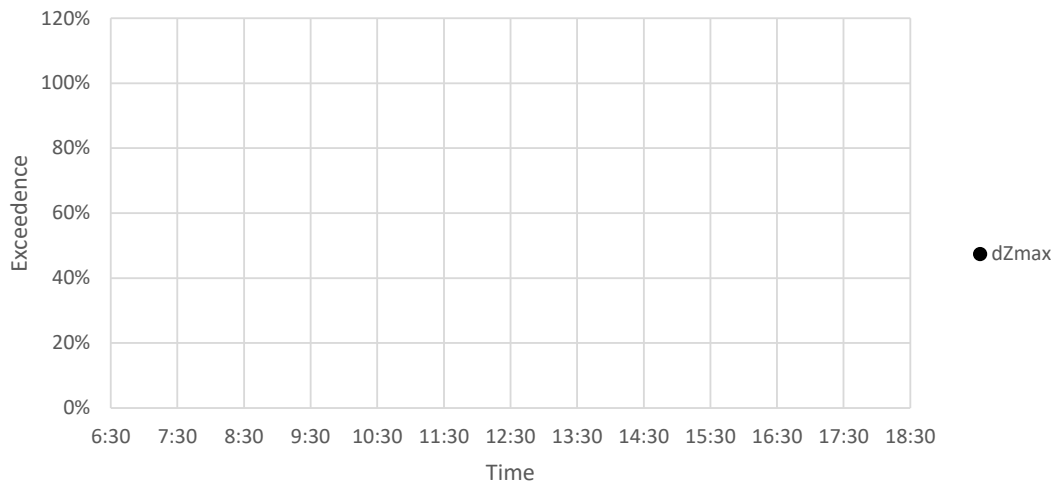
Sideways



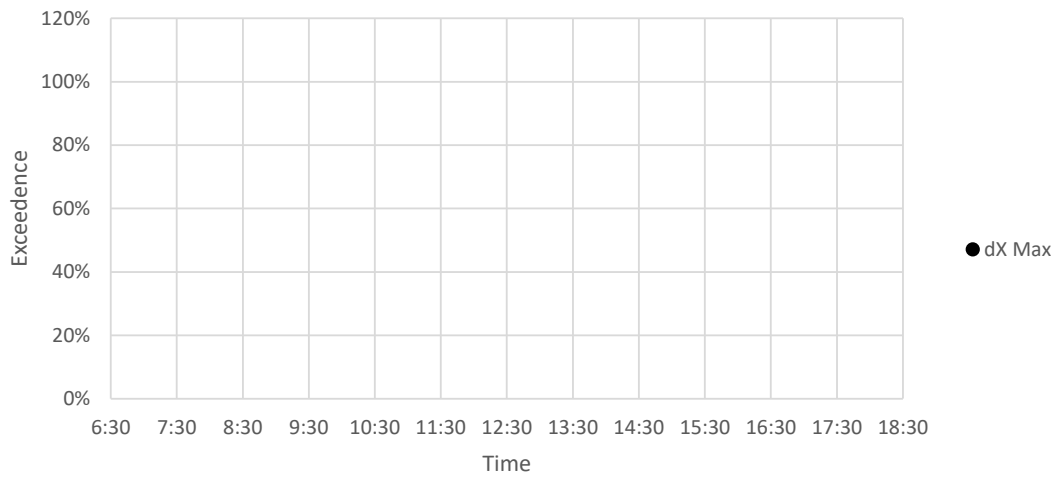


Yes

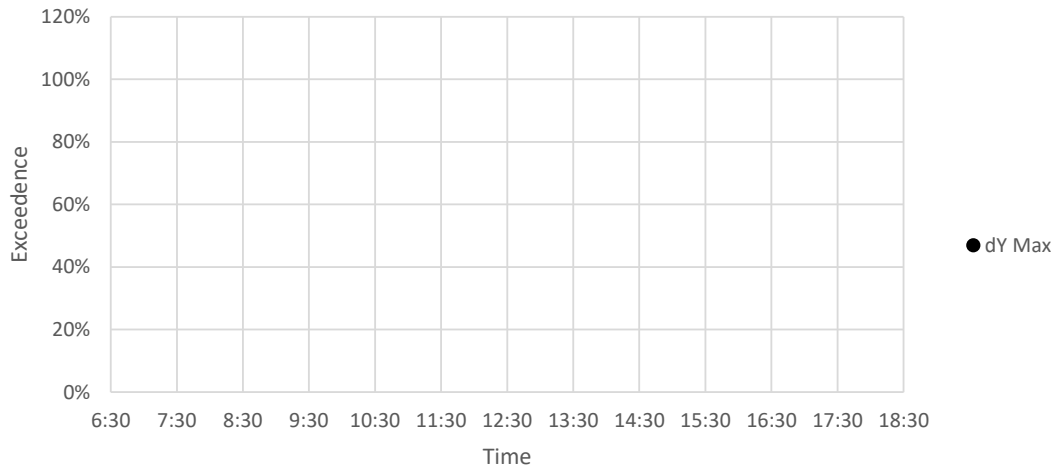
Vertical

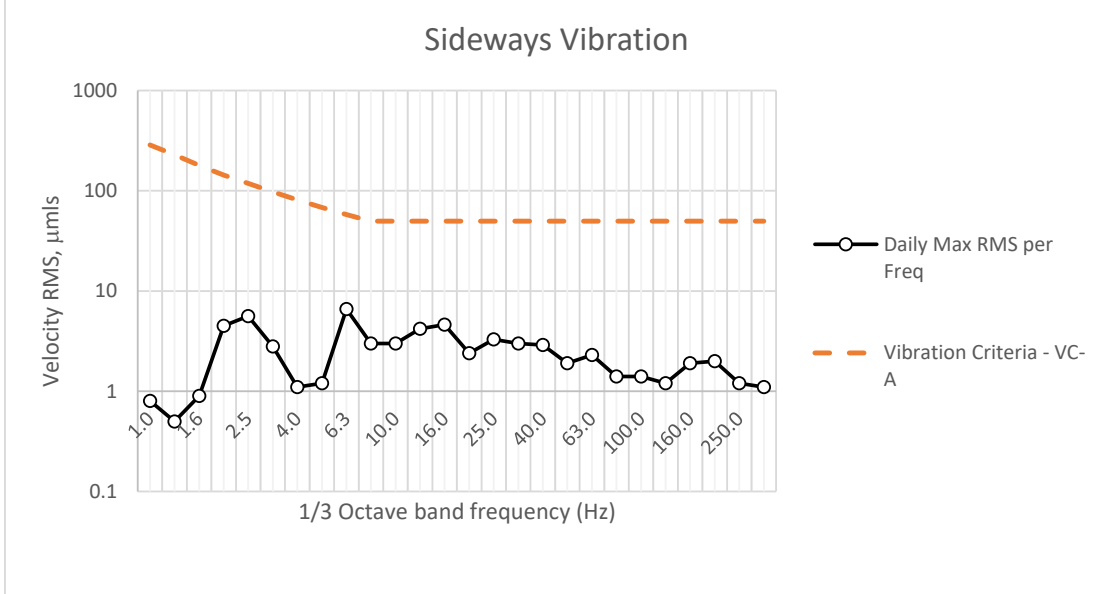
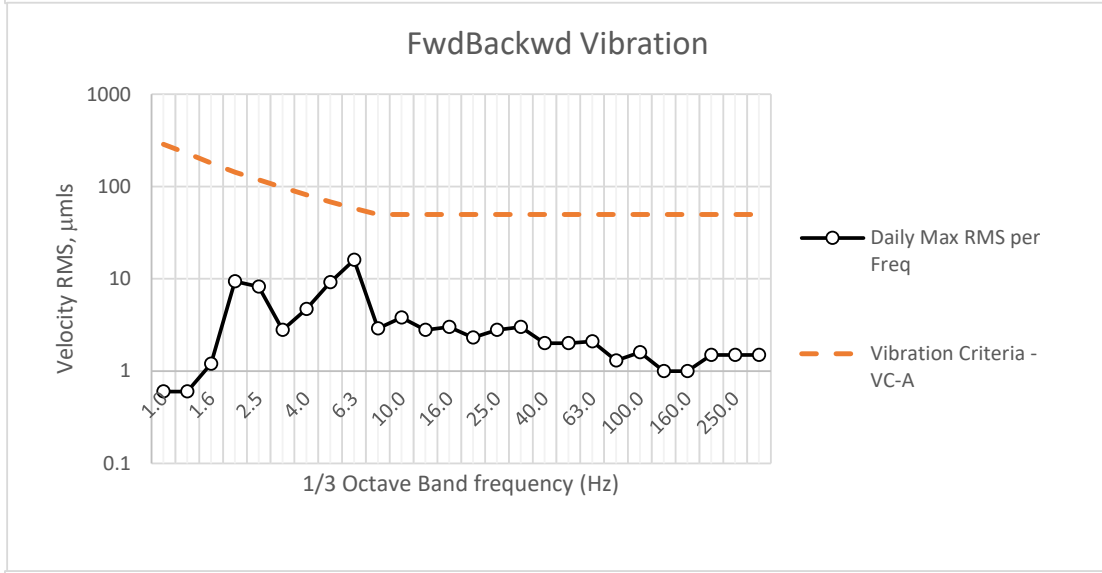
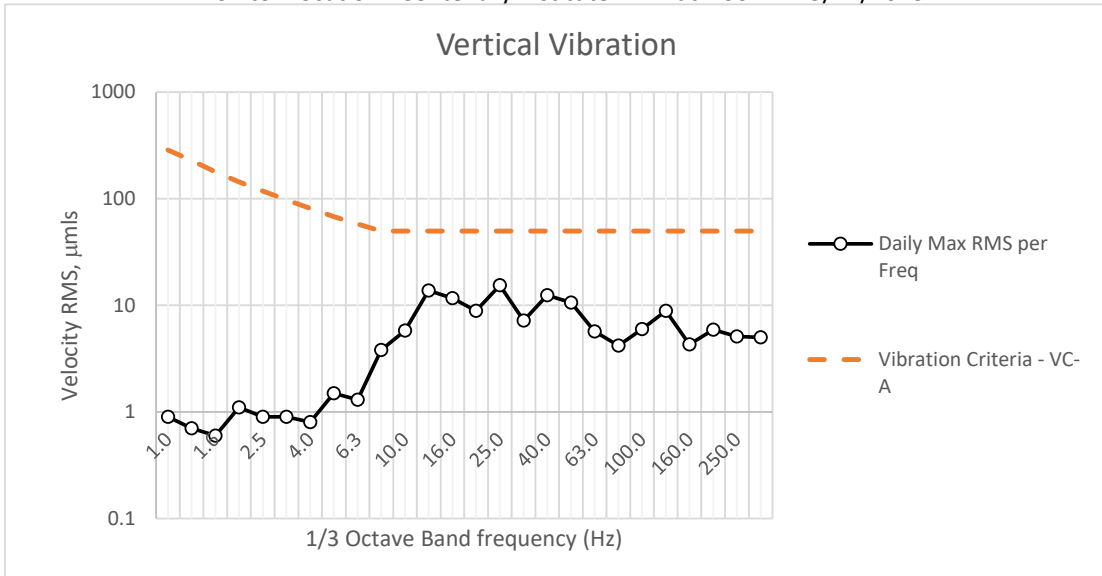


Fwd/Backwards

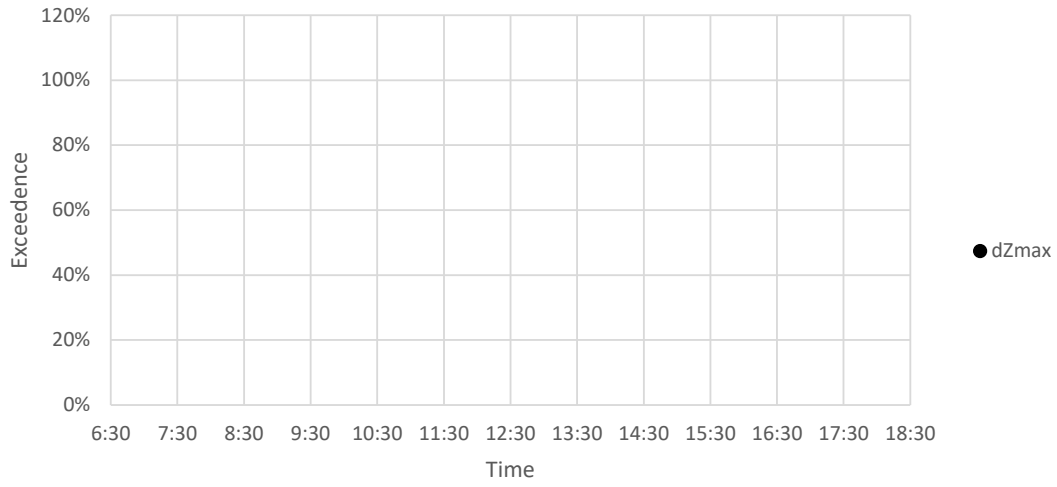


Sideways

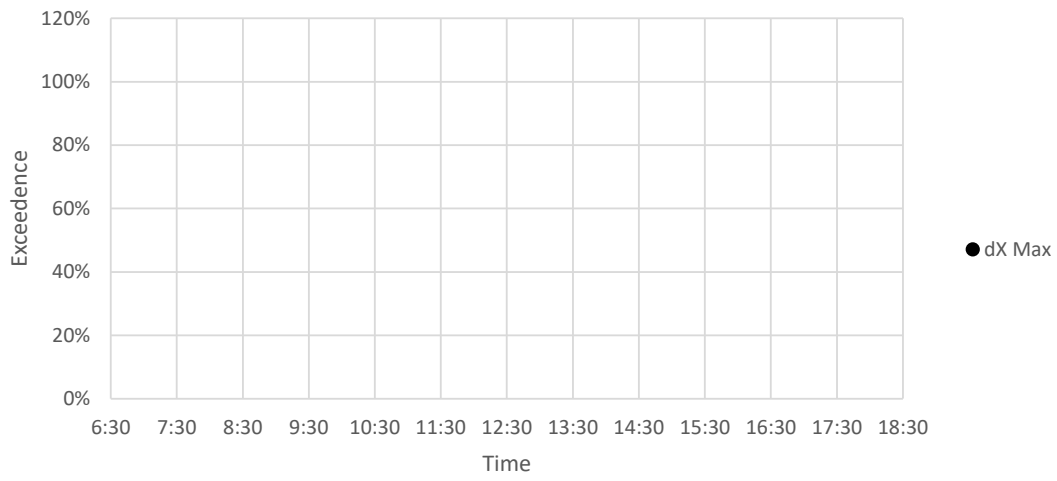




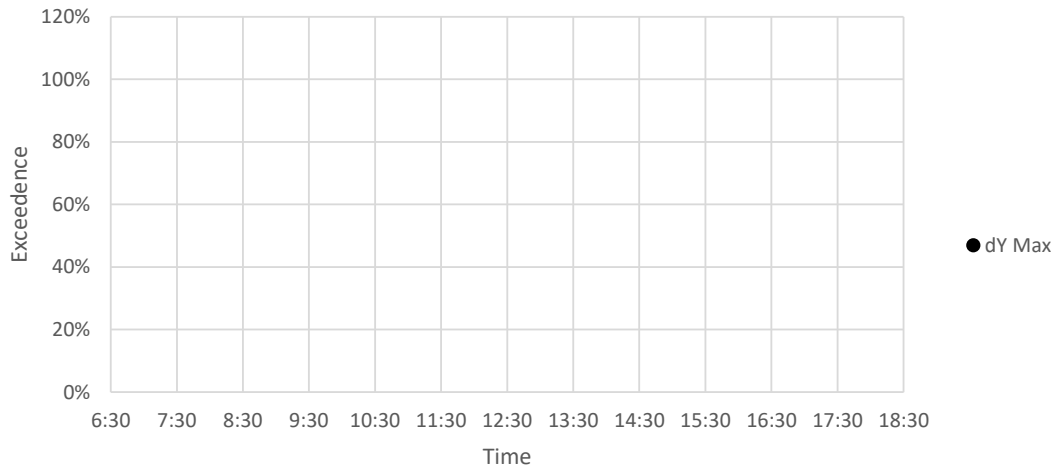
Vertical

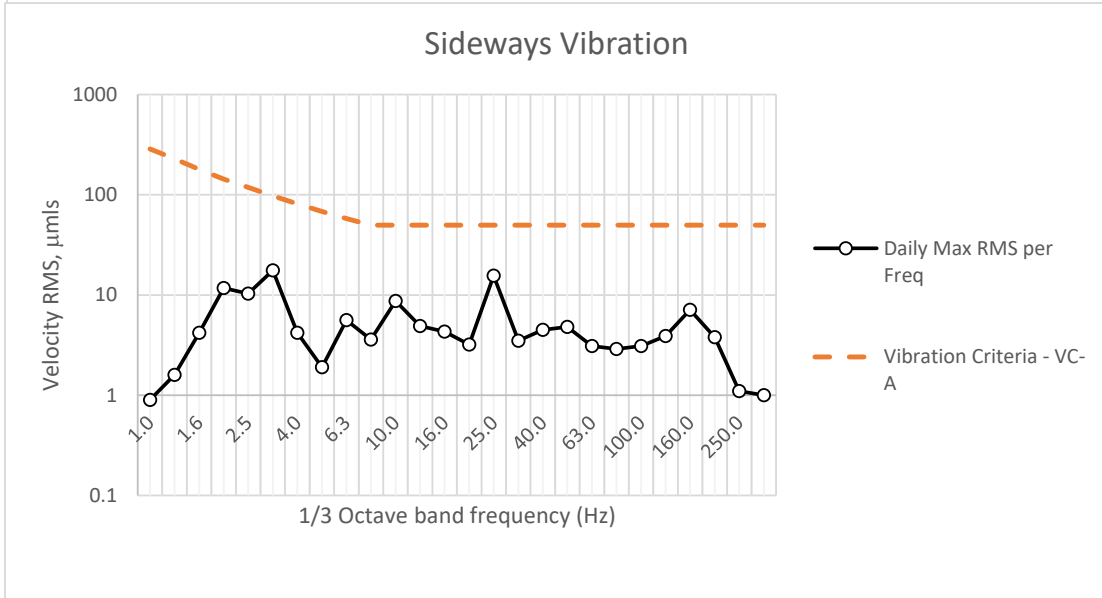
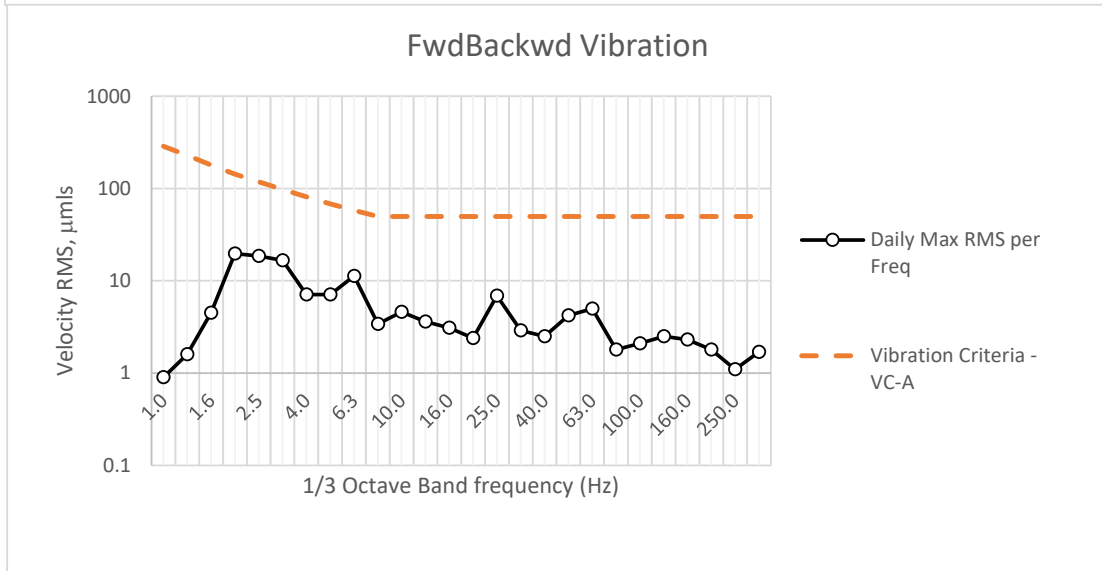
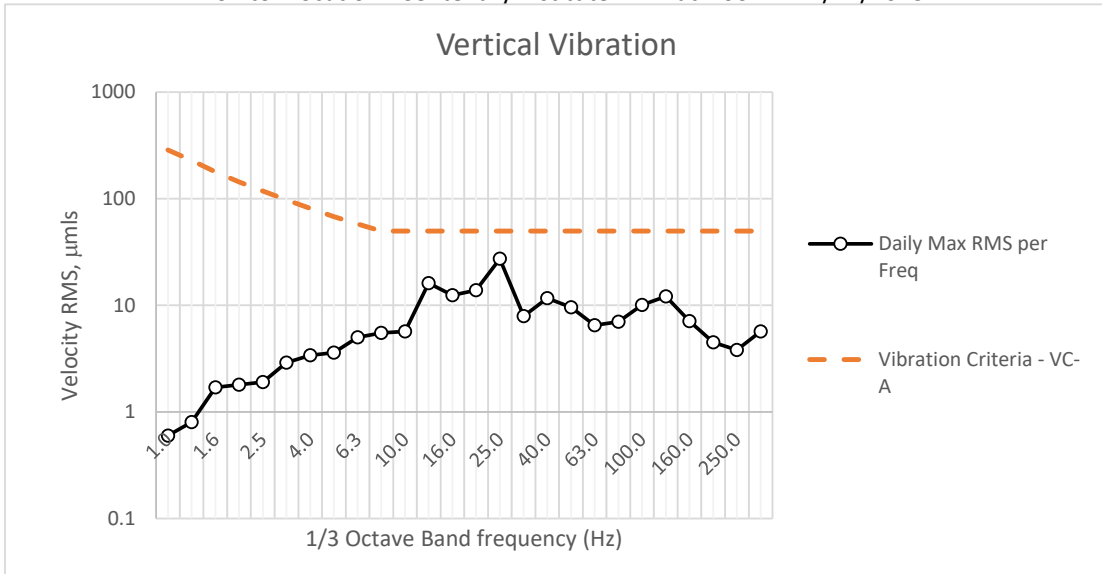


Fwd/Backwards

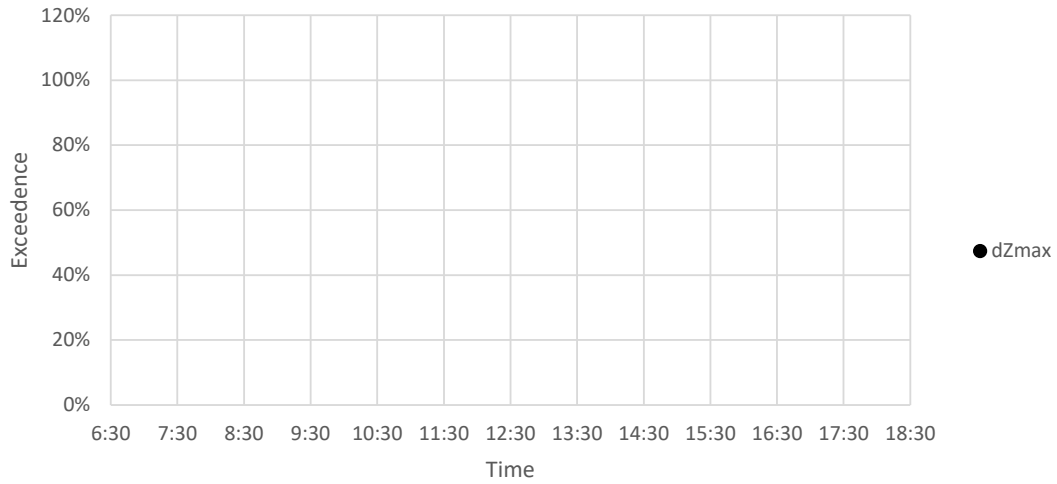


Sideways

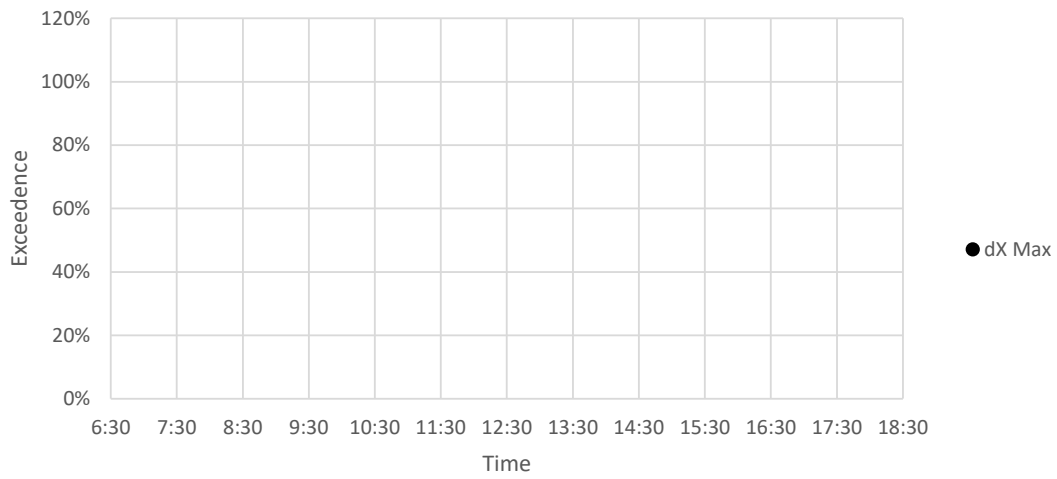




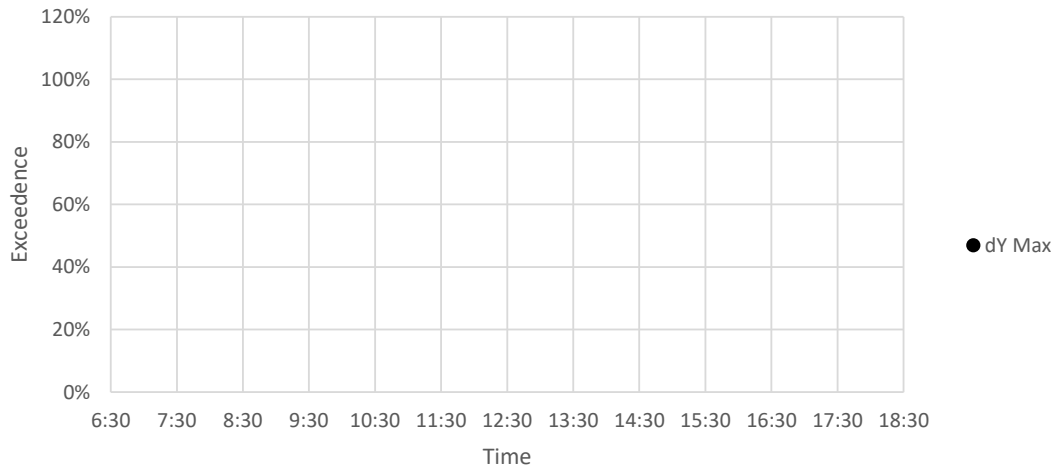
Vertical

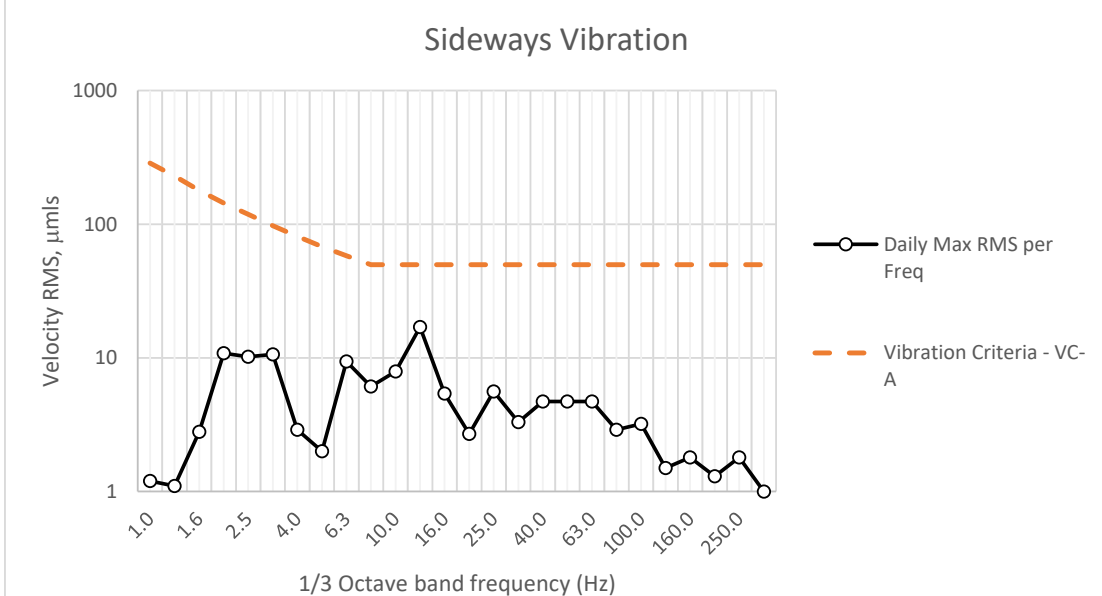
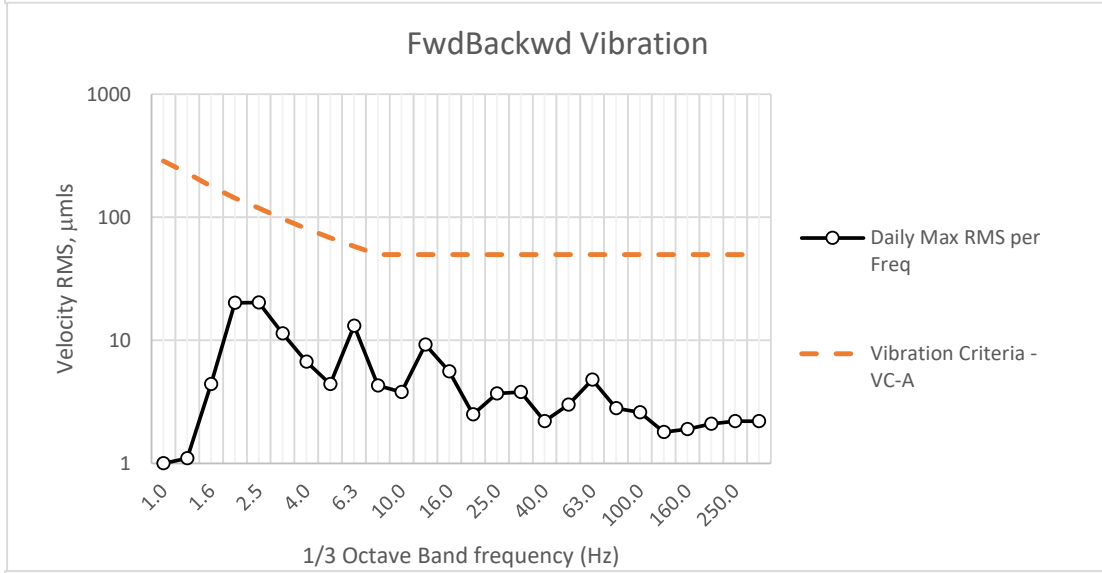
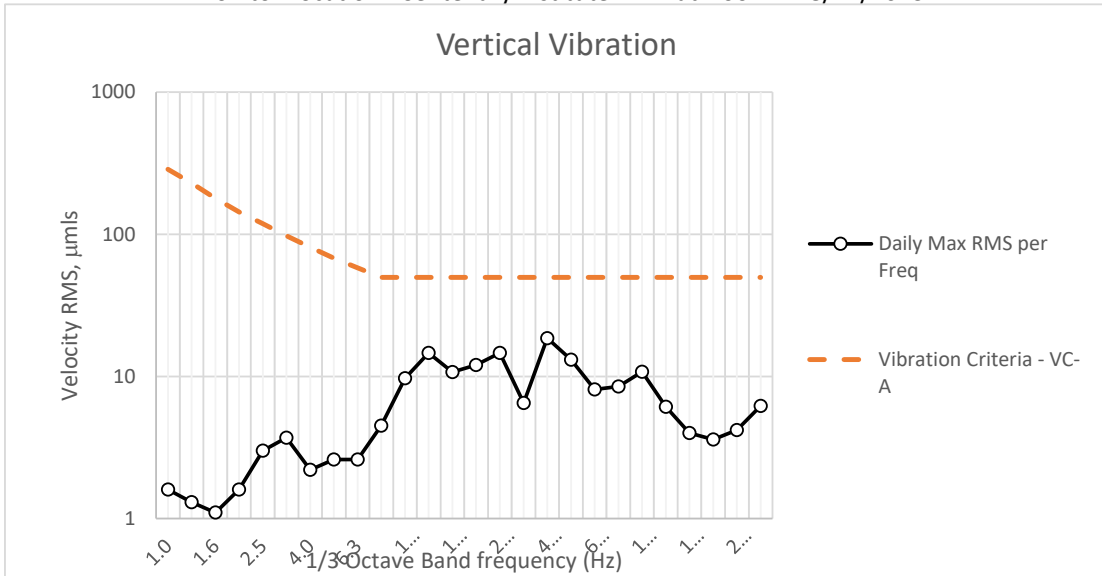


Fwd/Backwards

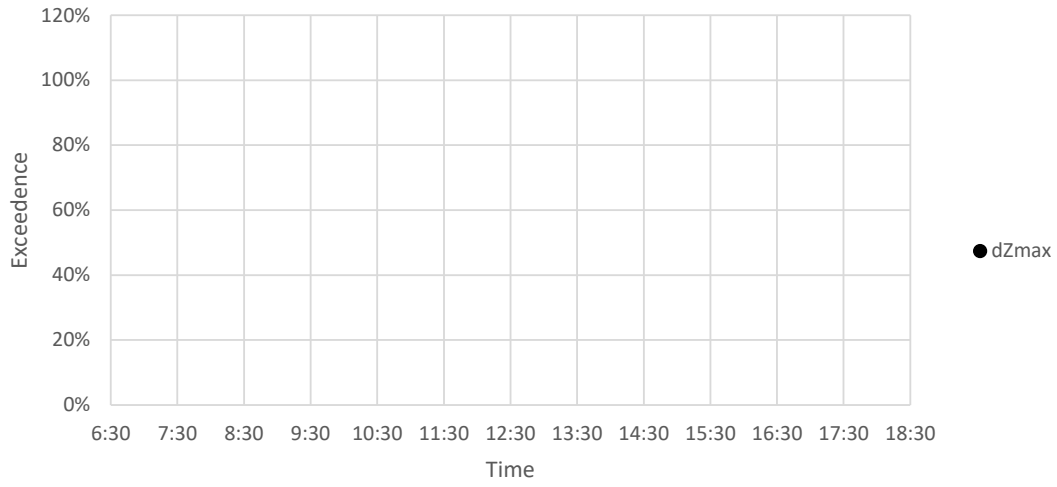


Sideways

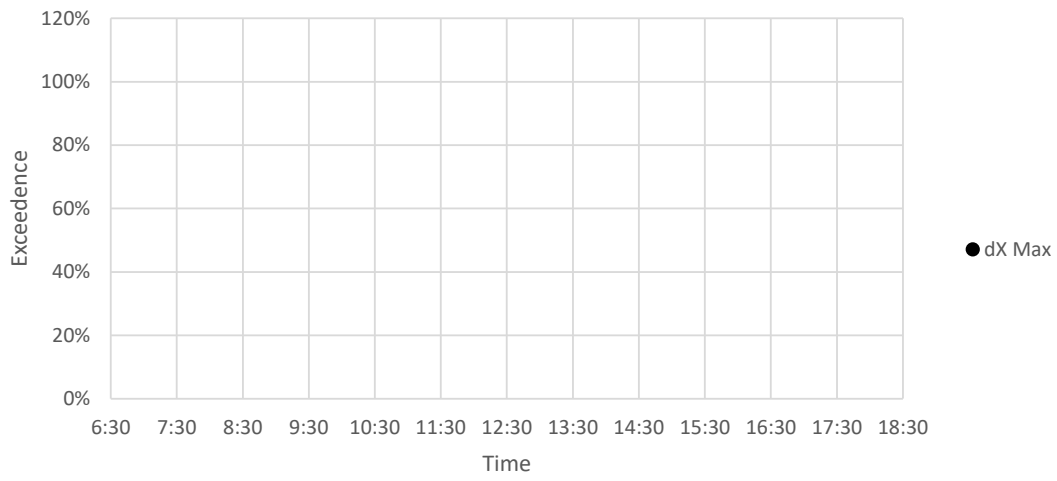




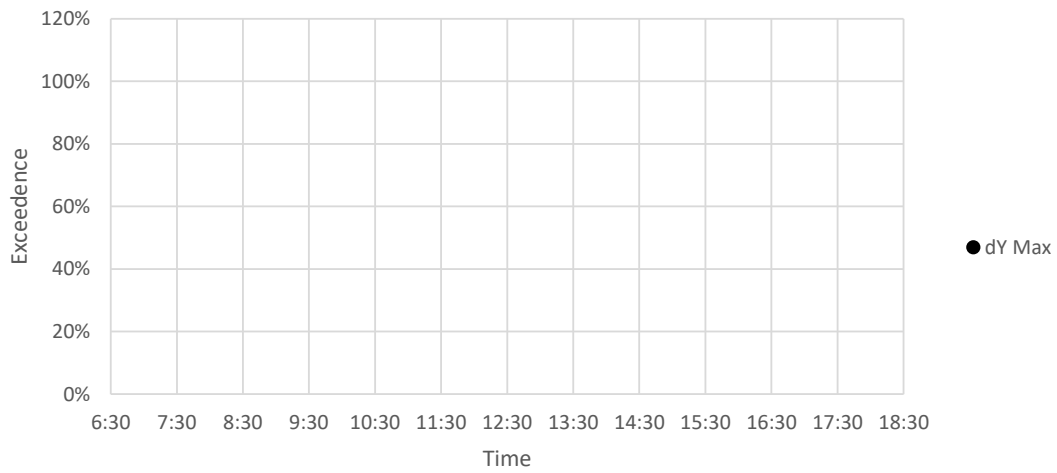
Vertical



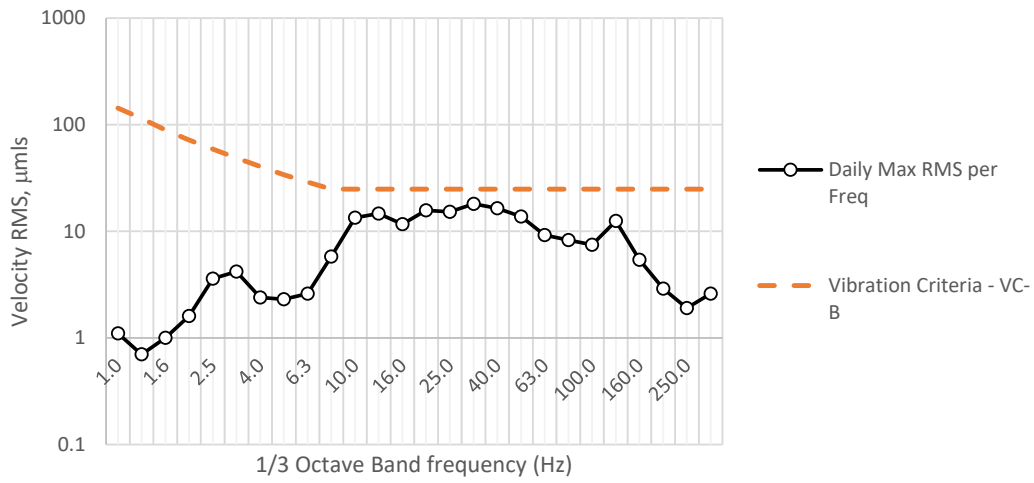
Fwd/Backwards



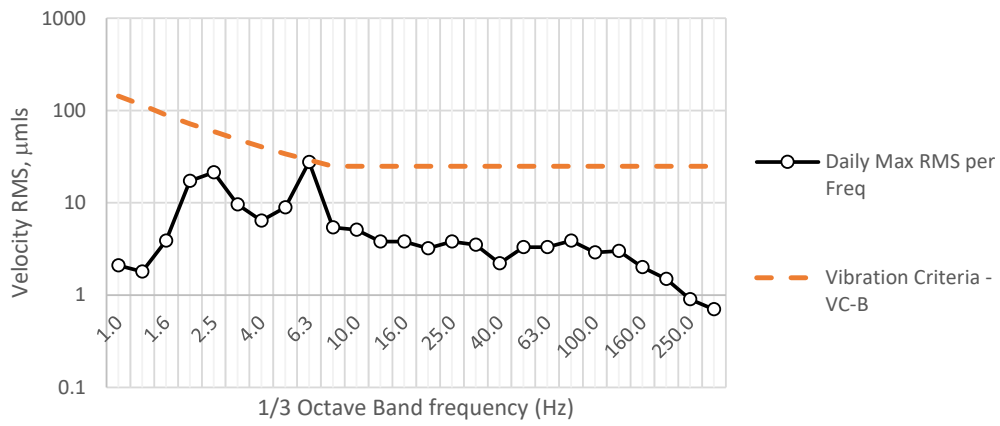
Sideways



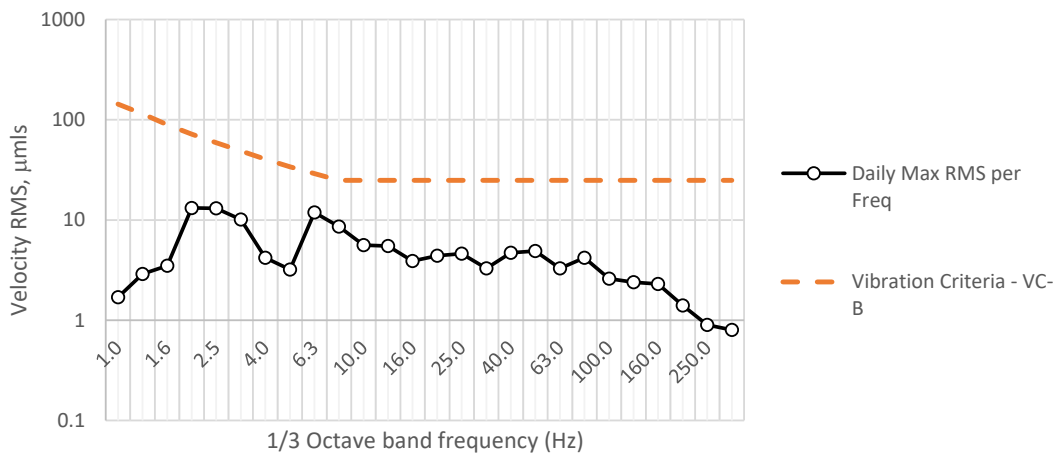
Vertical Vibration



FwdBackwd Vibration

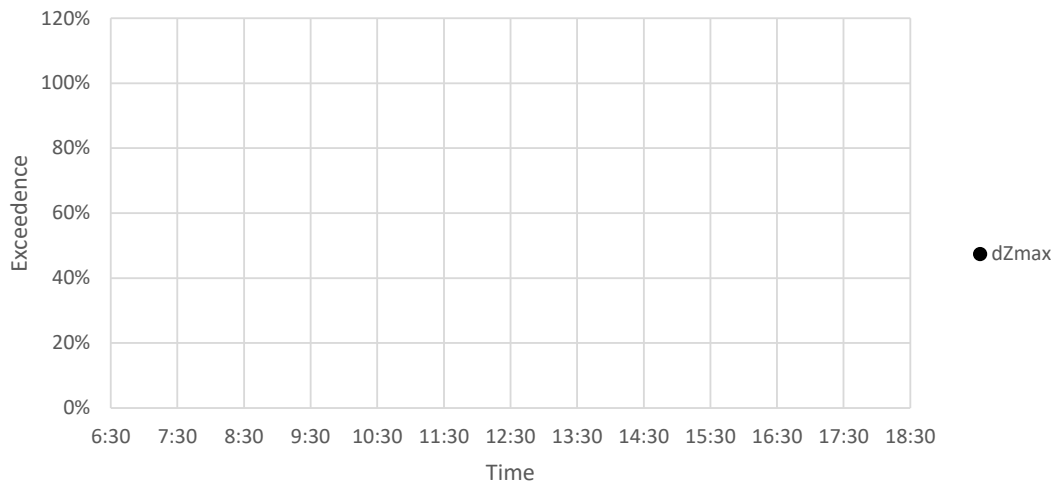


Sideways Vibration

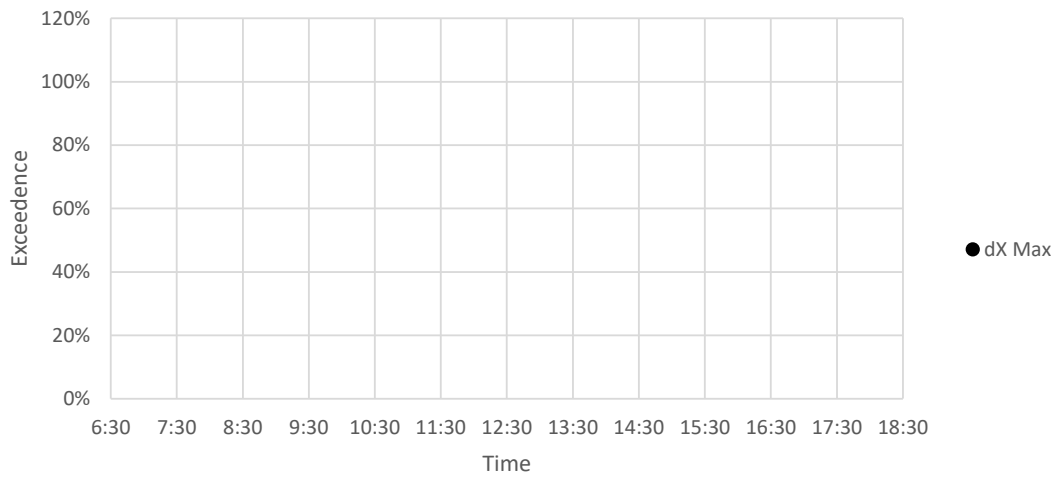


Yes

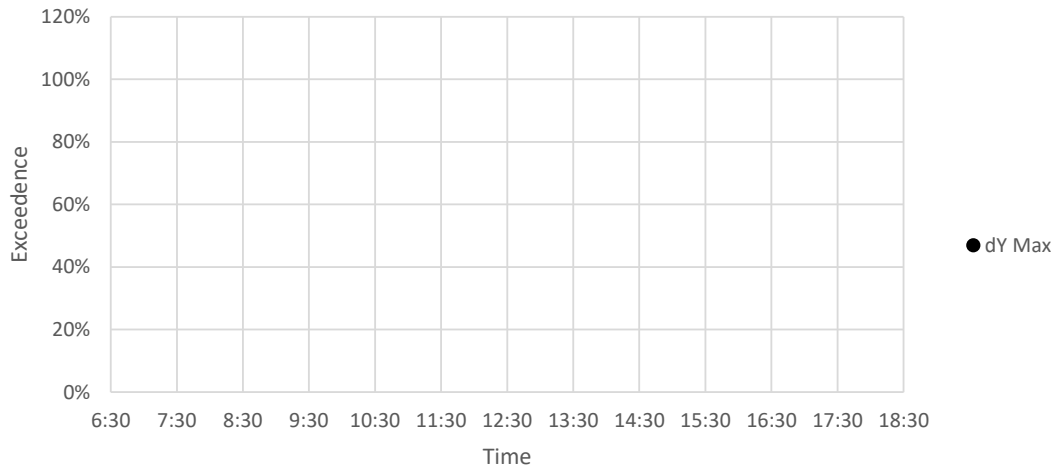
Vertical

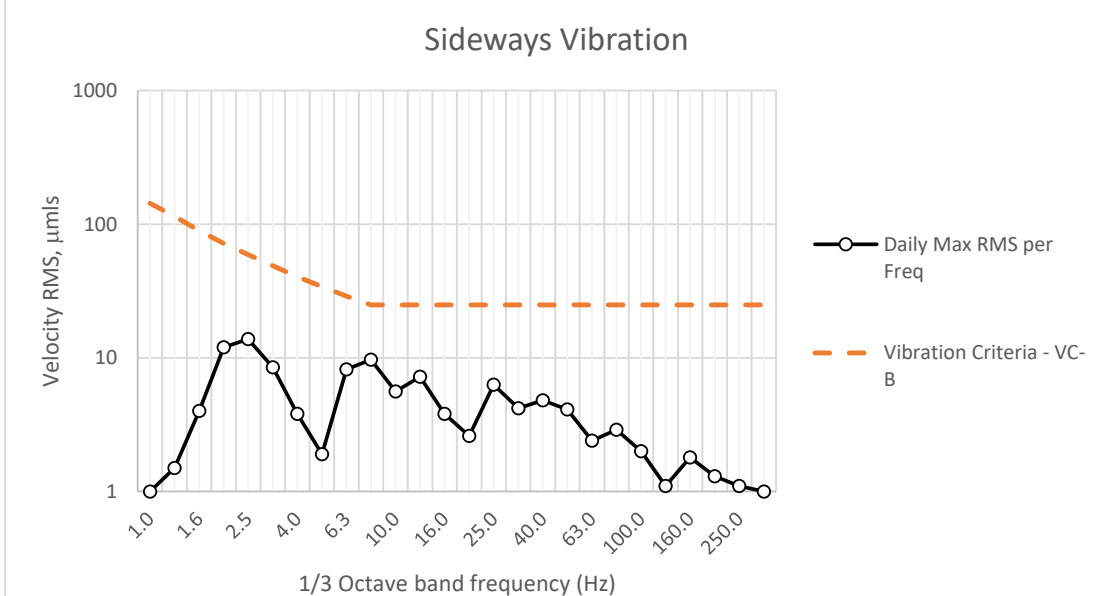
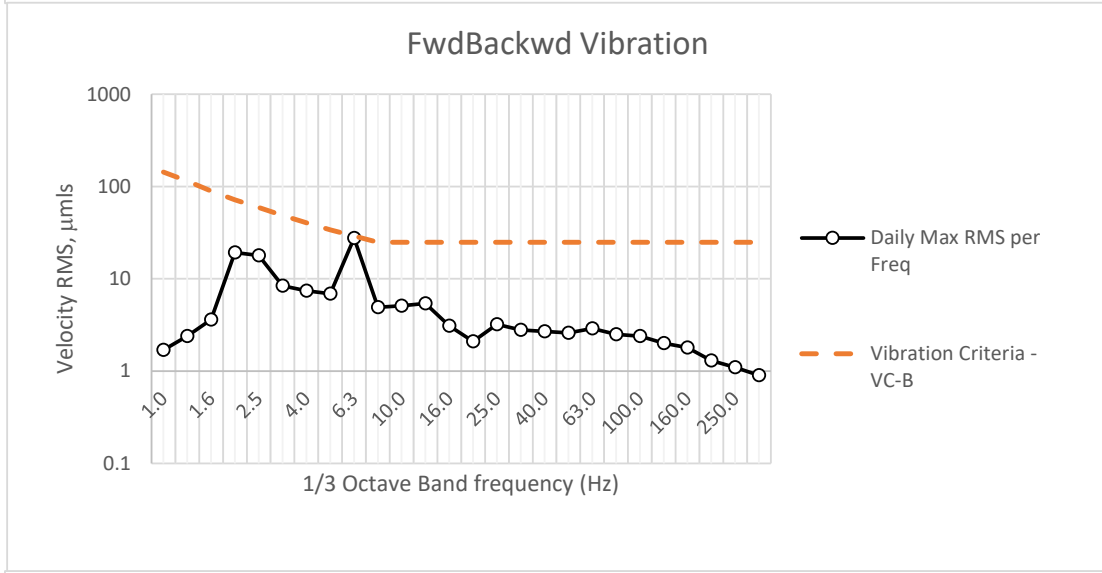
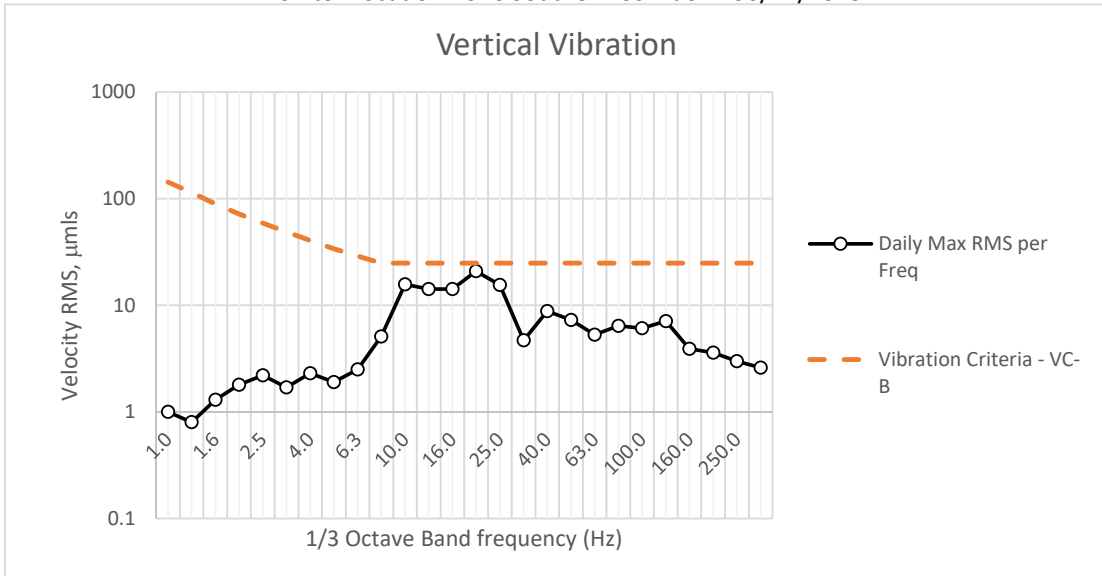


Fwd/Backwards



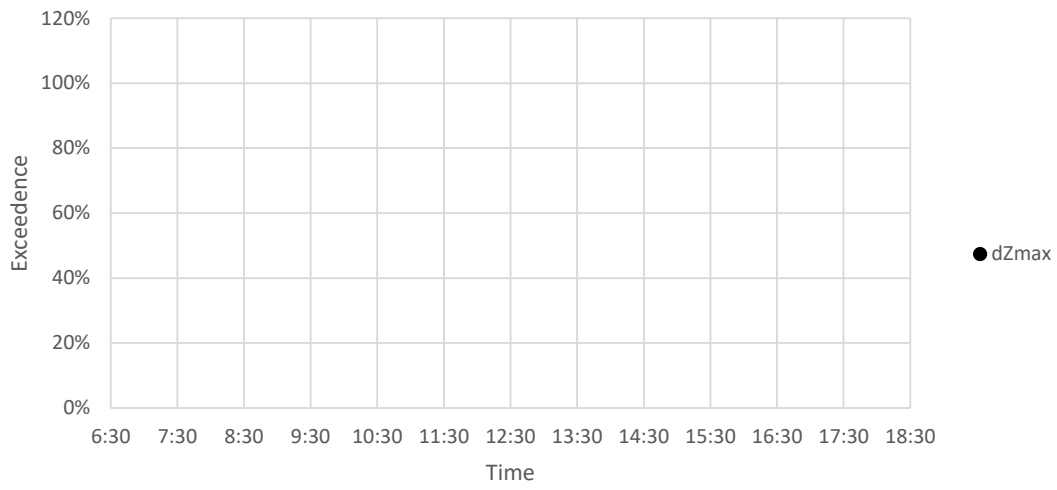
Sideways



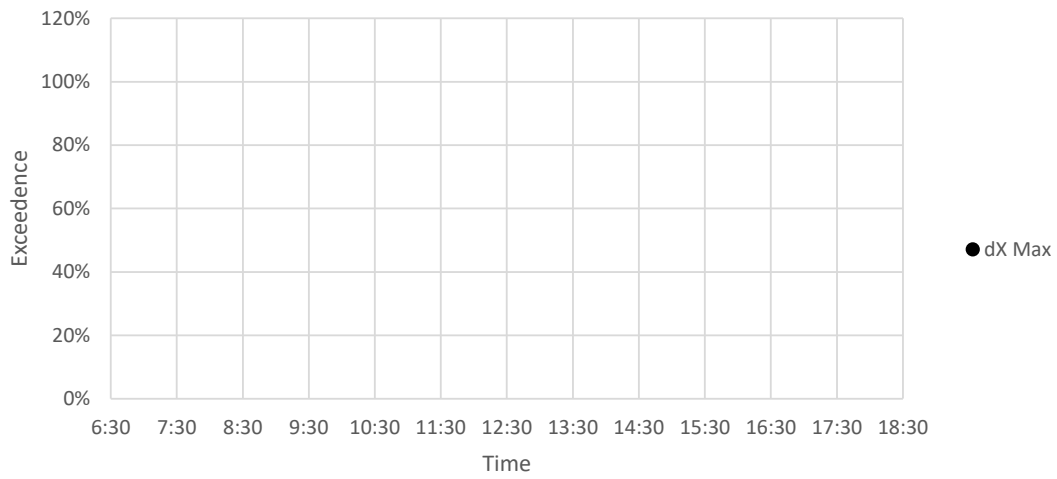


Yes

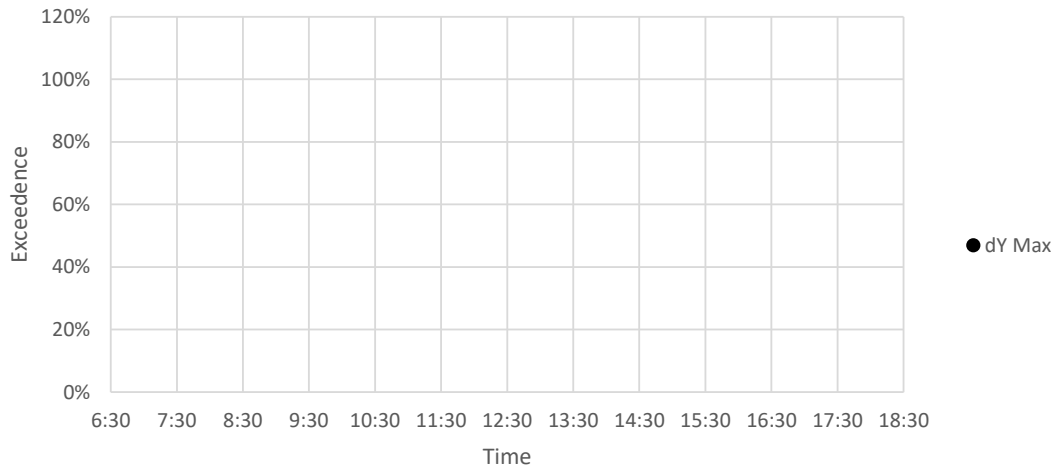
Vertical

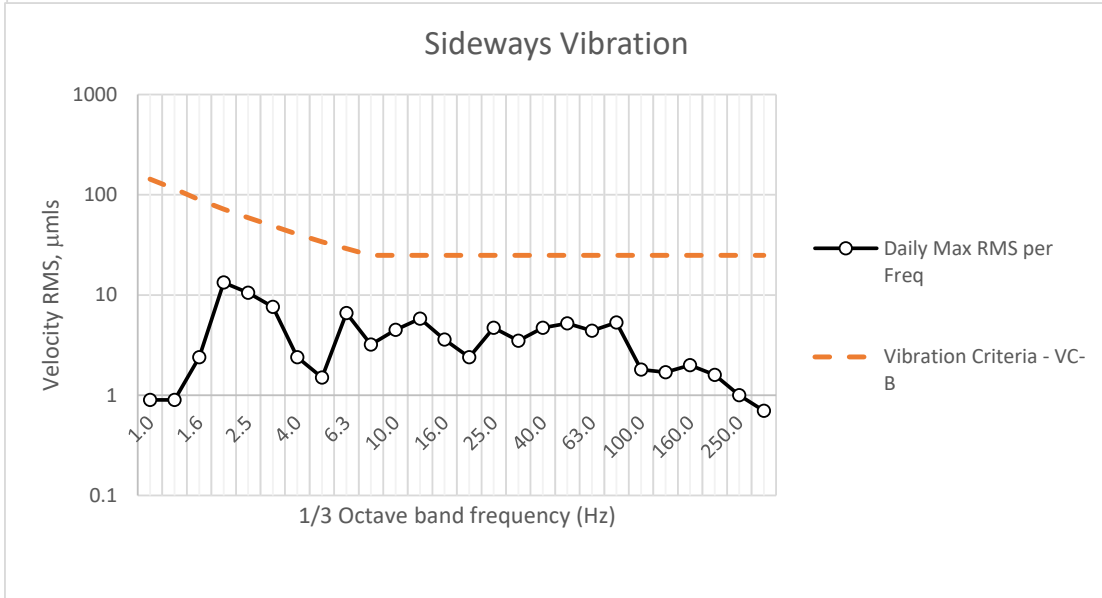
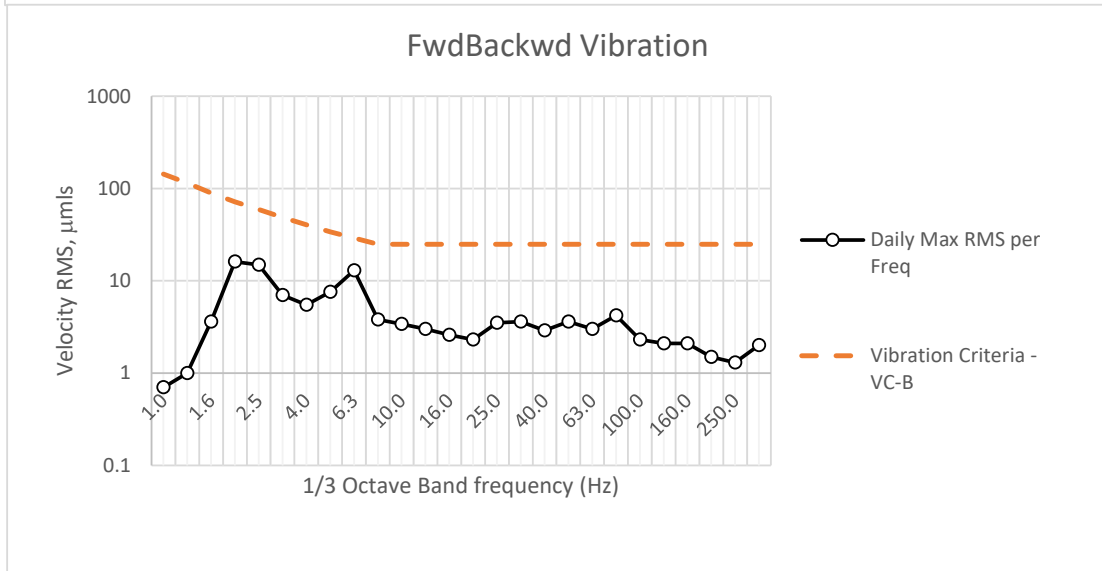
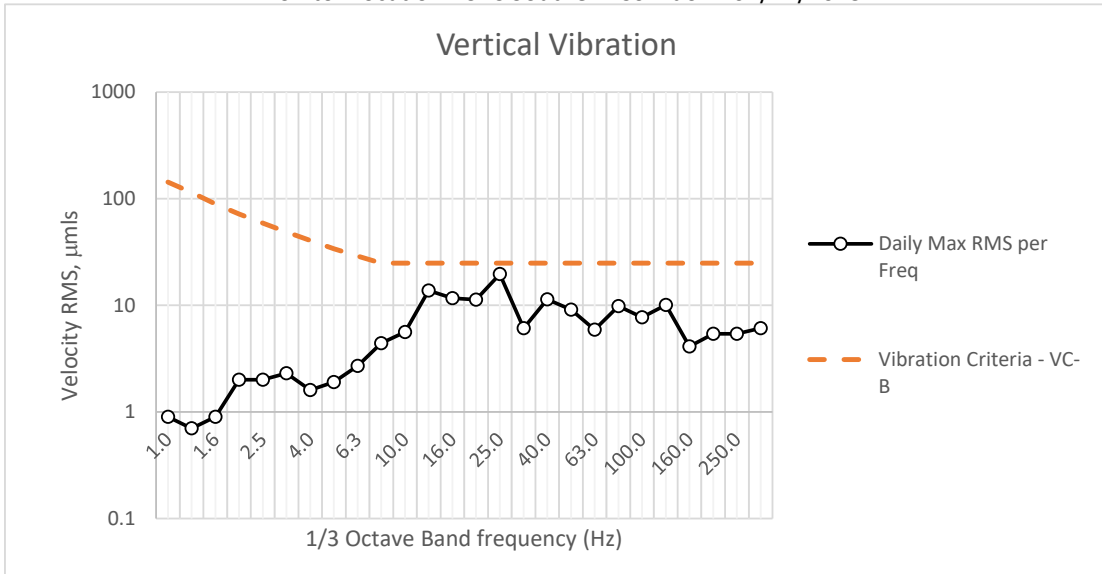


Fwd/Backwards



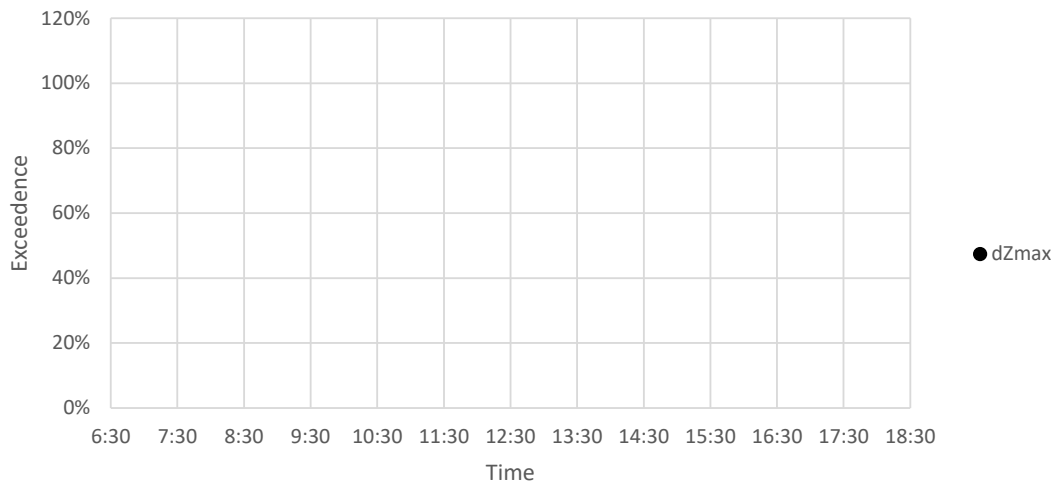
Sideways



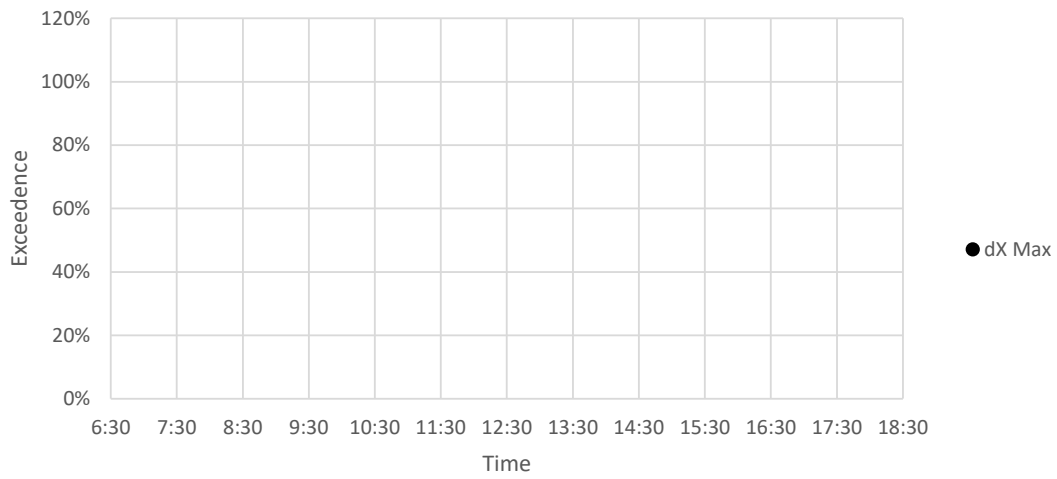


Yes

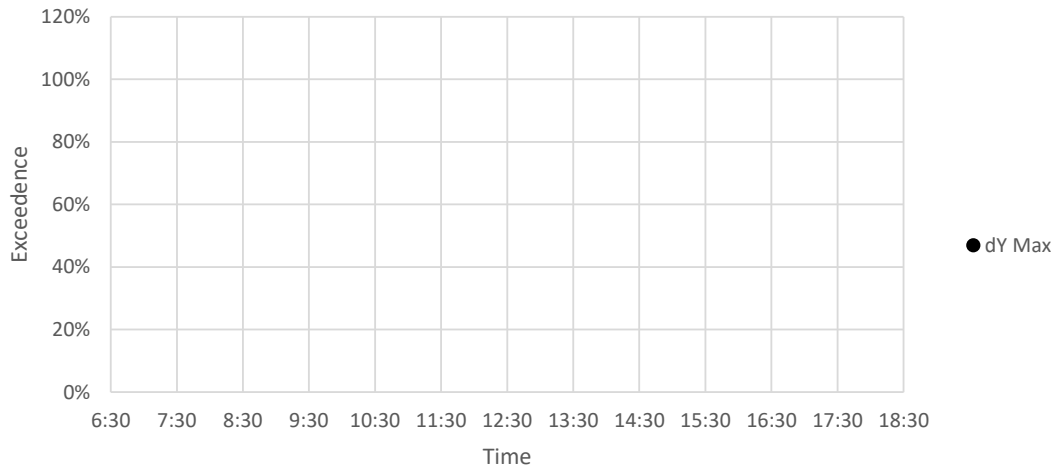
Vertical



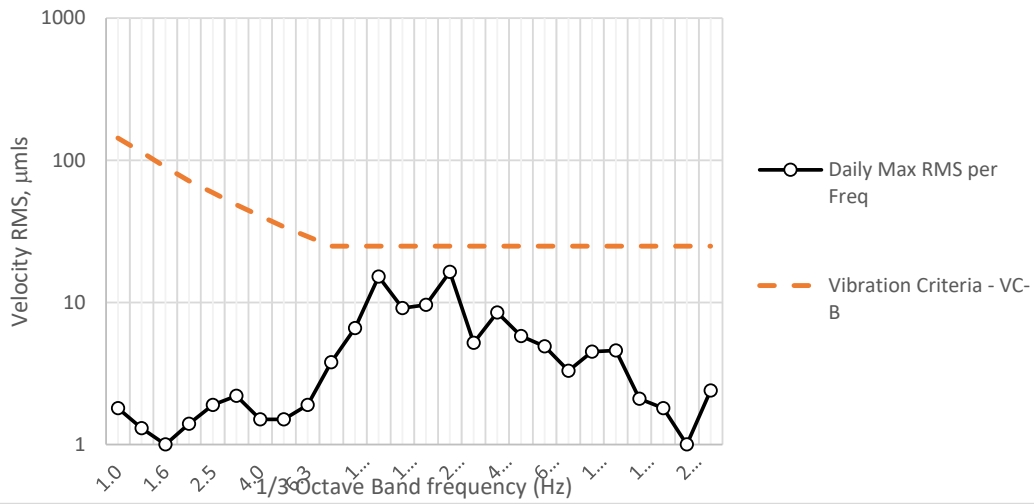
Fwd/Backwards



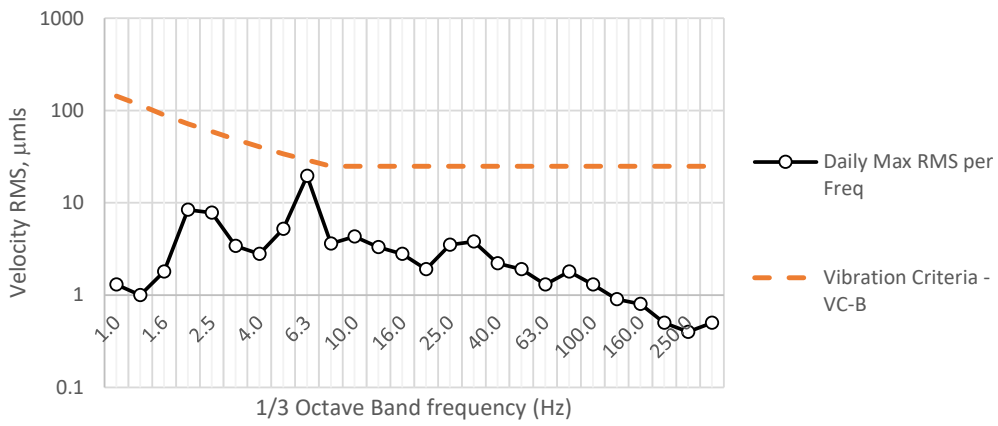
Sideways



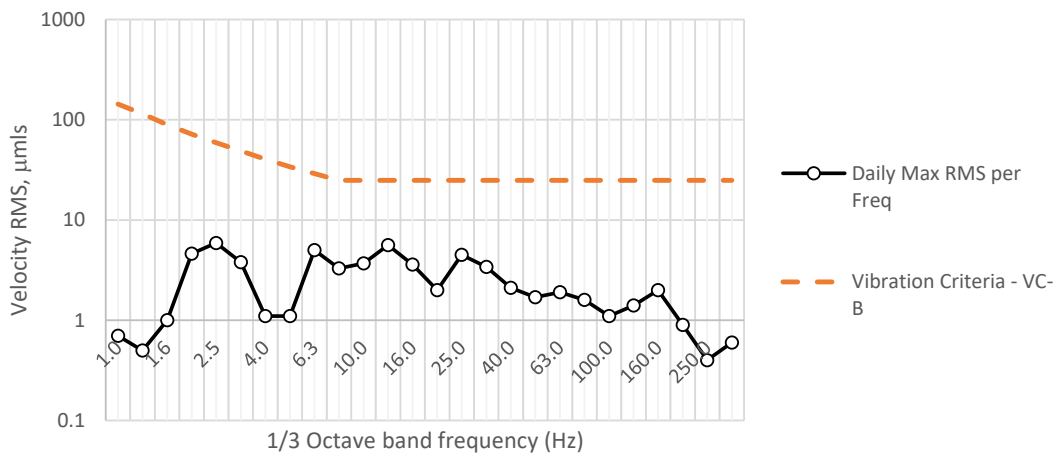
Vertical Vibration



FwdBackwd Vibration

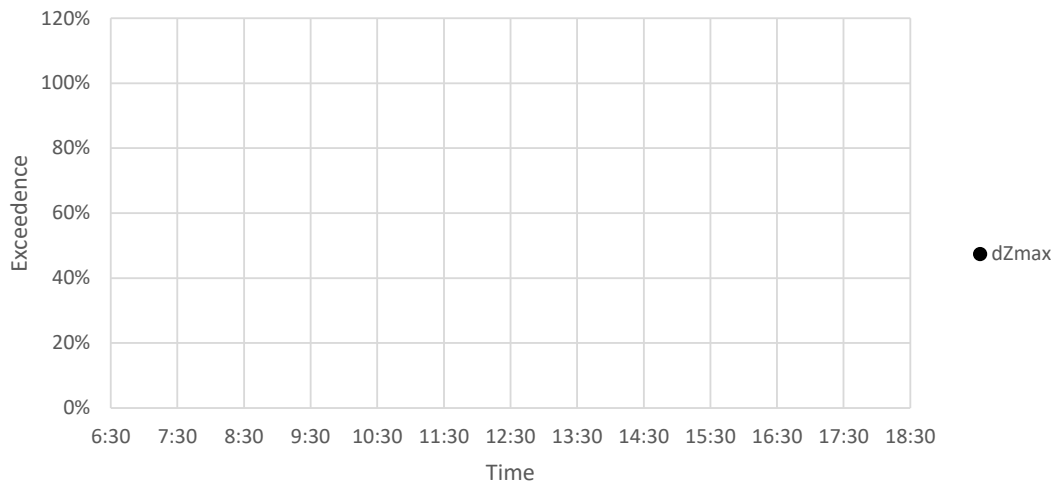


Sideways Vibration

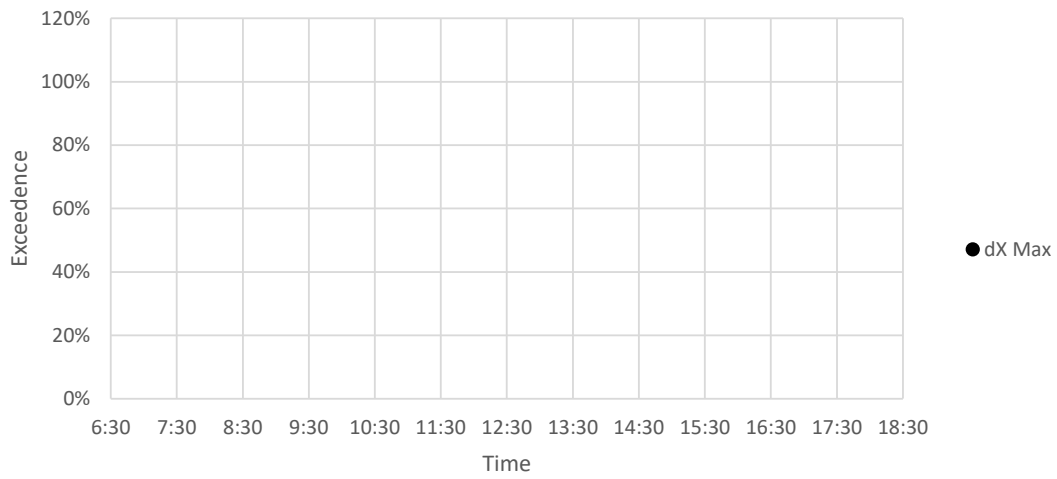


Yes

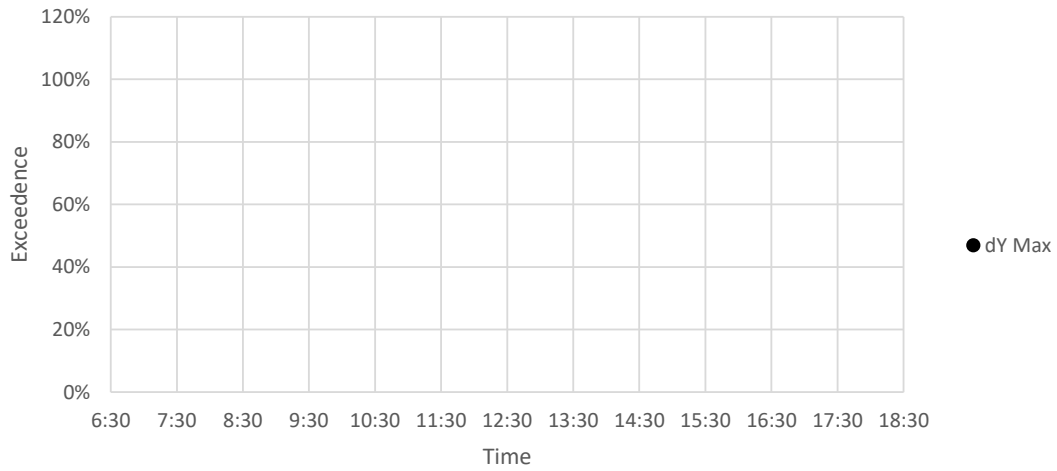
Vertical



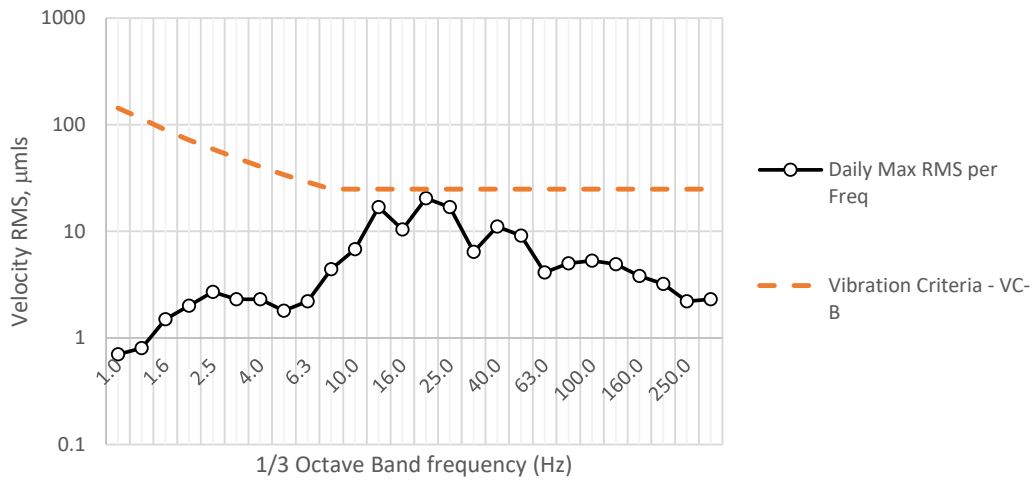
Fwd/Backwards



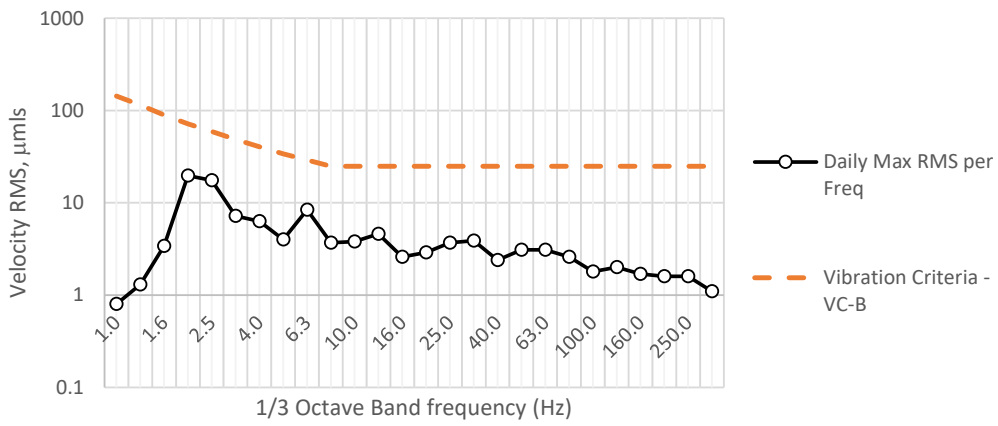
Sideways



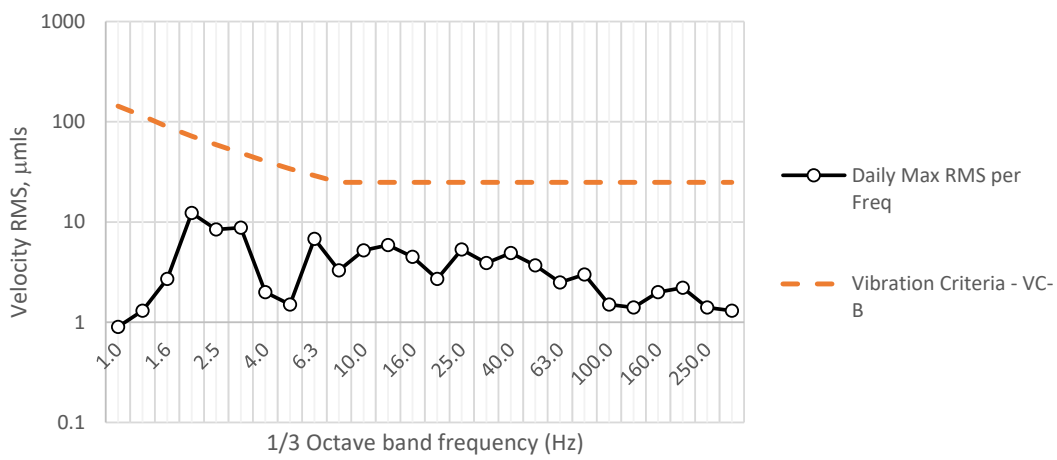
Vertical Vibration



FwdBackwd Vibration

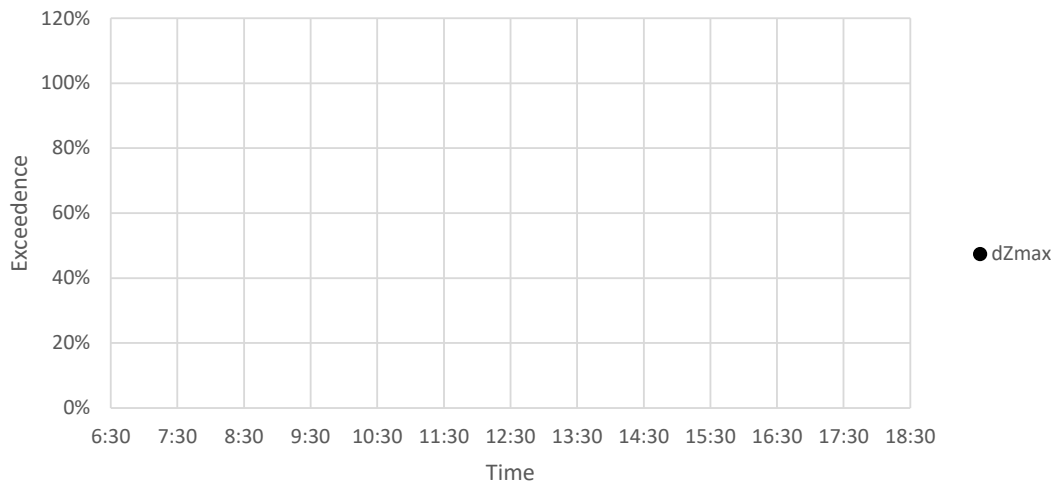


Sideways Vibration

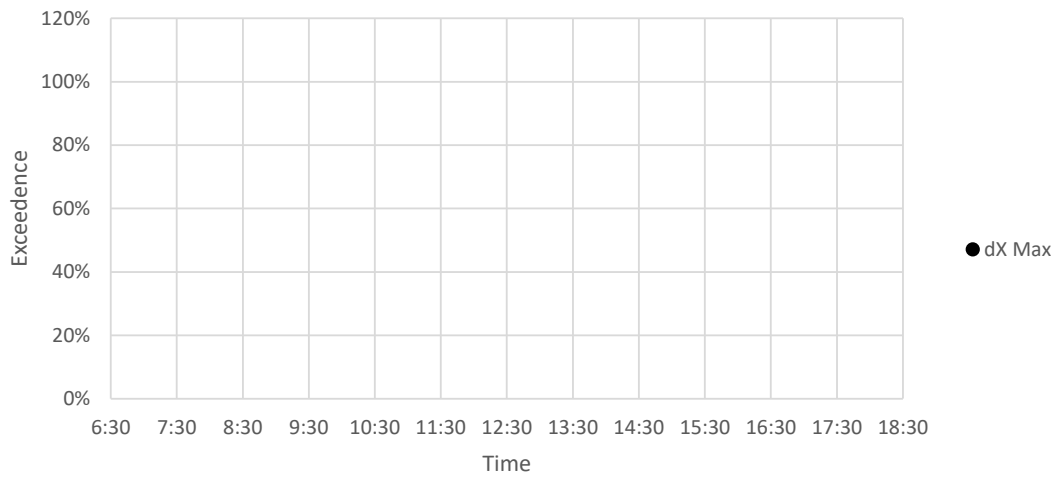


Yes

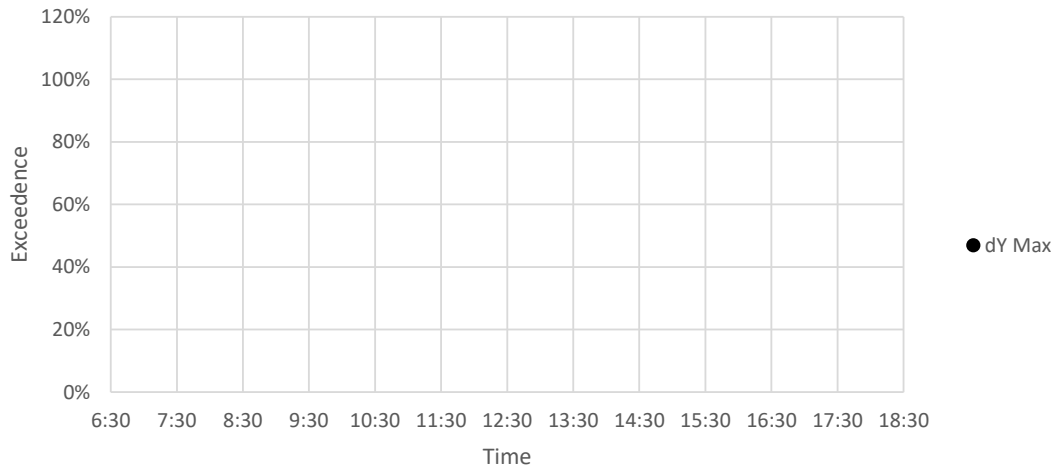
Vertical

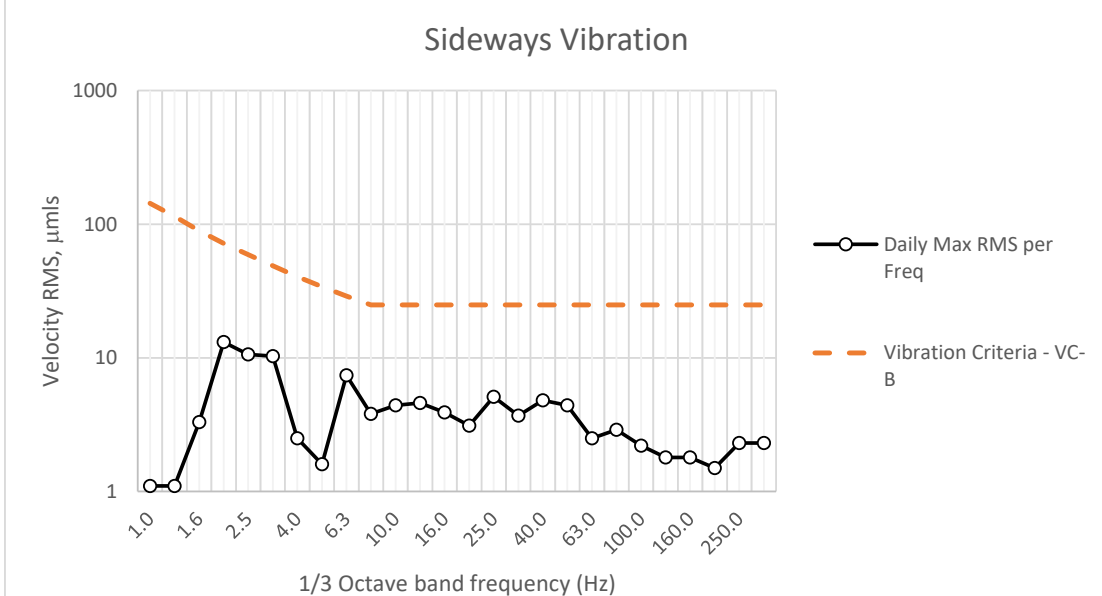
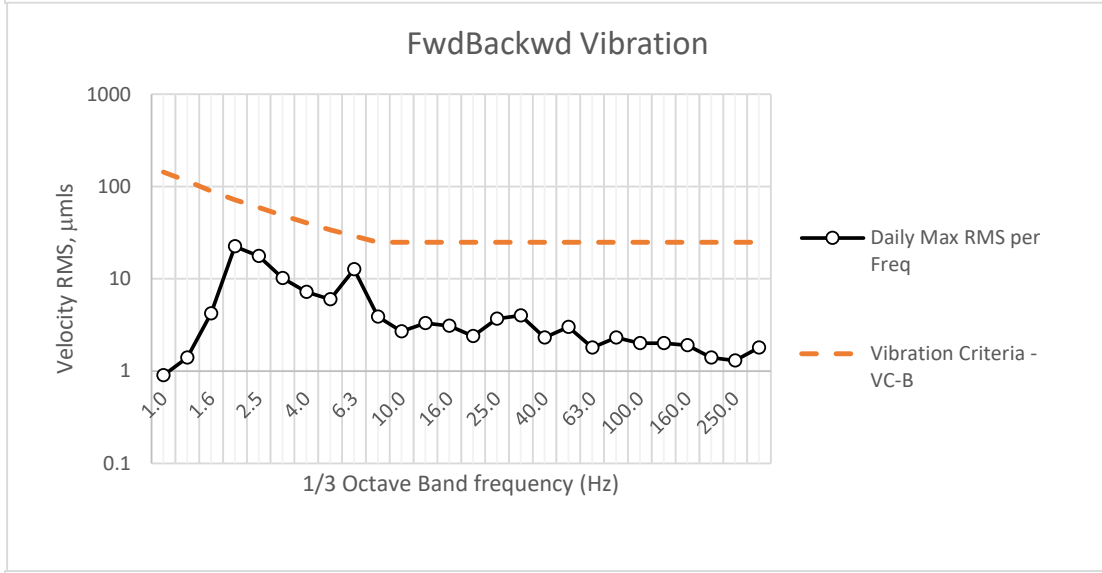
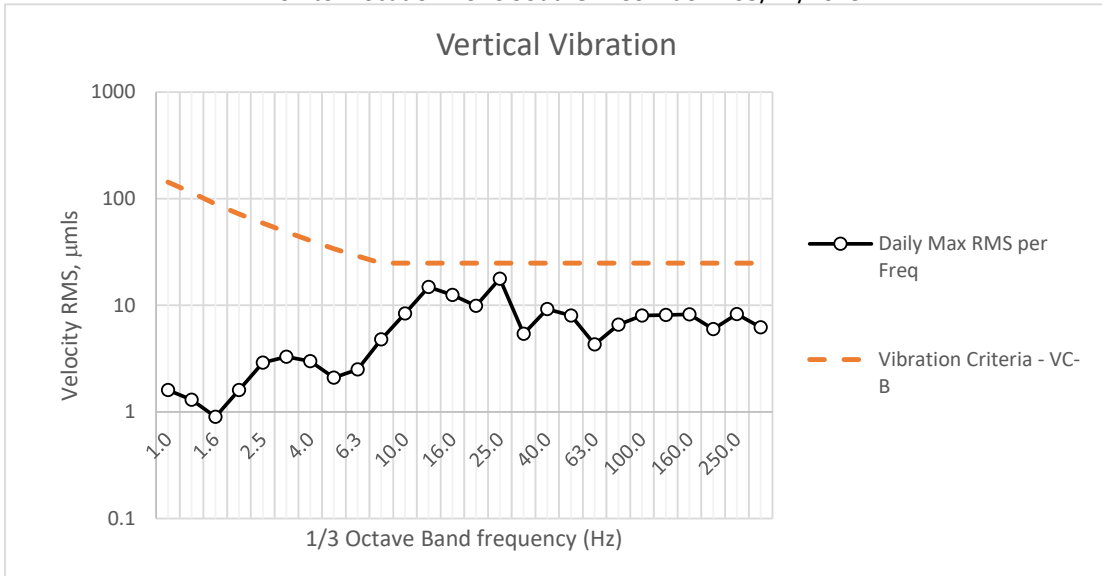


Fwd/Backwards



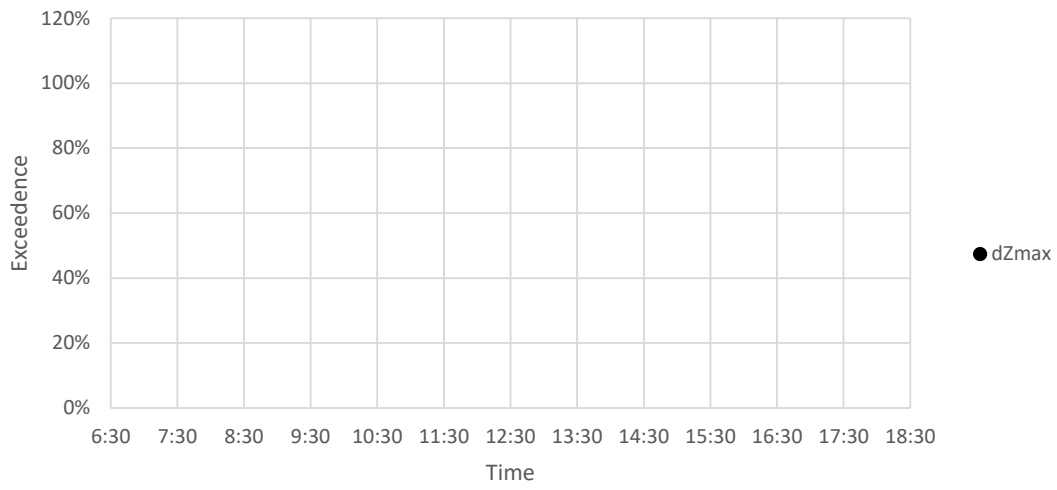
Sideways



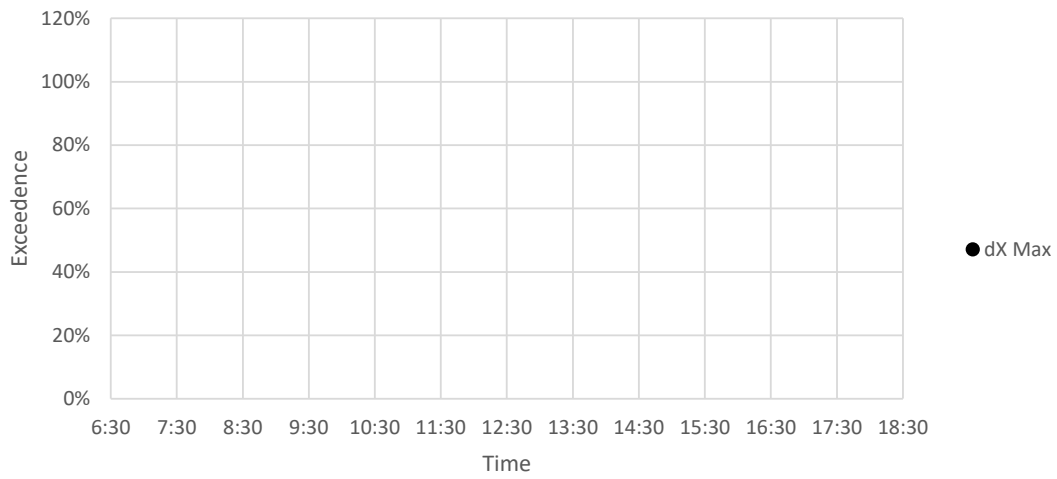


Yes

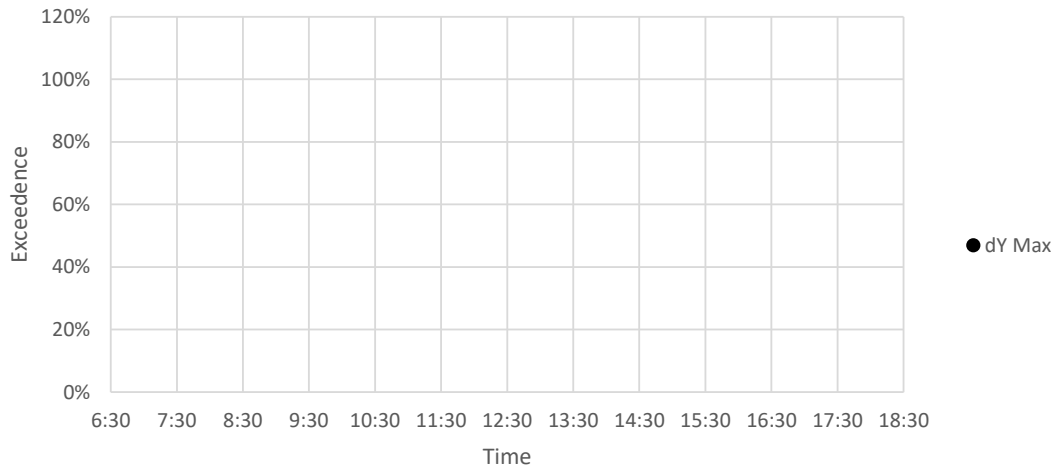
Vertical

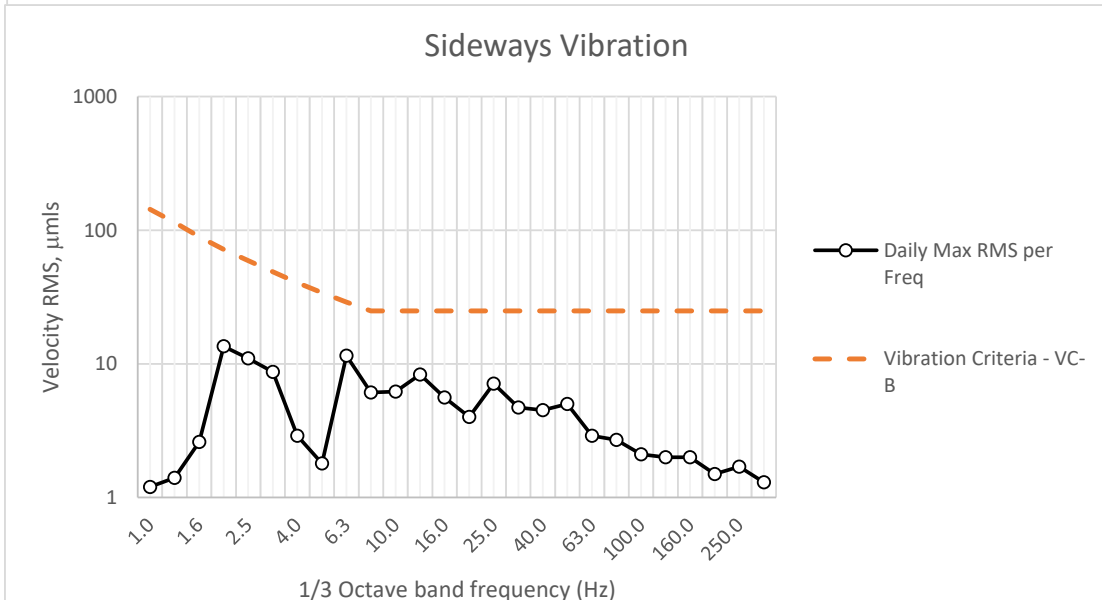
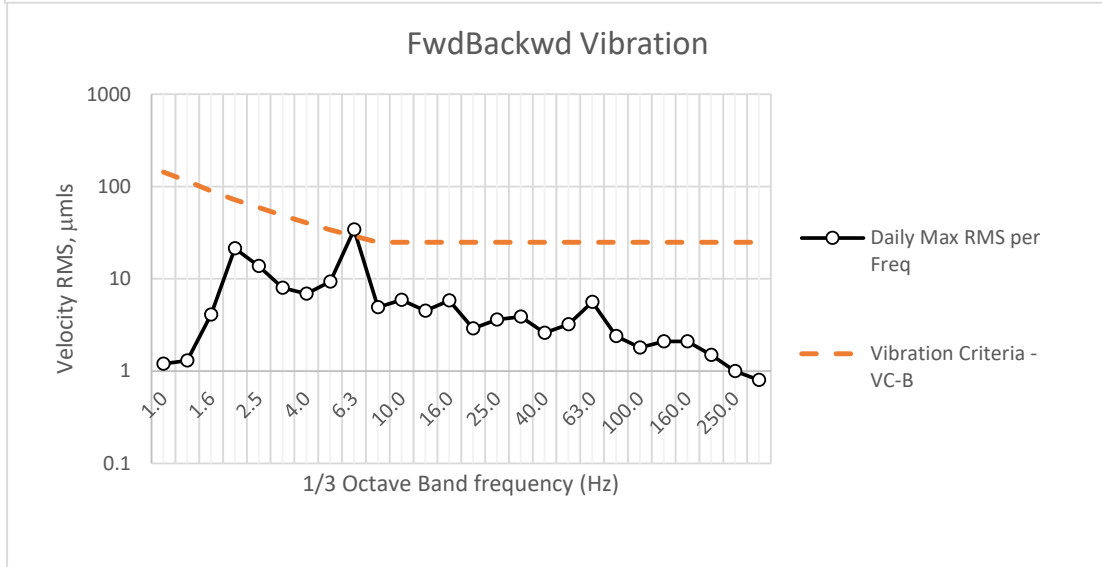
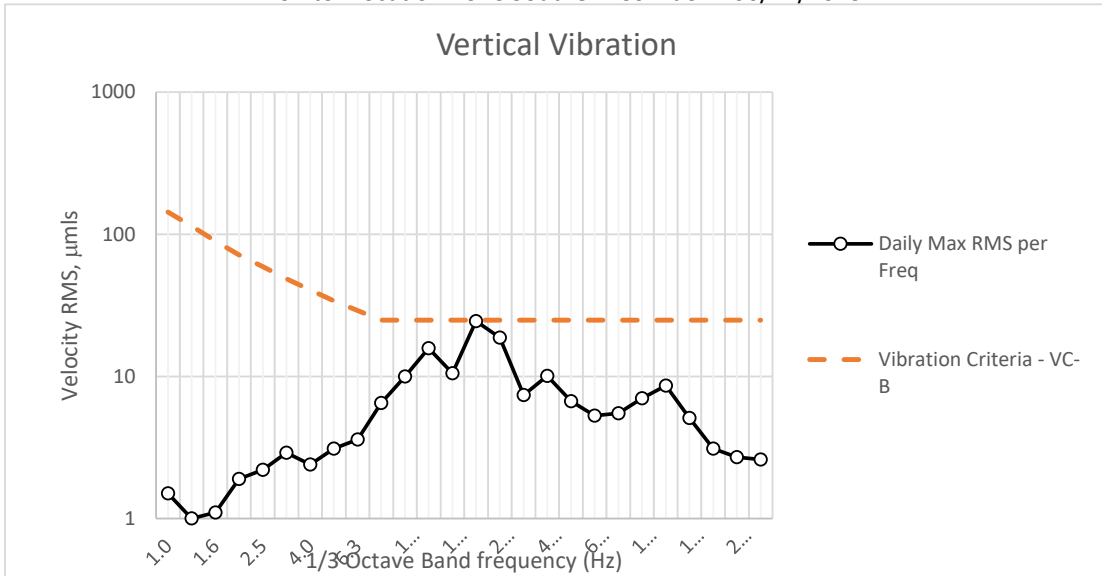


Fwd/Backwards



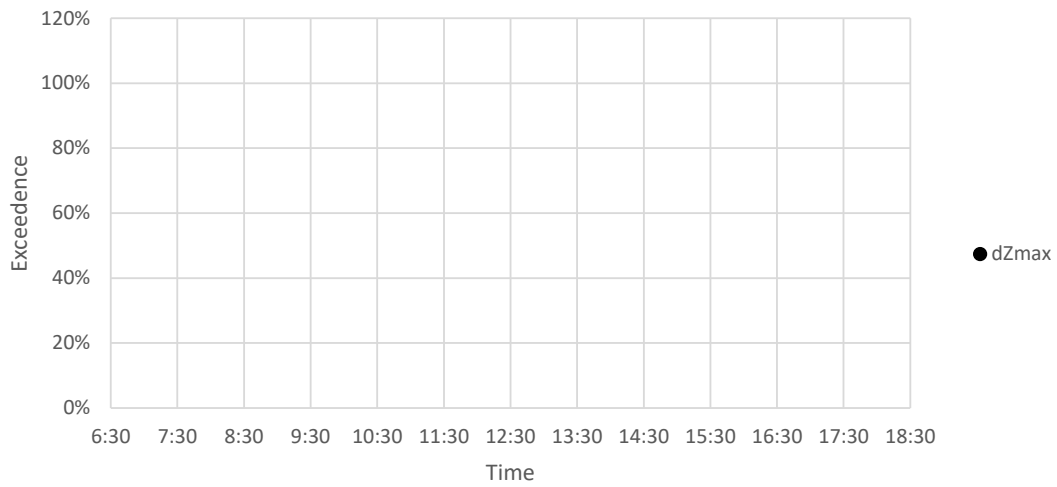
Sideways



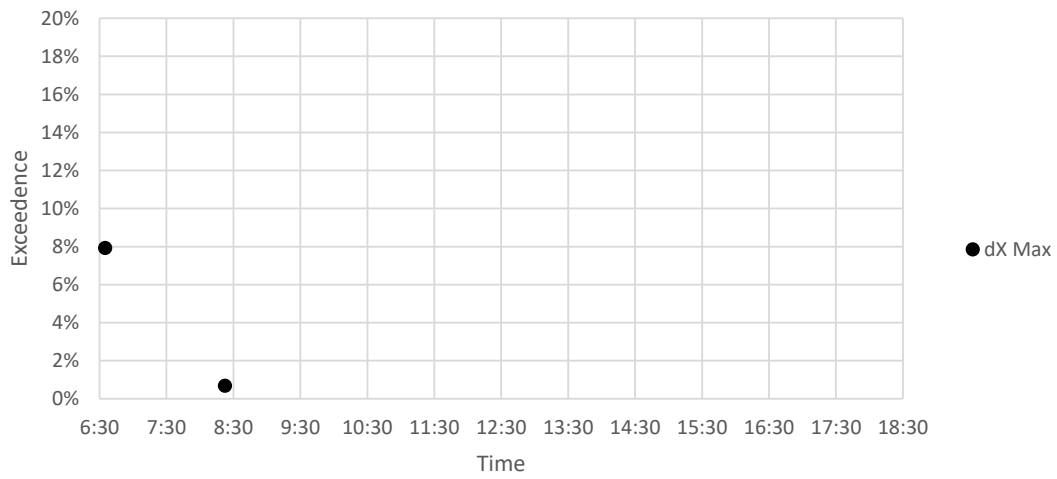


Yes

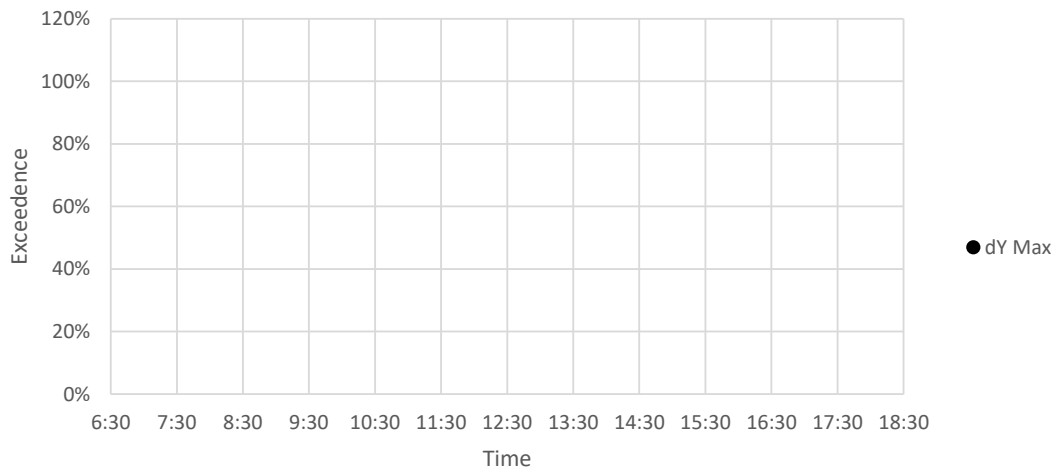
Vertical



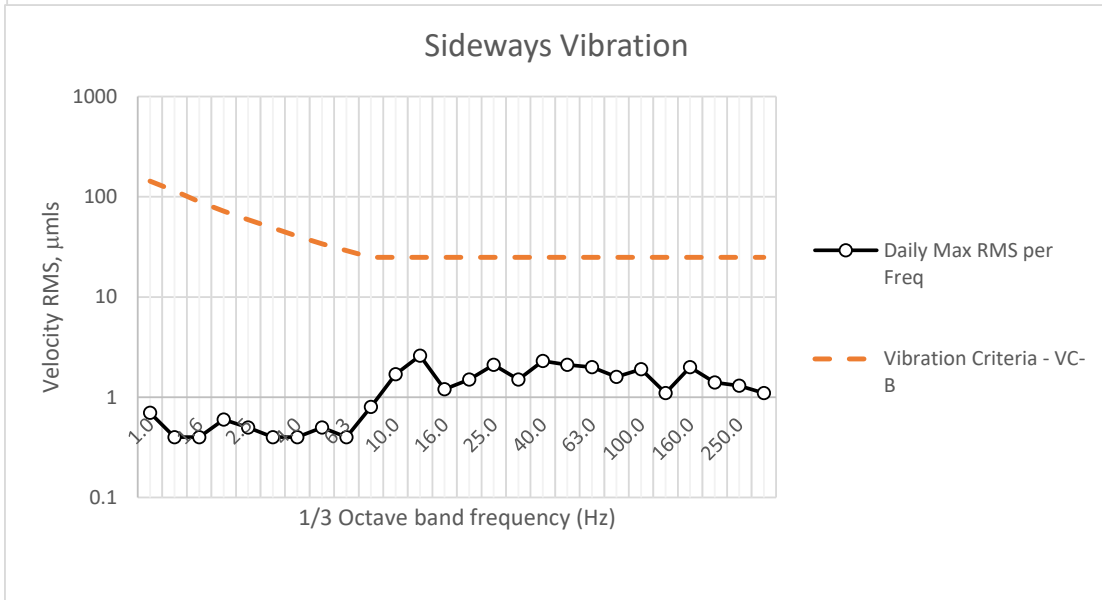
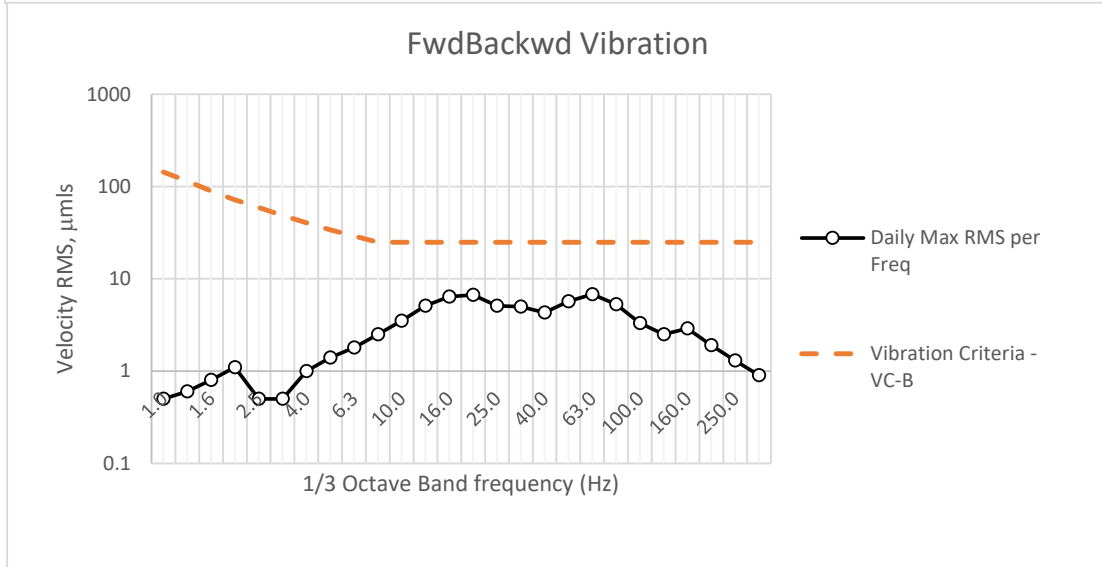
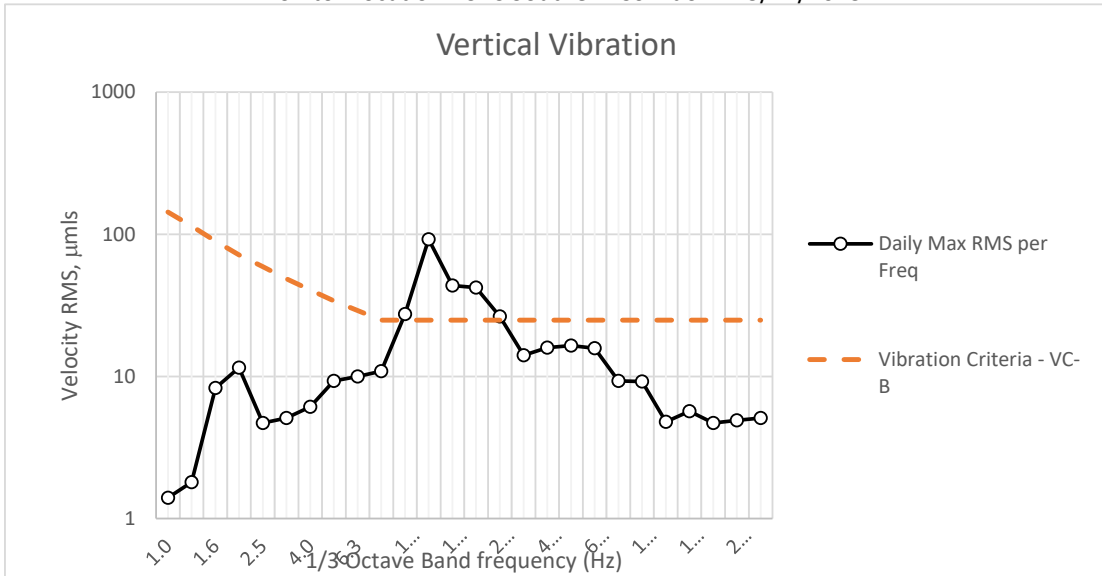
Fwd/Backwards



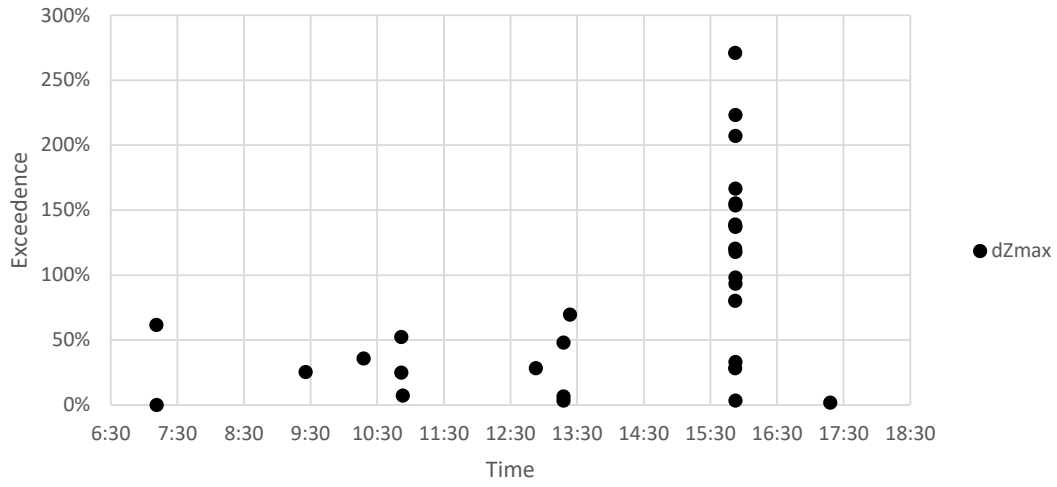
Sideways



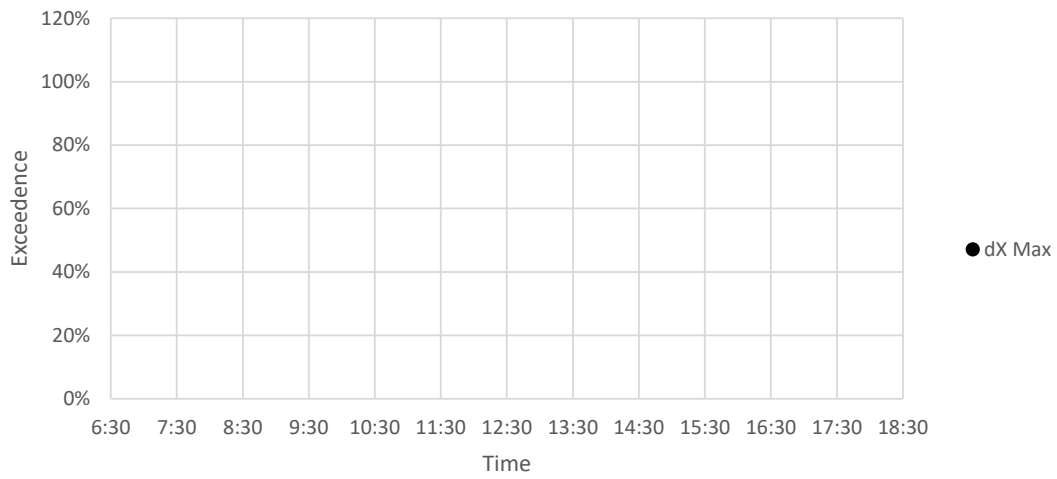
CHARLES PERKINS CENTRE – LEVEL B1 SOUTHERN CORRIDOR



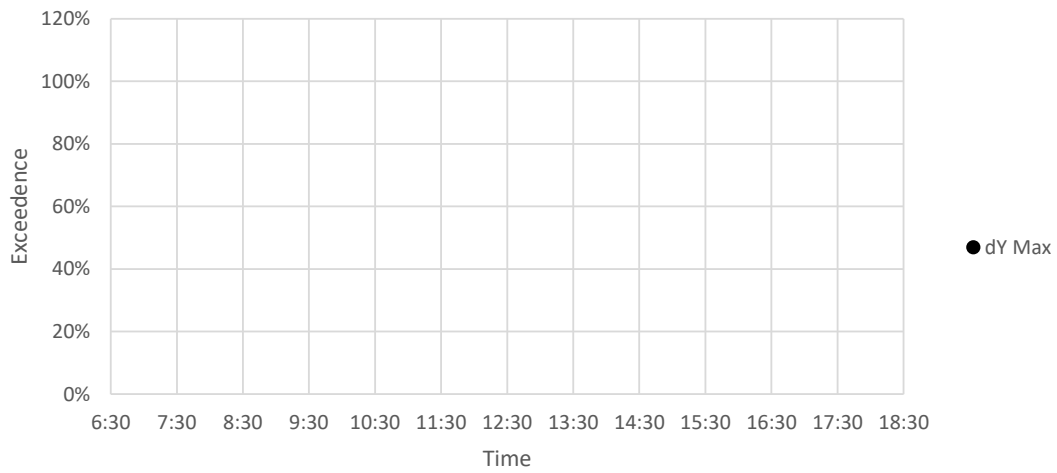
Vertical



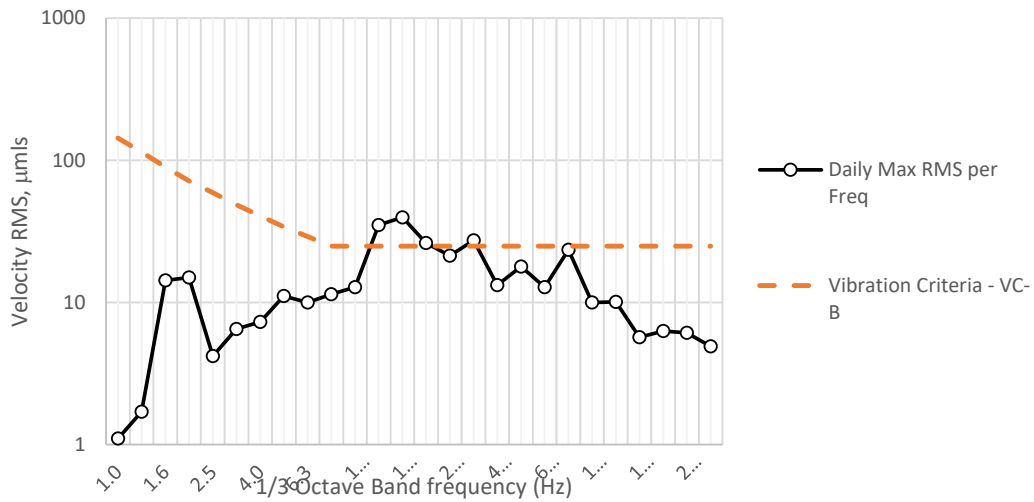
Fwd/Backwards



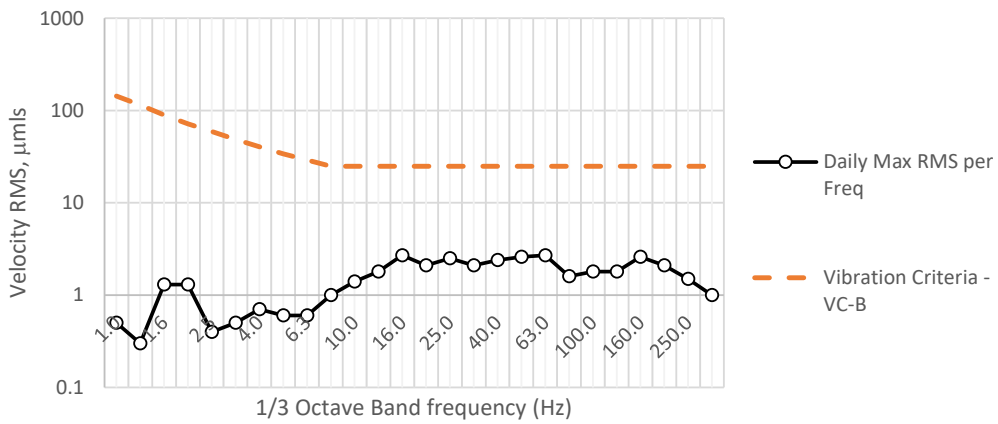
Sideways



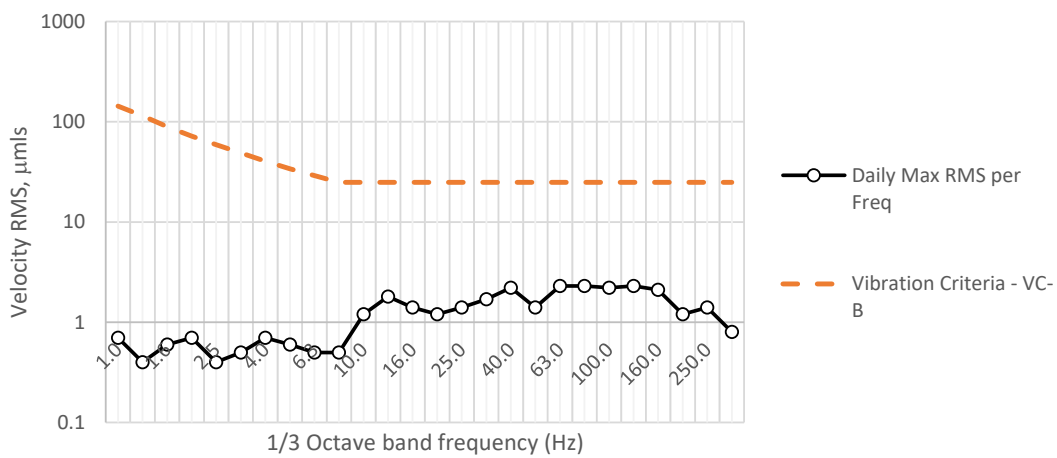
Vertical Vibration

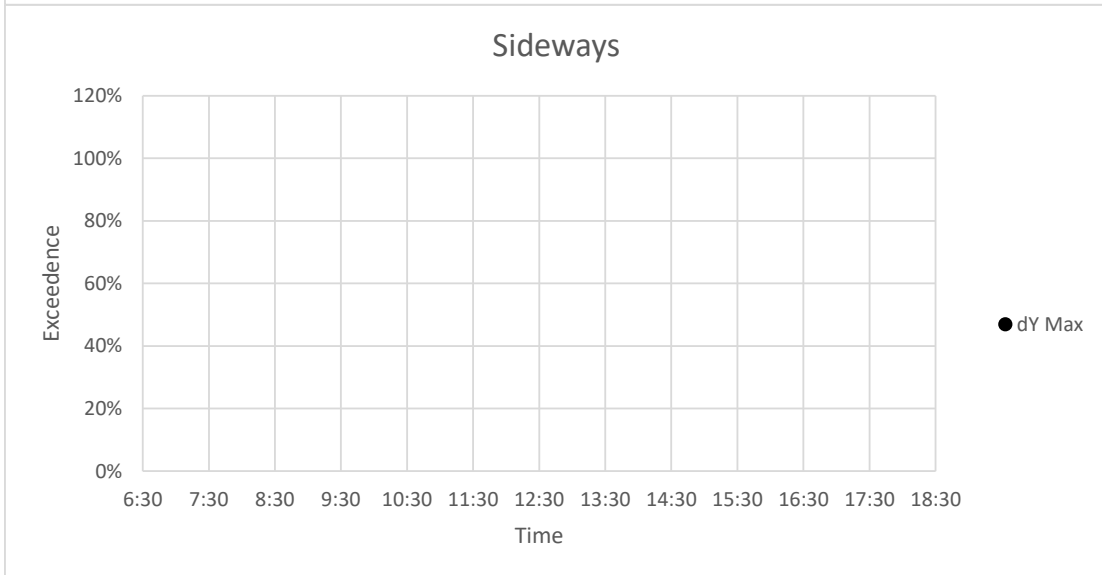
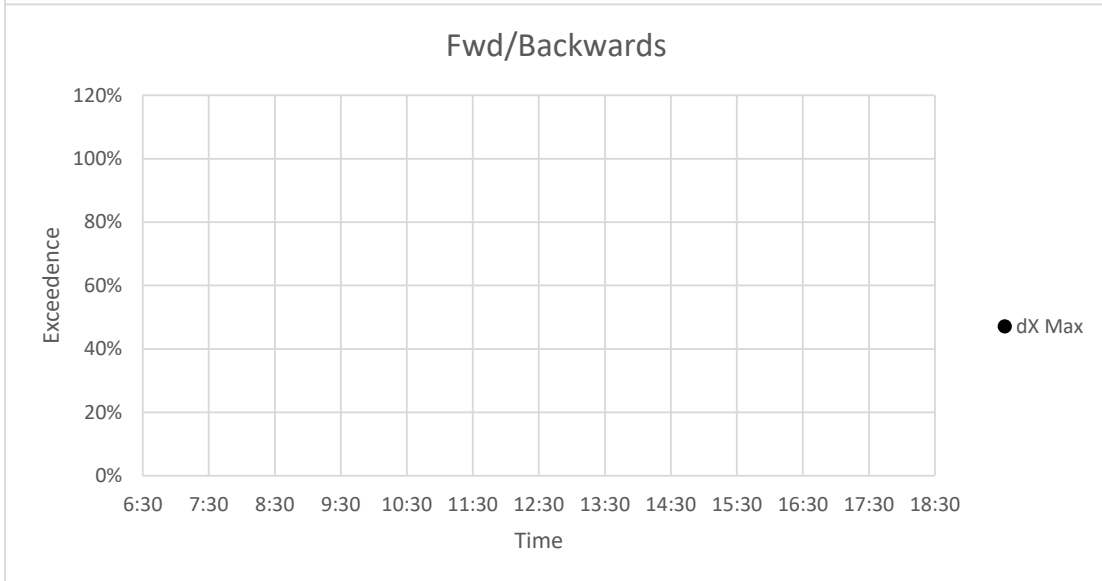
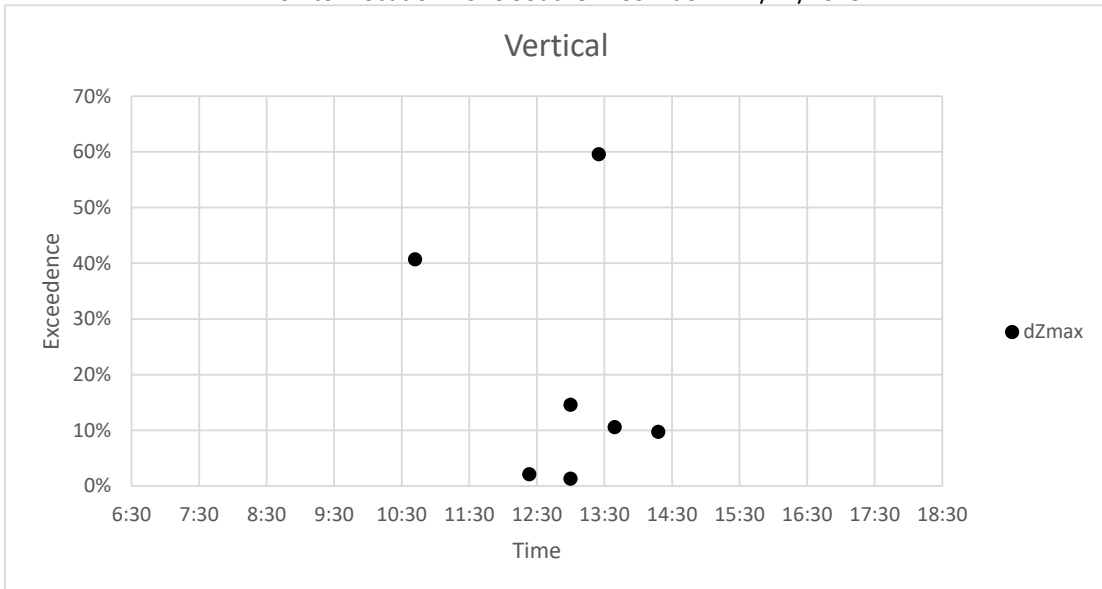


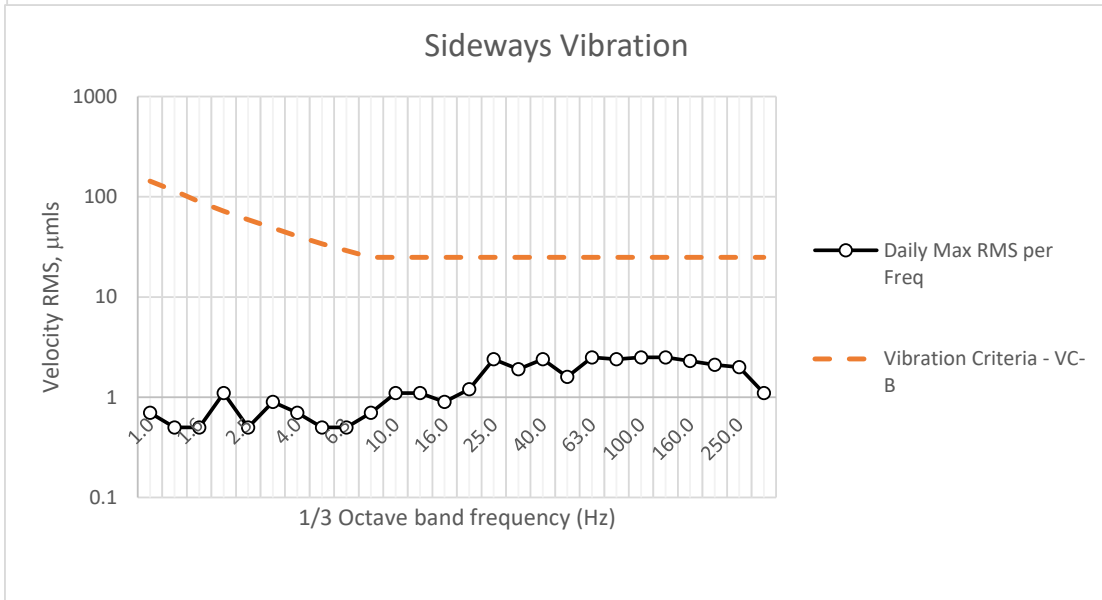
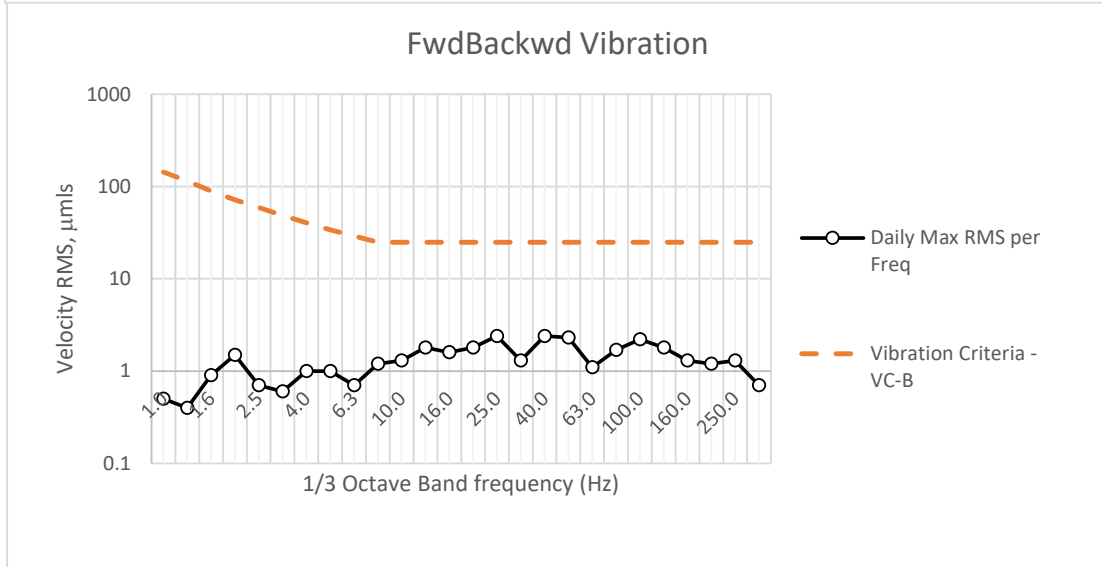
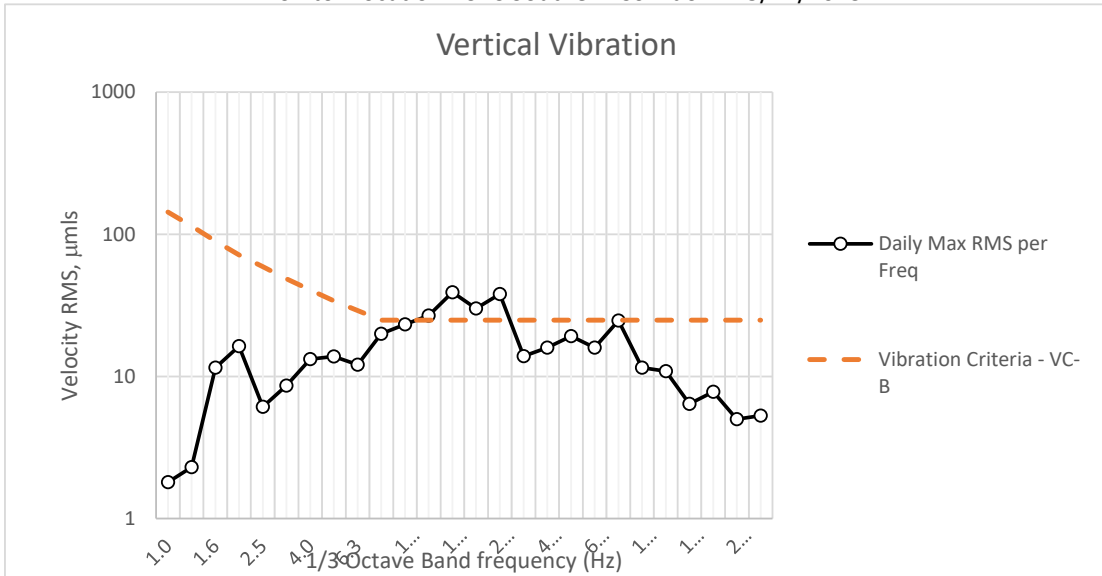
FwdBackwd Vibration



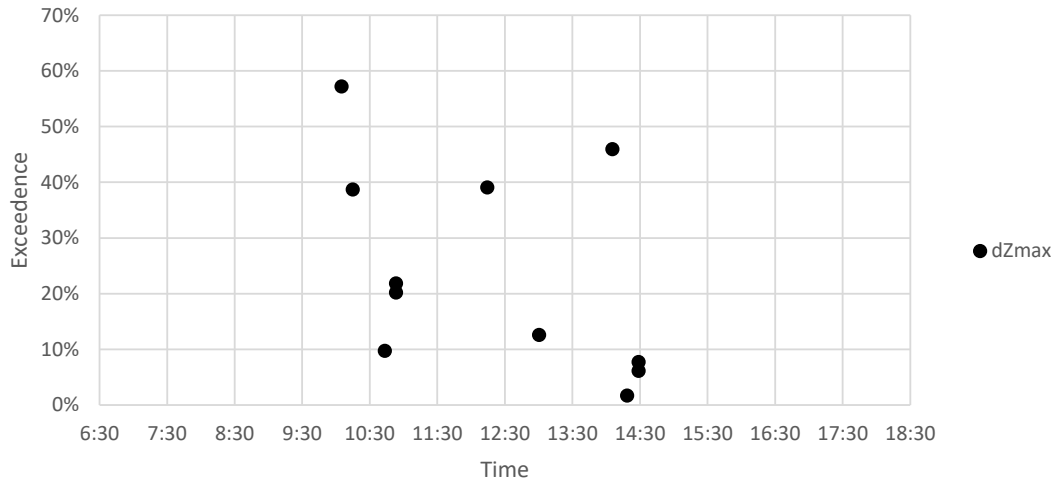
Sideways Vibration



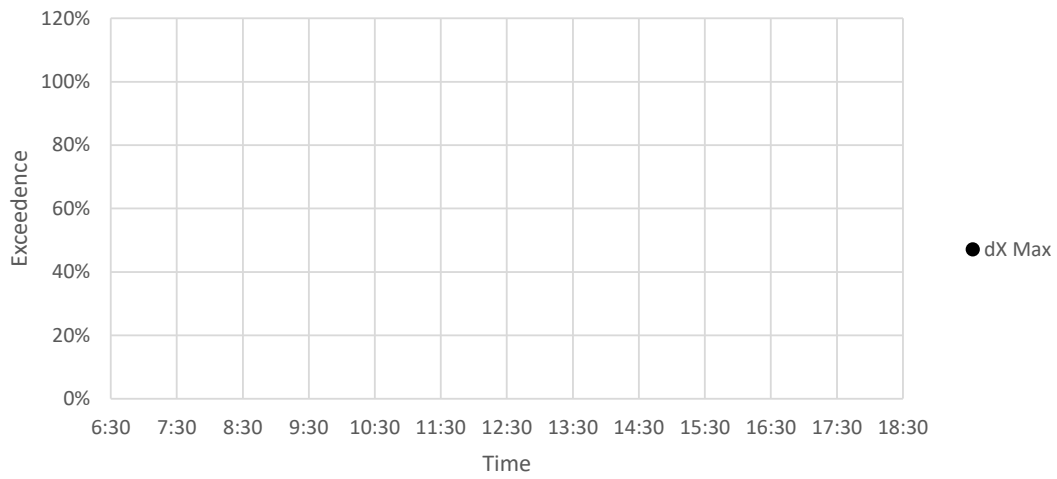




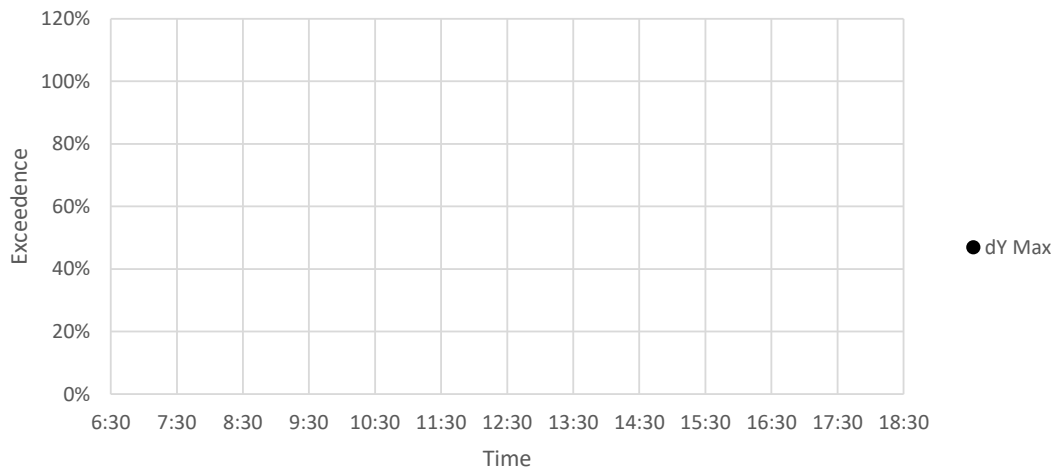
Vertical



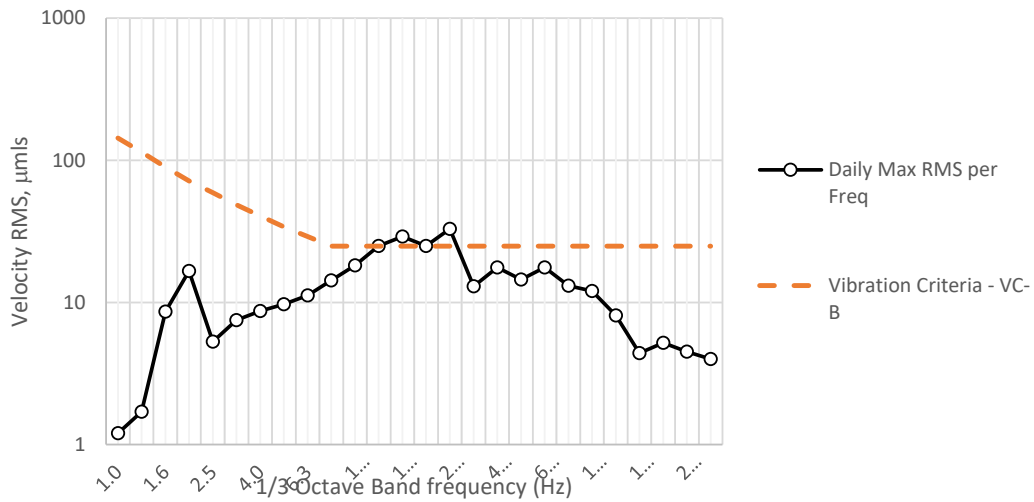
Fwd/Backwards



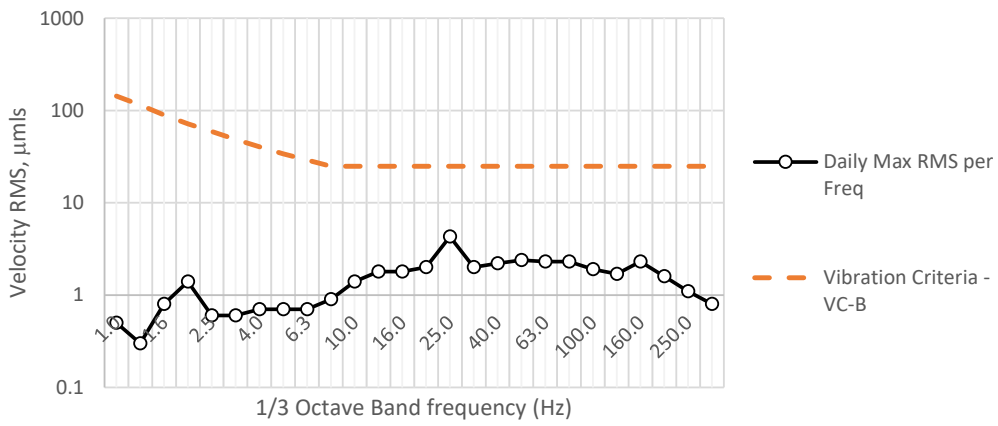
Sideways



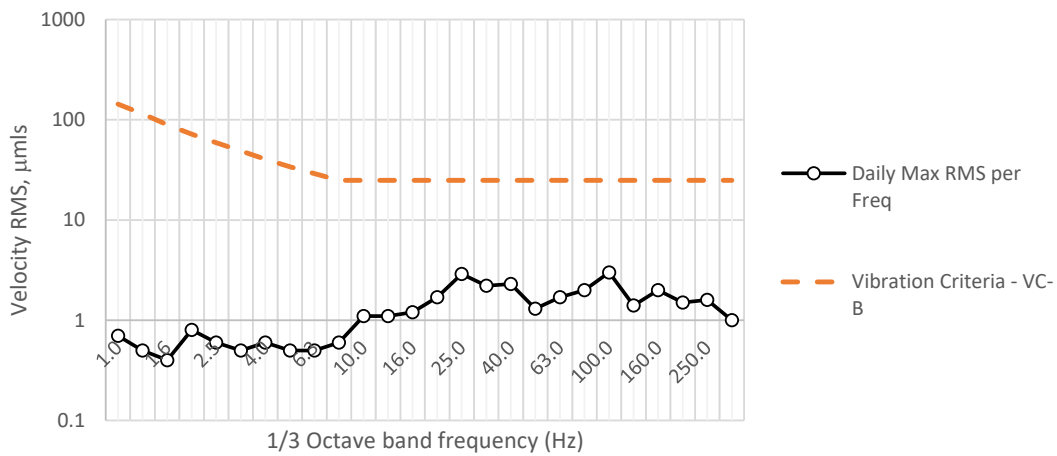
Vertical Vibration



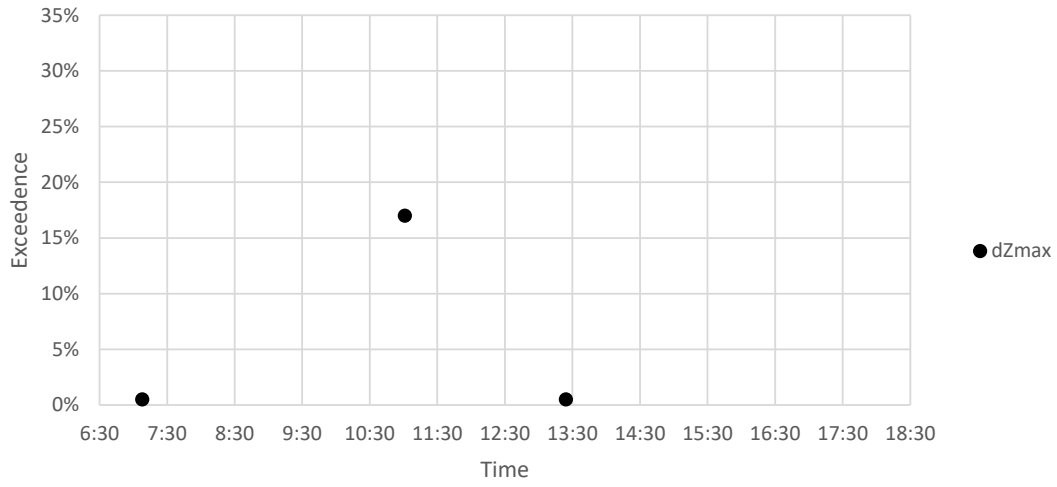
FwdBackwd Vibration



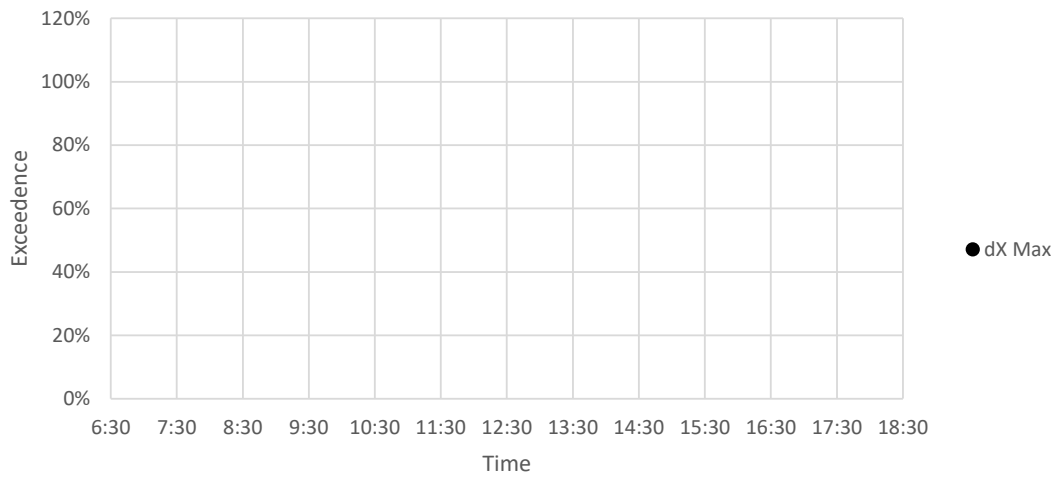
Sideways Vibration



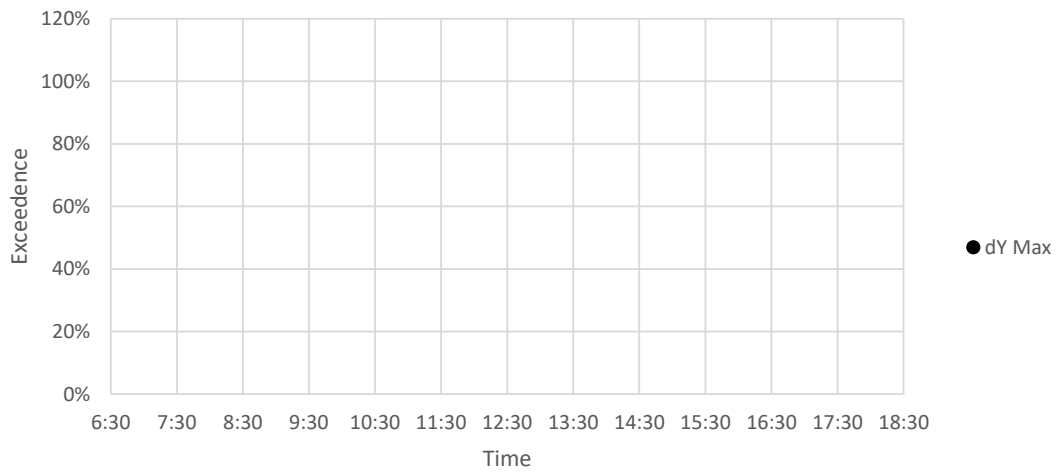
Vertical



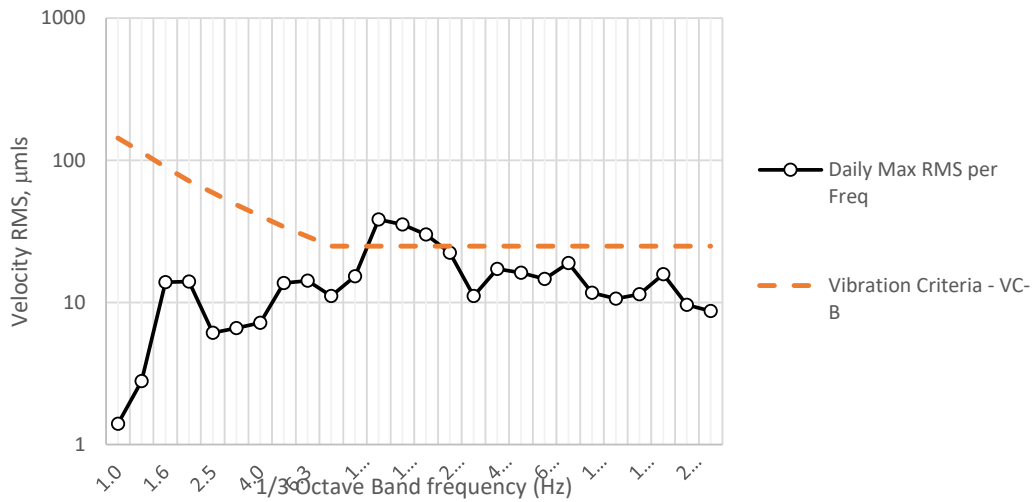
Fwd/Backwards



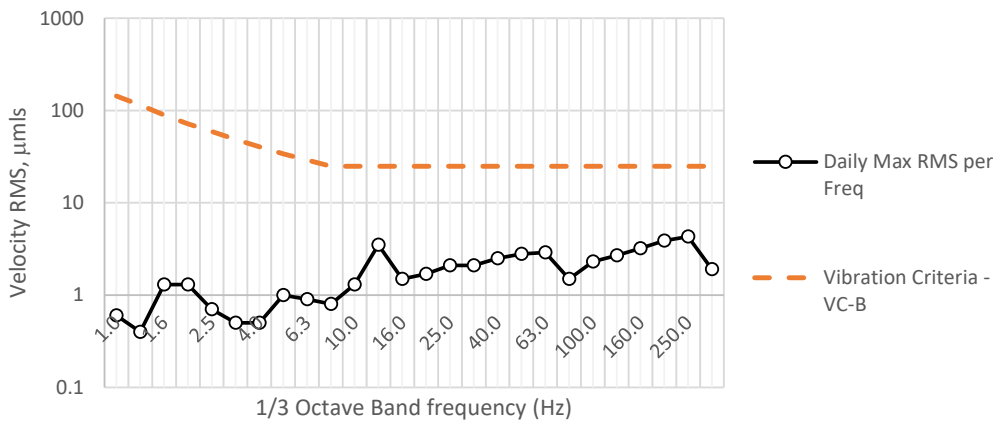
Sideways



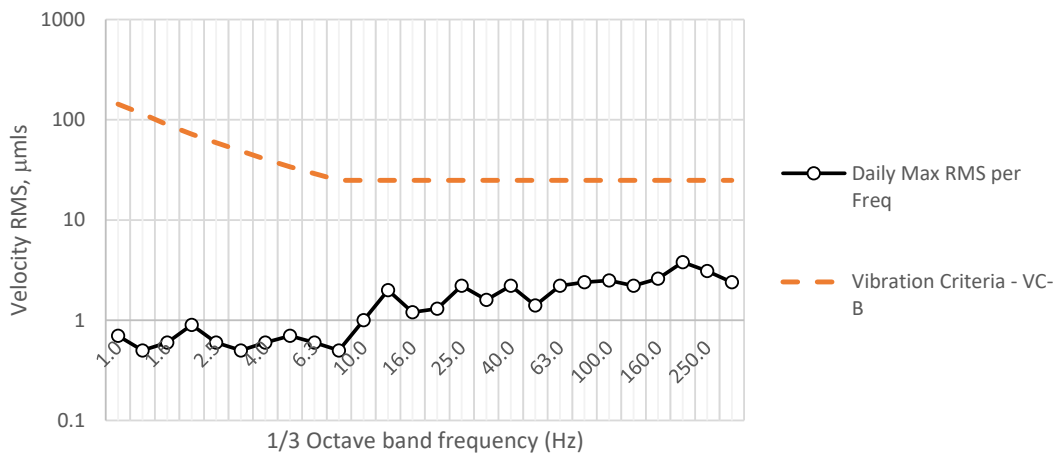
Vertical Vibration

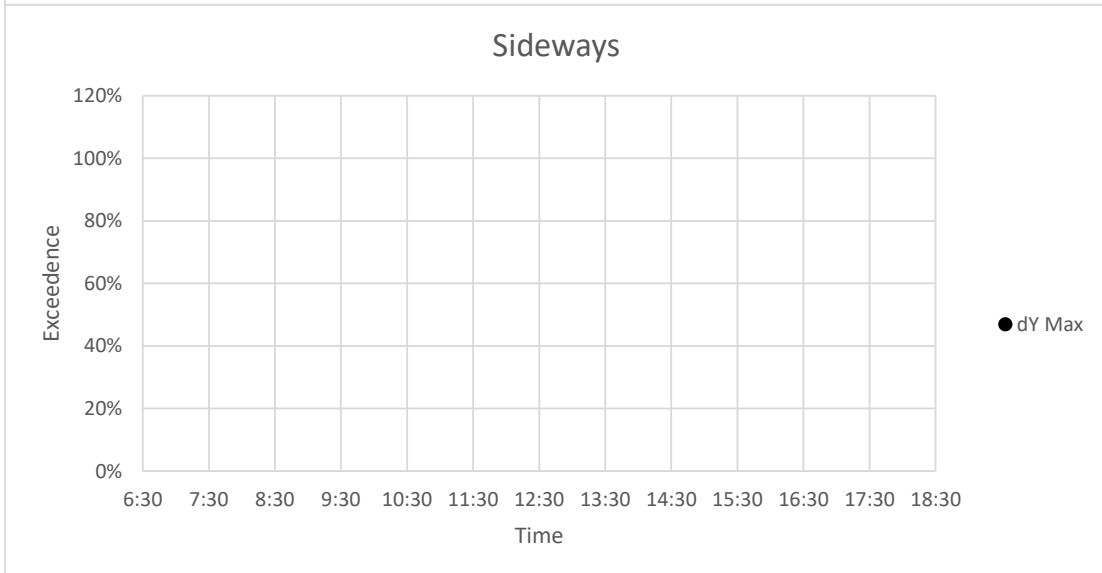
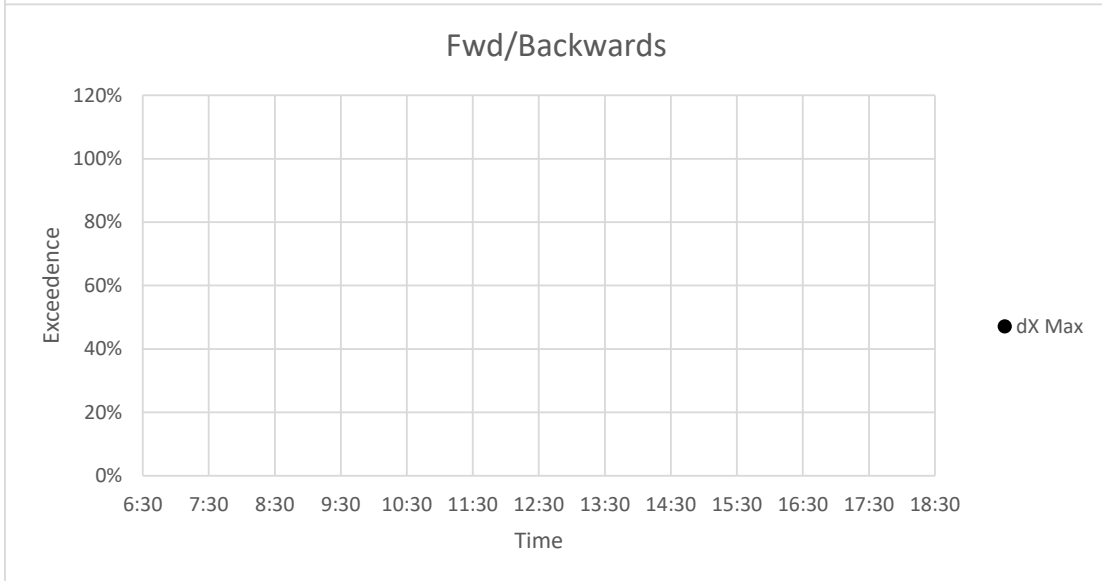
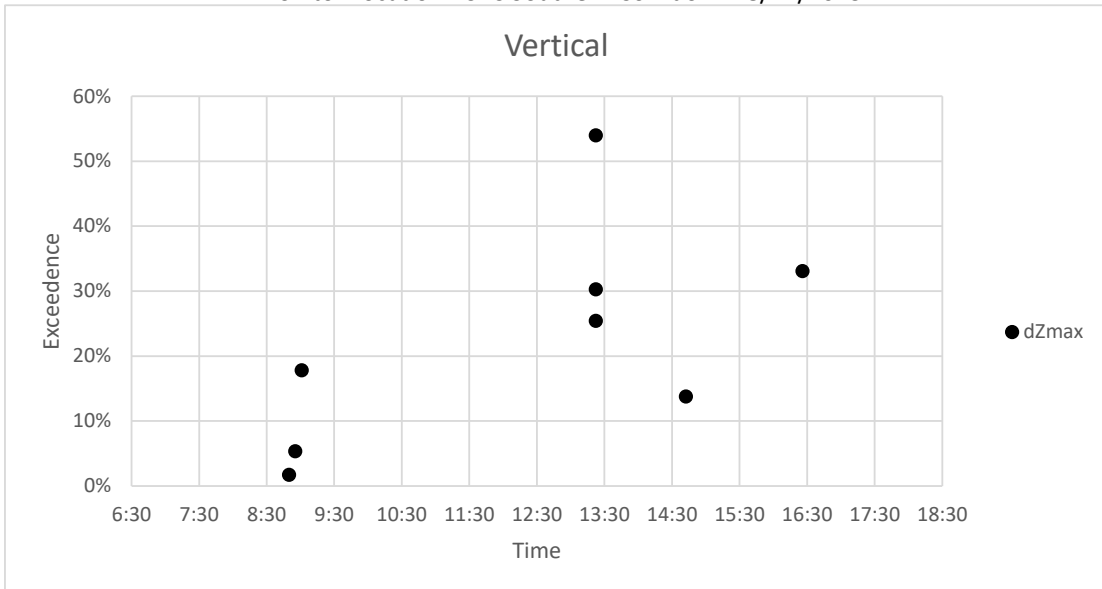


FwdBackwd Vibration

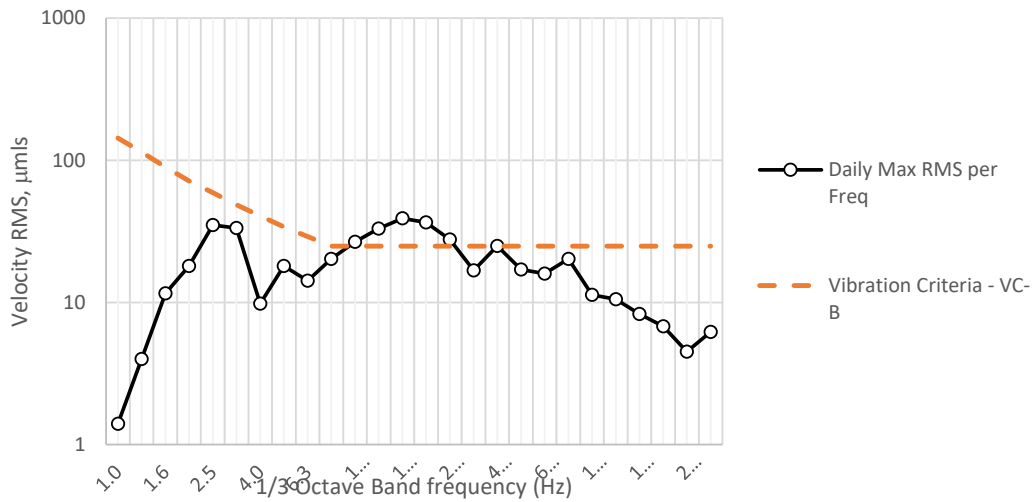


Sideways Vibration

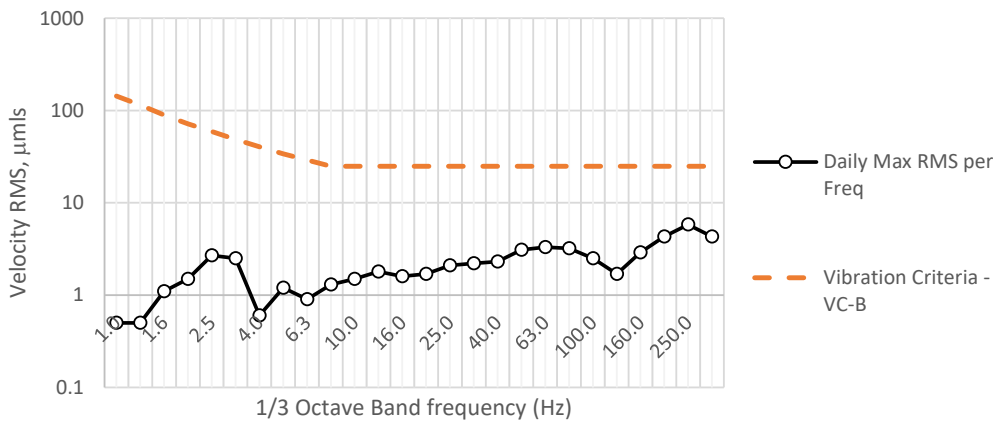




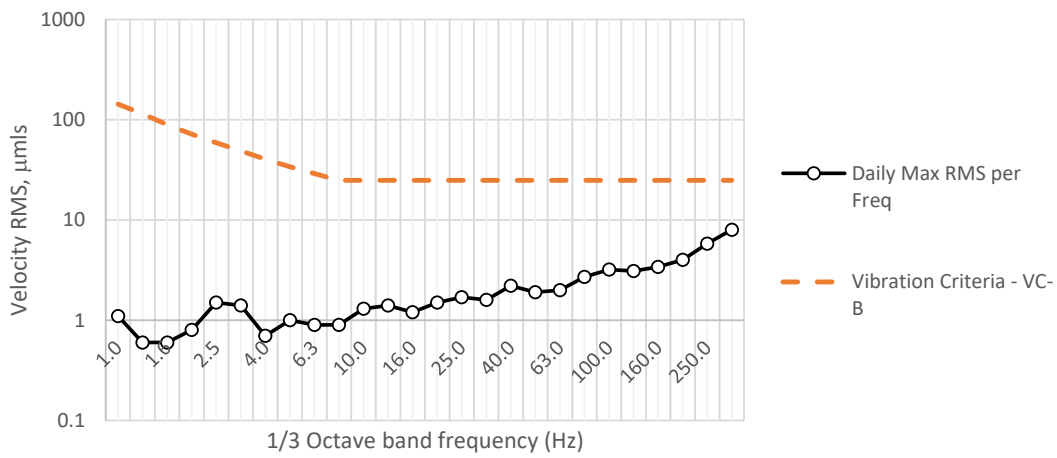
Vertical Vibration



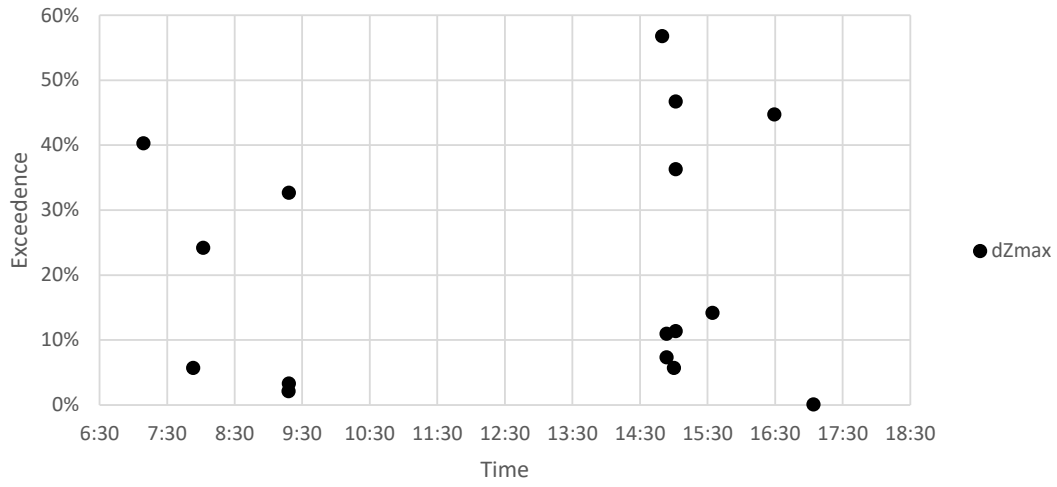
FwdBackwd Vibration



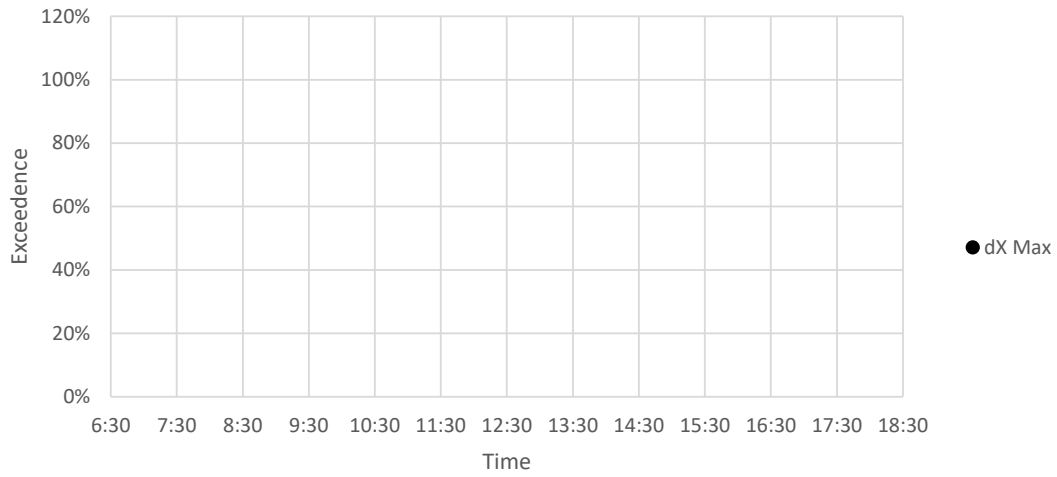
Sideways Vibration



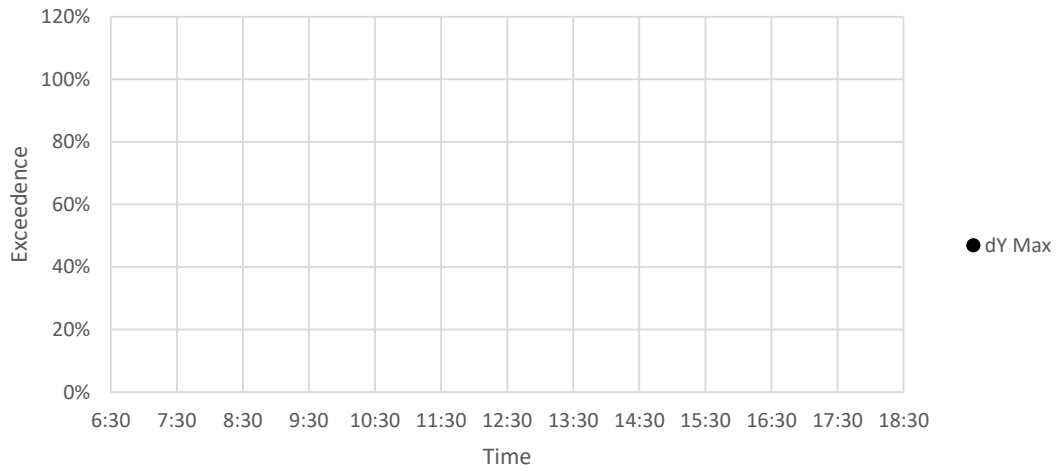
Vertical



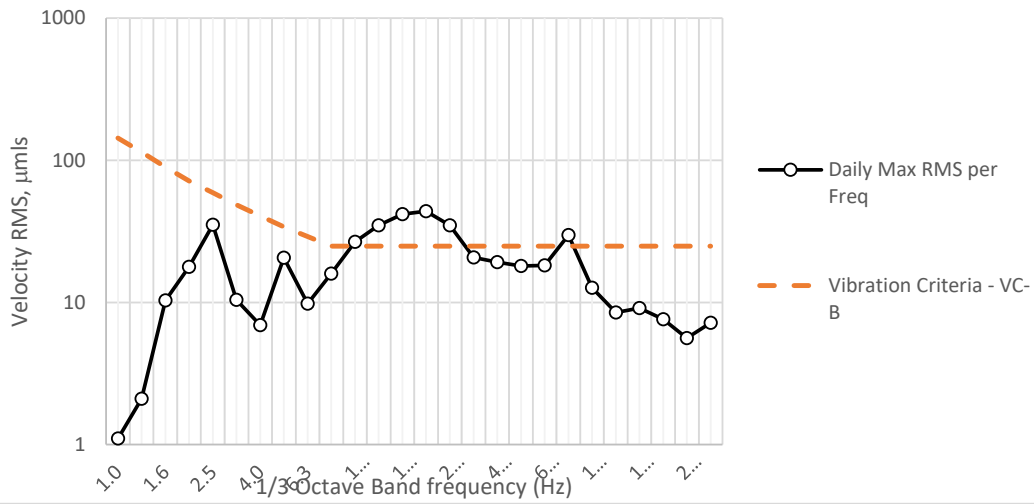
Fwd/Backwards



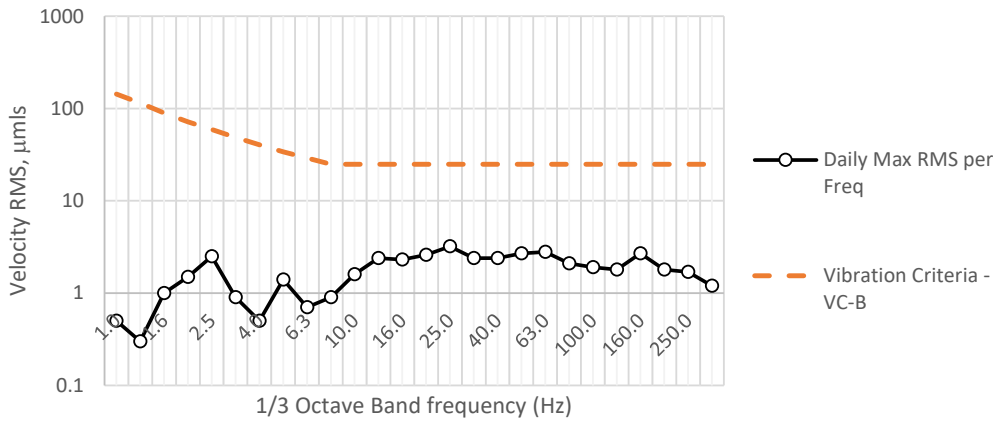
Sideways



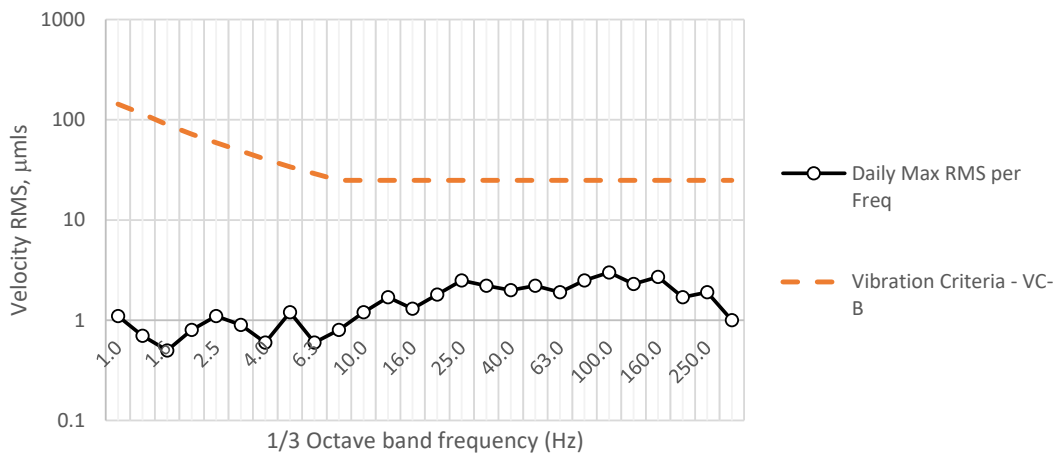
Vertical Vibration



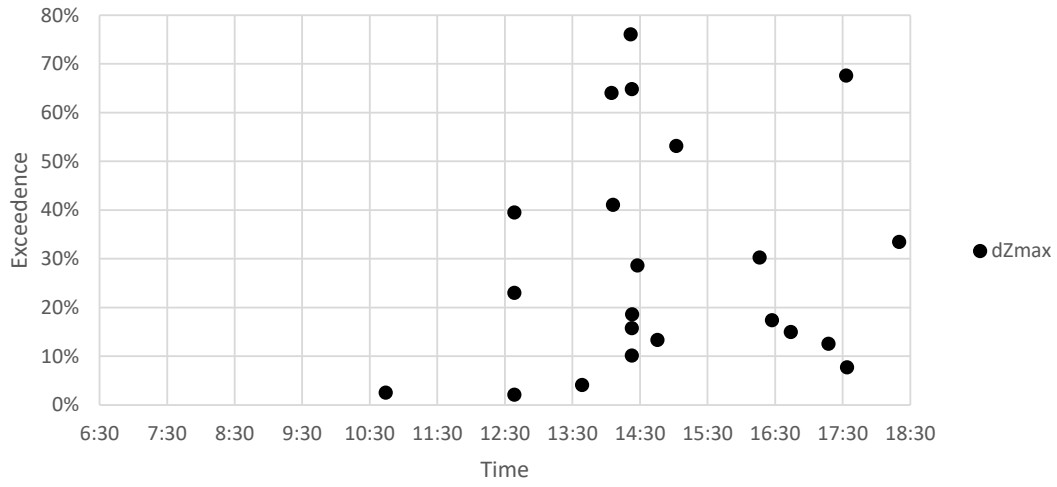
FwdBackwd Vibration



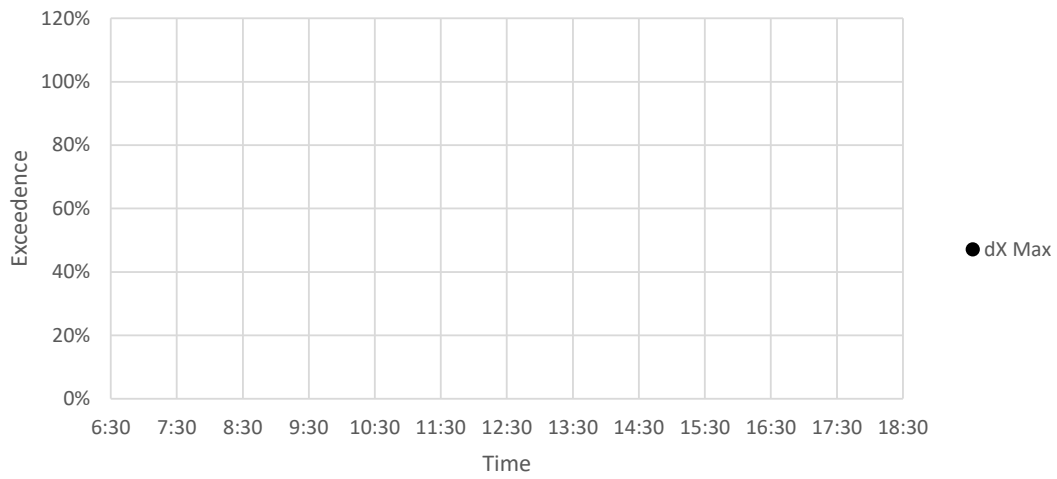
Sideways Vibration



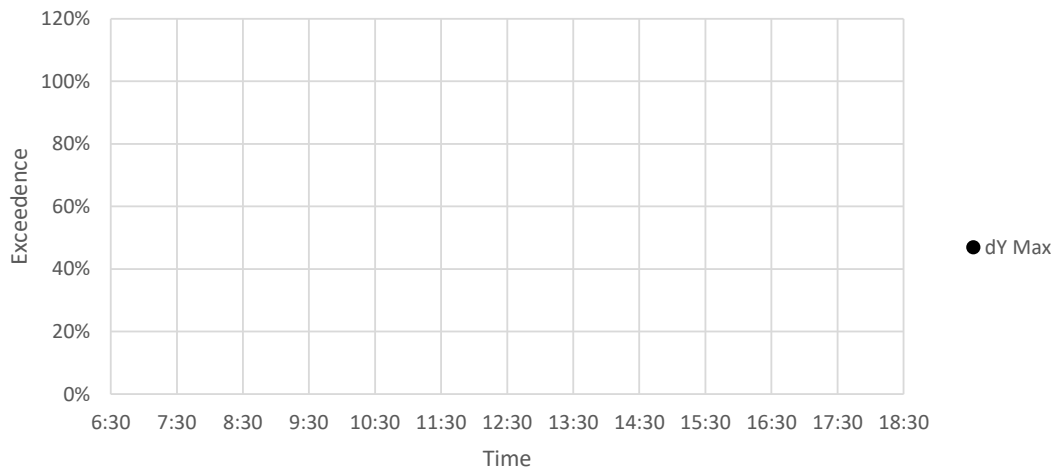
Vertical

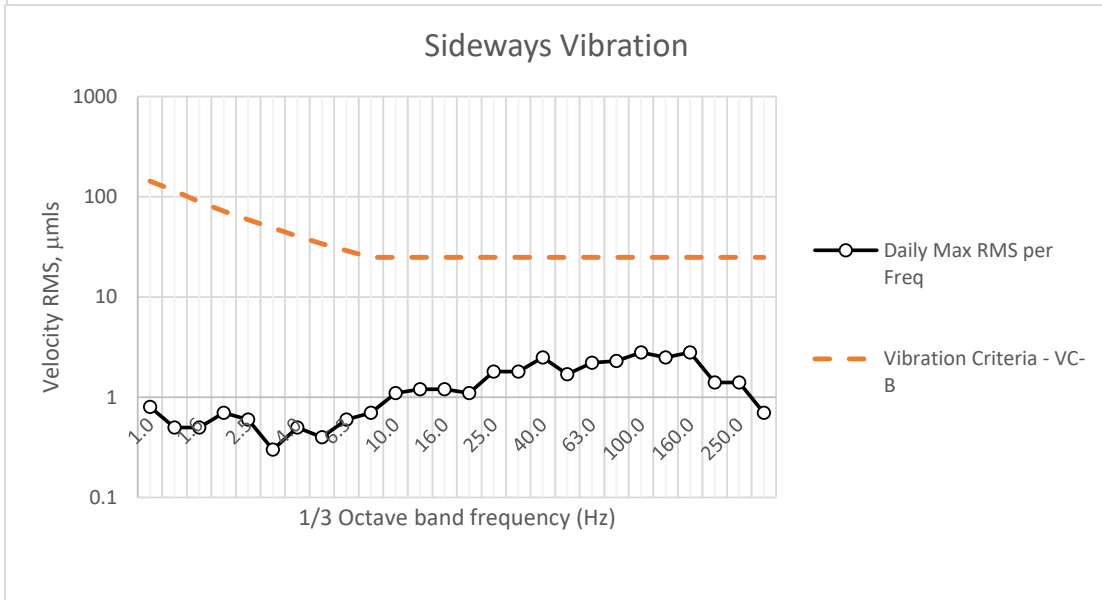
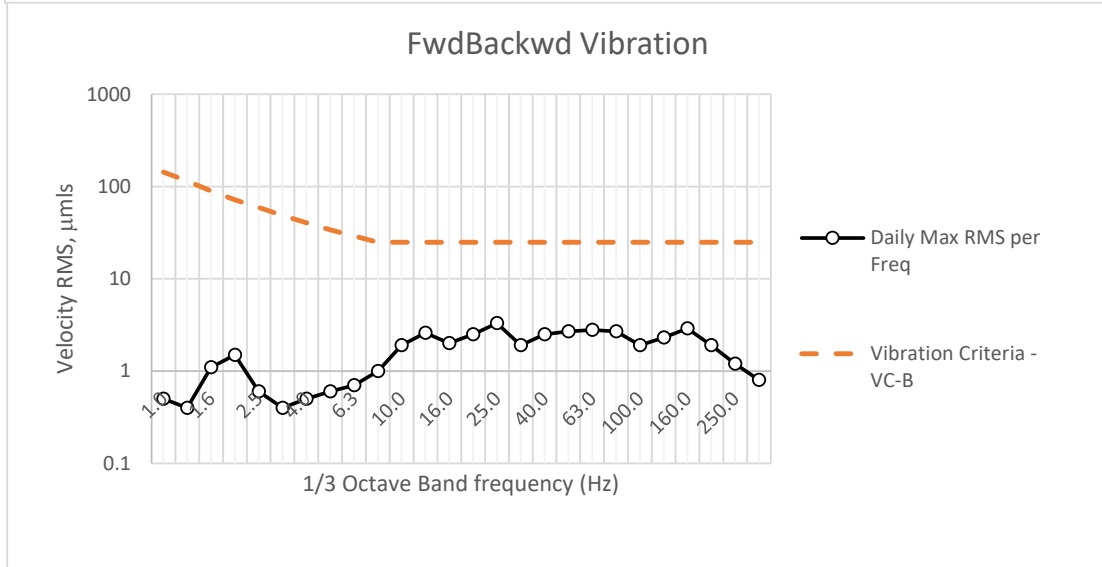
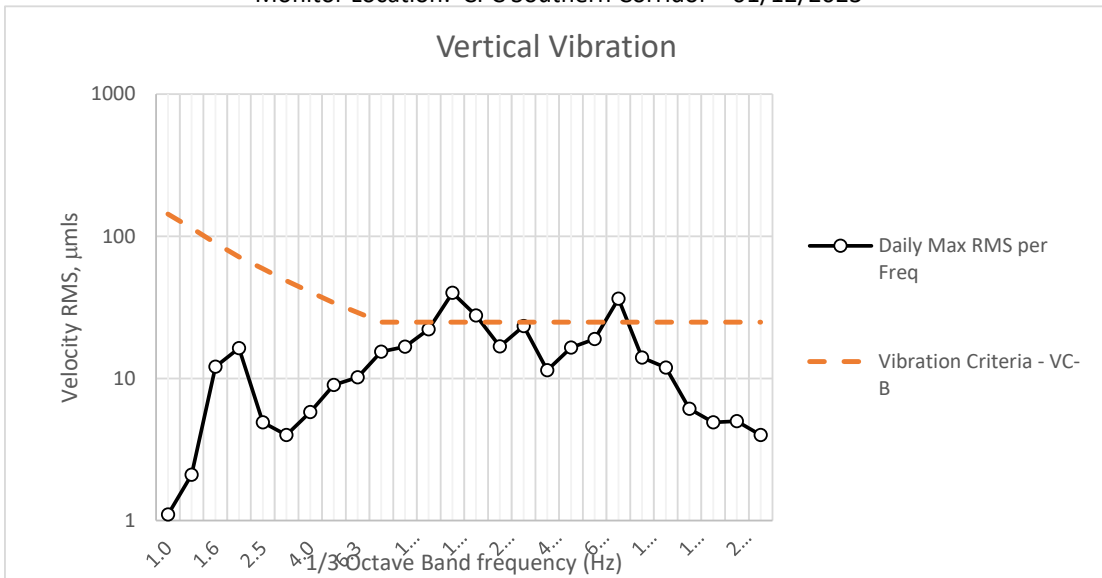


Fwd/Backwards

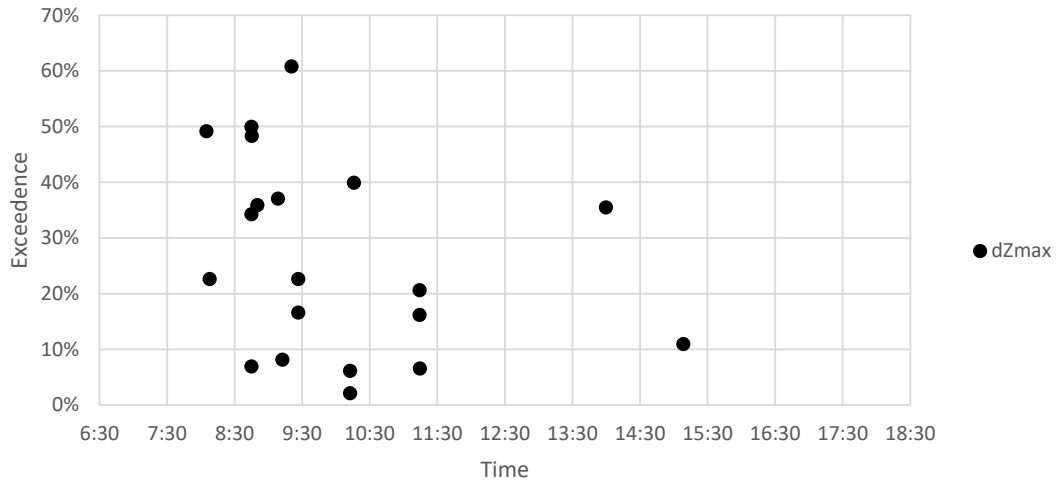


Sideways

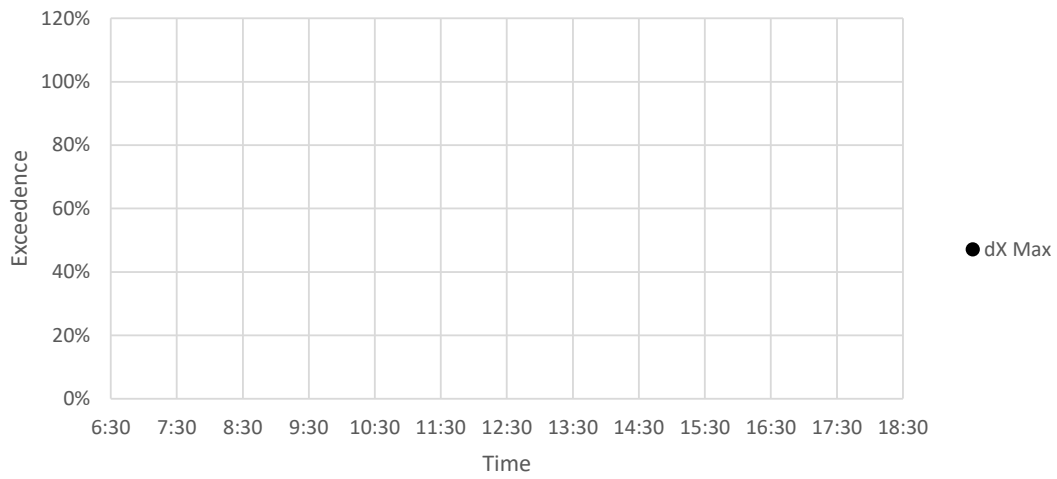




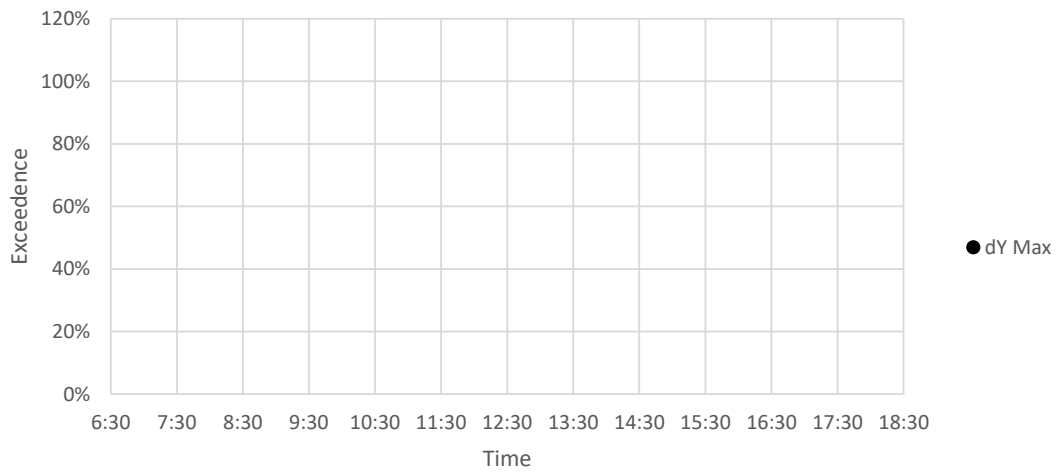
Vertical

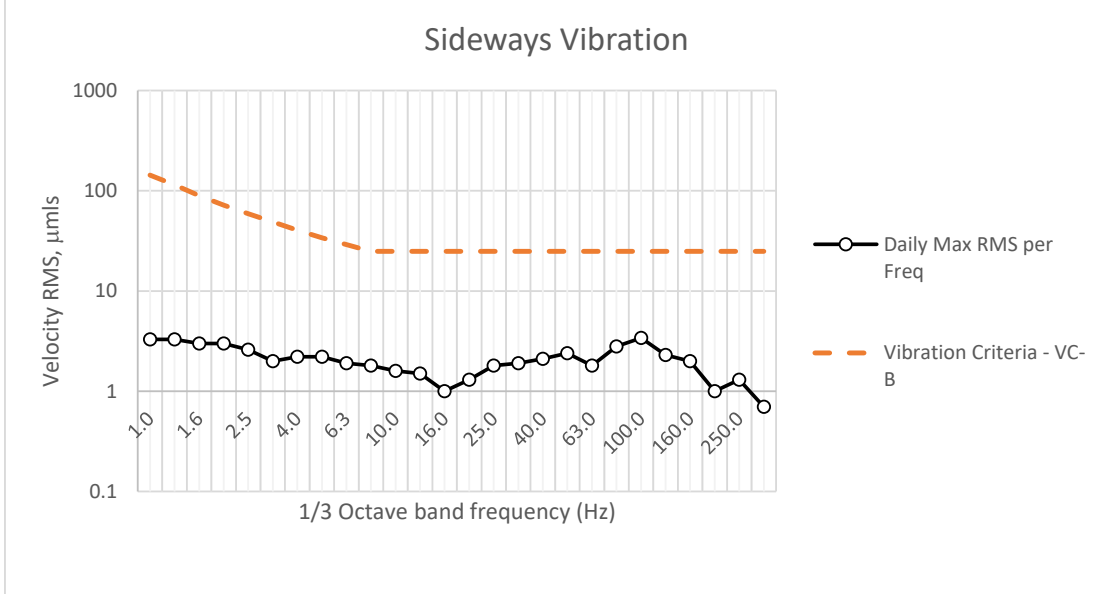
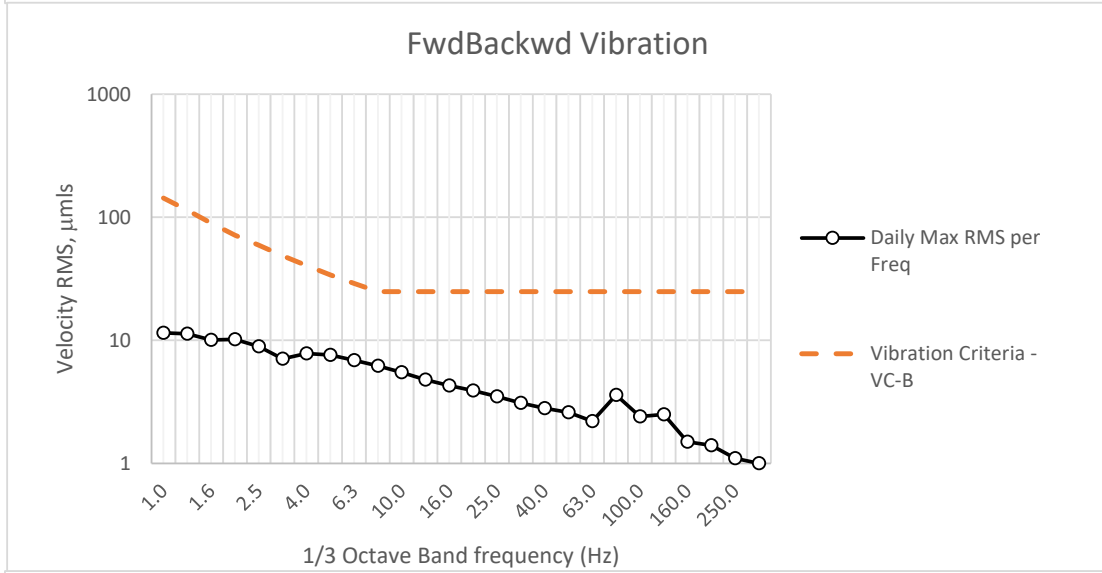
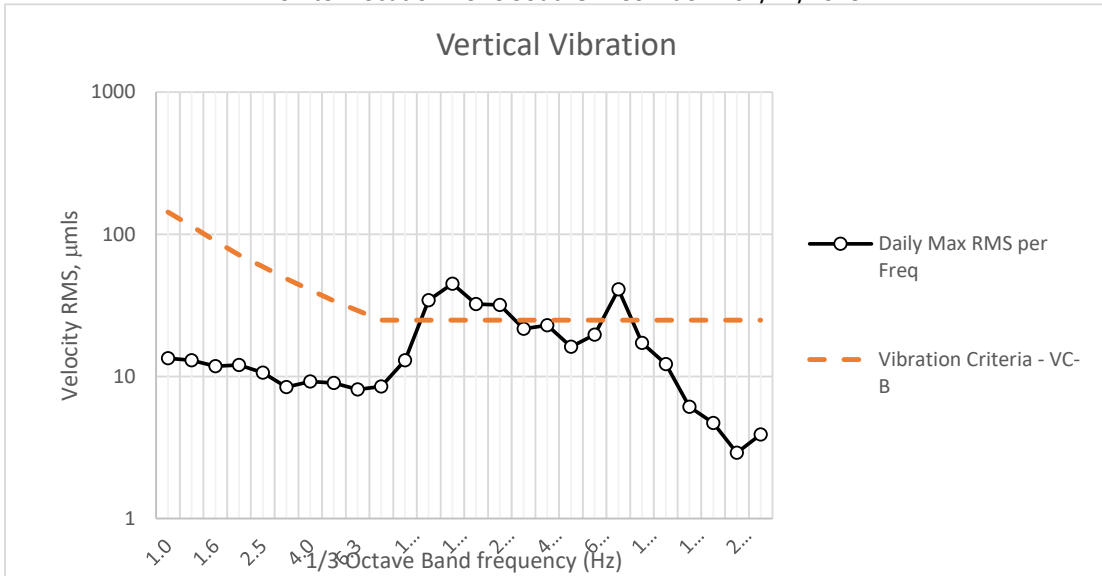


Fwd/Backwards

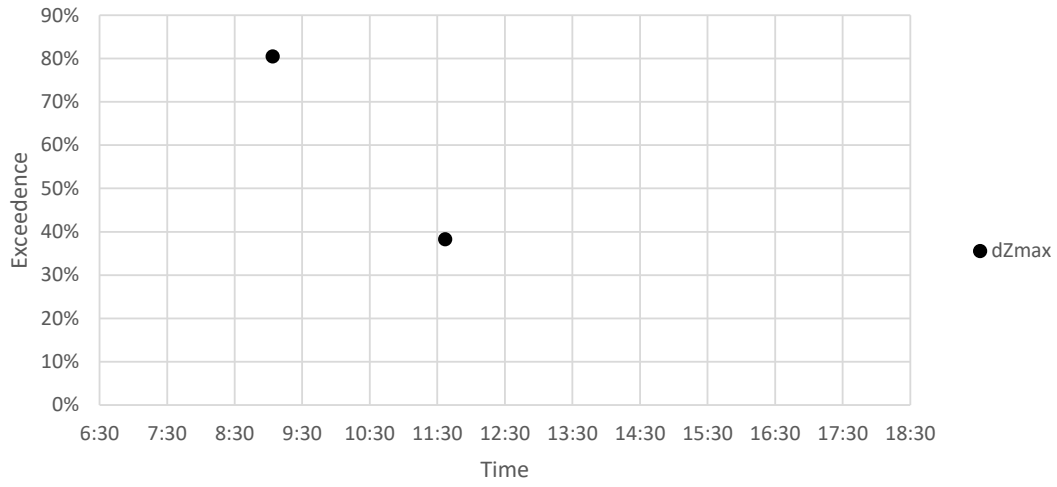


Sideways

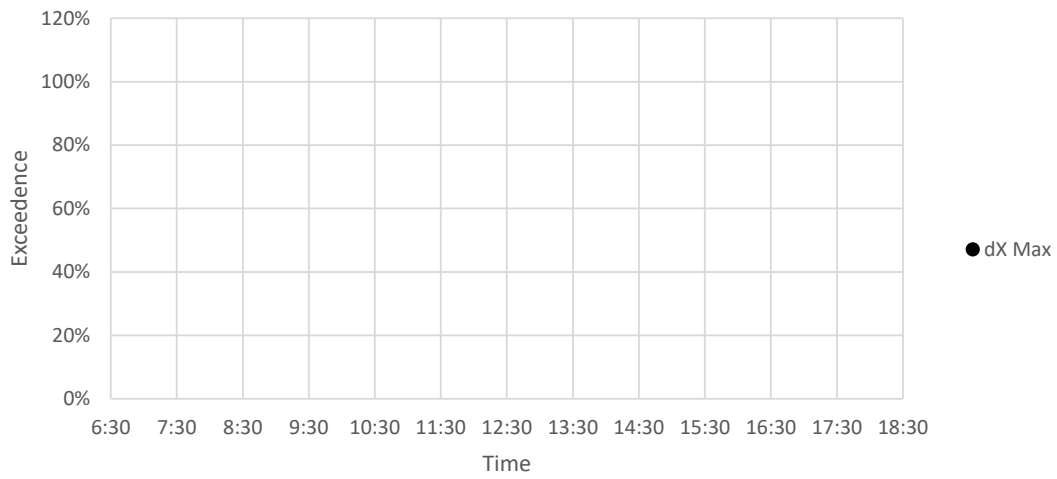




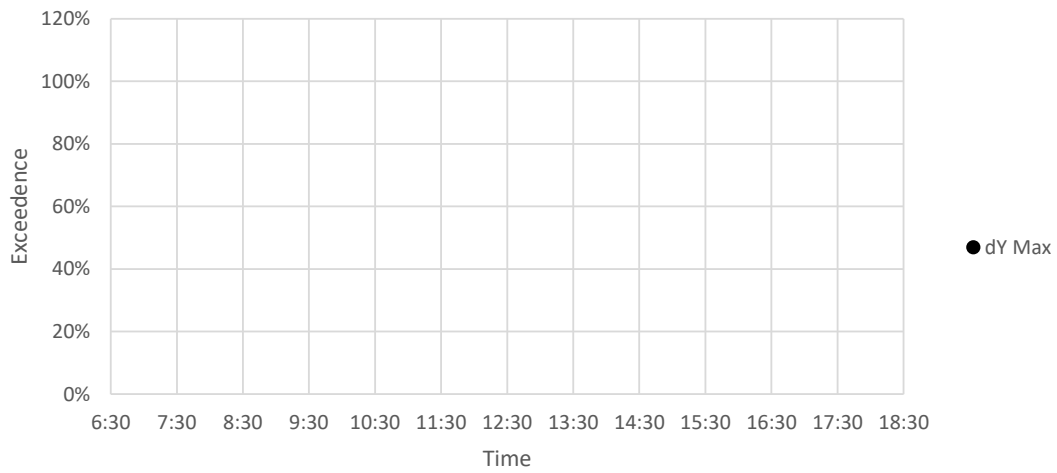
Vertical

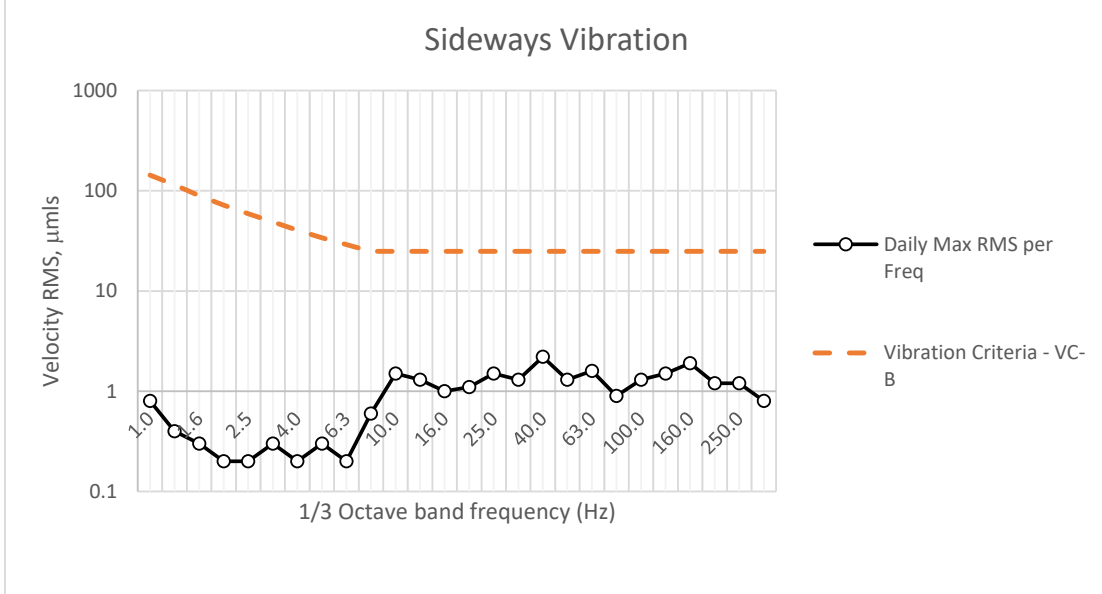
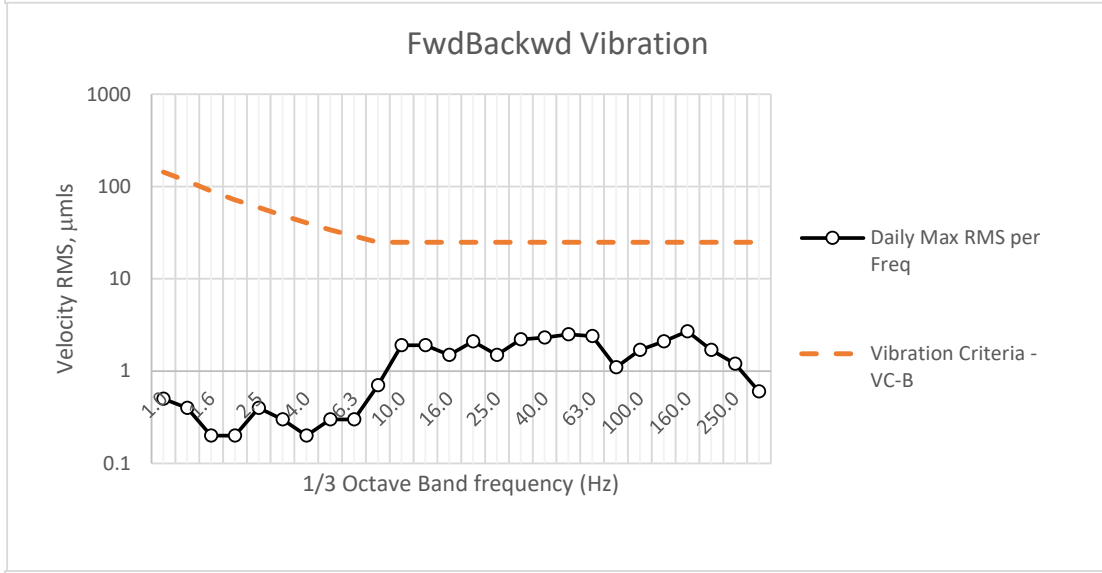
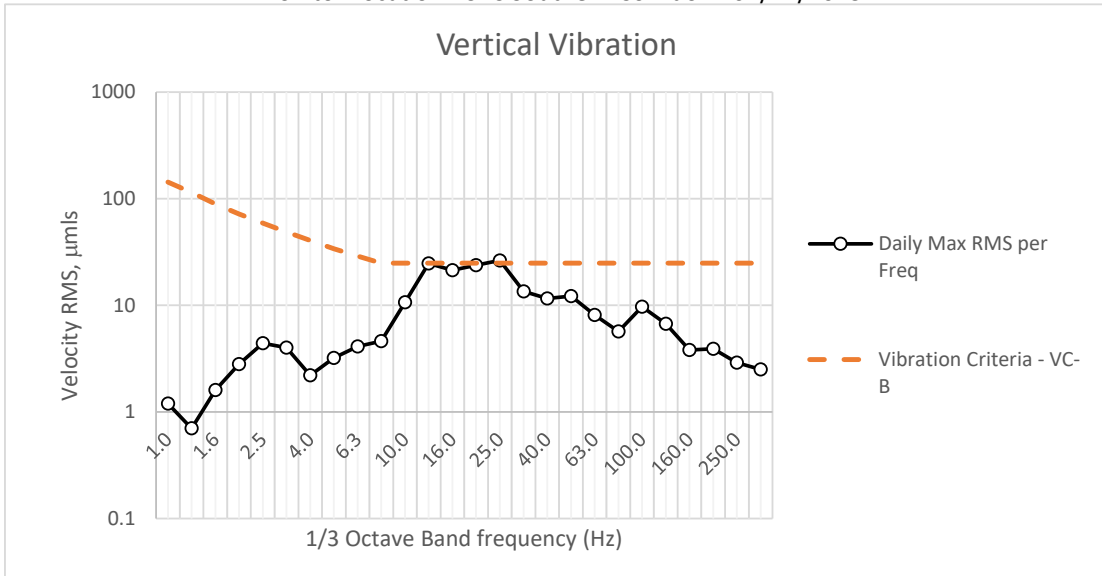


Fwd/Backwards

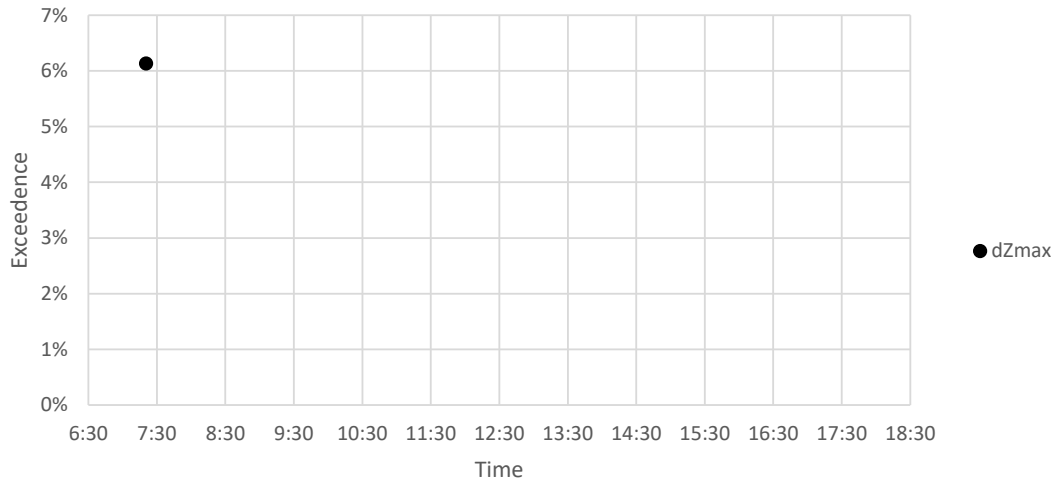


Sideways

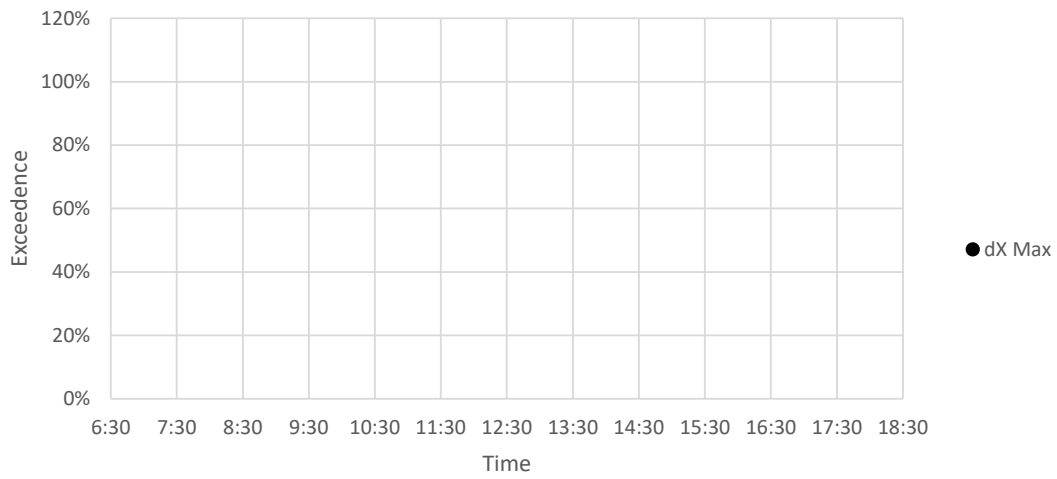




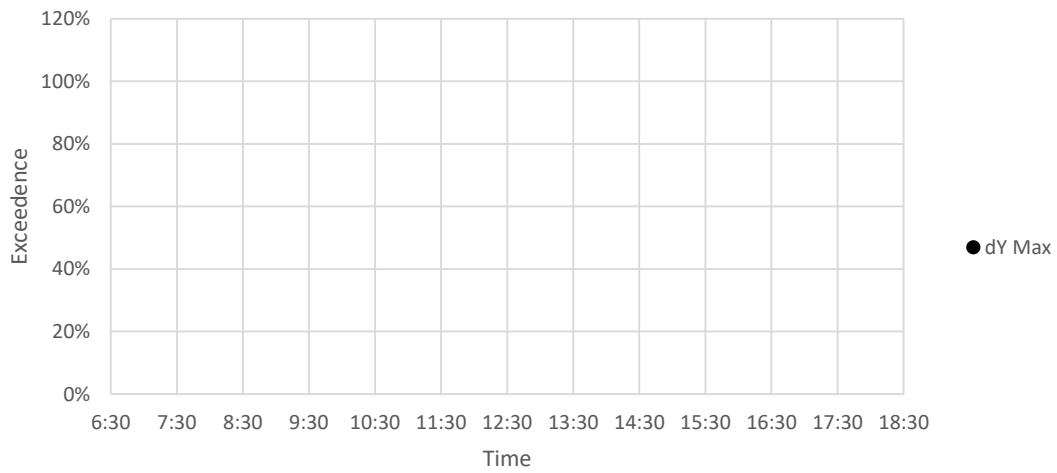
Vertical

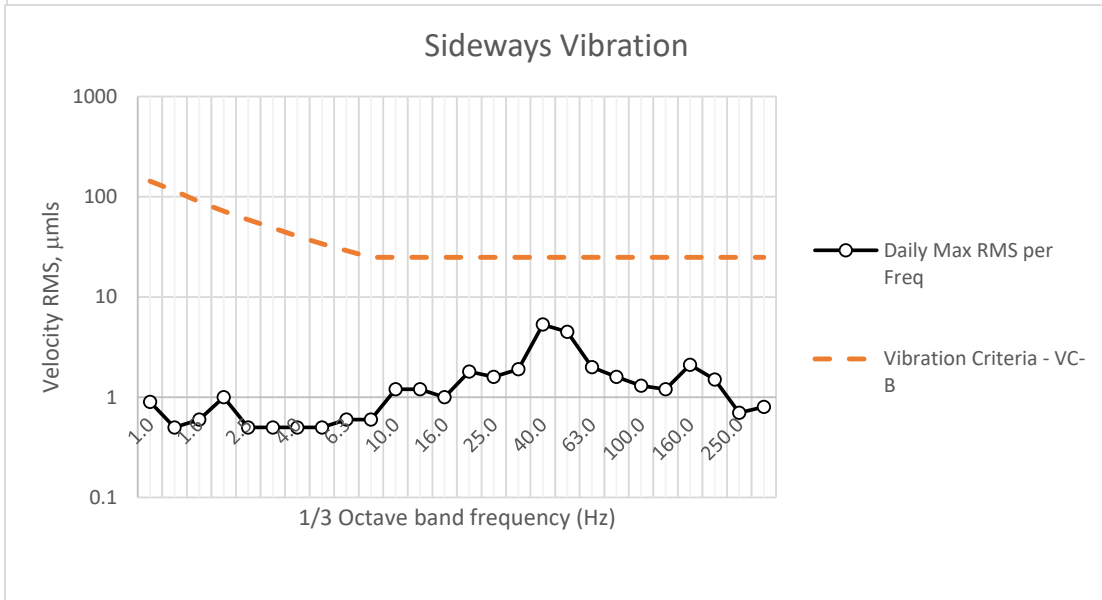
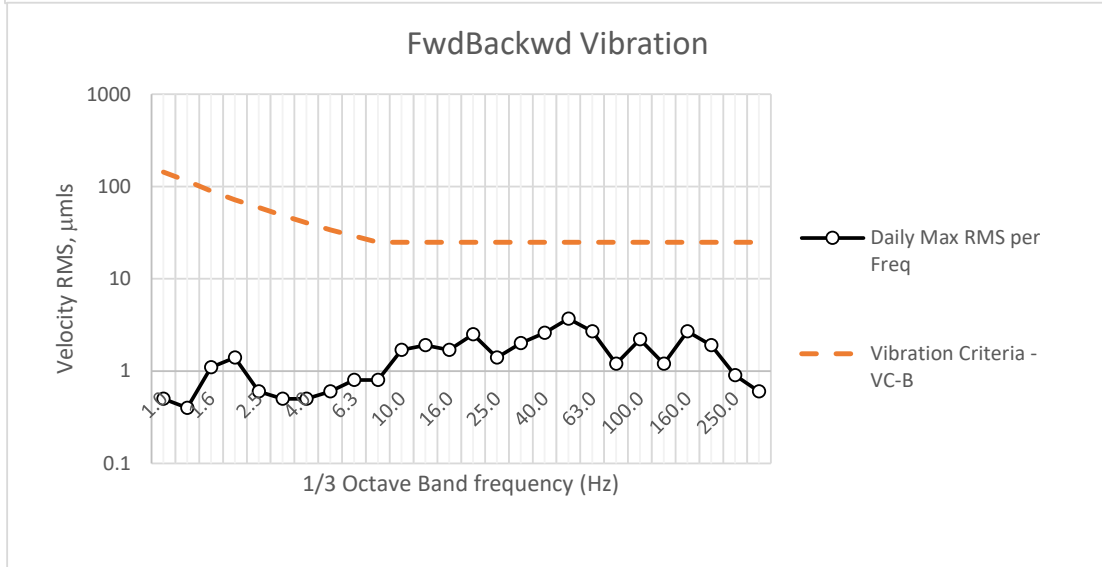
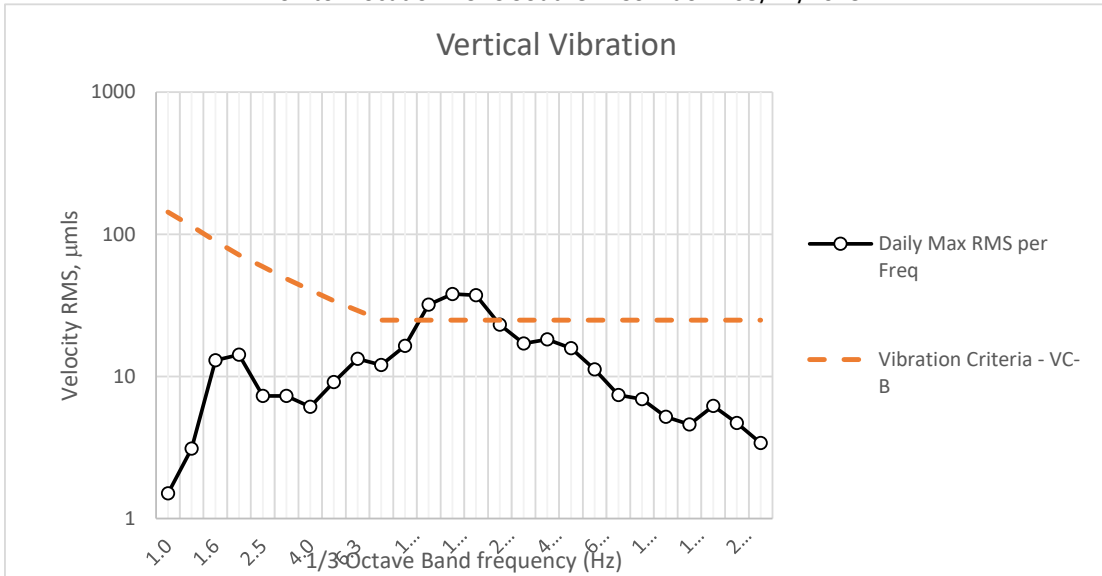


Fwd/Backwards

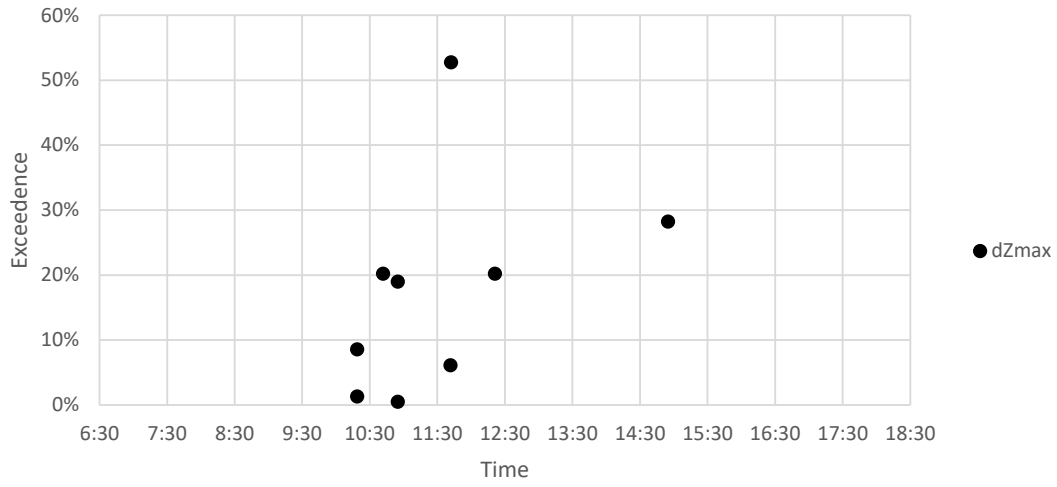


Sideways

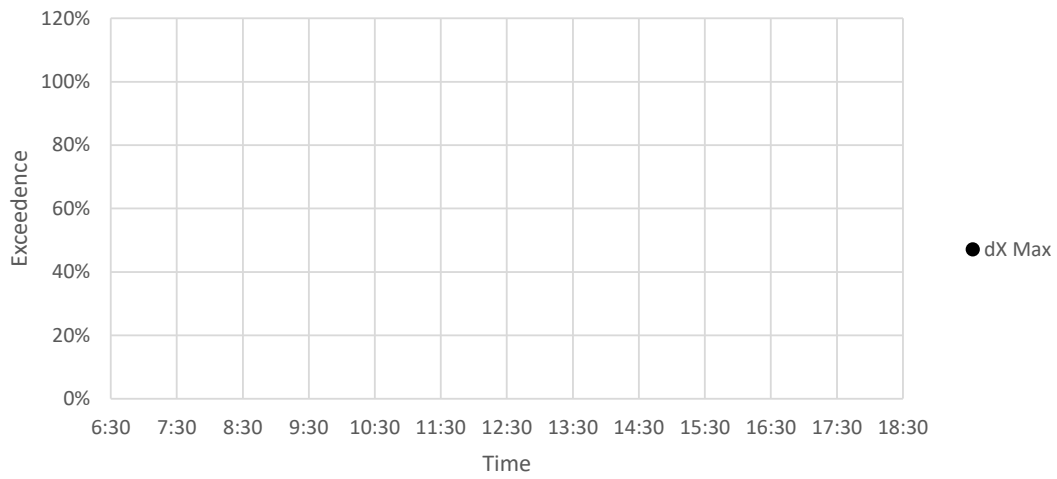




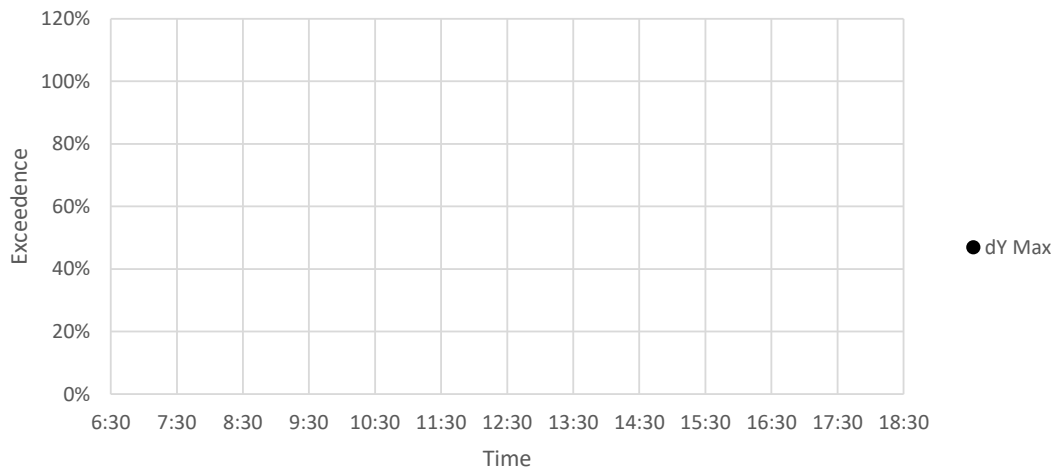
Vertical

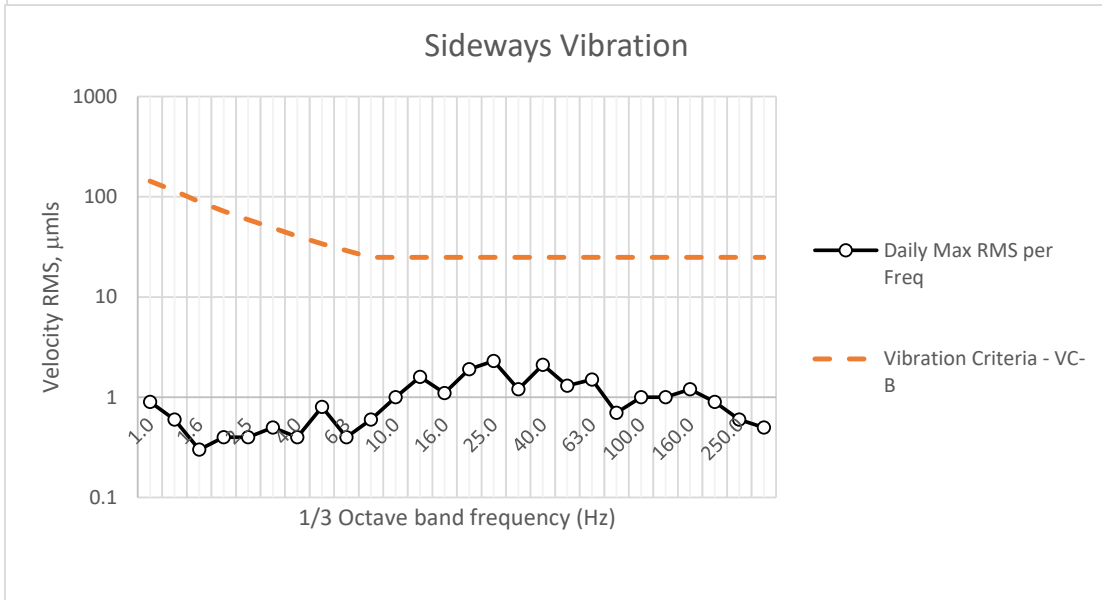
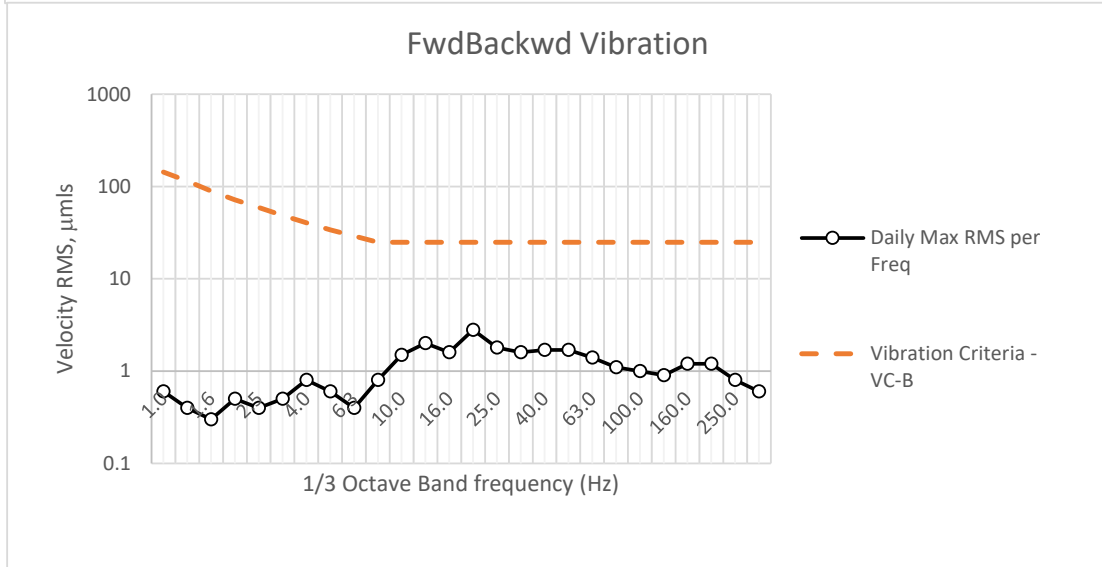
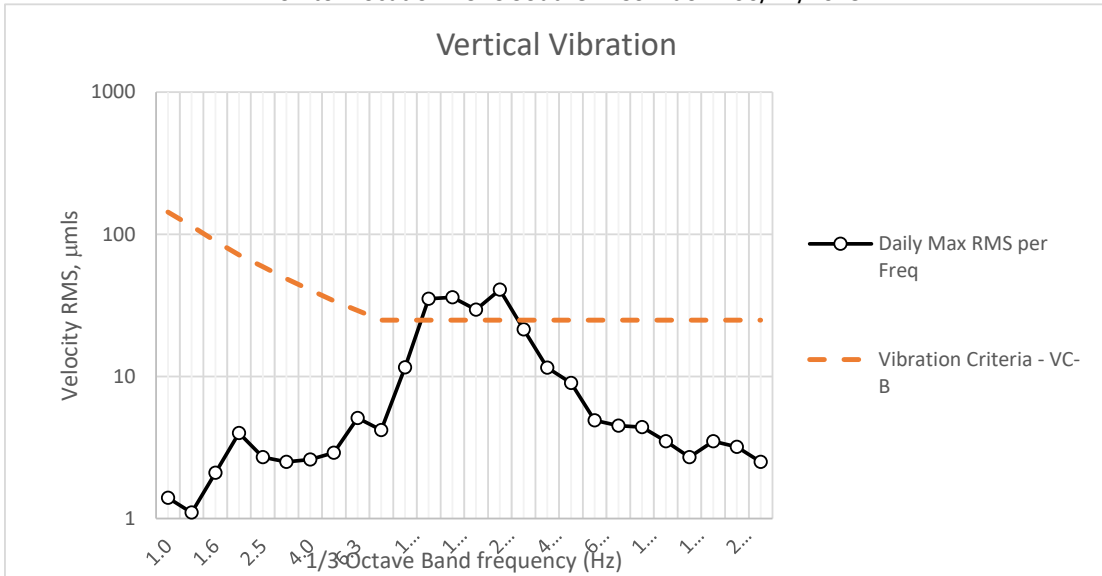


Fwd/Backwards

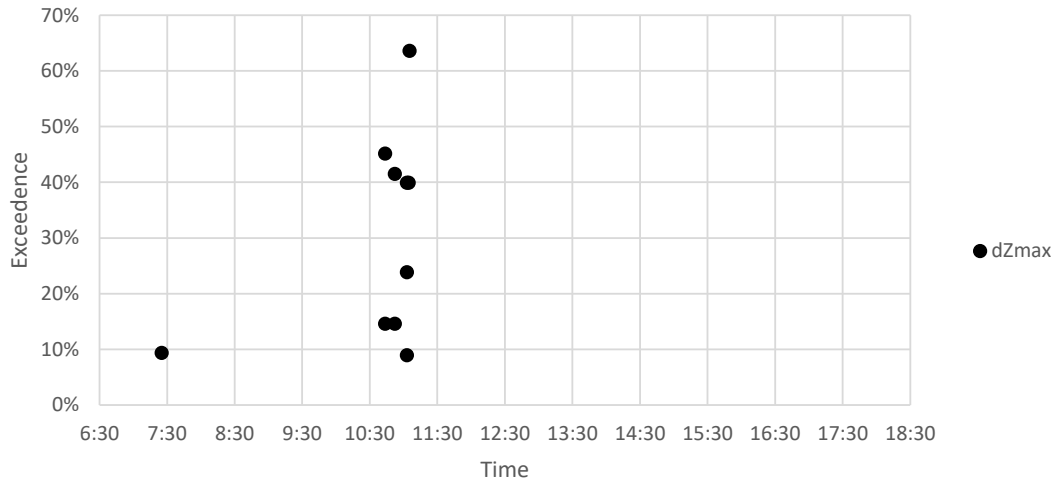


Sideways

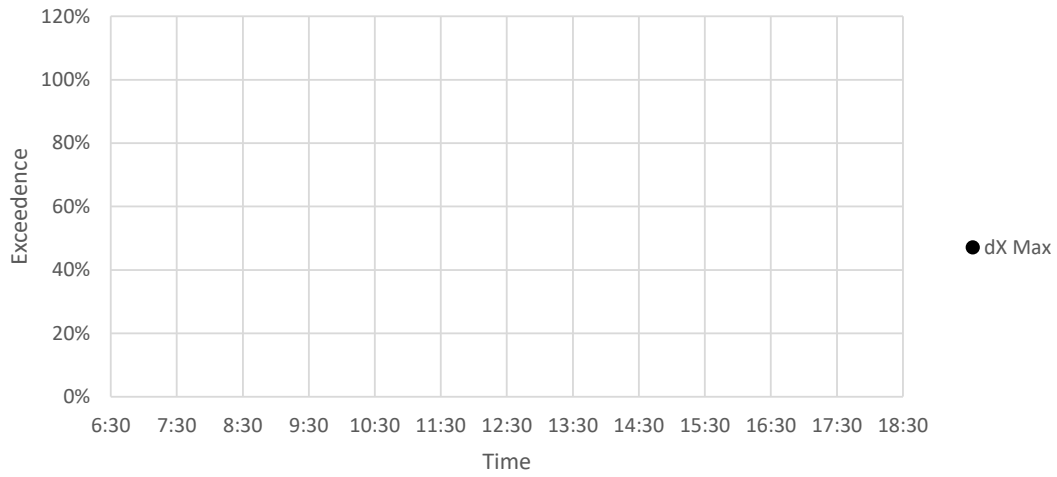




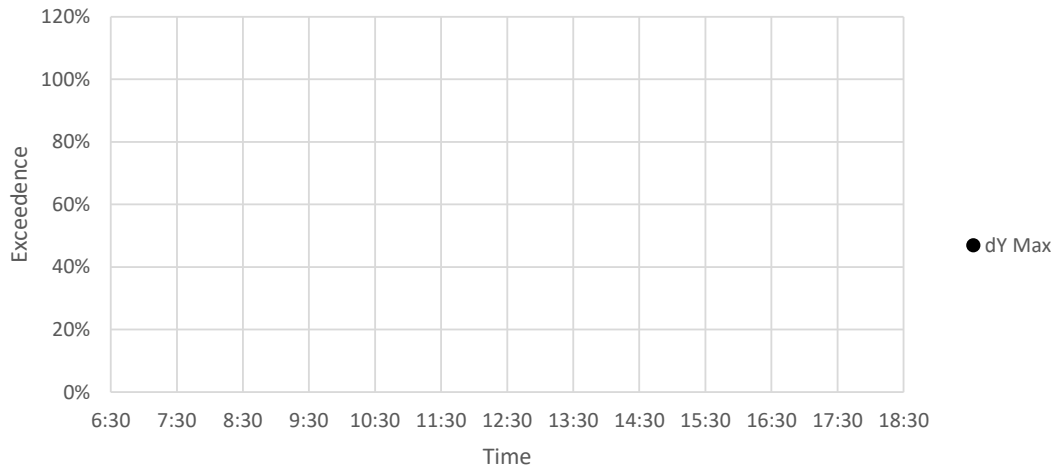
Vertical



Fwd/Backwards

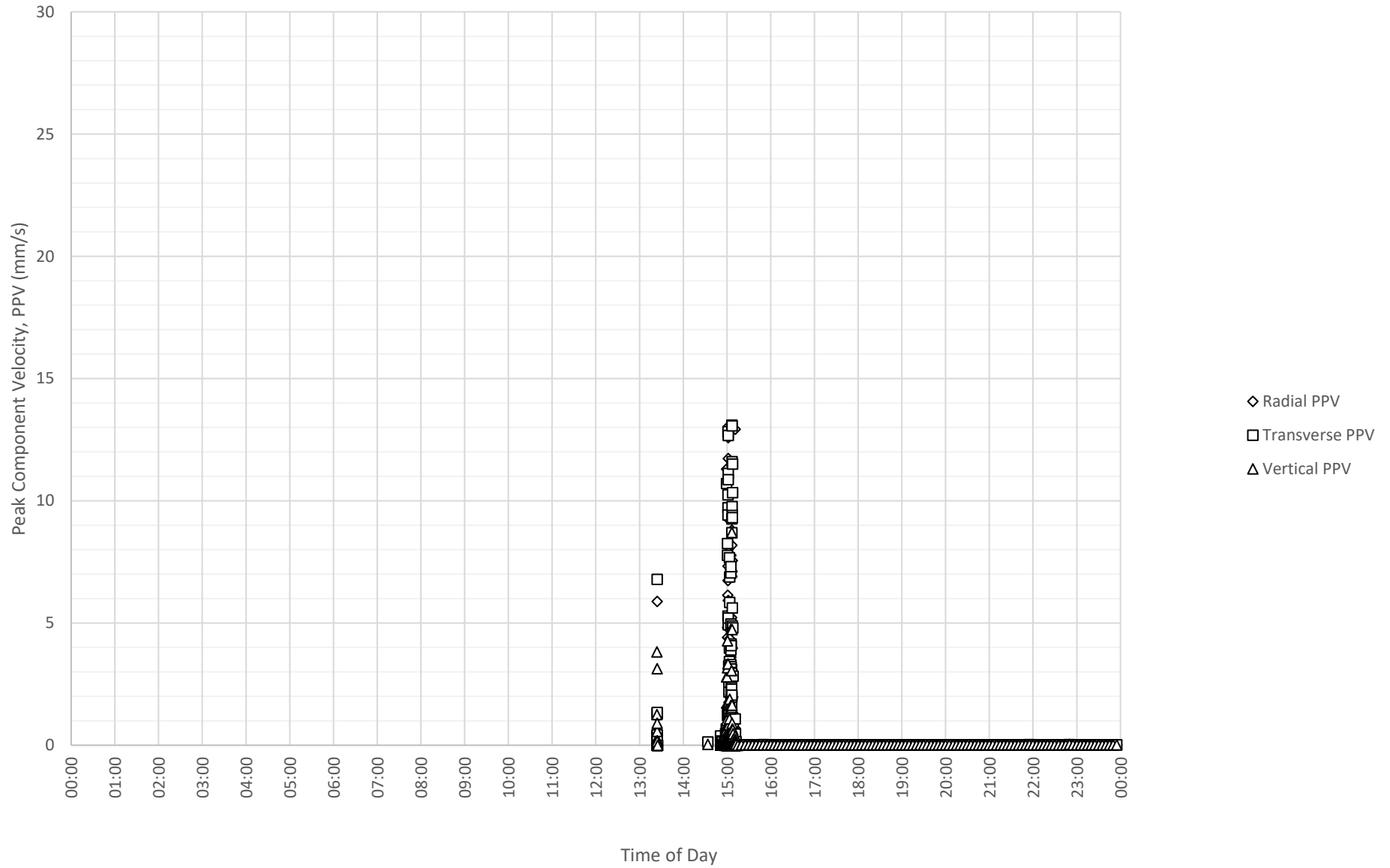


Sideways

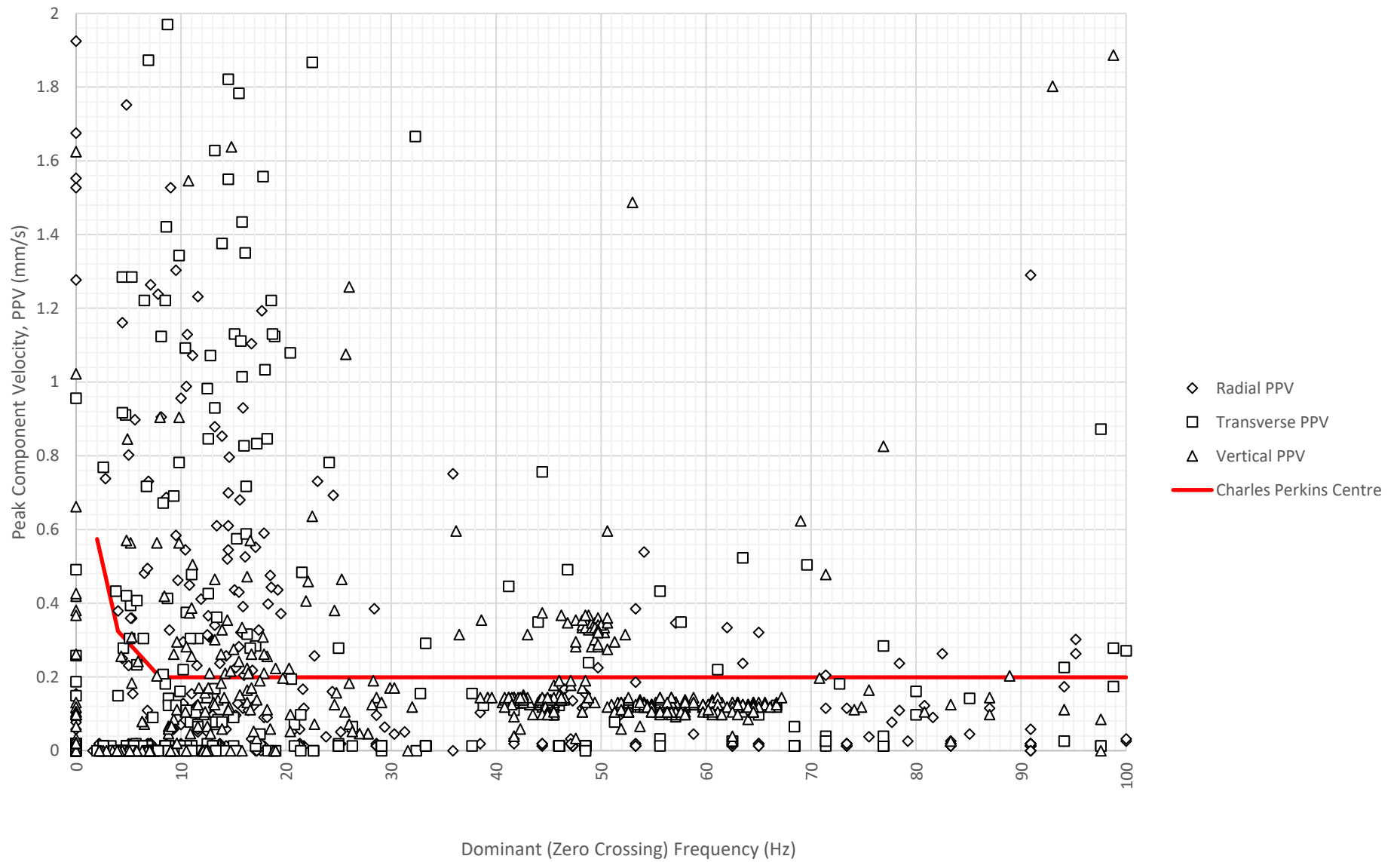


CHARLES PERKINS CENTRE – LEVEL B1 SOUTHERN WING OBSERVATION ROOM E

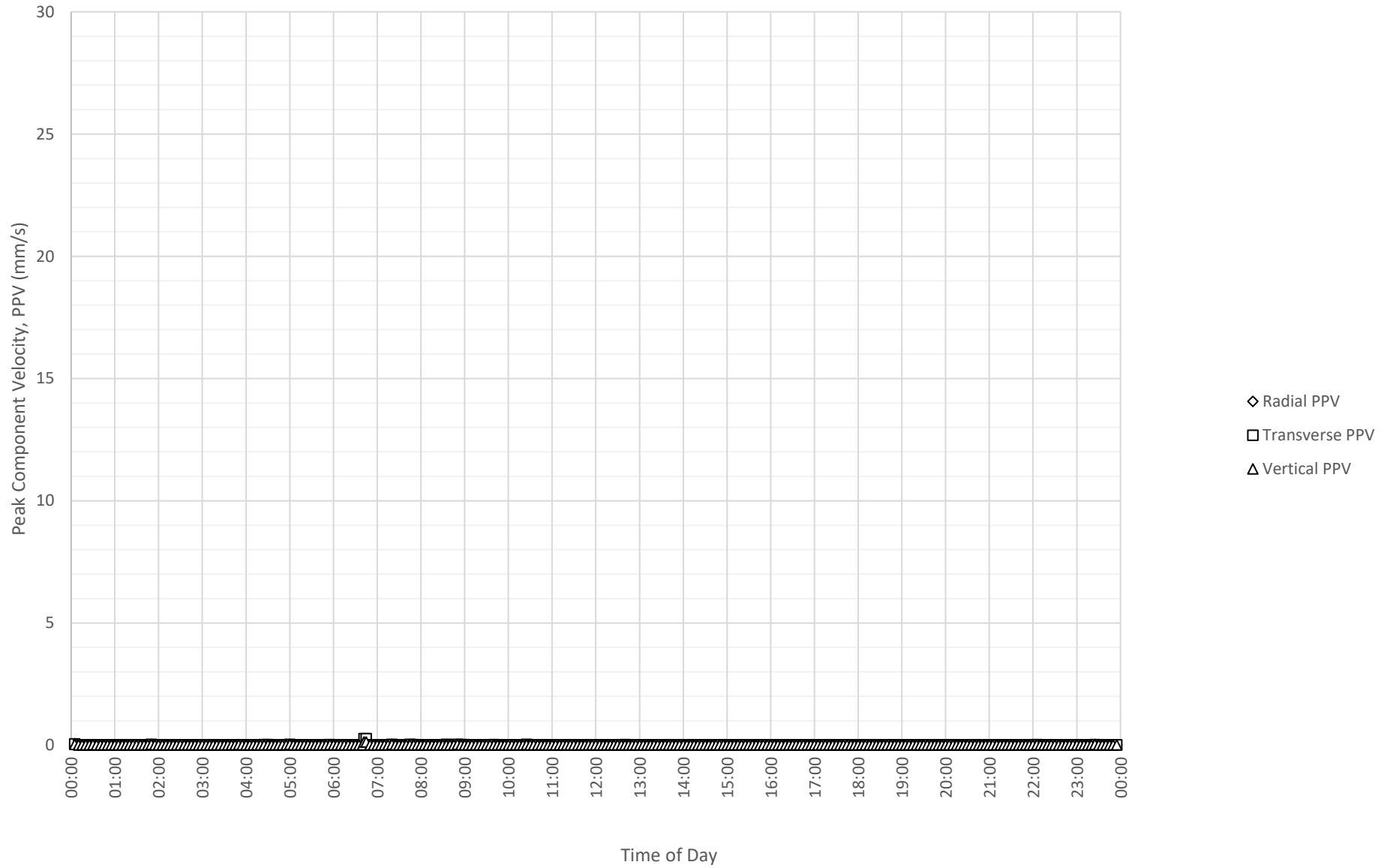
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 23-11-2023



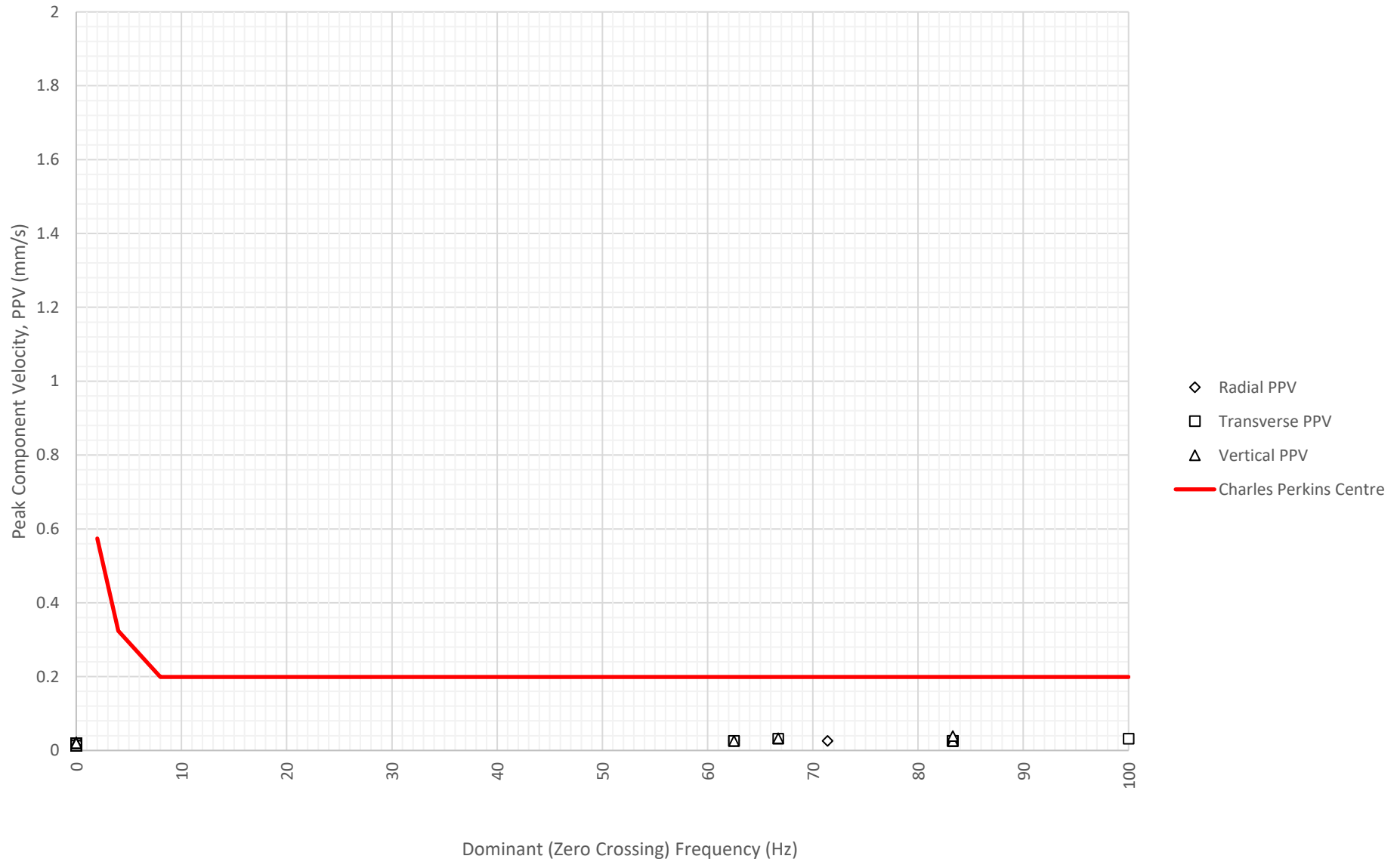
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 23-11-2023



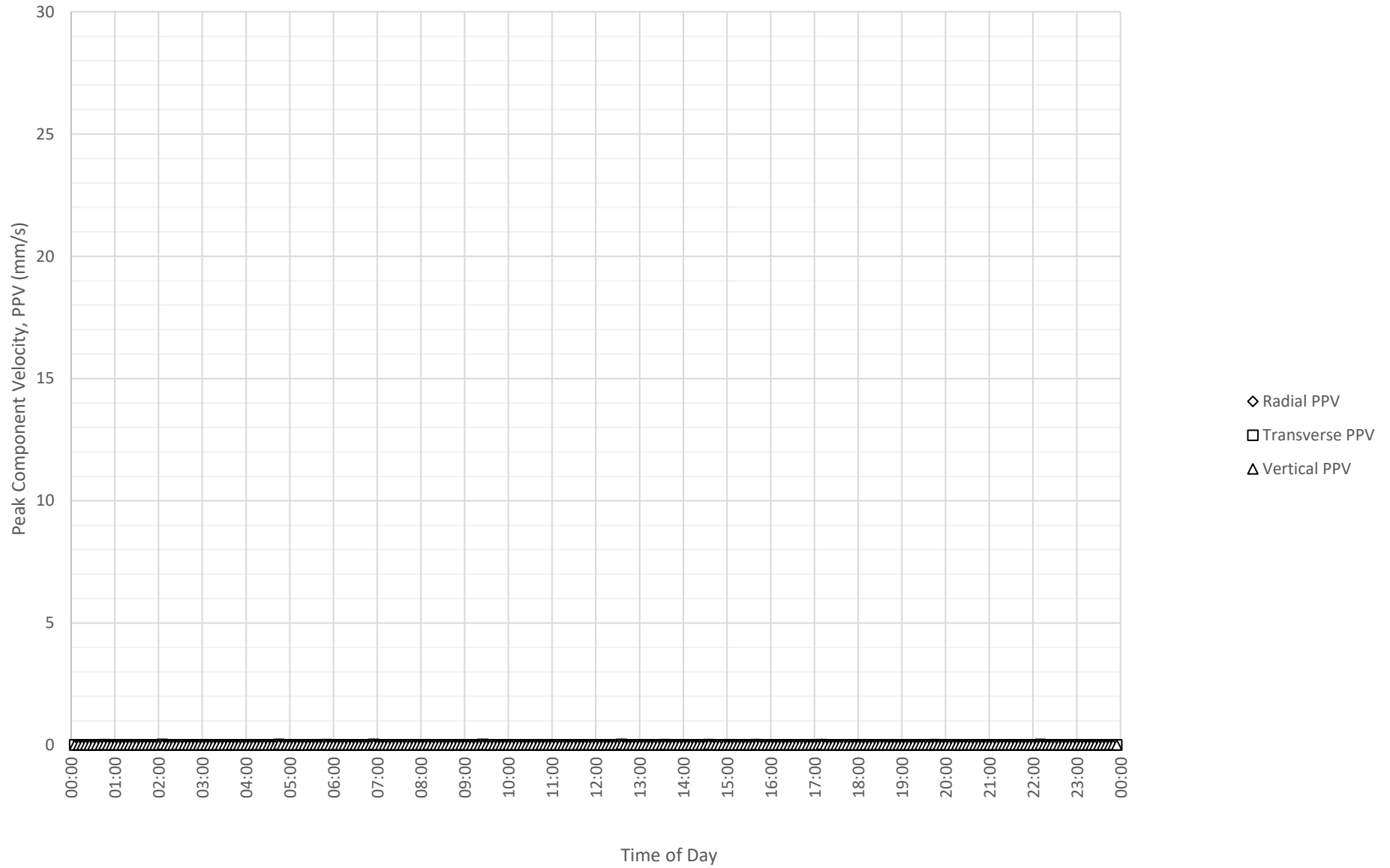
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 24-11-2023



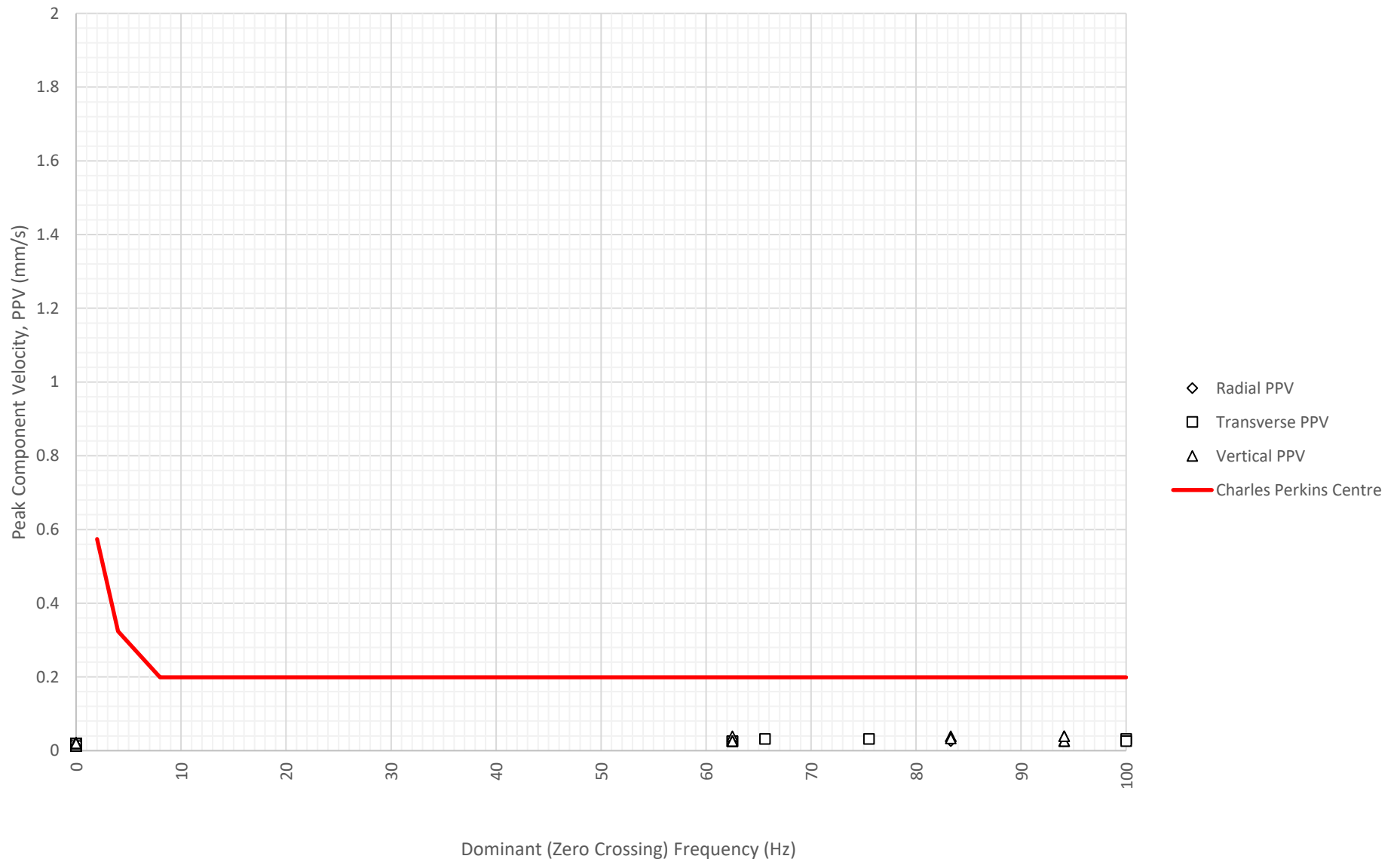
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 24-11-2023



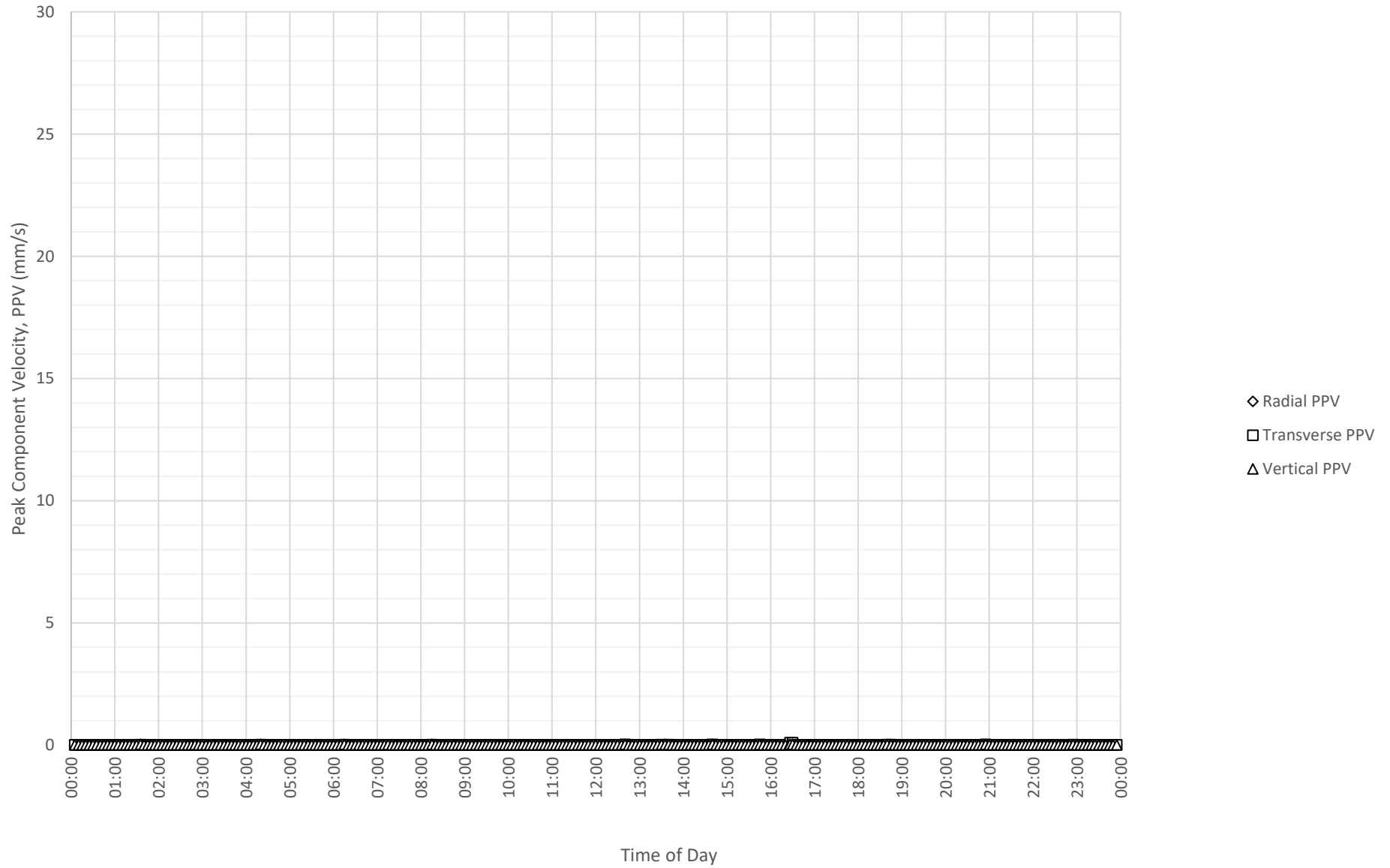
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 25-11-2023



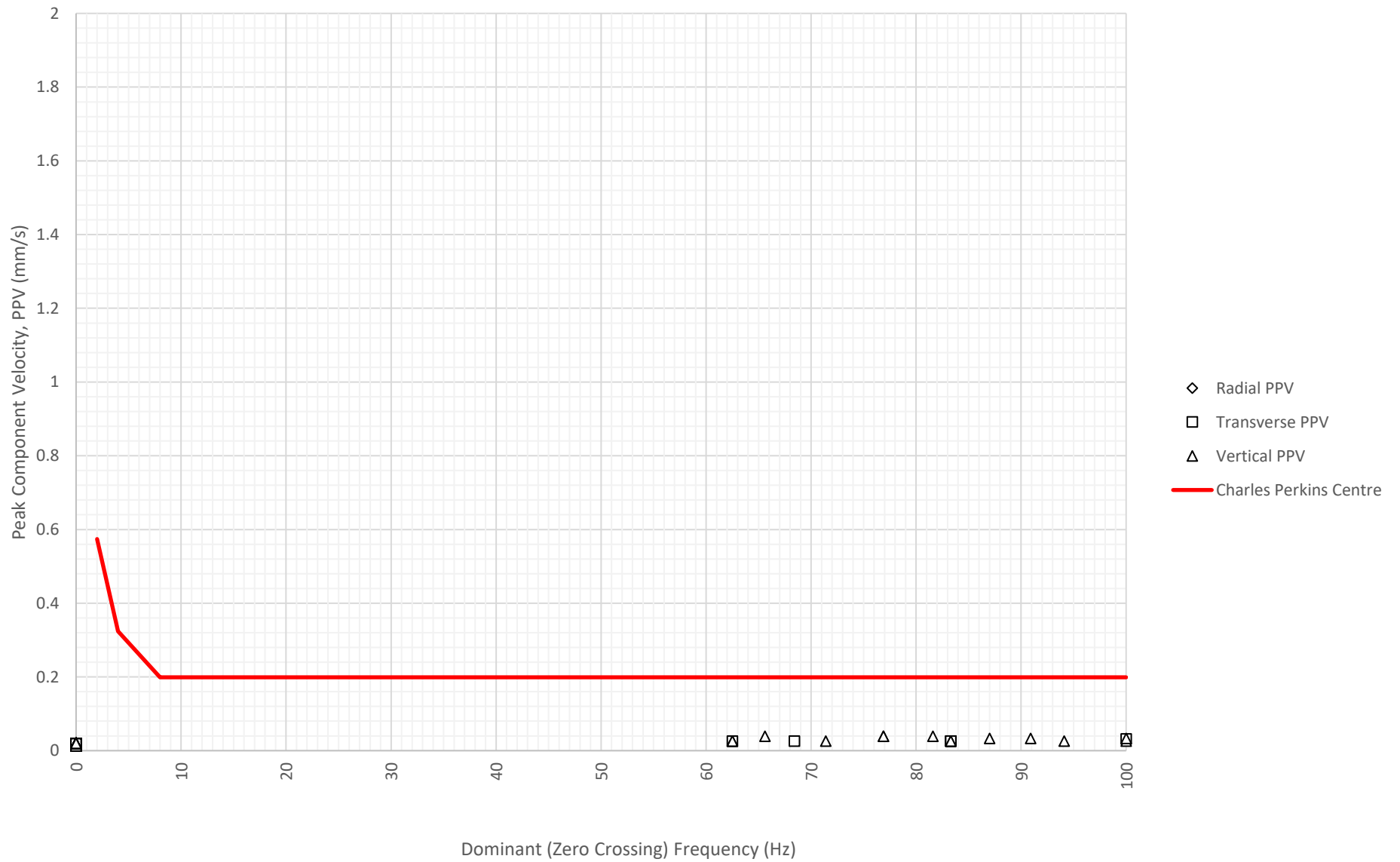
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 25-11-2023



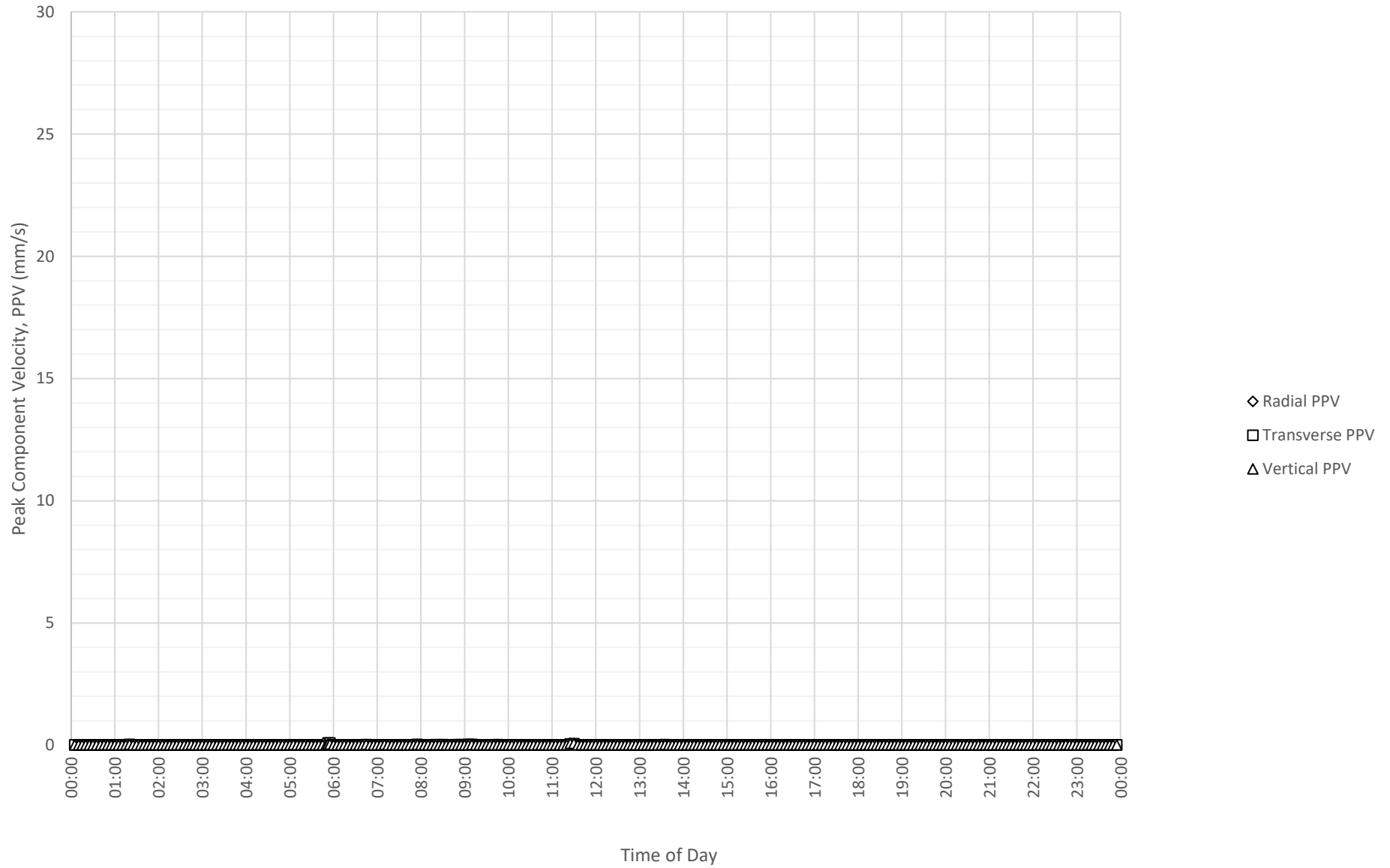
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 26-11-2023



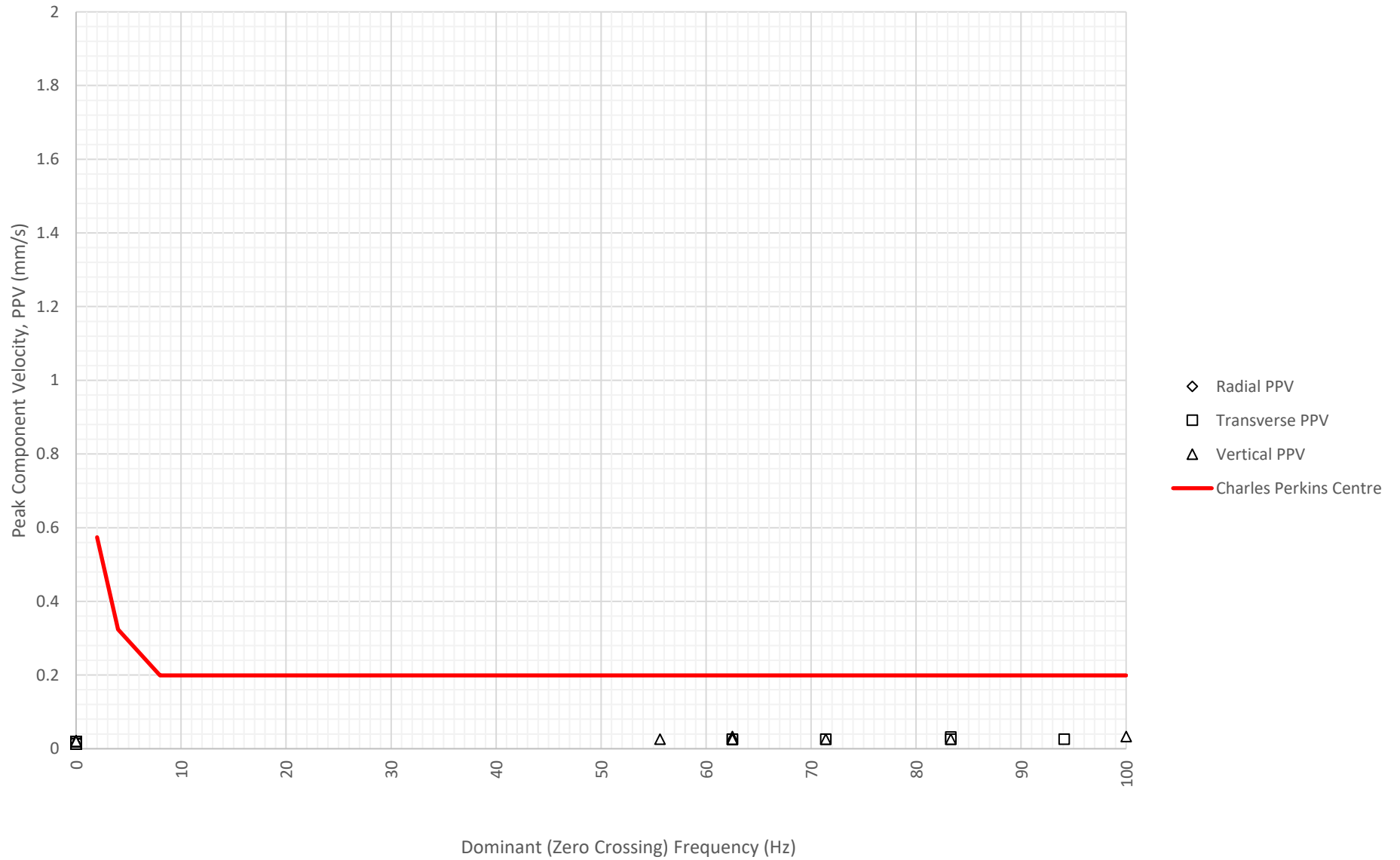
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 26-11-2023



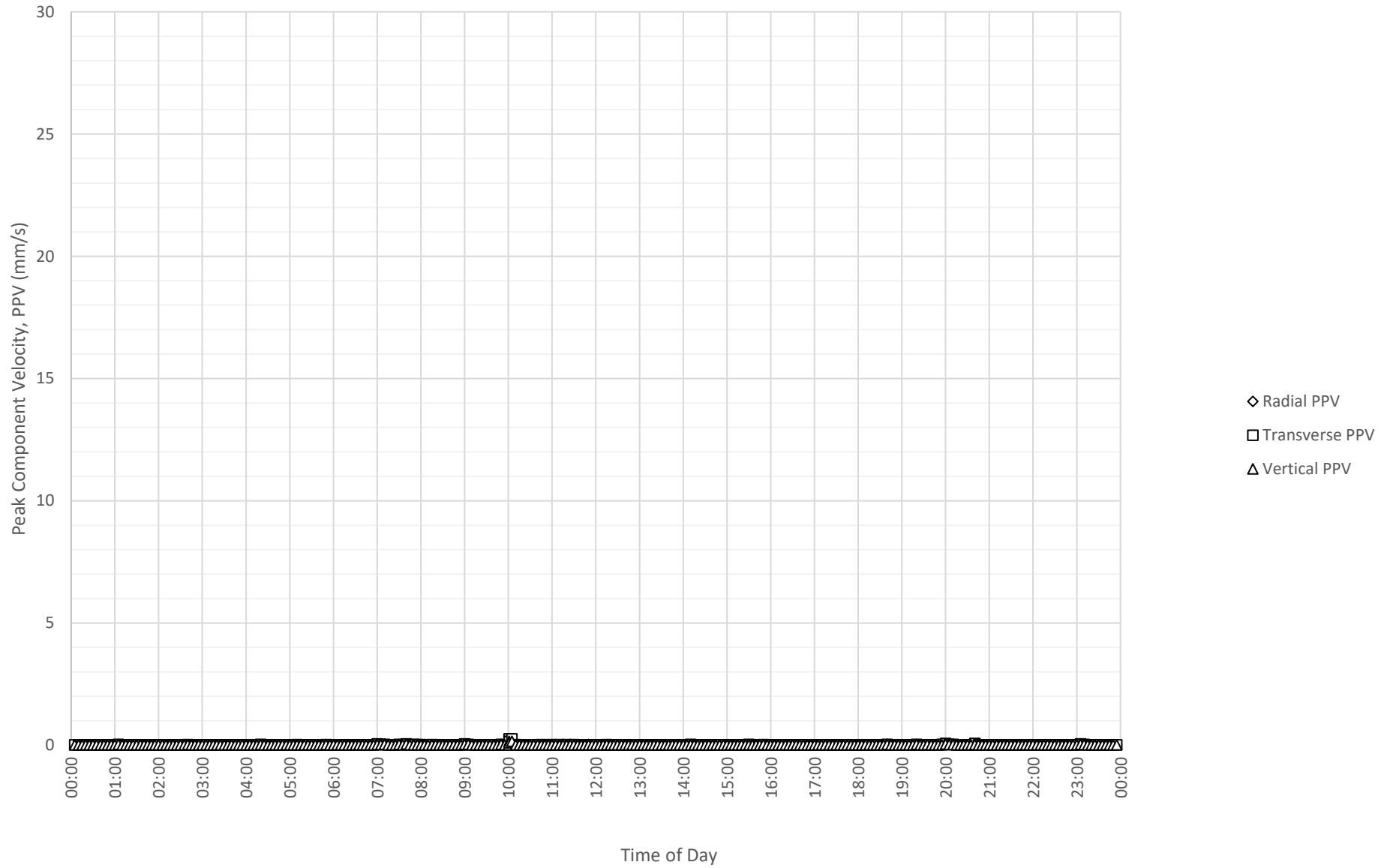
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 27-11-2023



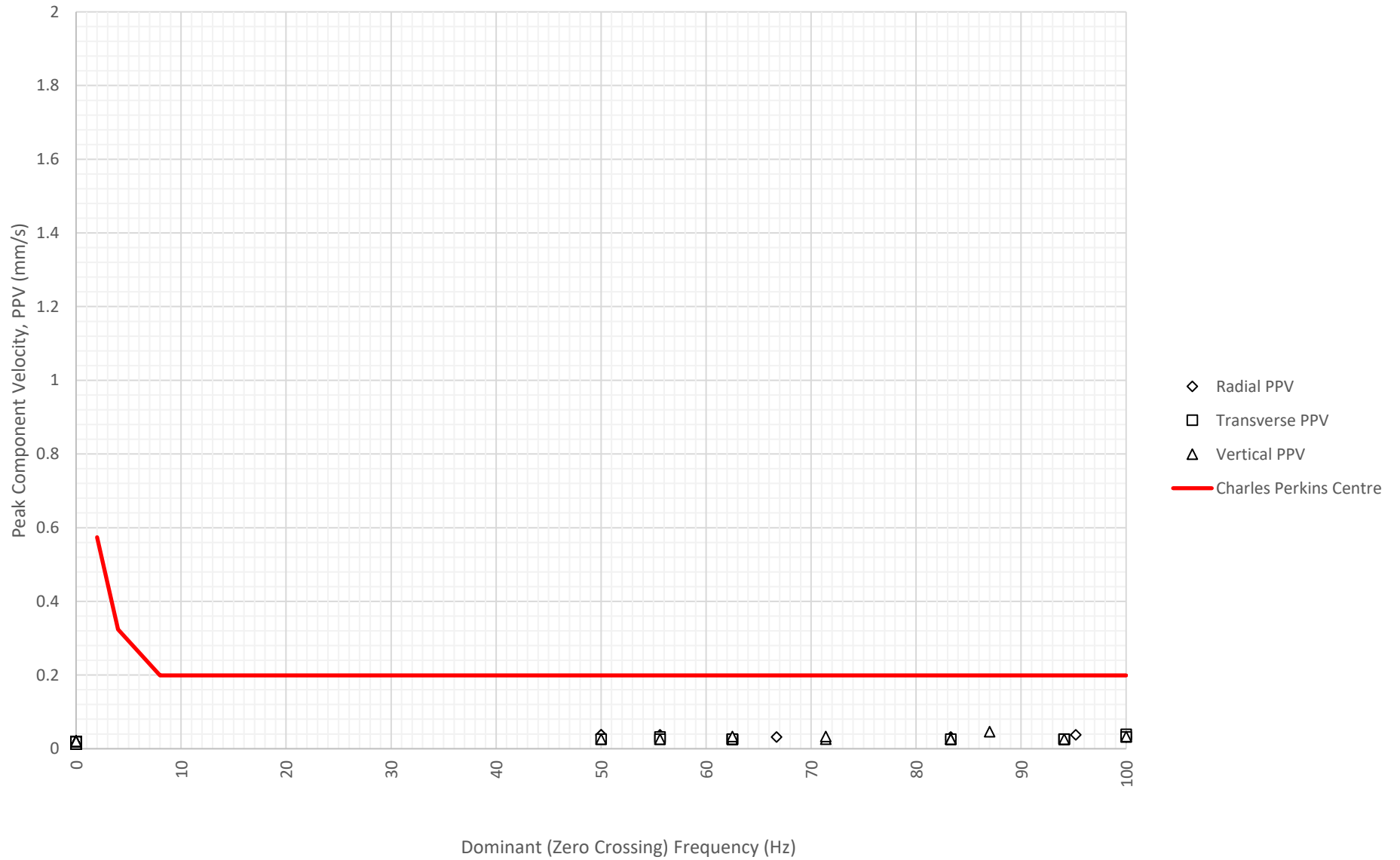
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 27-11-2023



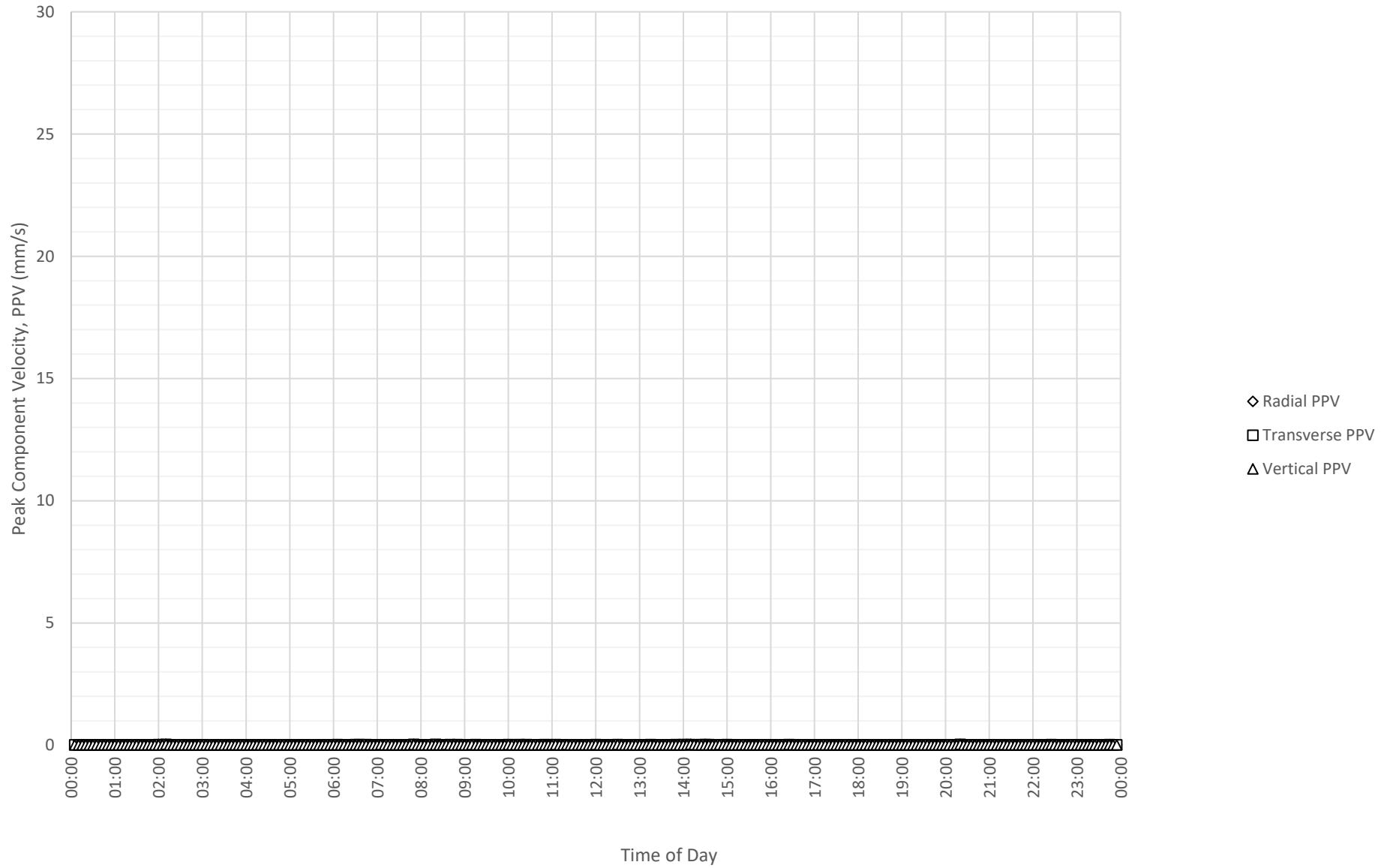
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 28-11-2023



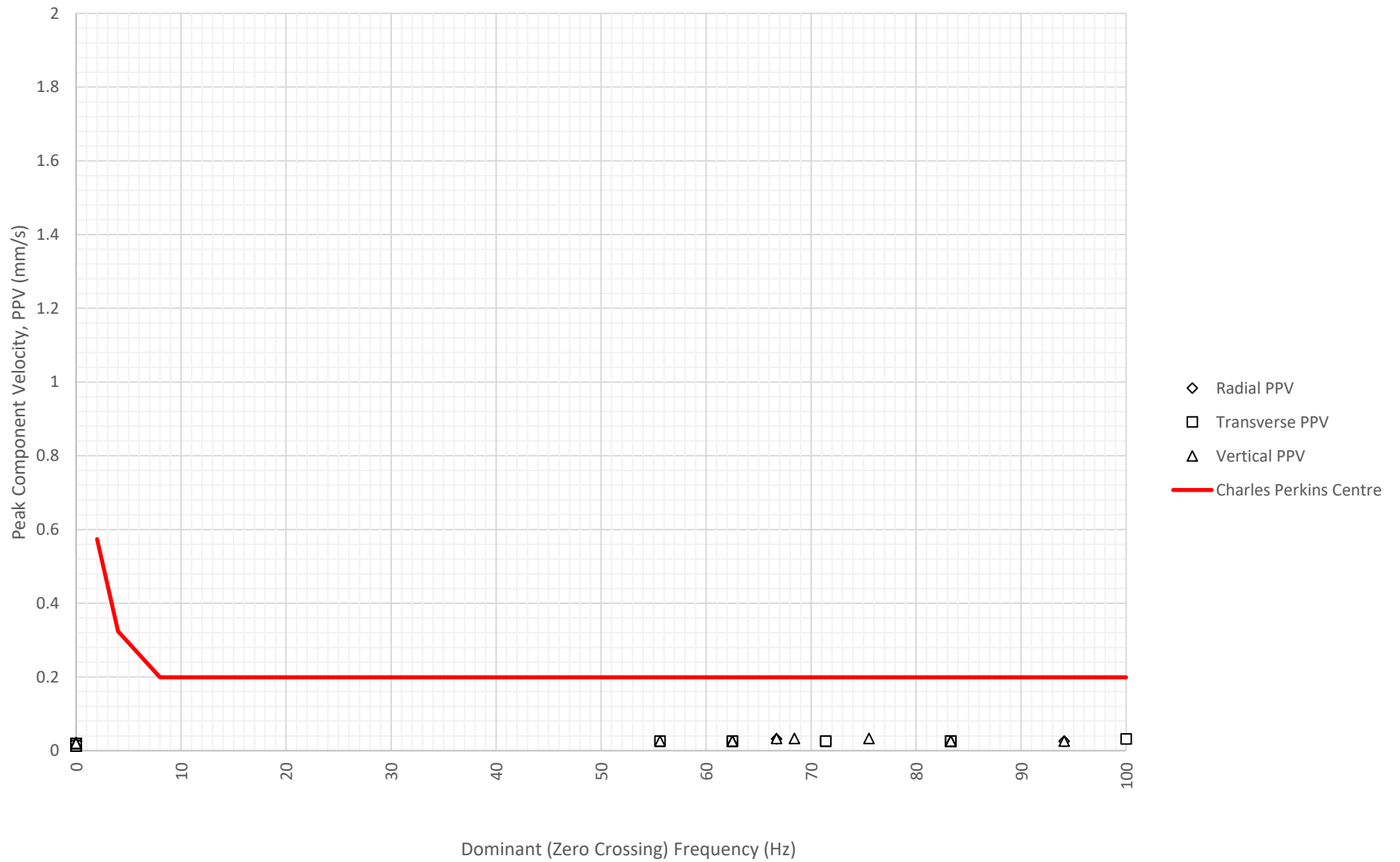
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 28-11-2023



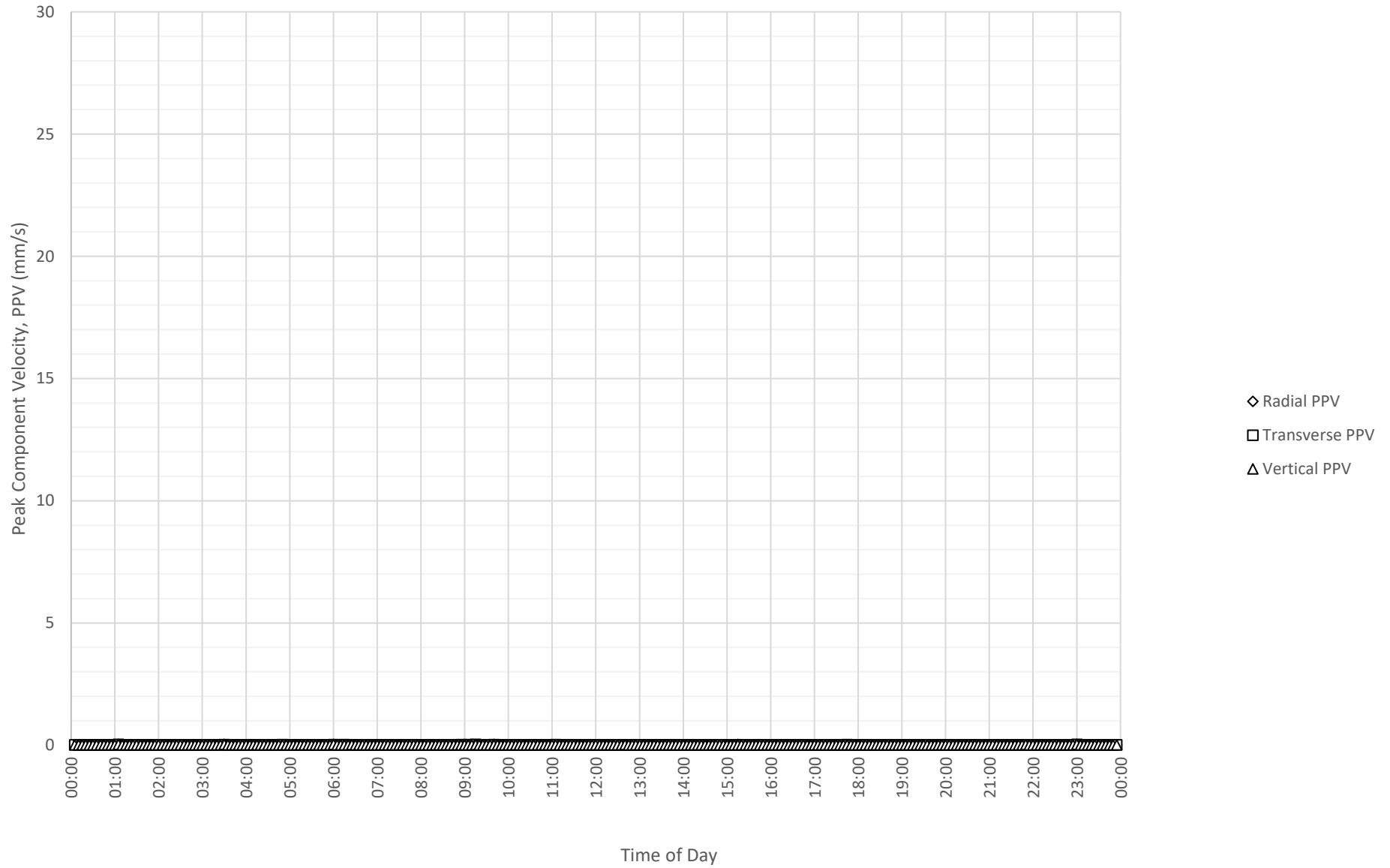
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 29-11-2023



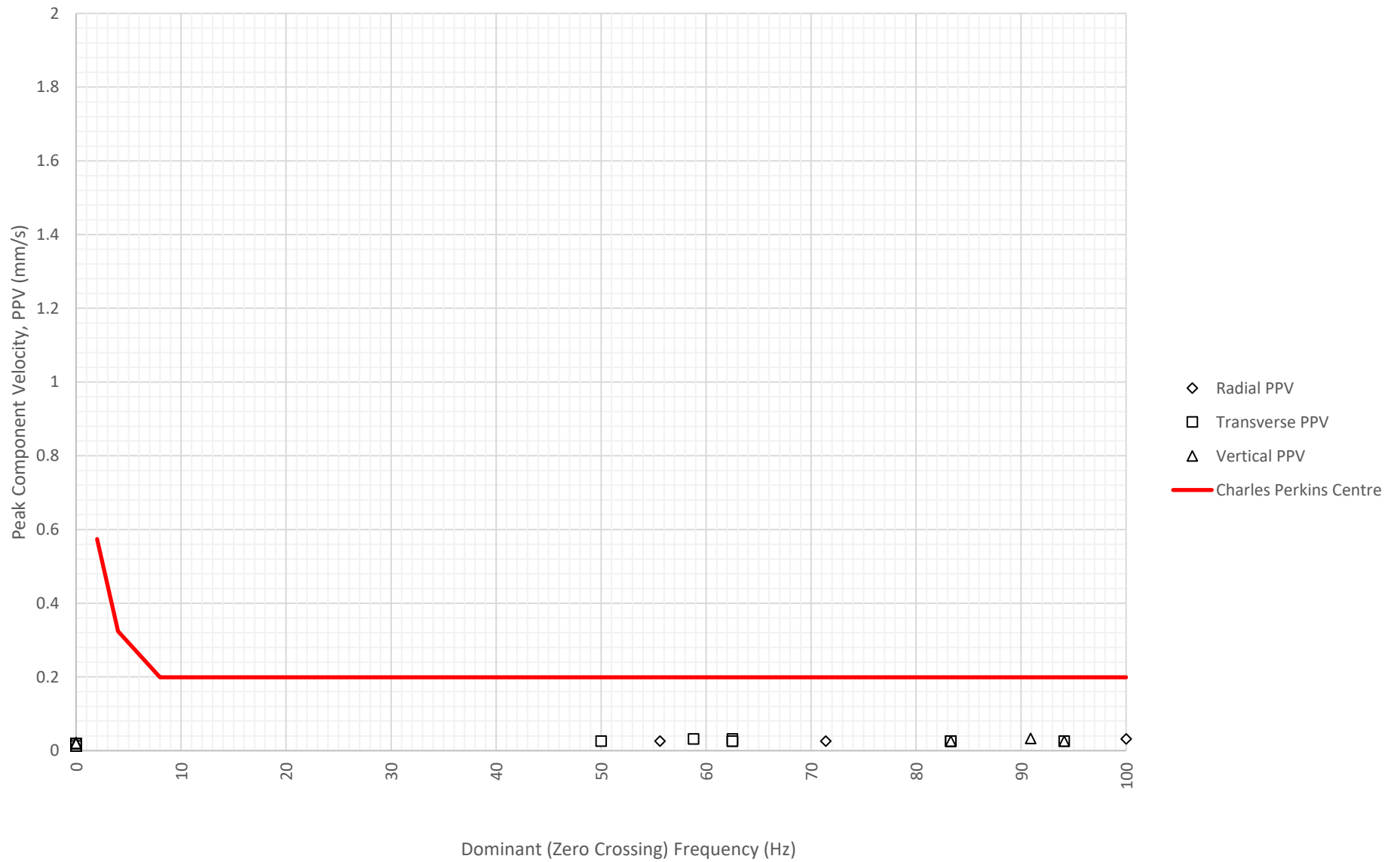
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 29-11-2023



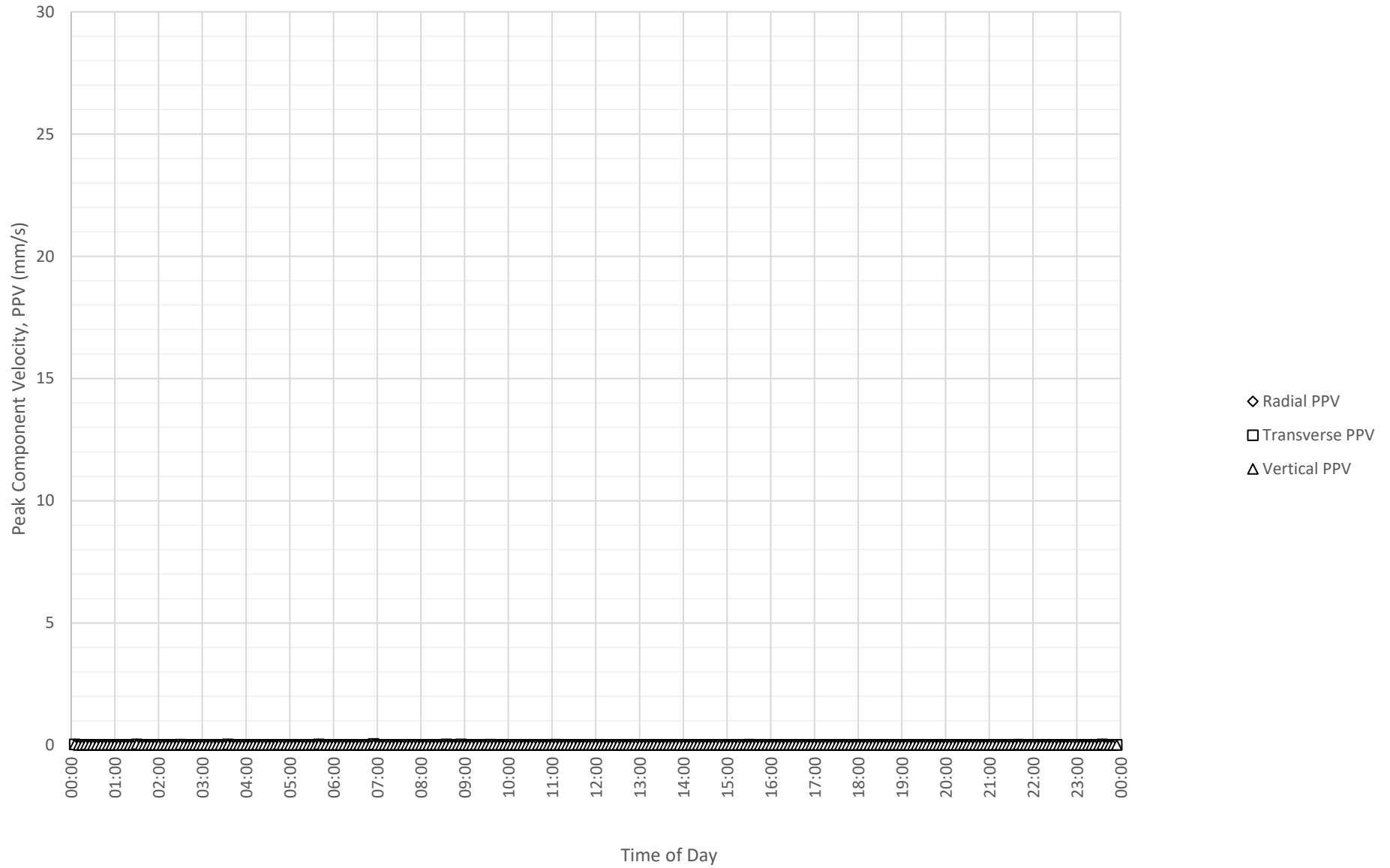
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 30-11-2023



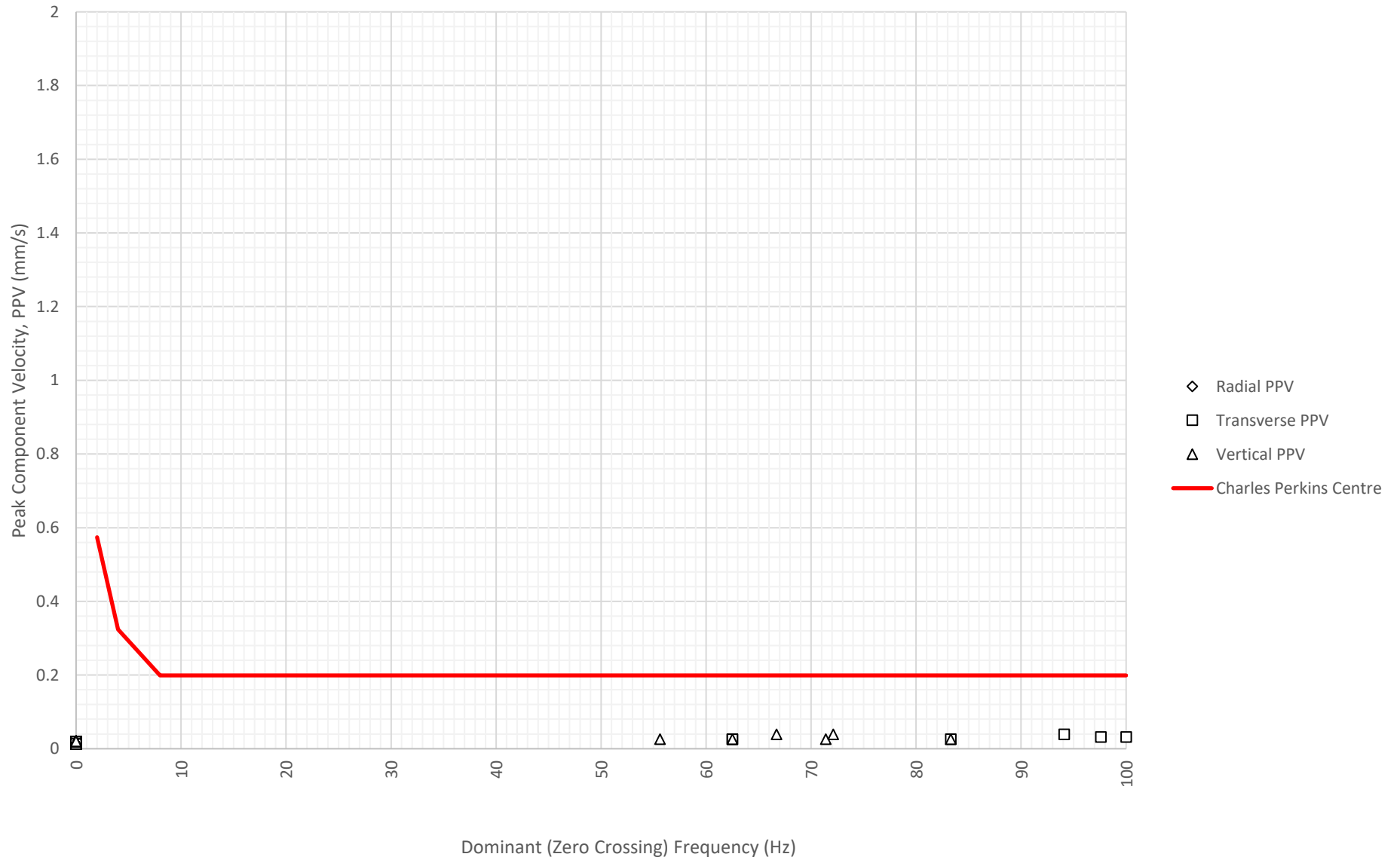
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 30-11-2023



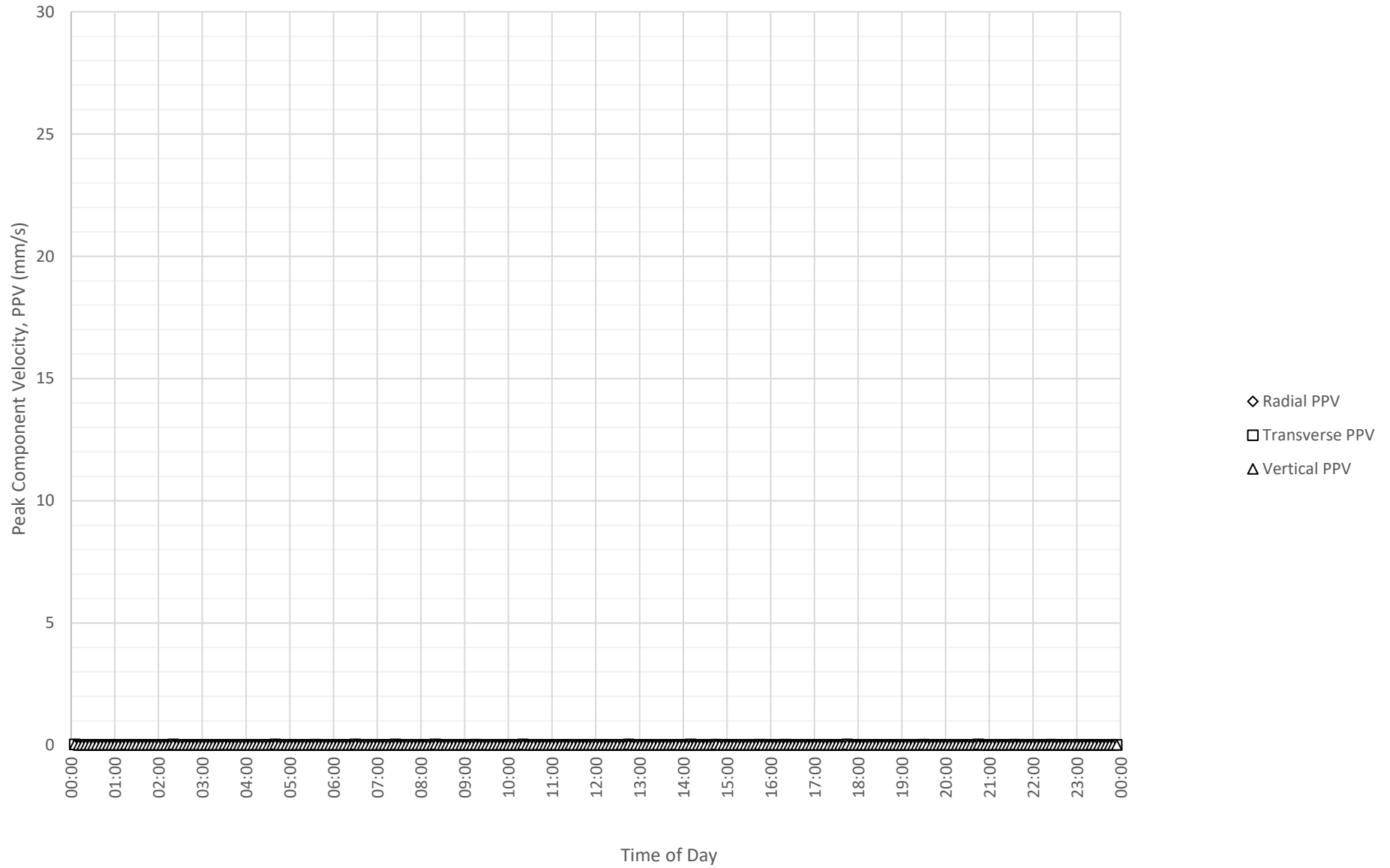
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 1-12-2023



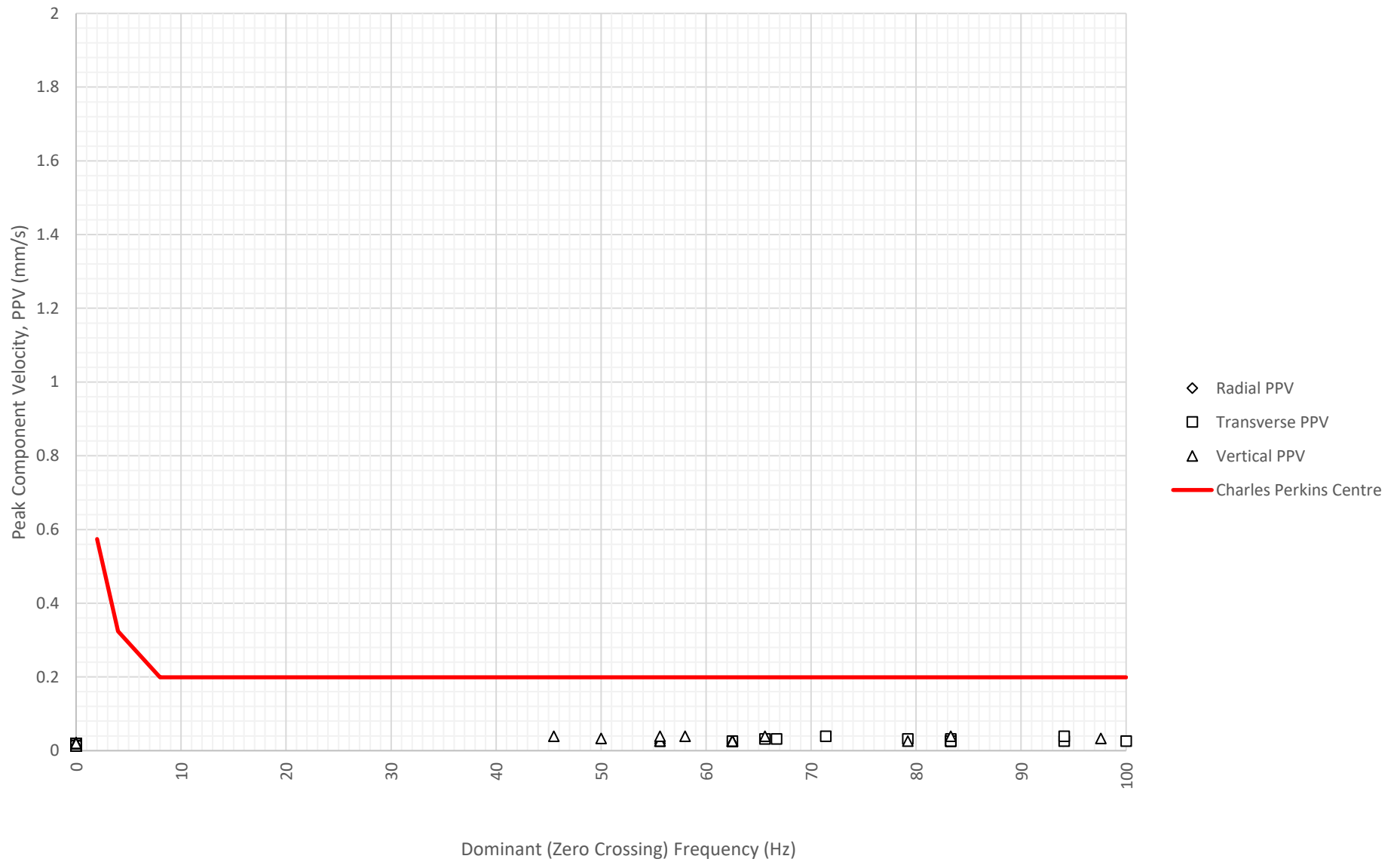
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 1-12-2023



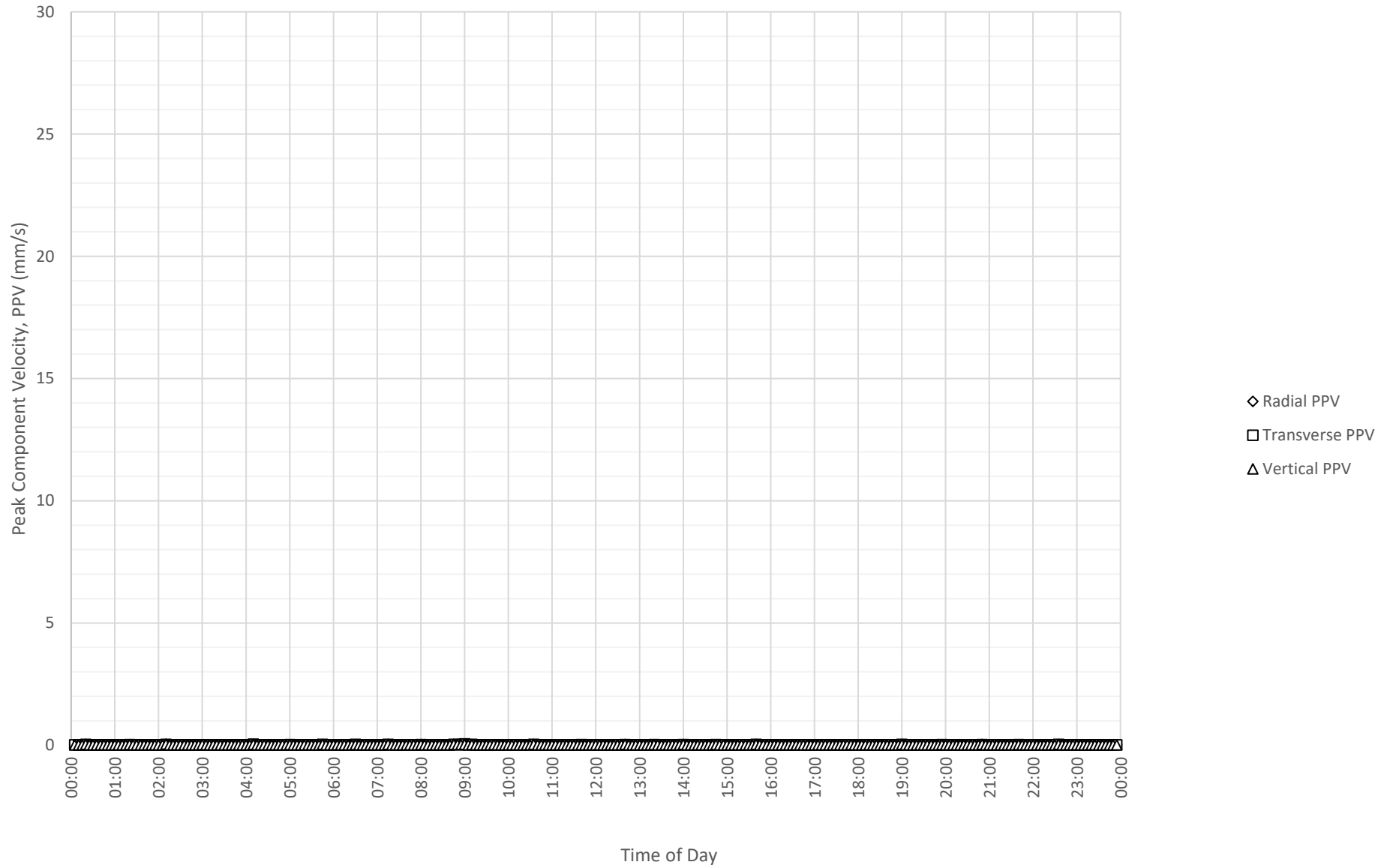
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 2-12-2023



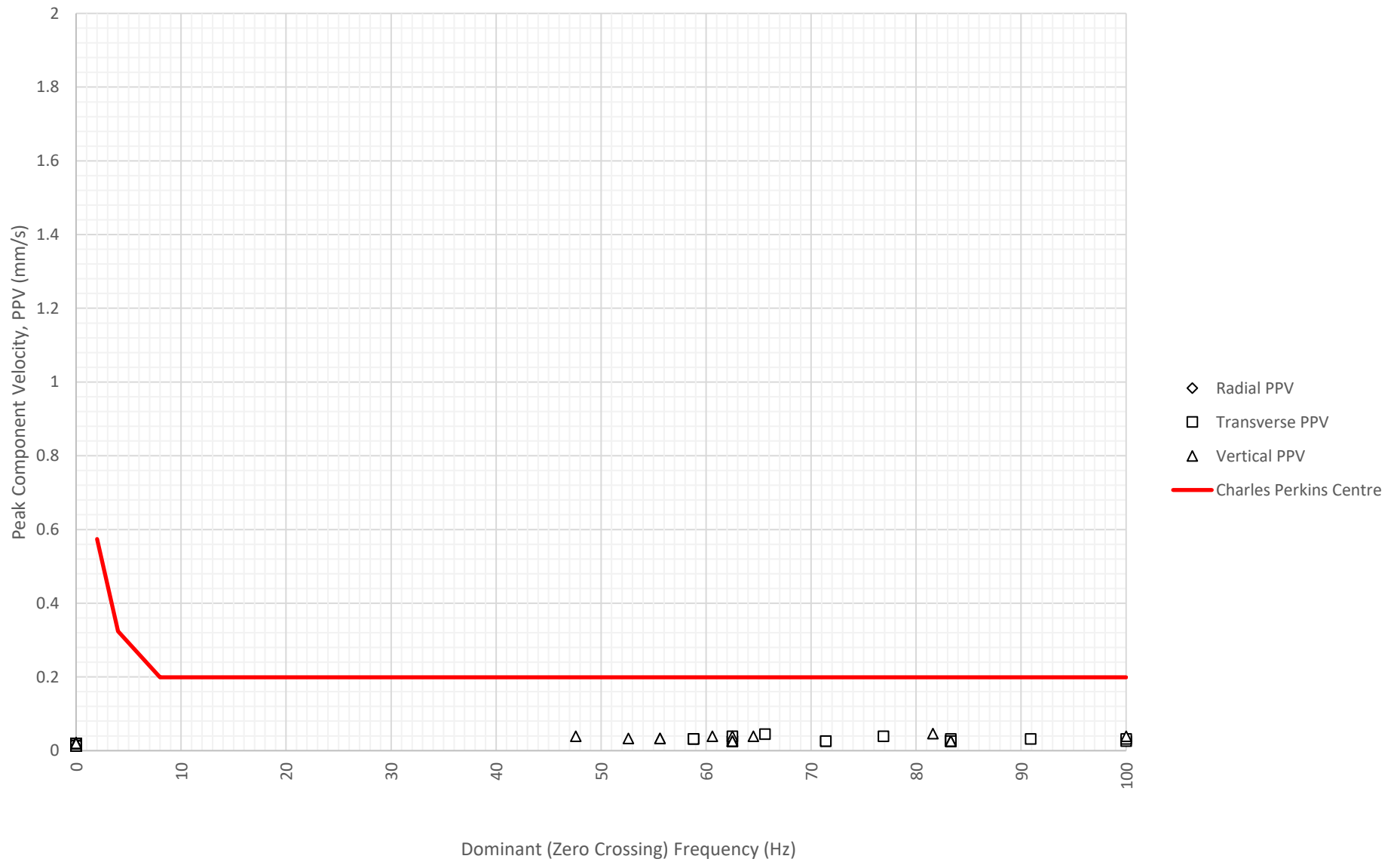
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 2-12-2023



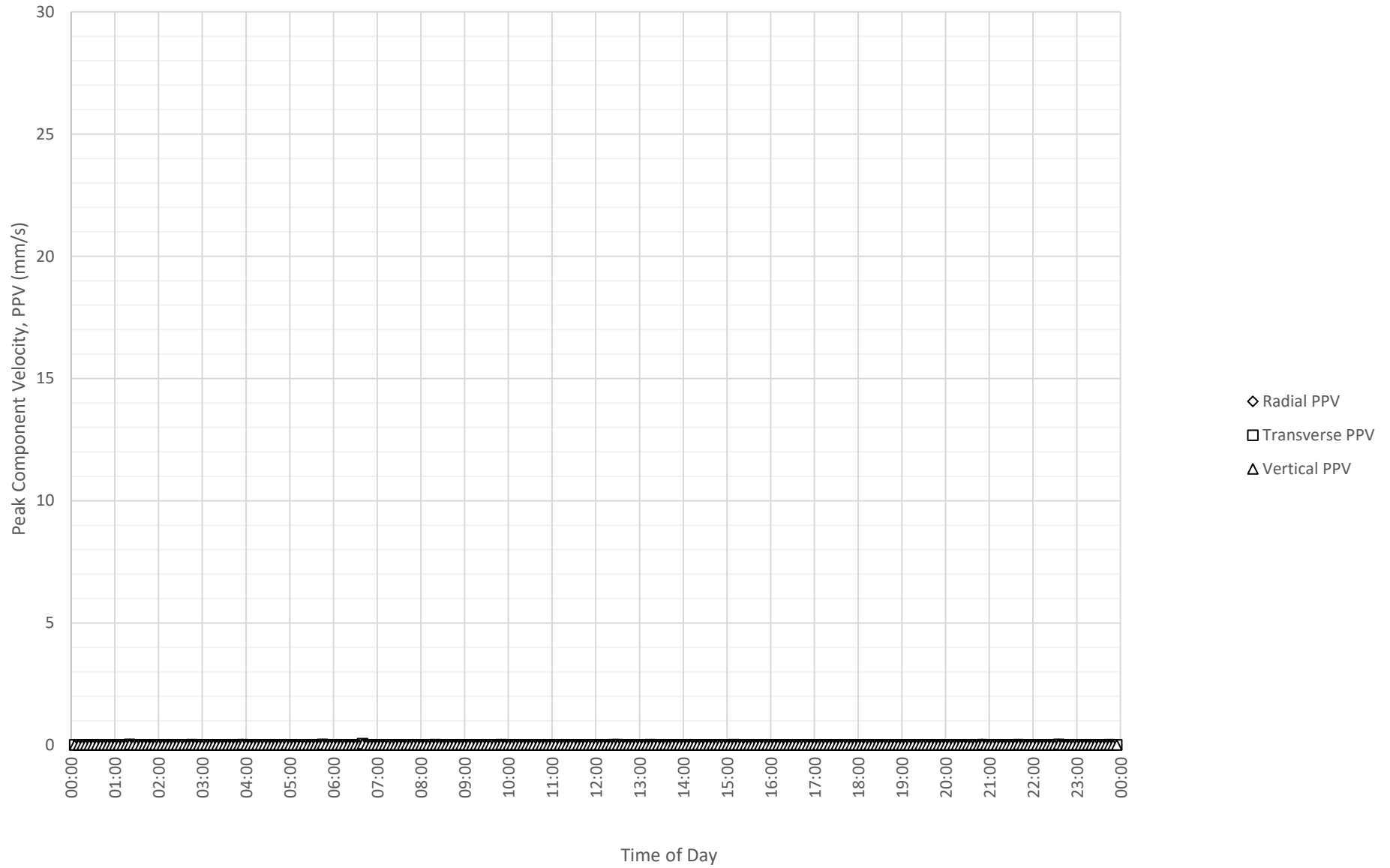
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 3-12-2023



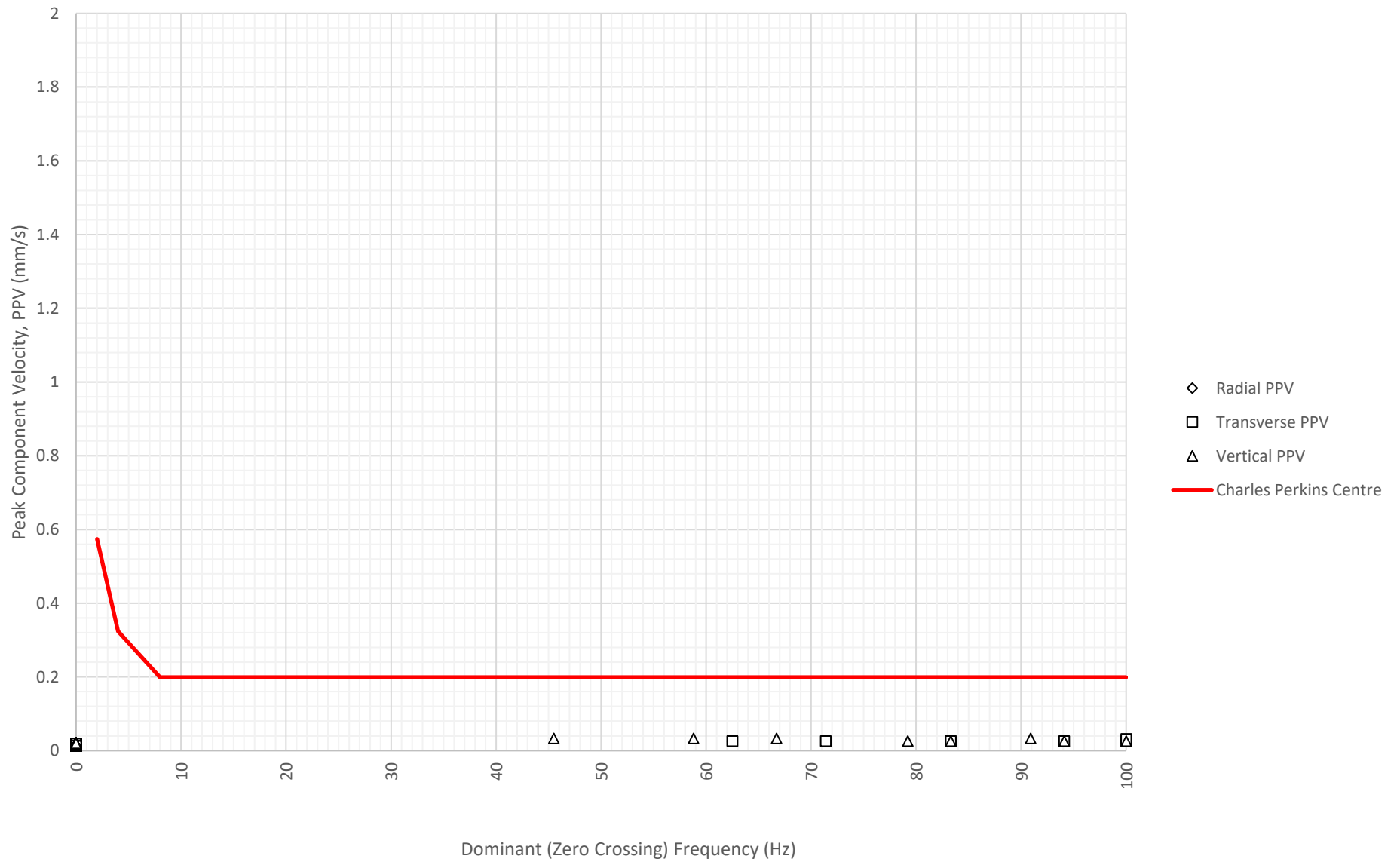
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 3-12-2023



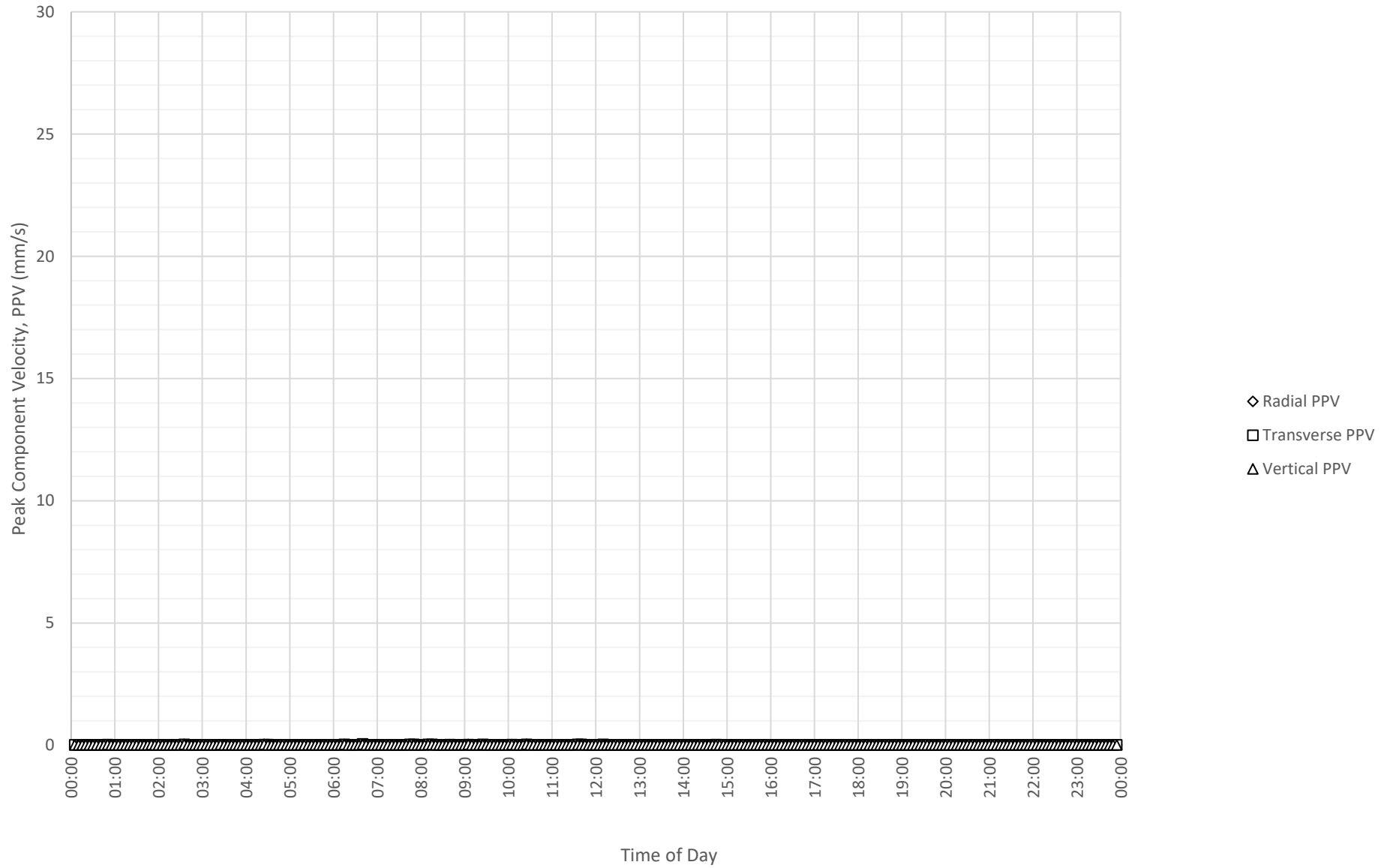
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 4-12-2023



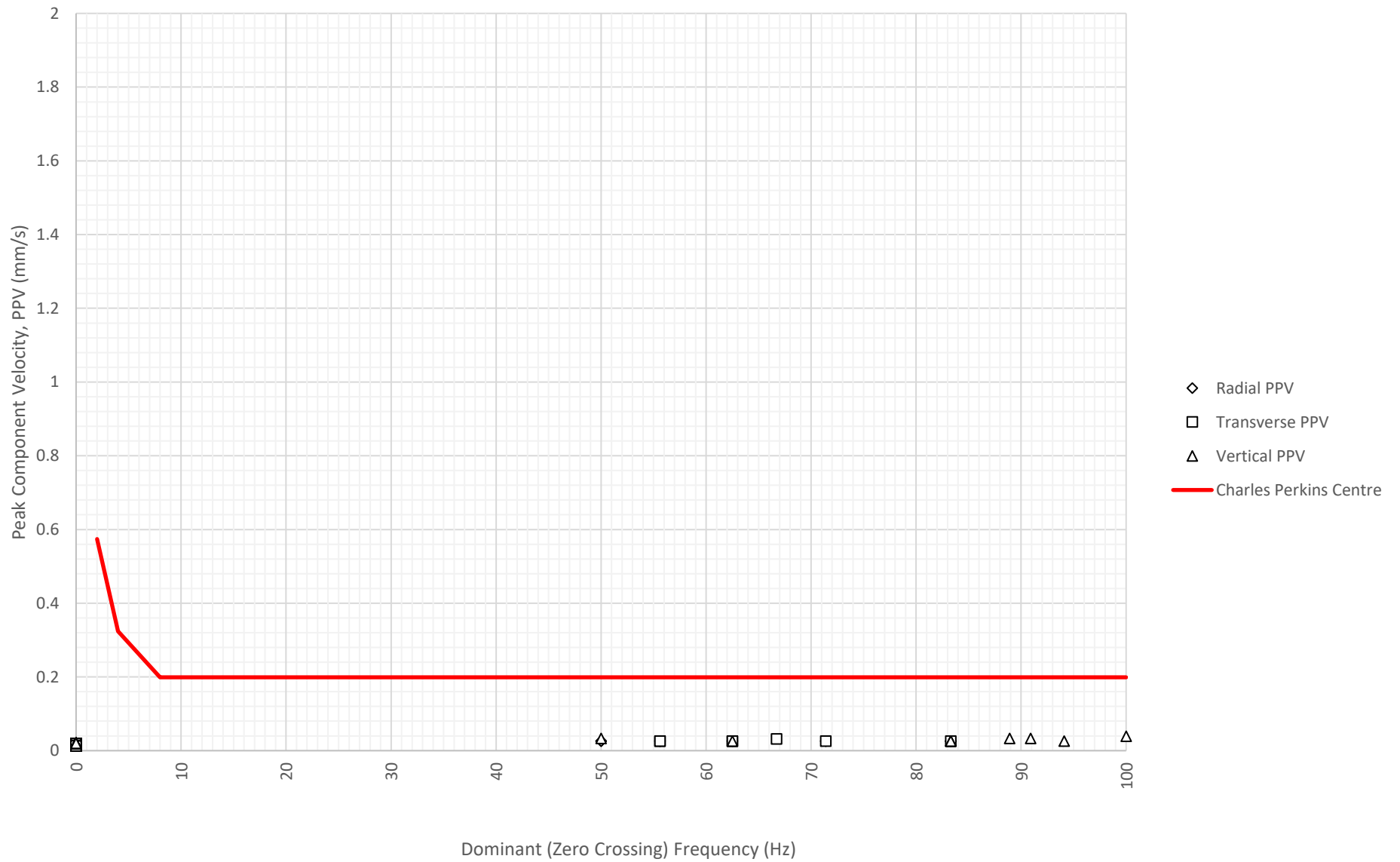
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E
on 4-12-2023



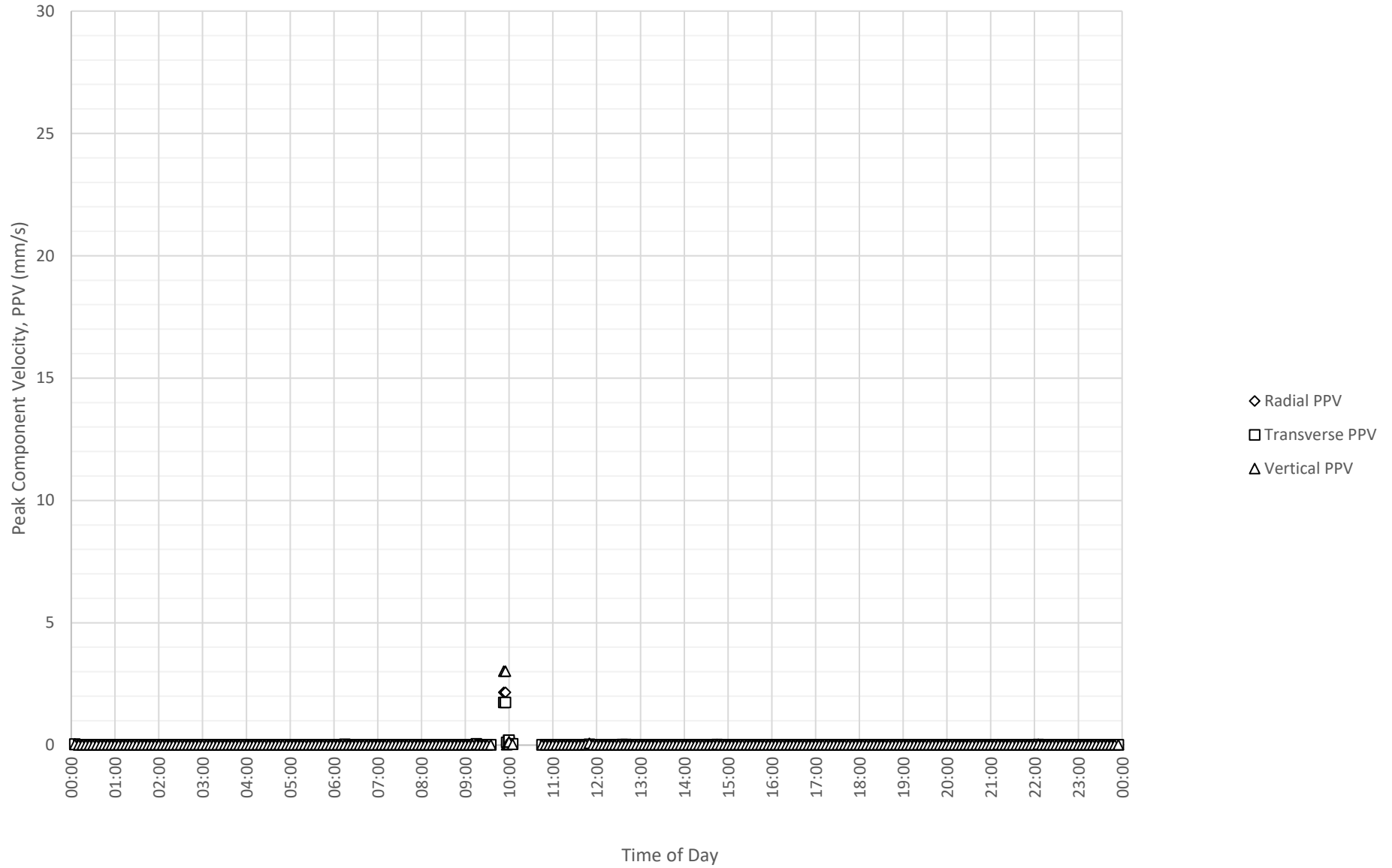
Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 5-12-2023



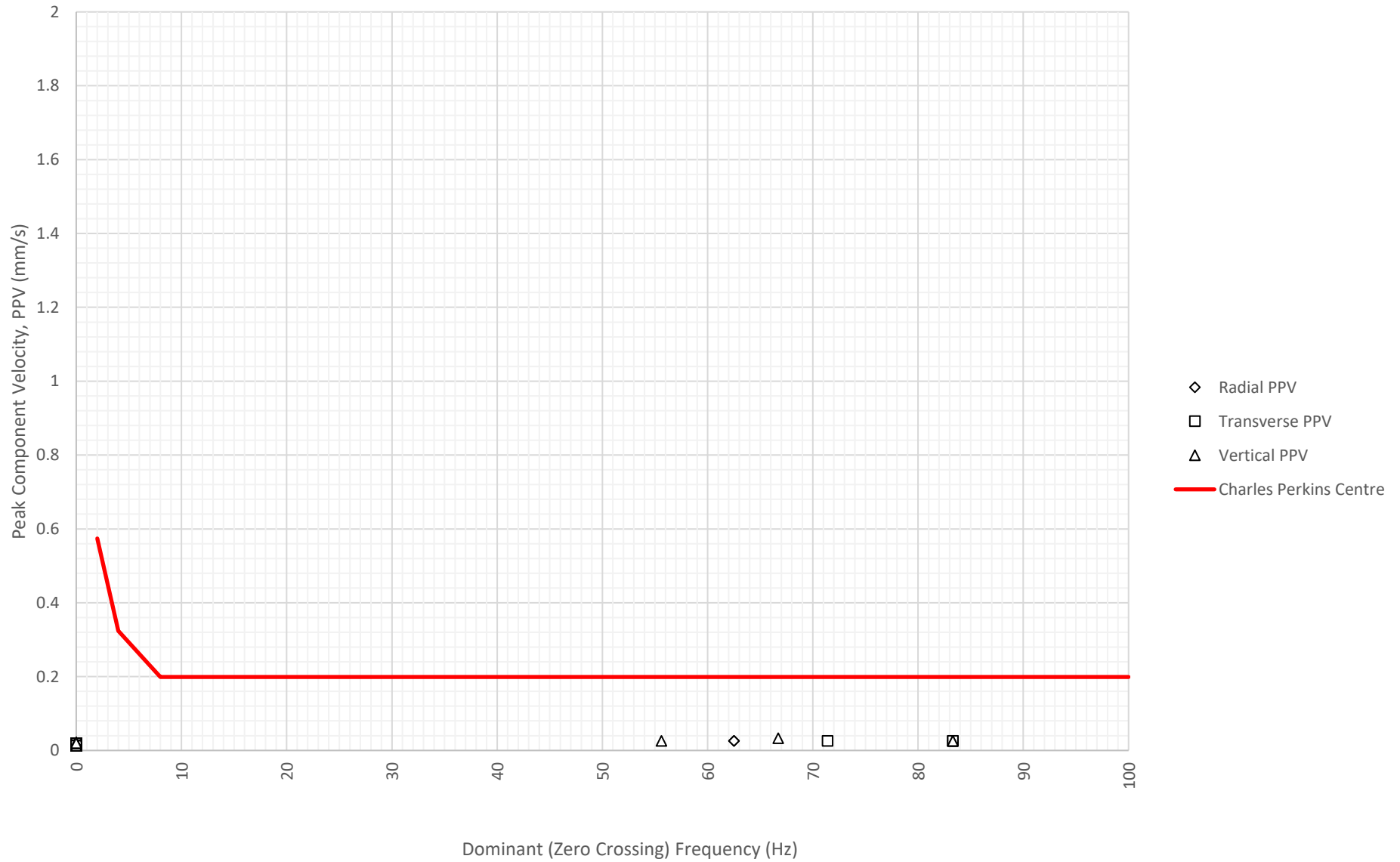
Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 5-12-2023



Daily Monitored Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 6-12-2023

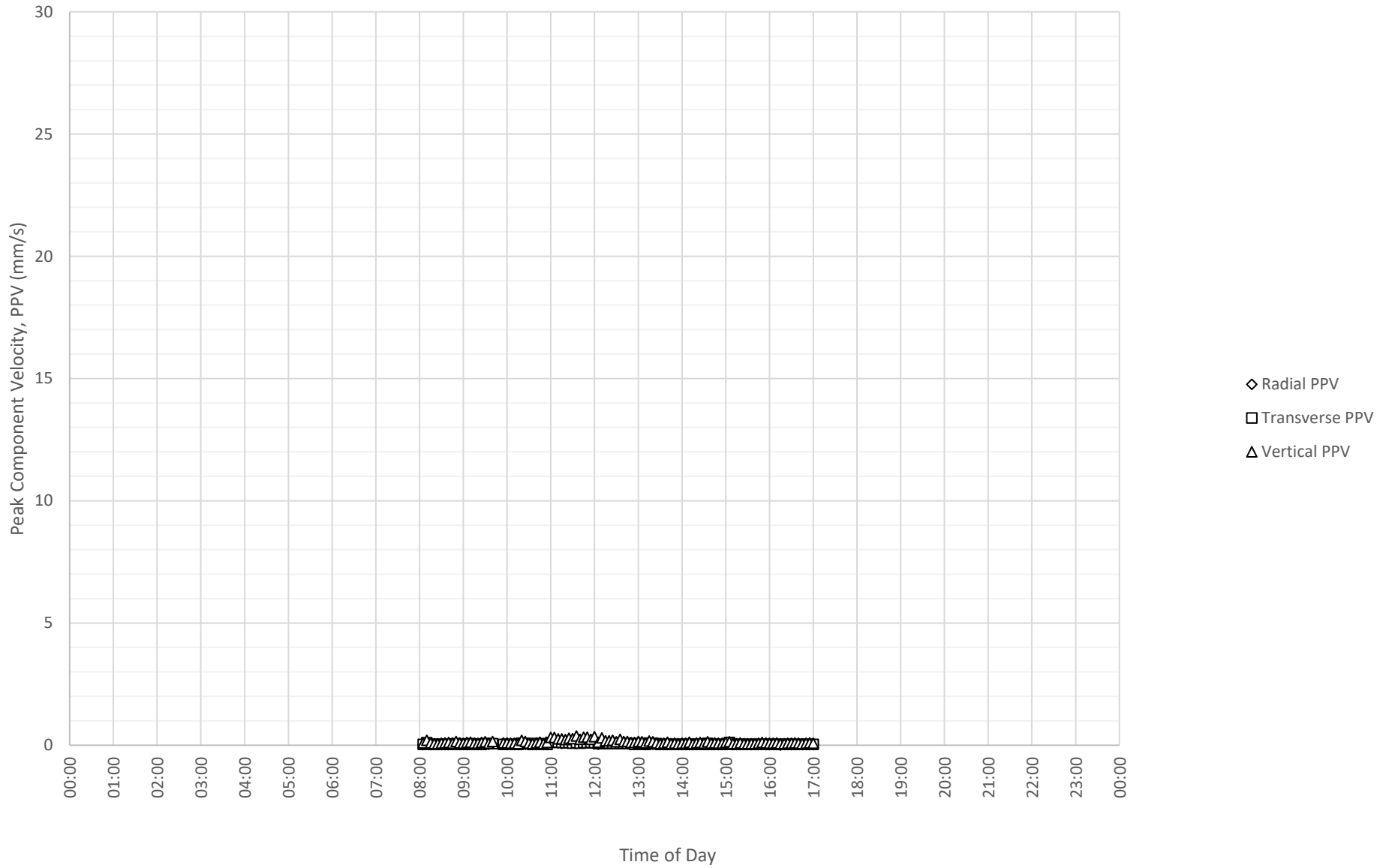


Frequency Content of Vibration Levels at Charles Perkins Centre - Southern Wing Observation Room E on 6-12-2023

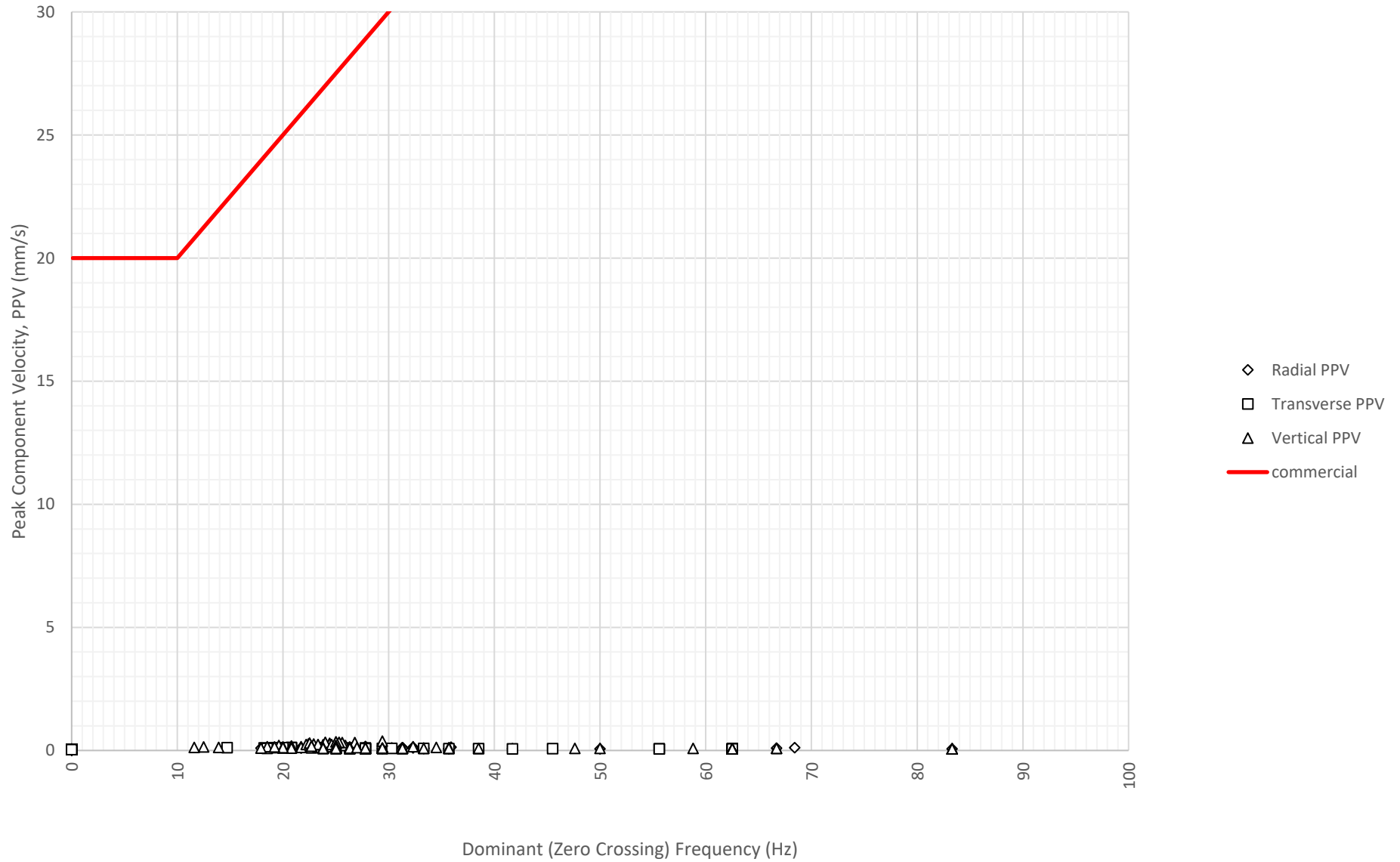


OUTSIDE SUSAN WAKIL HEALTH BUILDING

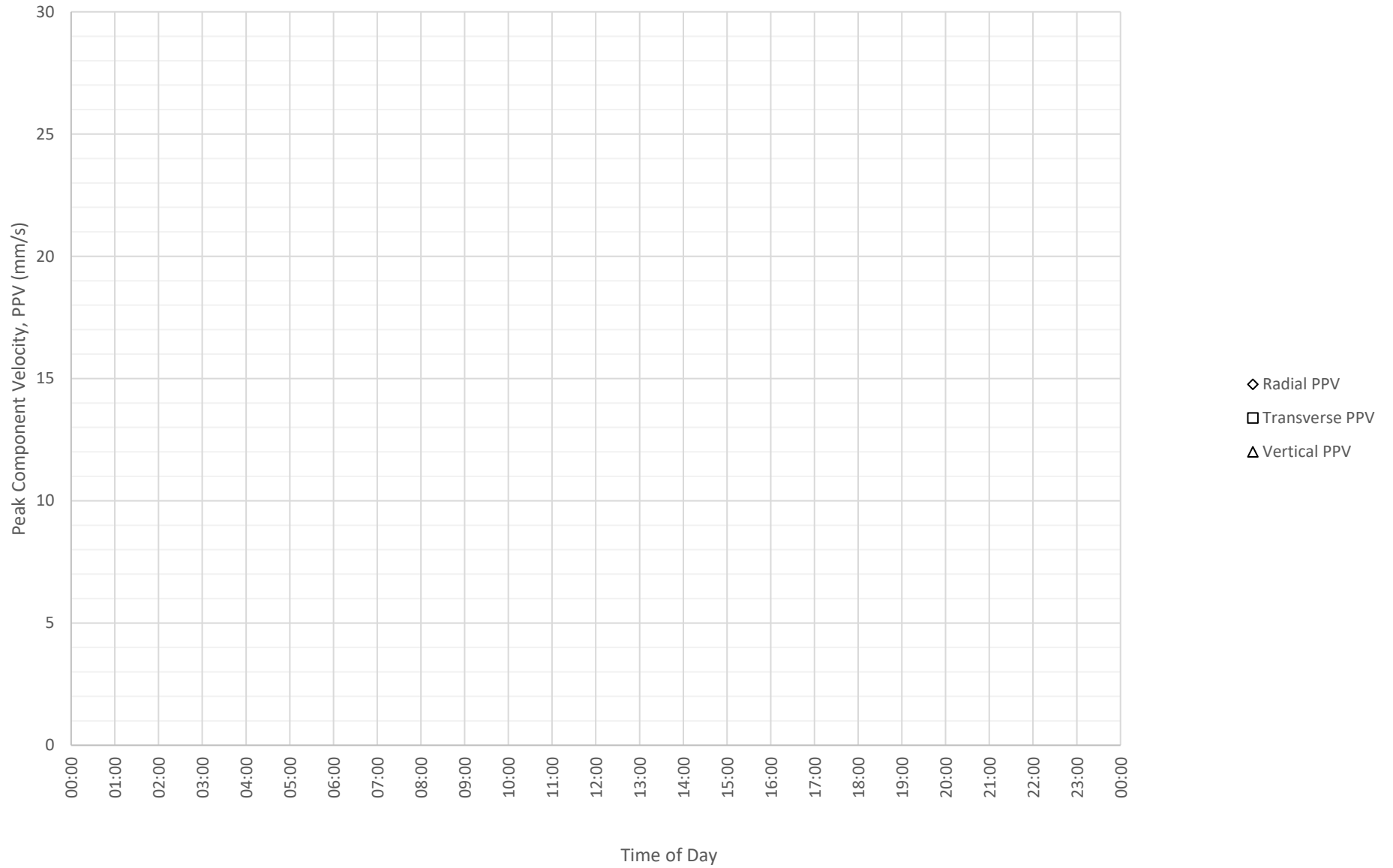
Daily Monitored Vibration Levels at Susan Wakil Health Building on 23-11-2023



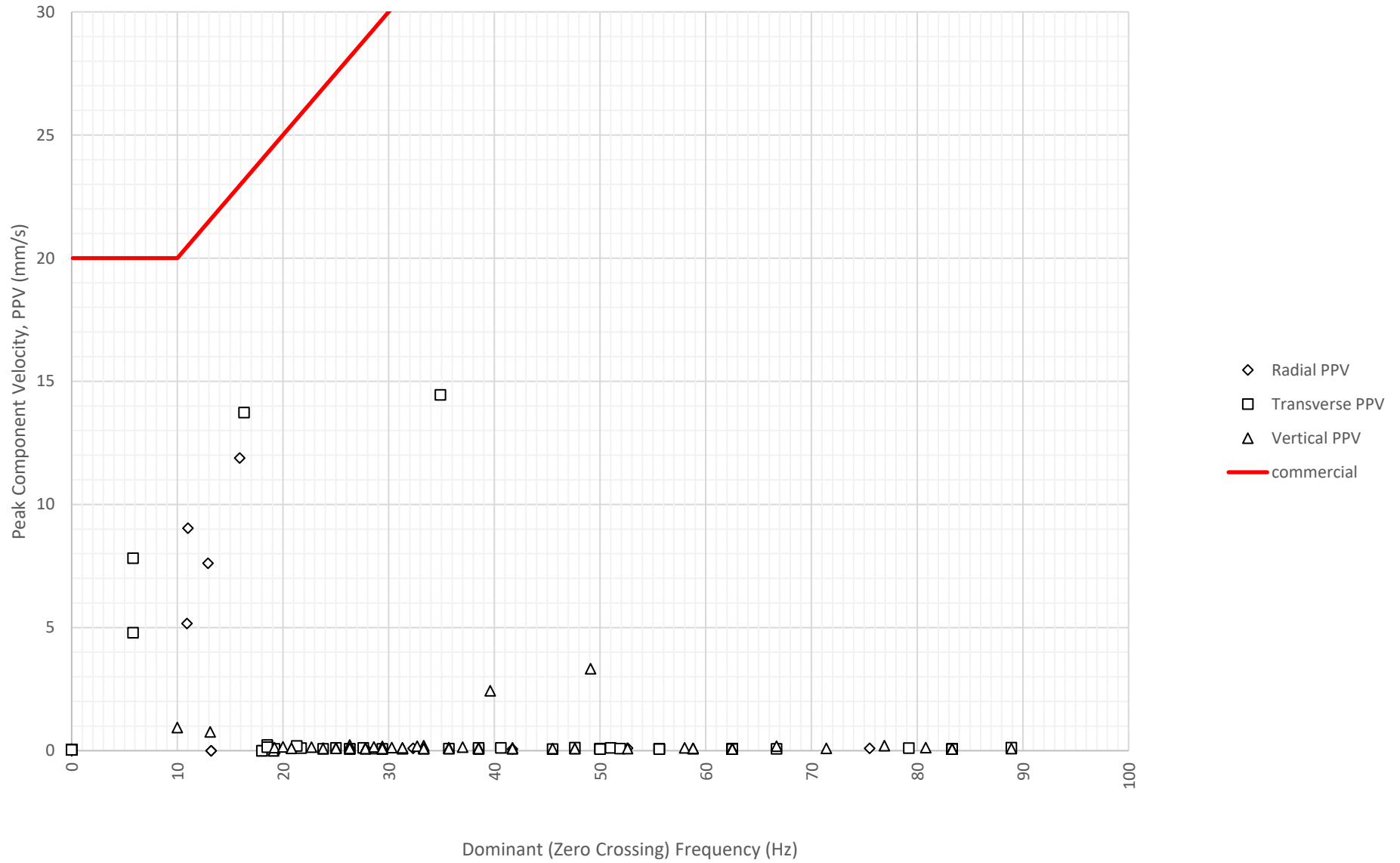
Frequency Content of Vibration Levels at Susan Wakil Health Building on 23-11-2023



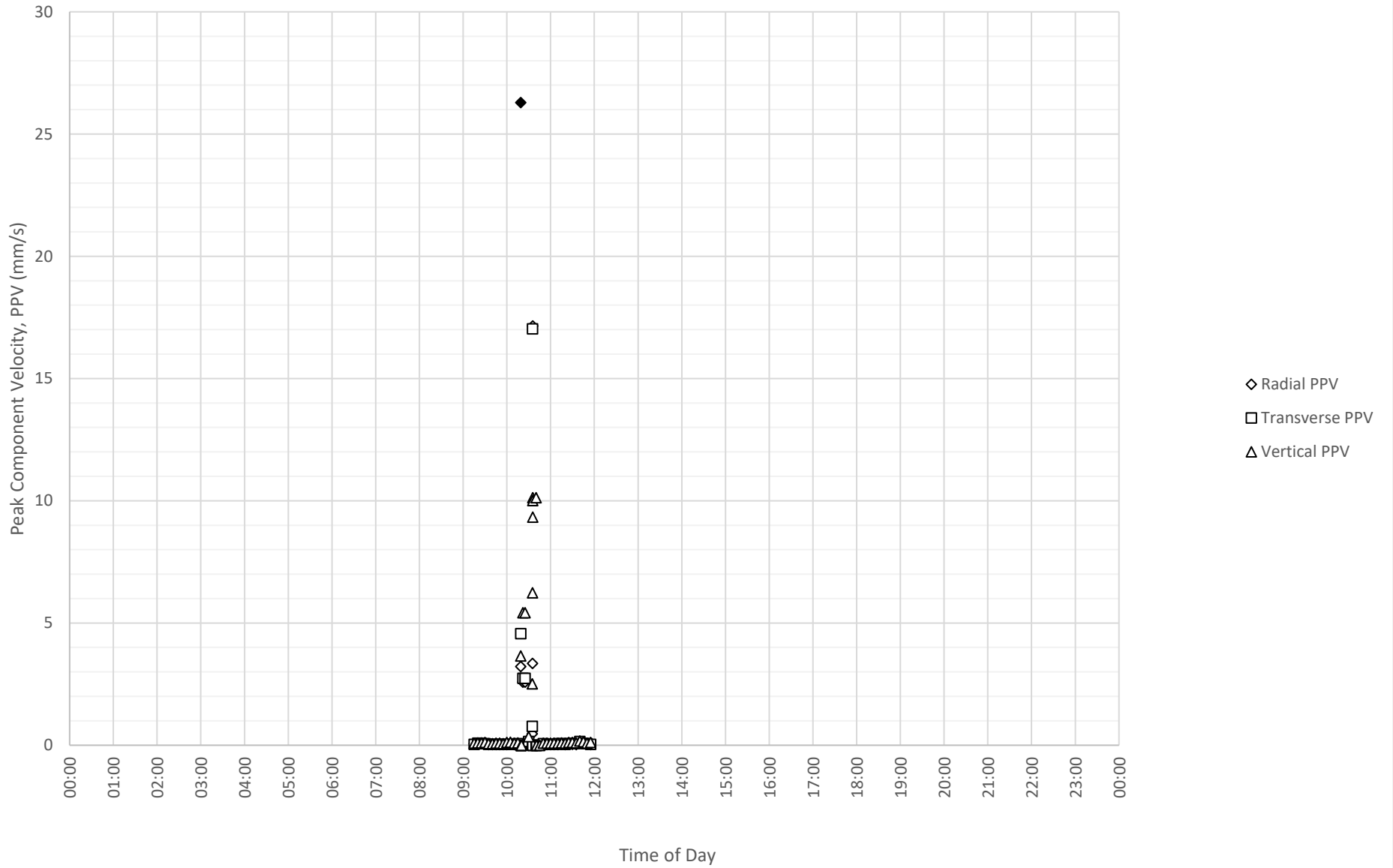
Daily Monitored Vibration Levels at Susan Wakil Health Building on 24-11-2023



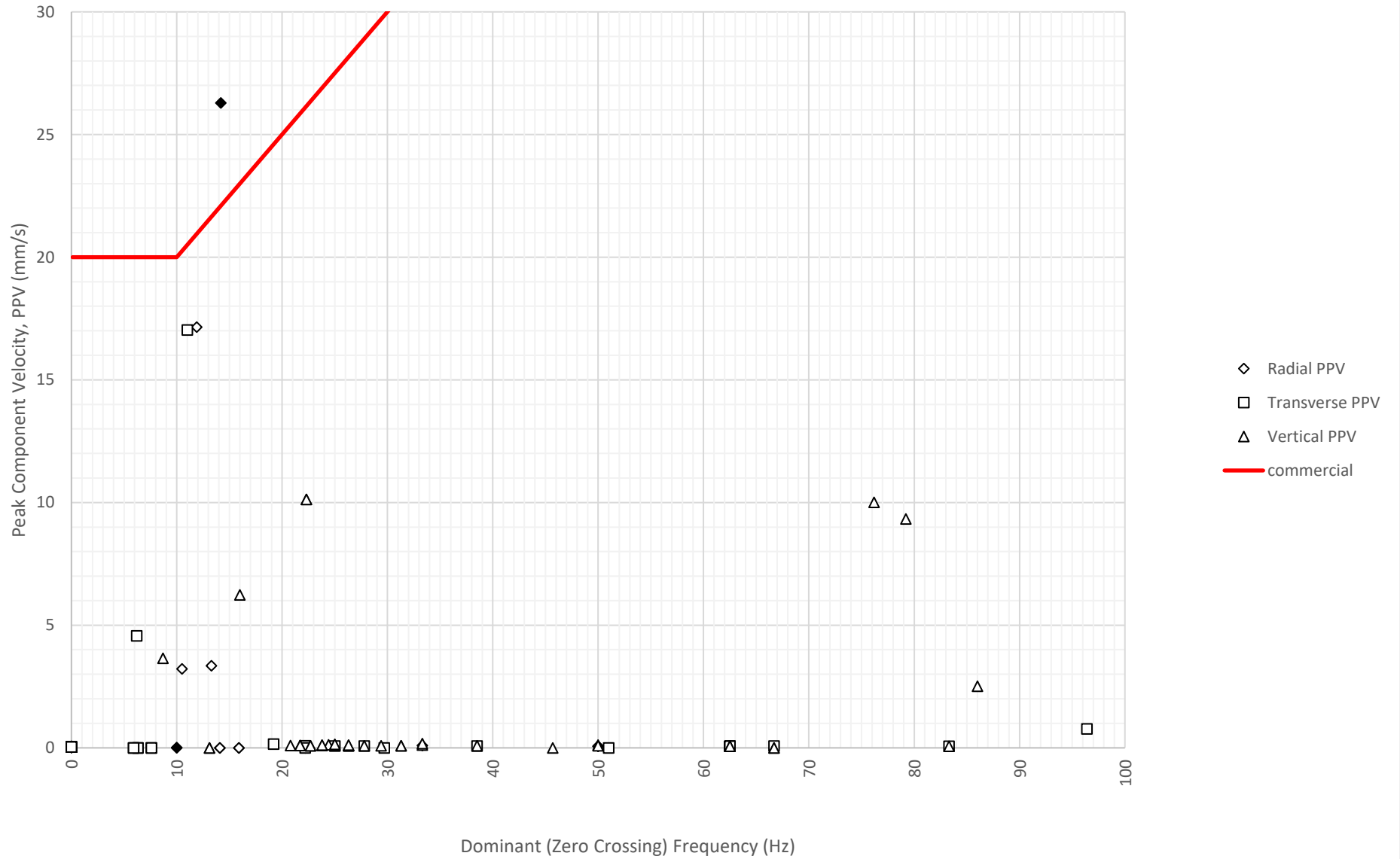
Frequency Content of Vibration Levels at Susan Wakil Health Building on 24-11-2023



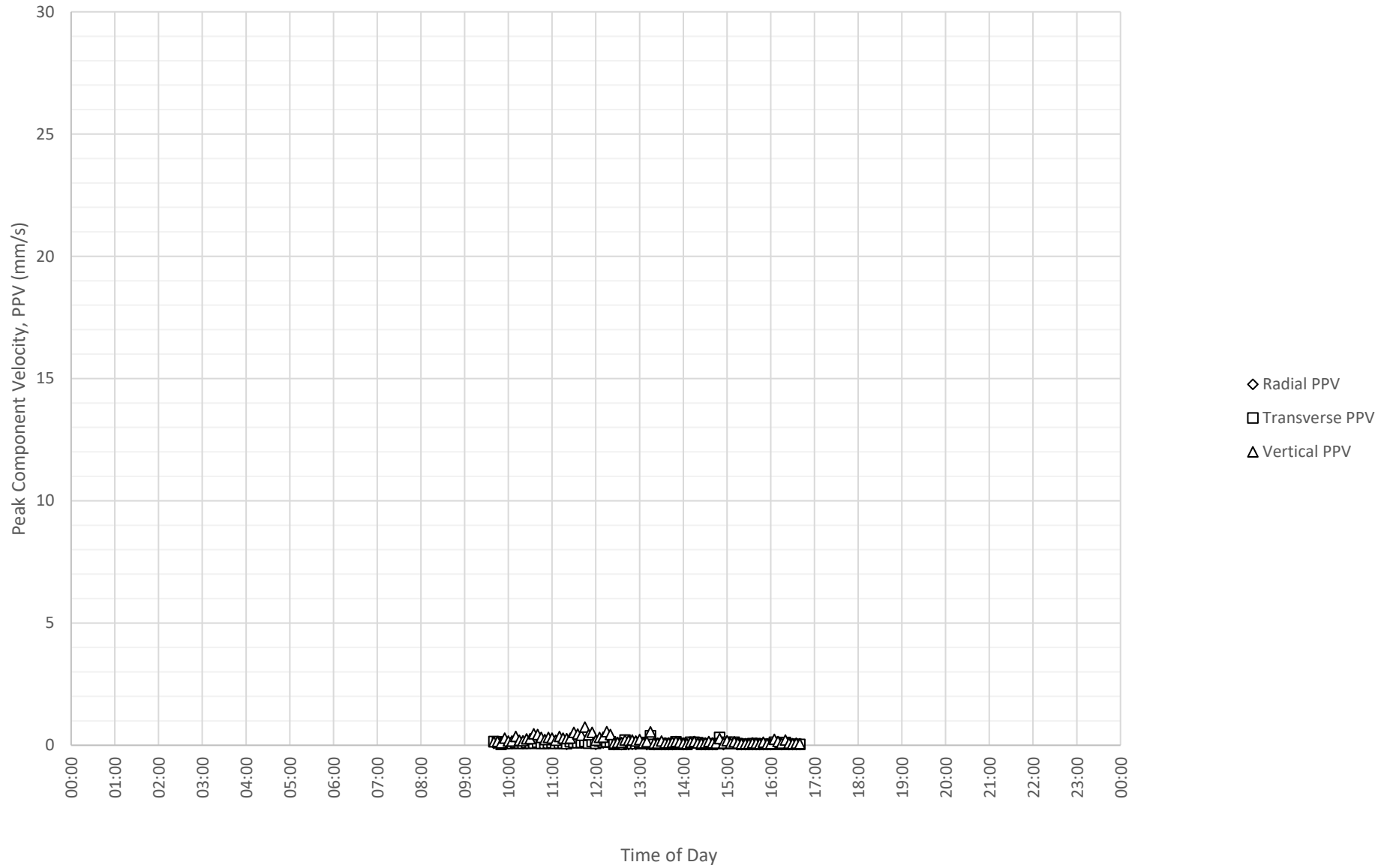
Daily Monitored Vibration Levels at Susan Wakil Health Building on 27-11-2023



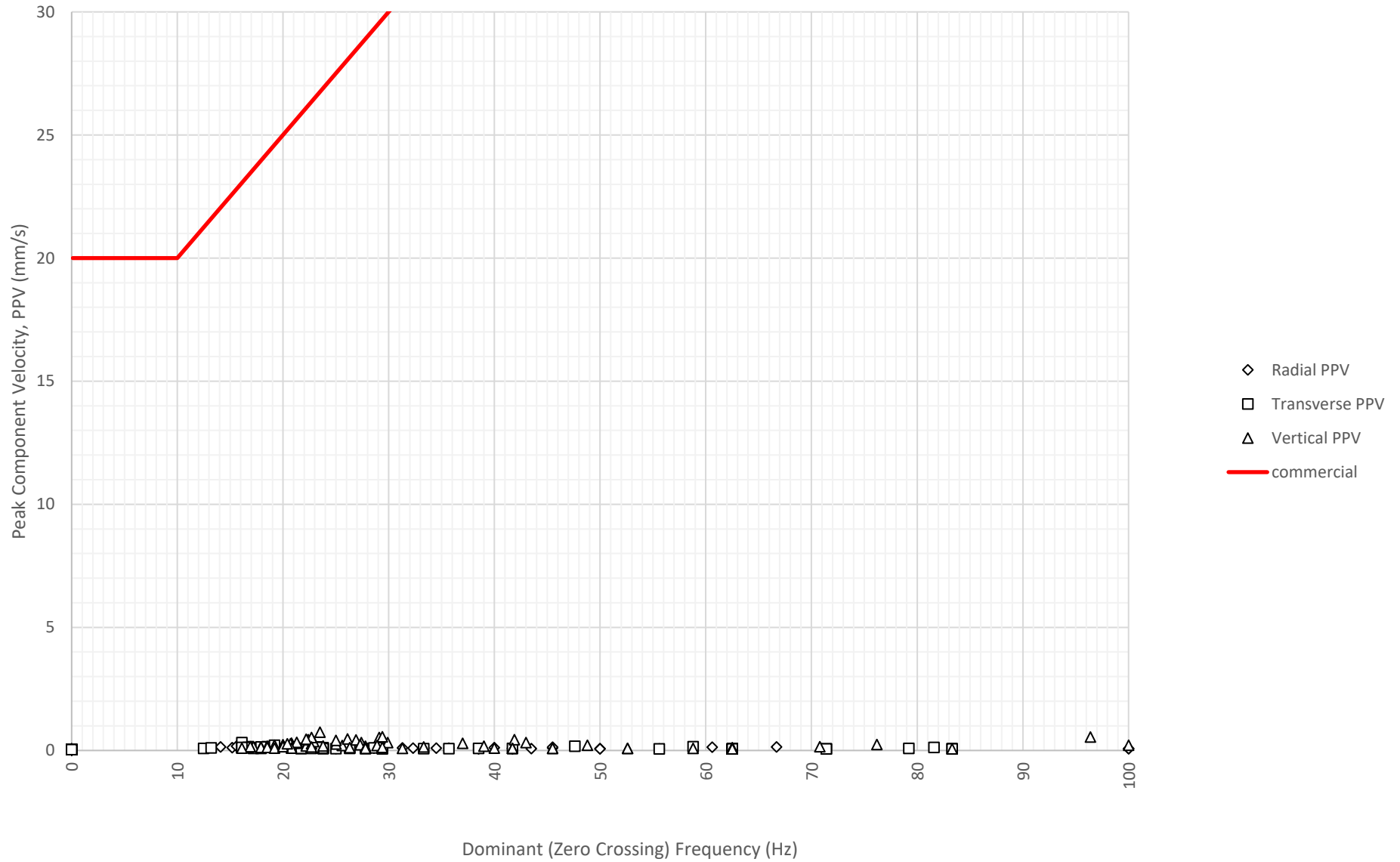
Frequency Content of Vibration Levels at Susan Wakil Health Building on 27-11-2023



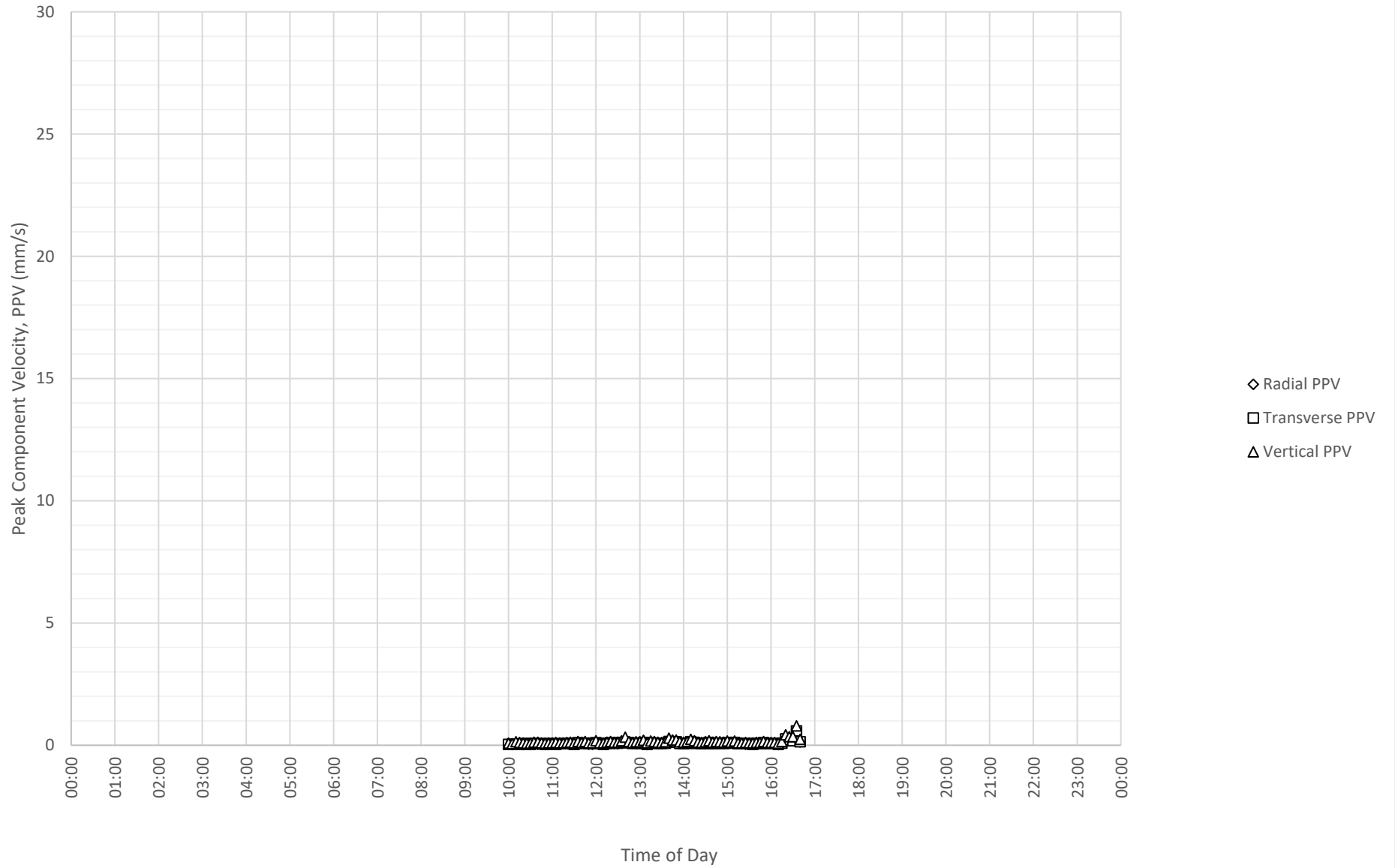
Daily Monitored Vibration Levels at Susan Wakil Health Building on 28-11-2023



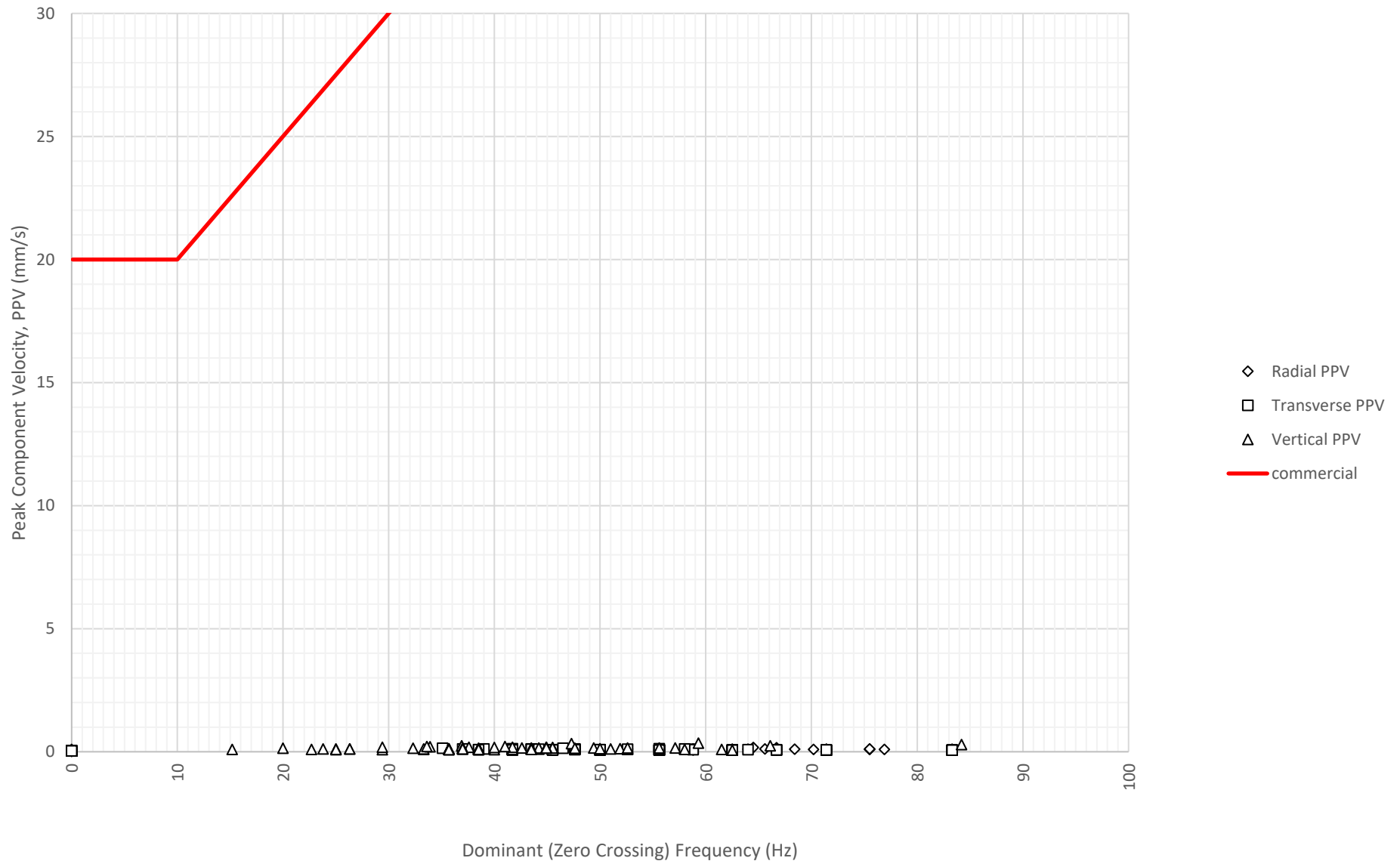
Frequency Content of Vibration Levels at Susan Wakil Health Building on 28-11-2023



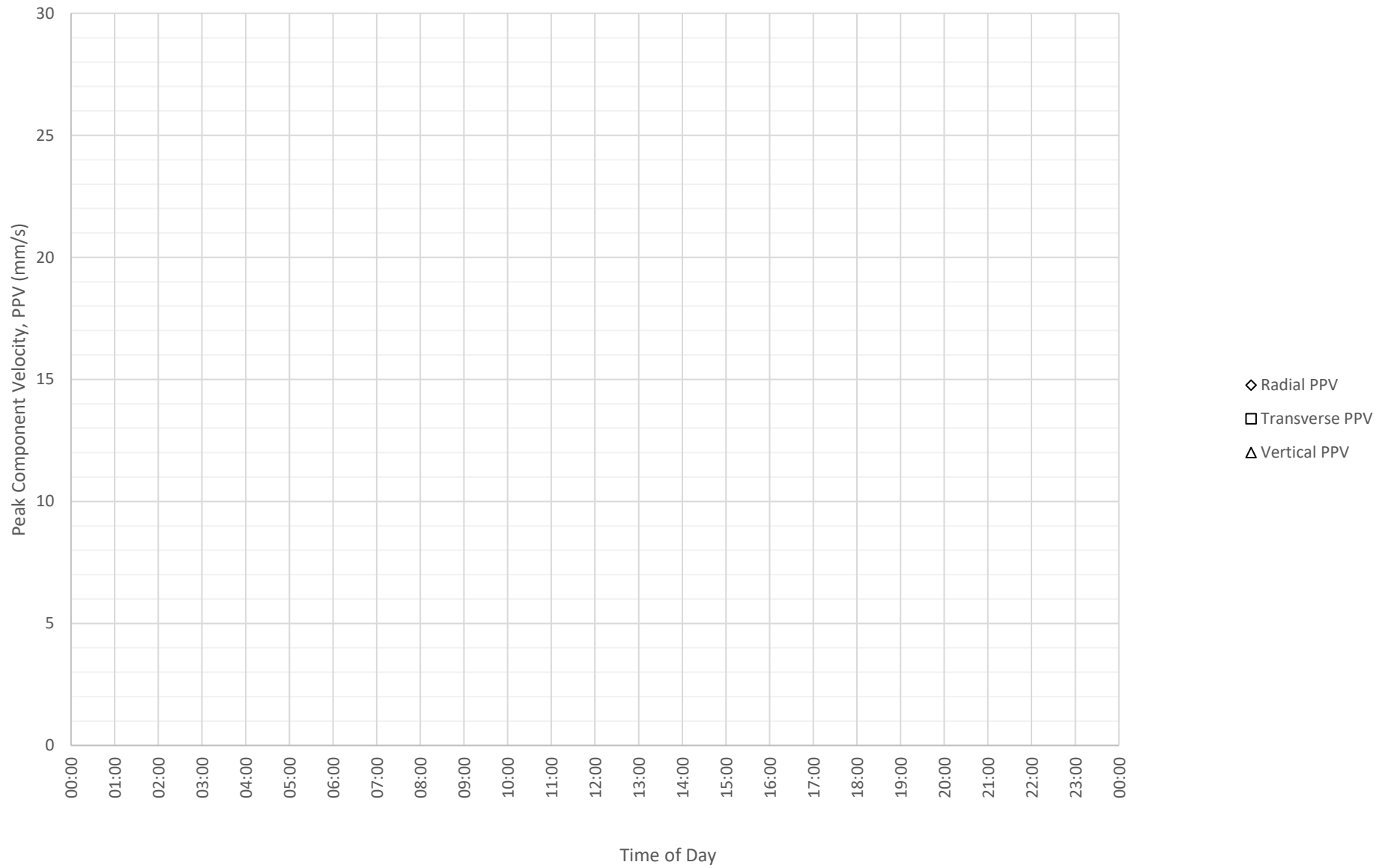
Daily Monitored Vibration Levels at Susan Wakil Health Building on 29-11-2023



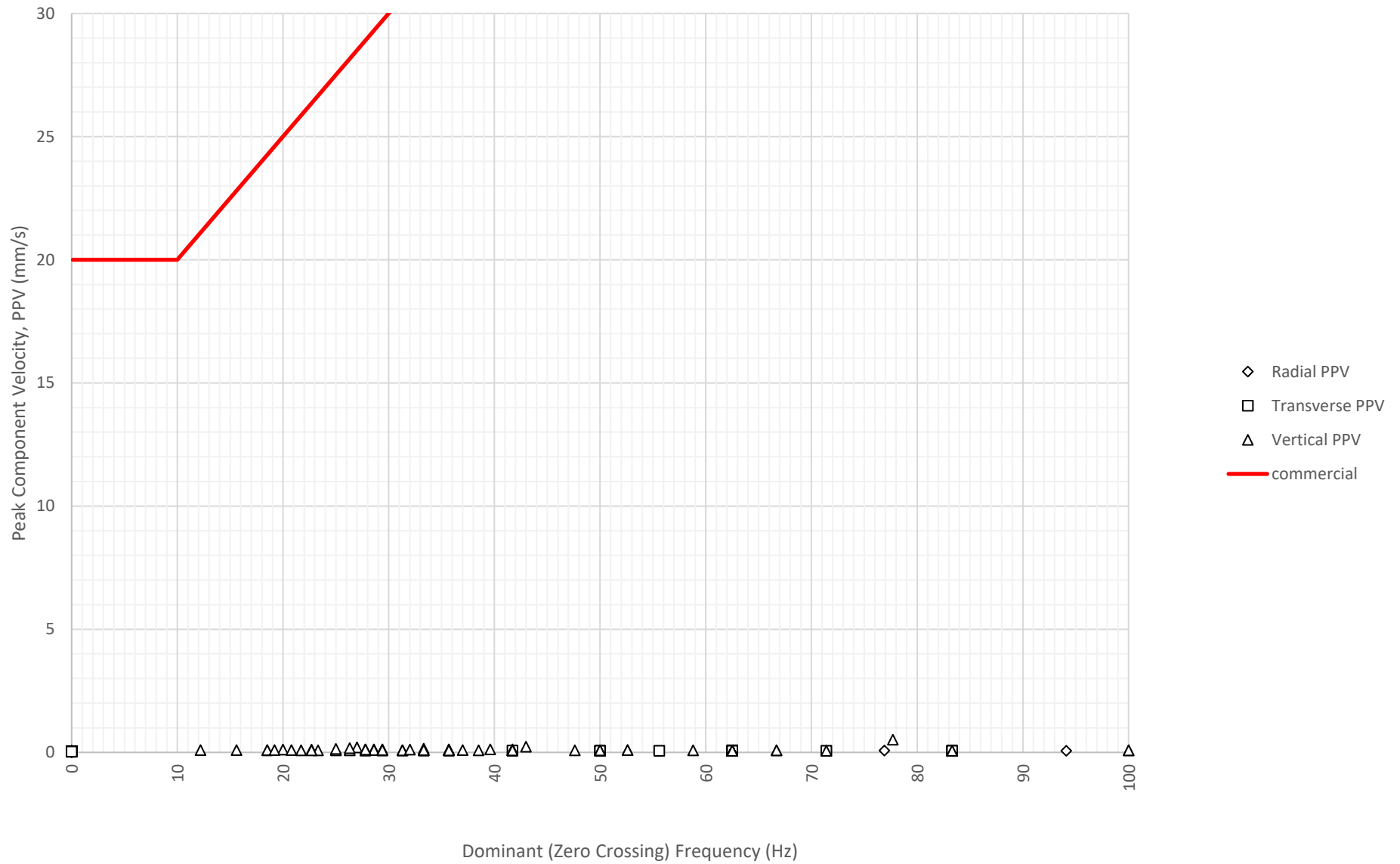
Frequency Content of Vibration Levels at Susan Wakil Health Building on 29-11-2023



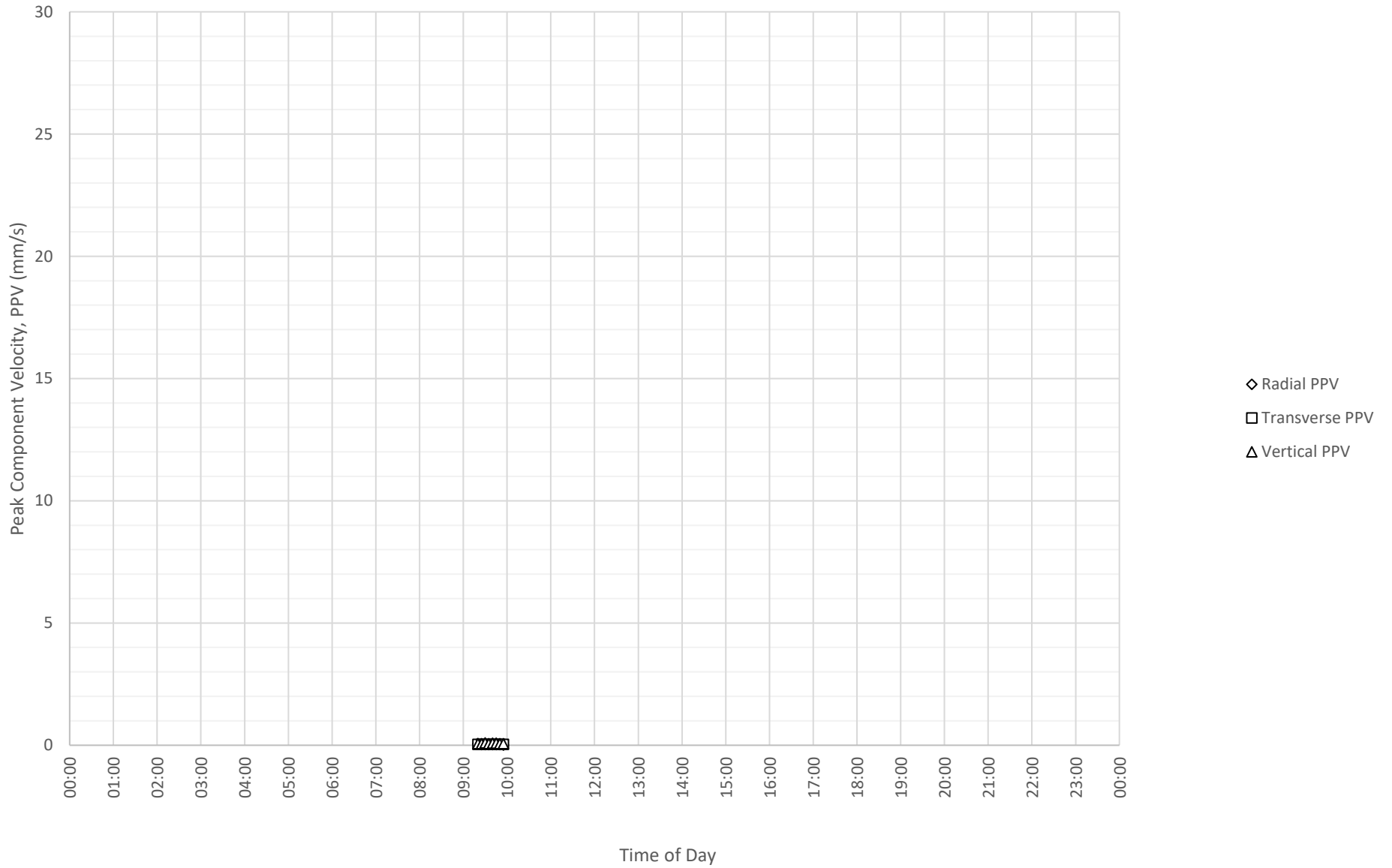
Daily Monitored Vibration Levels at Susan Wakil Health Building on 30-11-2023



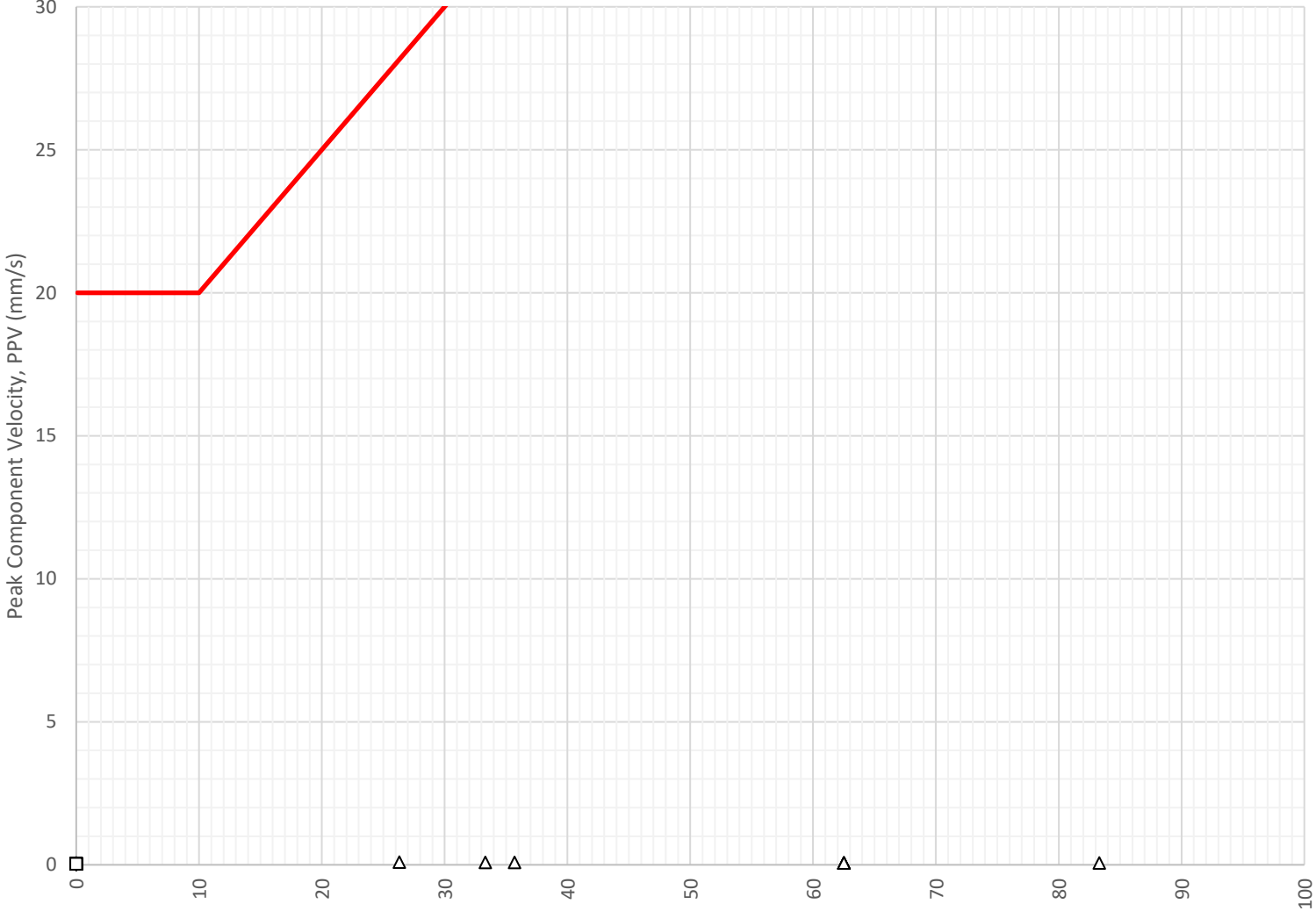
Frequency Content of Vibration Levels at Susan Wakil Health Building on 30-11-2023



Daily Monitored Vibration Levels at Susan Wakil Health Building on 4-12-2023



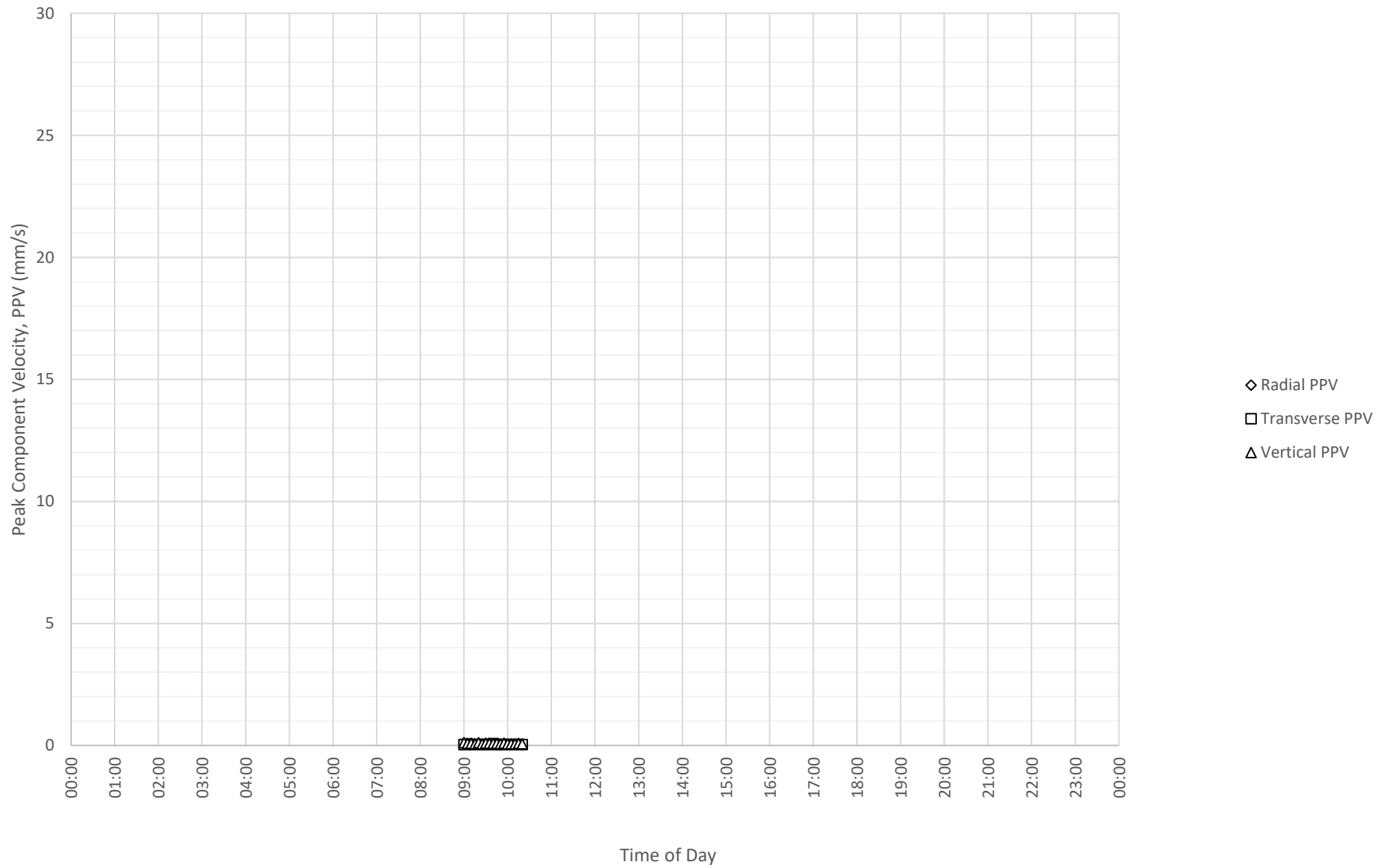
Frequency Content of Vibration Levels at Susan Wakil Health Building on 4-12-2023



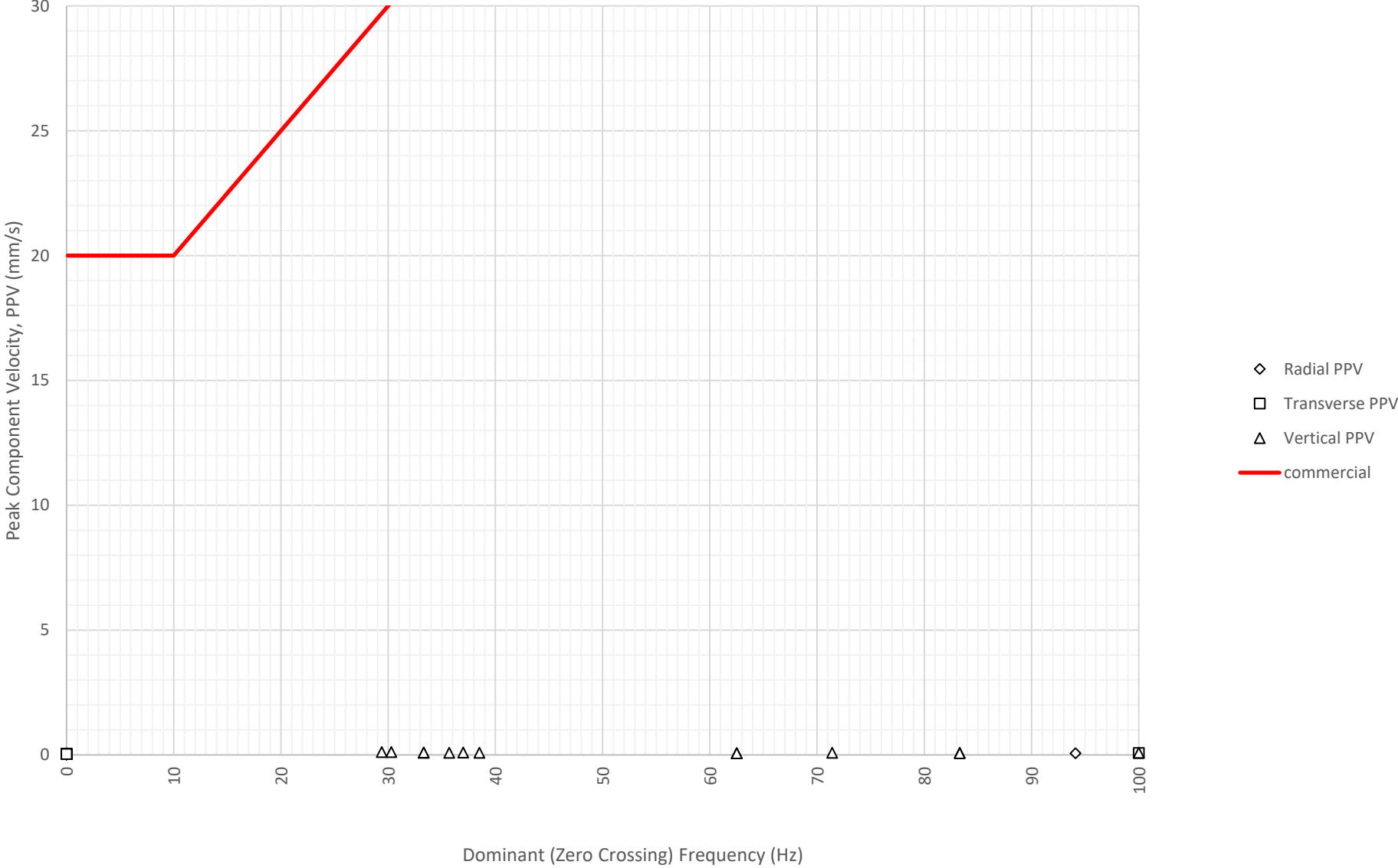
- ◇ Radial PPV
- Transverse PPV
- △ Vertical PPV
- commercial

Dominant (Zero Crossing) Frequency (Hz)

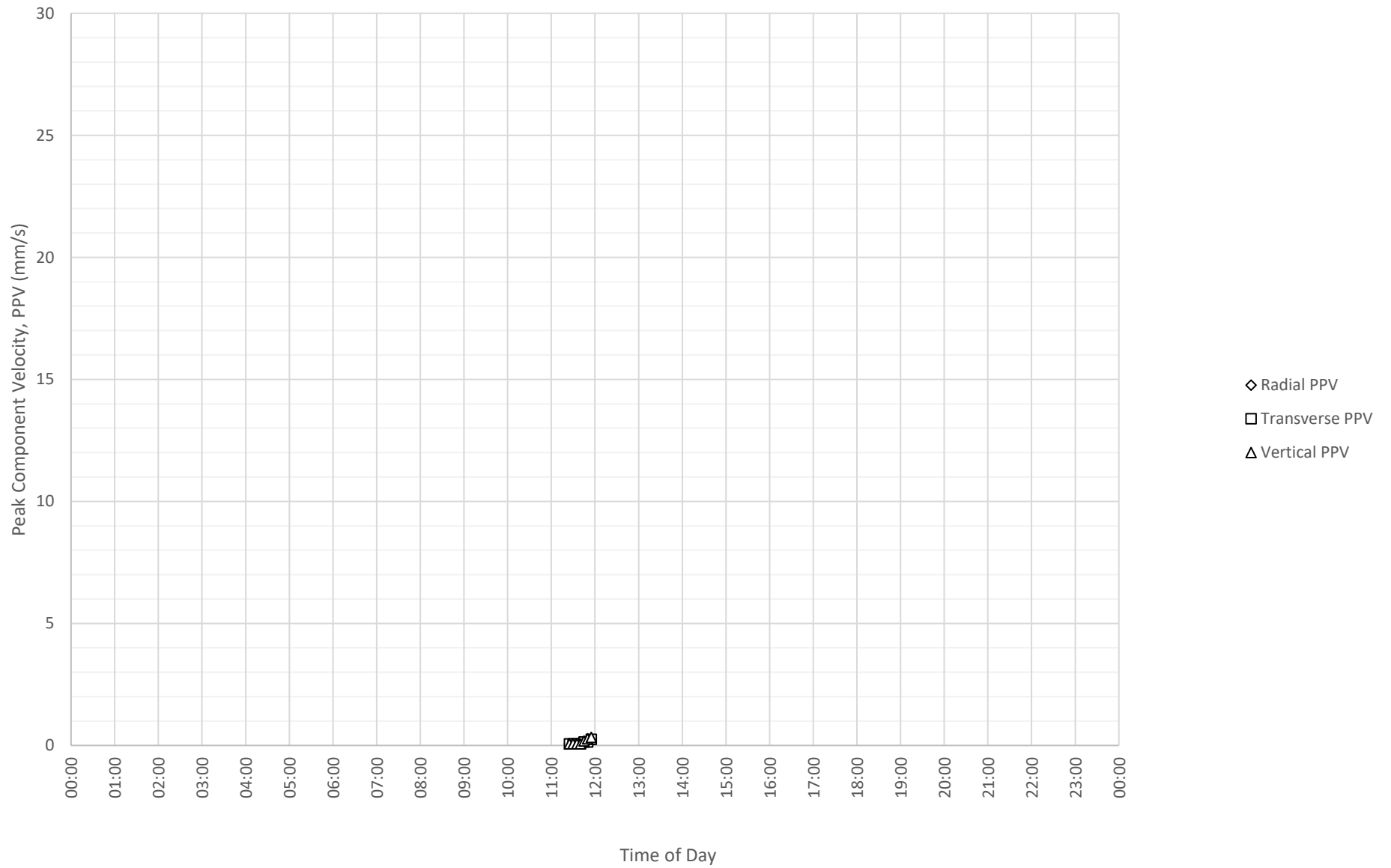
Daily Monitored Vibration Levels at Susan Wakil Health Building on 5-12-2023



Frequency Content of Vibration Levels at Susan Wakil Health Building on 5-12-2023



Daily Monitored Vibration Levels at Susan Wakil Health Building on 6-12-2023



Frequency Content of Vibration Levels at Susan Wakil Health Building on 6-12-2023

