



Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley

Monthly Report 6

09.01.2023 - 09.02.2023

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Project ID	20220910.5
Document Title	Monthly Report 6
Attention To	Hazell Bros

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	10/02/2023	20220910.5/1002A/R0/PF	PF		WY

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1 INTRODUCTION

Acoustic Logic has been engaged to carry out noise, dust and vibration monitoring for the impacts associated with the upgrade the existing road infrastructure of Tweed Coast Road/Cudgen Road intersection to service increased demand following the completion of the Tweed Valley Hospital.

This report provides the results of the following monitoring items:

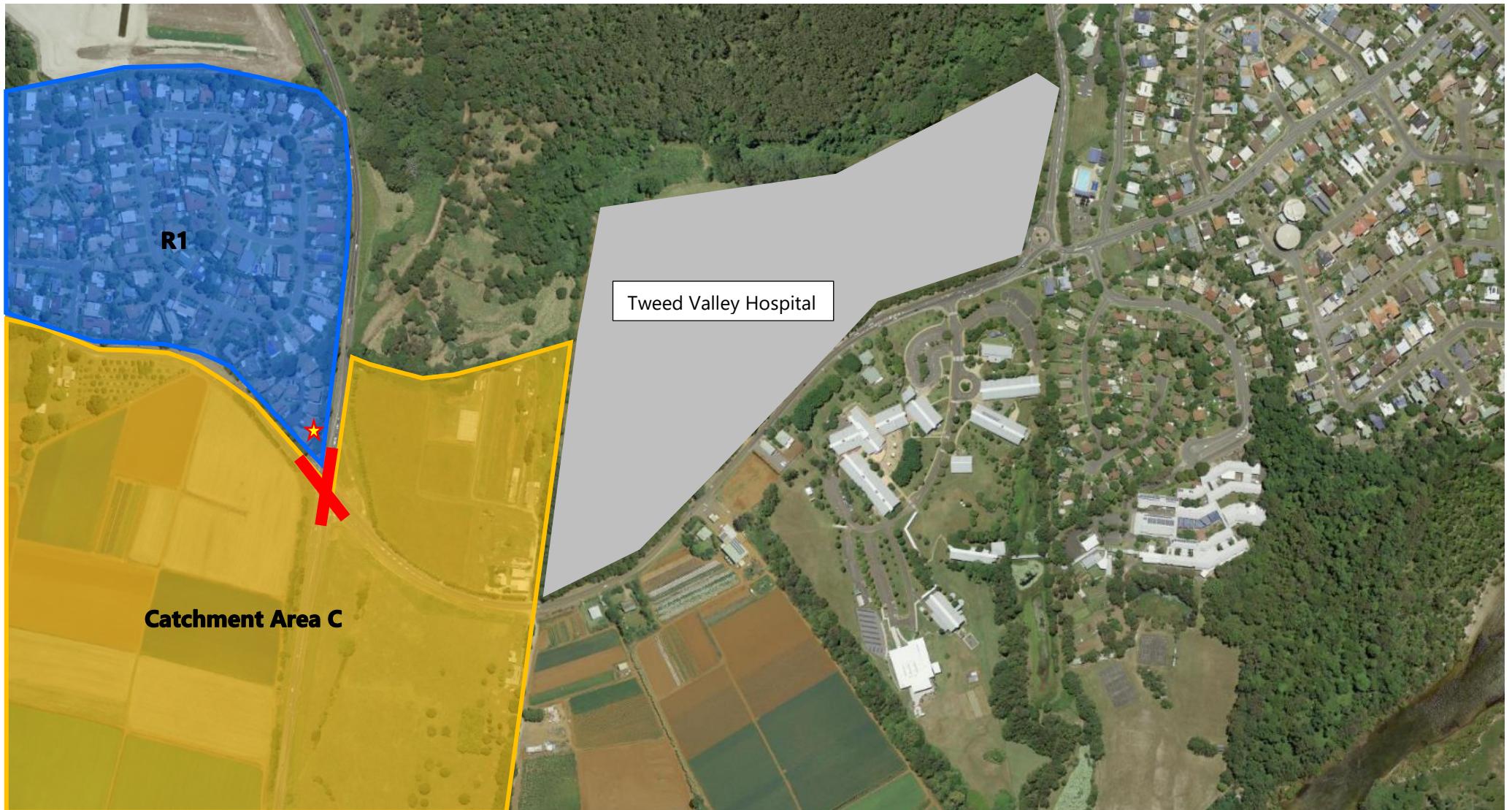
- Vibration Monitoring: 9th of January to 9th of February 2023
- Noise Monitoring: 9th of January to 9th of February 2023, and
- Dust Monitoring: 9th of January to 9th of February 2023.

Unattended noise, dust and vibration monitoring has been carried out with reference to the management levels identified in the *Construction Noise, Dust & Vibration Management Plan* (CNVMP) for Tweed Valley Hospital Carpark the site prepared by AL (ref: 20211491.1/2911A/R2/OB, dated 29/11/2021). The criteria set up in the above management plan will be adopted to the proposed intersection upgrade site.

1.1 SITE DESCRIPTION AND SENSITIVE RECEIVERS

The subject site is located at Tweed Coast Road/Cudgen Road intersection, Kingscliff as indicated in Figure 1-1. The land uses surrounding the intersection are existing residential and agricultural receivers. The nearest potentially most affected receivers are:

- **Residential Receiver R1:** Residential receivers at 6-30 John Robb Way to the north of the proposed construction site
- **Industrial/Agricultural Receiver 1:** Catchment Area C to the south of the proposed construction site



- Industrial/Agricultural
- Proposed road upgrade location
- ★ Monitoring Location

Figure 1-1 – Project Site and Sensitive Receiver Locations

- Tweed Valley Hospital
- Residential Receiver

2 CONSTRUCTION NOISE, DUST & VIBRATION MANAGEMENT LEVELS

Noise, dust and vibration management levels which are presented below have been adopted from the following documents:

- Tweed Valley Hospital Carpark Construction Noise, Dust and Vibration Management Plan (CNVMP), Acoustic Logic (ref: 20211491.1/2911A/R2/OB, dated 29/11/2021)
- For structural damage vibration, German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures*, and
- For human exposure to vibration, the NSW EPA document *Assessing Vibration: A Technical Guideline*.

2.1 VIBRATION MONITORING OBJECTIVES

German Standard DIN 4150-3 provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 are presented in Table 2-1.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 2-1 – DIN4150-3 Safe Limits for Building Vibration

TYPE OF STRUCTURE		PEAK PARTICLE VELOCITY (mms^{-1})			
		At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
		< 10Hz	10Hz to 50Hz	50Hz to 100Hz	
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use Receivers R1	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

The surrounding residential properties are considered type 2 structures and are the most sensitive receivers as such vibration will be assessed to the Type 2 criteria.

2.2 NOISE MONITORING OBJECTIVES

Project specific noise construction noise management levels are outlined in the approved CNVMP and summarised in Table 2-2 below:

Table 2-2 – Summarised Construction Noise Requirements During Proposed Hours

“Noise Affected” Level - dB(A) $L_{eq(15min)}$ Standard Hours	“Highly Noise Affected” Level - dB(A) $L_{eq(15min)}$
55 externally at façade	75

2.3 DUST MONITORING OBJECTIVES

Dust monitoring has been conducted to measure mechanically generated respirable PM_{2.5} dust particles (< 2.5µm) and PM₁₀ dust particles (< 10µm), which are generally understood to be the main health concern in airborne dust. The air quality limits are based on the standards outlined in Department of the Environment's *National Environment Protection (Ambient Air Quality) Measure* and NSW EPA's air quality categories.

It should be noted that the dust monitoring results can be influenced by events such as fires and dust storms, thus the PM₁₀ limit has an allowance of 5 days per year to account for the effects of such events.

The PM_{2.5} and PM₁₀ goals are summarised below.

Table 3 – PM_{2.5} and PM₁₀ Goals (24-Hour Average)

Pollutant	Averaging Time	Maximum Concentration
PM _{2.5}	24 hours	25 µg/m ³
PM ₁₀	24 hours	50 µg/m ³

The EPA has air quality categories based on particle concentration over a one hour average. As per the Construction Noise, Dust and Vibration management Plan, this project has targeted the 'Poor' category as a reference, **however, the assessment level is the 24-hour average.**

Table 4 – PM_{2.5} and PM₁₀ Goals (1-Hour Average)

Pollutant	Air Quality Category	Maximum Concentration
PM _{2.5}	Poor	62-97 µg/m ³
PM ₁₀		80-120 µg/m ³

3 MONITOR/MEASUREMENT EQUIPMENT AND LOCATIONS

3.1 VIBRATION MONITOR

3.1.1 Measurement Equipment

Vibration monitoring was conducted using Texcel ETM vibration monitors with external Tri-axial Geophones. The monitors are programmed to store statistical vibration data every 5-minute intervals, along with any 'triggered' events that occur throughout the monitoring period.

3.1.2 Measurement Locations & Installation Dates

A vibration monitor (M7394) has been installed, representative of the potential impact for vibration transmission to surrounding residential houses, at the northern boundary of the construction site (at the ground level, also see Figure 3-1). The monitor was installed on Friday 22nd July 2022.

3.2 NOISE AND DUST MONITOR

3.2.1 Measurement Equipment

Unattended noise monitoring was conducted using a *SiteHive Hexanode 134* noise and dust monitor. The monitor was programmed to store 15-minute statistical noise levels throughout the monitoring period. Measurements were taken on A-frequency weighting and fast time weighting.

3.2.2 Measurement Locations & Installation Dates

A noise monitor has been installed, representative of the potential impact for noise transmission to surrounding residential houses, at the northern boundary of the construction site (at the ground level, also see Figure below). The monitor was installed on Friday 22nd July 2022.



Figure 3-1 Noise, Dust and Vibration Monitor Installation Locations

4 NOISE, DUST & VIBRATION MEASUREMENTS

4.1 MONITORING PERIOD

This report provides the available results of noise, dust and vibration monitoring between the 9th of January to 9th of February 2023.

4.2 VIBRATION MONITORING RESULTS

The highest axial (transverse / radial / vertical) vibration level, Peak Particle Velocity (PPV), during the monitoring period have been presented below. Graphs of the results are presented in Appendix A.

Table 5 – Vibration Monitoring Results-M7394

Date	Maximum Measured Vibration Level mm/s	Structural Damage Criteria for Type 2 (DIN4150-3)	Comments
Tuesday 2023-01-10	<3mm/s		
Wednesday 2023-01-11	<3mm/s		
Thursday 2023-01-12	<3mm/s		
Friday 2023-01-13	<3mm/s		
Saturday 2023-01-14	<3mm/s		
Sunday 2023-01-15	No work		
Monday 2023-01-16	<3mm/s	5 mm/s (<10Hz)	Vibration levels satisfy DIN4150-3 Type 2 criteria
Tuesday 2023-01-17	<3mm/s	5-15 mm/s (10-50Hz)	
Wednesday 2023-01-18	<3mm/s	15-20mm/s (50-100Hz)	
Thursday 2023-01-19	<3mm/s		
Friday 2023-01-20	<3mm/s		
Saturday 2023-01-21	<3mm/s		
Sunday 2023-01-22	No work		

Date	Maximum Measured Vibration Level mm/s	Structural Damage Criteria for Type 2 (DIN4150-3)	Comments
Monday 2023-01-23	<3mm/s		
Tuesday 2023-01-24	<3mm/s		
Wednesday 2023-01-25	<3mm/s		
Thursday 2023-01-26	<3mm/s		
Friday 2023-01-27	<3mm/s		
Saturday 2023-01-28	<3mm/s		
Sunday 2023-01-29	No work		
Monday 2023-01-30	<3mm/s	5 mm/s (<10Hz)	
Tuesday 2023-01-31	<3mm/s	5-15 mm/s (10-50Hz)	Vibration levels satisfy DIN4150-3 Type 2 criteria
Wednesday 2023-02-01	<3mm/s	15-20mm/s (50-100Hz)	
Thursday 2023-02-02	3mm/s		
Friday 2023-02-03	<3mm/s		
Saturday 2023-02-04	<3mm/s		
Sunday 2023-02-05	No work		
Monday 2023-02-06	<3mm/s		
Tuesday 2023-02-07	<3mm/s		
Wednesday 2023-02-08	5mm/s @ 36Hz		
Thursday 2023-02-09	6mm/s @ 42Hz		

Vibration levels for monitor M7394 to the north of the construction site were within the nominated criteria for the whole monitoring period between 9th of January to 9th of February 2023.

4.3 NOISE MONITORING RESULTS

The available measured noise levels have been analysed by this office and the graphed noise data presented in Appendix 1. Summarised results are also in Table 6 below.

Table 6 – Measured Construction Noise Levels @ R1

Date	Time Period	Percentage of Time that Measured Noise Level dB(A)L _{eq(15min)} Exceeds			
		0-5 above Noise affected level 55 dB(A)L _{eq(15min)}	5-10 above Noise affected level 55 dB(A)L _{eq(15min)}	10-15 above Noise affected level 55 dB(A)L _{eq(15min)}	Above Highly Noise affected level 75 dB(A)L _{eq(15min)}
Monday 2023-01-09	7am – 6pm	93.62%	4.26%	0.00%	0.00%
Tuesday 2023-01-10		93.18%	6.82%	0.00%	0.00%
Wednesday 2023-01-11		100.00%	0.00%	0.00%	0.00%
Thursday 2023-01-12		100.00%	0.00%	0.00%	0.00%
Friday 2023-01-13		100.00%	0.00%	0.00%	0.00%
Saturday 2023-01-14	8am – 1pm	95.24%	4.76%	0.00%	0.00%
Sunday 2023-01-15		No Works			
Monday 2023-01-16	7am – 6pm	90.91%	6.82%	0.00%	0.00%
Tuesday 2023-01-17		90.91%	9.09%	0.00%	0.00%
Wednesday 2023-01-18		90.91%	2.27%	0.00%	0.00%
Thursday 2023-01-19		100.00%	0.00%	0.00%	0.00%
Friday 2023-01-20		86.36%	13.64%	0.00%	0.00%
Saturday 2023-01-21	8am – 1pm	85.71%	14.29%	0.00%	0.00%
Sunday 2023-01-22		No Works			
Monday 2023-01-23	7am – 6pm	79.55%	20.45%	0.00%	0.00%

Date	Time Period	Percentage of Time that Measured Noise Level dB(A)L _{eq(15min)} Exceeds			
		0-5 above Noise affected level 55 dB(A)L _{eq(15min)}	5-10 above Noise affected level 55 dB(A)L _{eq(15min)}	10-15 above Noise affected level 55 dB(A)L _{eq(15min)}	Above Highly Noise affected level 75 dB(A)L _{eq(15min)}
Tuesday 2023-01-24	7am – 6pm	90.91%	9.09%	0.00%	0.00%
Wednesday 2023-01-25		84.09%	15.91%	0.00%	0.00%
Thursday 2023-01-26		65.91%	0.00%	0.00%	0.00%
Friday 2023-01-27		70.45%	27.27%	2.27%	0.00%
Saturday 2023-01-28	8am – 1pm	85.71%	0.00%	0.00%	0.00%
Sunday 2023-01-29	No Works				
Monday 2023-01-30	7am – 6pm	93.18%	2.27%	0.00%	0.00%
Tuesday 2023-01-31		93.18%	4.55%	0.00%	0.00%
Wednesday 2023-02-01		84.09%	13.64%	0.00%	0.00%
Thursday 2023-02-02		79.55%	9.09%	4.55%	0.00%
Friday 2023-02-03		100.00%	0.00%	0.00%	0.00%
Saturday 2023-02-04	8am – 1pm	90.48%	0.00%	0.00%	0.00%
Sunday 2023-02-05	No Works				
Monday 2023-02-06	7am – 6pm	72.73%	15.91%	11.36%	0.00%
Tuesday 2023-02-07		93.18%	6.82%	0.00%	0.00%
Wednesday 2023-02-08		70.45%	27.27%	2.27%	0.00%
Thursday 2023-02-09		54.55%	31.82%	4.55%	4.55%

Noise levels were generally below the highly noise affected level (75dB(A)) during the monitoring period. Noise levels were normally between 5-10 dB higher than the noise affected level. This is expected to be lower at the residential façade due to distance attenuation.

4.4 DUST MONITORING RESULTS

The daily average PM_{2.5} and PM₁₀ concentration levels are presented below.

Table 7 – 24hr Average PM_{2.5} and PM₁₀ Concentration

Date	24hr Average PM _{2.5} and PM ₁₀ Concentration					
	PM _{2.5} Level (µg/m ³)	PM _{2.5} Limit (µg/m ³)	Complies	PM ₁₀ Level (µg/m ³)	PM ₁₀ Limit (µg/m ³)	Complies
Monday 2023-01-09	6	25	Yes	19	50	Yes
Tuesday 2023-01-10	6		Yes	18		Yes
Wednesday 2023-01-11	6		Yes	18		Yes
Thursday 2023-01-12	6		Yes	20		Yes
Friday 2023-01-13	5		Yes	15		Yes
Saturday 2023-01-14	7		Yes	22		Yes
Sunday 2023-01-15		No Works				
Monday 2023-01-16	2	25	Yes	7	50	Yes
Tuesday 2023-01-17	1		Yes	4		Yes
Wednesday 2023-01-18	1		Yes	3		Yes
Thursday 2023-01-19	5		Yes	18		Yes
Friday 2023-01-20	8		Yes	23		Yes
Saturday 2023-01-21	8		Yes	21		Yes
Sunday 2023-01-22		No Works				
Monday 2023-01-23	4	25	Yes	18	50	Yes
Tuesday 2023-01-24	3		Yes	12		Yes
Wednesday 2023-01-25	6		Yes	25		Yes

Date	24hr Average PM _{2.5} and PM ₁₀ Concentration					
	PM _{2.5} Level (µg/m ³)	PM _{2.5} Limit (µg/m ³)	Complies	PM ₁₀ Level (µg/m ³)	PM ₁₀ Limit (µg/m ³)	Complies
Thursday 2023-01-26	5	25	Yes	17	50	Yes
Friday 2023-01-27	5		Yes	17		Yes
Saturday 2023-01-28	3		Yes	9		Yes
Sunday 2023-01-29						
Monday 2023-01-30	2	25	Yes	7	50	Yes
Tuesday 2023-01-31	7		Yes	26		Yes
Wednesday 2023-02-01	6		Yes	26		Yes
Thursday 2023-02-02	6		Yes	22		Yes
Friday 2023-02-03	7		Yes	28		Yes
Saturday 2023-02-04	13		Yes	47		Yes
Sunday 2023-02-05						
Monday 2023-02-06	7	25	Yes	24	50	Yes
Tuesday 2023-02-07	5		Yes	19		Yes
Wednesday 2023-02-08	6		Yes	22		Yes
Thursday 2023-02-09	6		Yes	22		Yes

Dust data recorded were below the criteria during the whole monitoring period.

The **daily maximum 1hour** PM_{2.5} and PM₁₀ concentration levels are presented below.

Table 8 – 1Hr Maximum PM_{2.5} and PM₁₀ Concentration

Date	Maximum 1hr Average PM _{2.5} and PM ₁₀ Concentration					
	PM _{2.5} Level (µg/m ³)	PM _{2.5} Limit (µg/m ³)	Complies	PM ₁₀ Level (µg/m ³)	PM ₁₀ Limit (µg/m ³)	Complies
Monday 2023-01-09	8	62-97	Yes	41	80-120	Yes
Tuesday 2023-01-10	8		Yes	31		Yes
Wednesday 2023-01-11	9		Yes	30		Yes
Thursday 2023-01-12	8		Yes	38		Yes
Friday 2023-01-13	7		Yes	24		Yes
Saturday 2023-01-14	9		Yes	38		Yes
Sunday 2023-01-15		No Works				
Monday 2023-01-16	6	62-97	Yes	22	80-120	Yes
Tuesday 2023-01-17	2		Yes	6		Yes
Wednesday 2023-01-18	2		Yes	6		Yes
Thursday 2023-01-19	11		Yes	51		Yes
Friday 2023-01-20	11		Yes	37		Yes
Saturday 2023-01-21	10		Yes	36		Yes
Sunday 2023-01-22		No Works				
Monday 2023-01-23	8	62-97	Yes	34	80-120	Yes
Tuesday 2023-01-24	16		Yes	60		Yes
Wednesday 2023-01-25	10		Yes	63		Yes

Date	Maximum 1hr Average PM _{2.5} and PM ₁₀ Concentration					
	PM _{2.5} Level (µg/m ³)	PM _{2.5} Limit (µg/m ³)	Complies	PM ₁₀ Level (µg/m ³)	PM ₁₀ Limit (µg/m ³)	Complies
Thursday 2023-01-26	7	62-97	Yes	22	80-120	Yes
Friday 2023-01-27	9		Yes	30		Yes
Saturday 2023-01-28	7		Yes	25		Yes
Sunday 2023-01-29	No Works					
Monday 2023-01-30	9	62-97	Yes	37	80-120	Yes
Tuesday 2023-01-31	37		Yes	122		Severe weather affected*
Wednesday 2023-02-01	16		Yes	92		Yes
Thursday 2023-02-02	8		Yes	34		Yes
Friday 2023-02-03	20		Yes	99		Yes
Saturday 2023-02-04	24		Yes	109		Severe weather affected*
Sunday 2023-02-05	No Works					
Monday 2023-02-06	11	62-97	Yes	37	80-120	Yes
Tuesday 2023-02-07	10		Yes	30		Yes
Wednesday 2023-02-08	9		Yes	57		Yes
Thursday 2023-02-09	22		Yes	100		Yes

Dust data recorded during the monitoring period were generally below the criteria except for 31st January and 4th February when exceedances occurred due to extreme rain fall.

5 CONCLUSION

Acoustic Logic Consultancy has carried out noise, dust and vibration monitoring for the proposed intersection upgrade at Tweed Coast Road/Cudgen Road intersection, Tweed Valley.

This monitoring report presents the noise and vibration monitoring for the periods as follows:

- Vibration Monitoring: 9th of January to 9th of February 2023
- Noise Monitoring: 9th of January to 9th of February 2023, and
- Dust Monitoring: 9th of January to 9th of February 2023.

Vibration levels were below the criteria during the whole monitoring period. Noise levels were normally below 10dB(A) exceedance of noise affected level (55dB(A)). This is believed to be lower at the closest residential receiver due to distance attenuation. Dust levels recorded during the above monitoring period were generally below the criteria except for 31st January and 4th February where exceedances were caused by extreme rain fall as per the results notes in this report.

Please contact us should you have any further queries.

Yours faithfully,

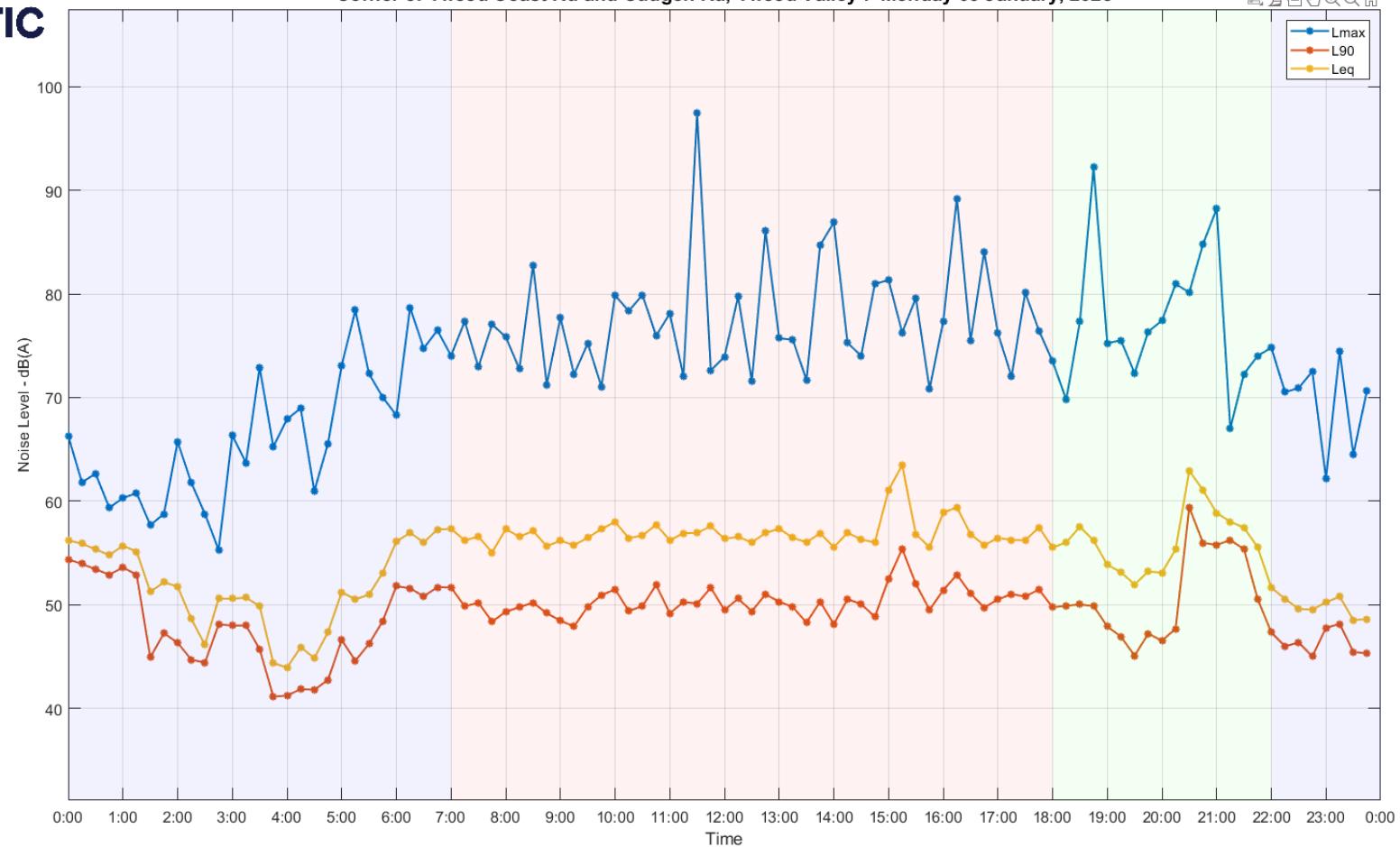


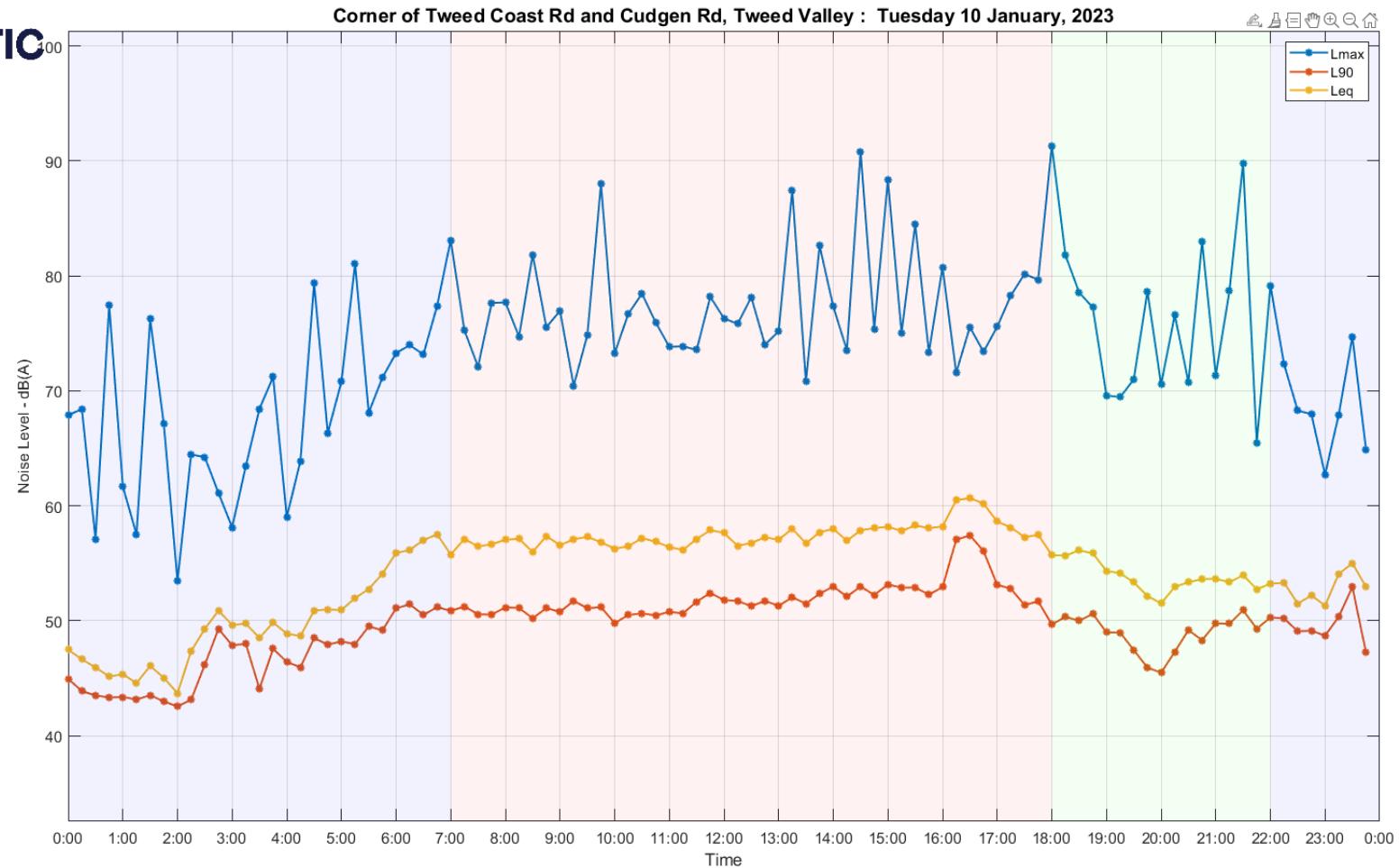
Acoustic Logic Pty Ltd
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APPENDIX 1 – NOISE MONITORING RESULTS

Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Monday 09 January, 2023


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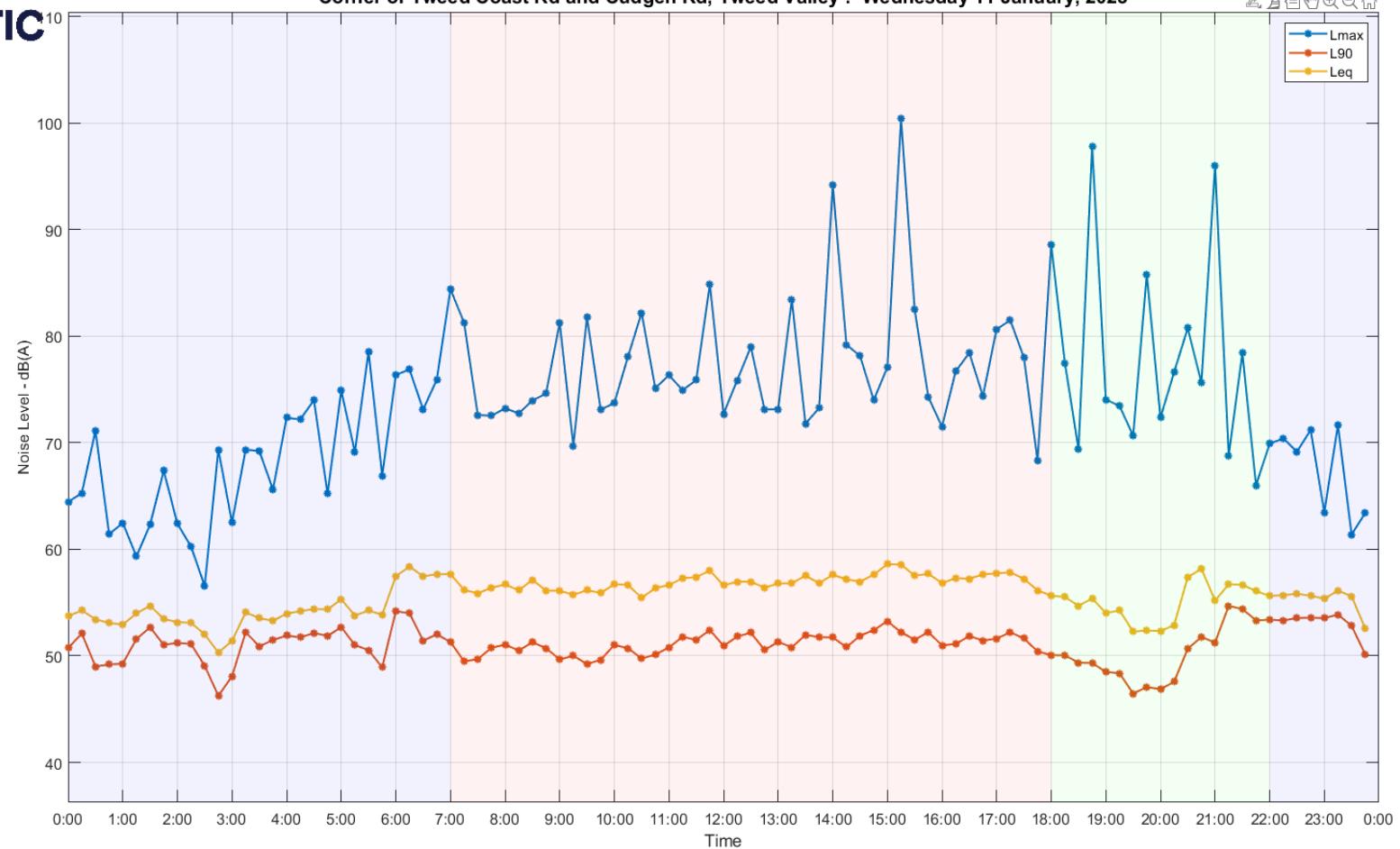


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Tuesday 10 January, 2023


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Wednesday 11 January, 2023

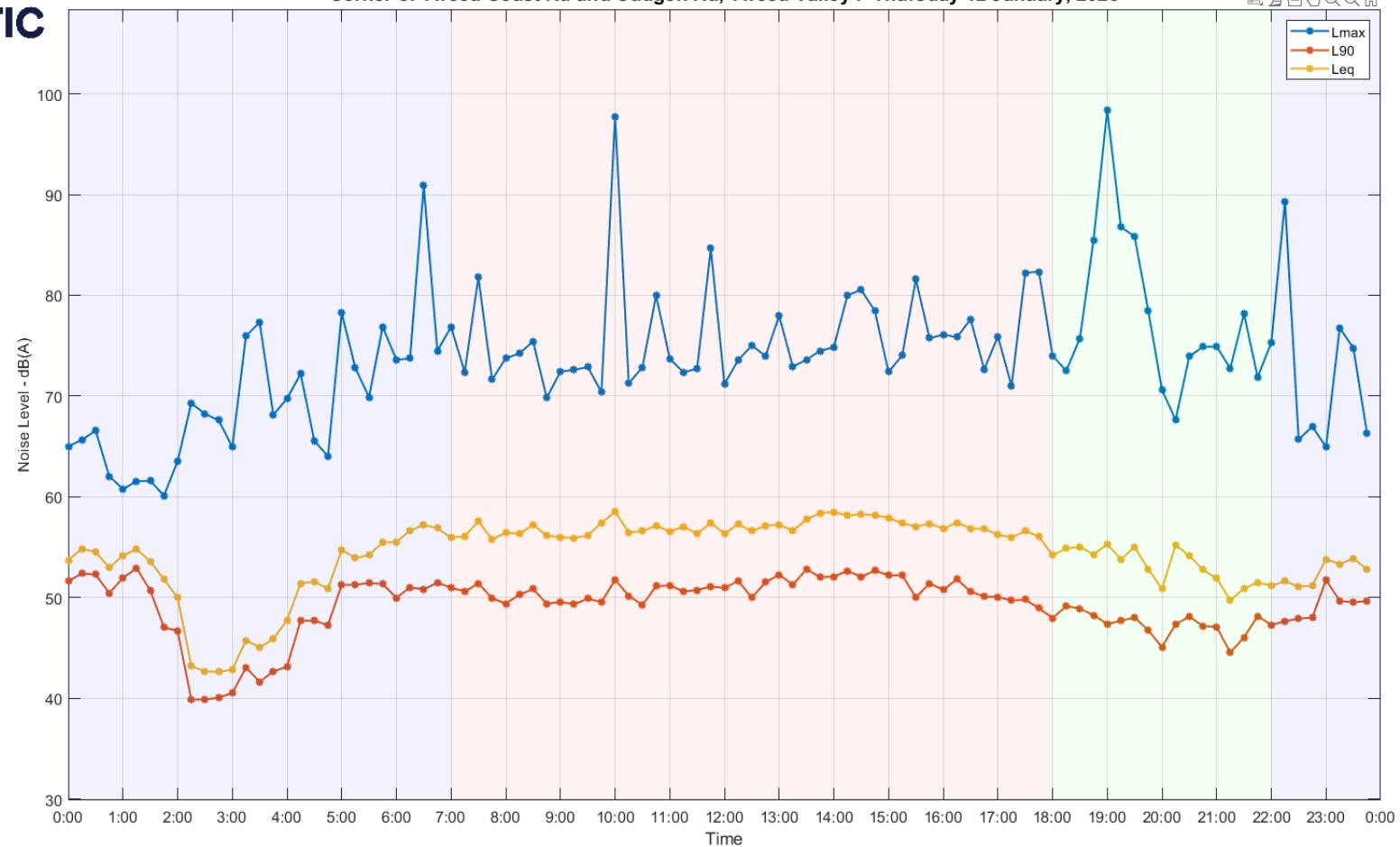


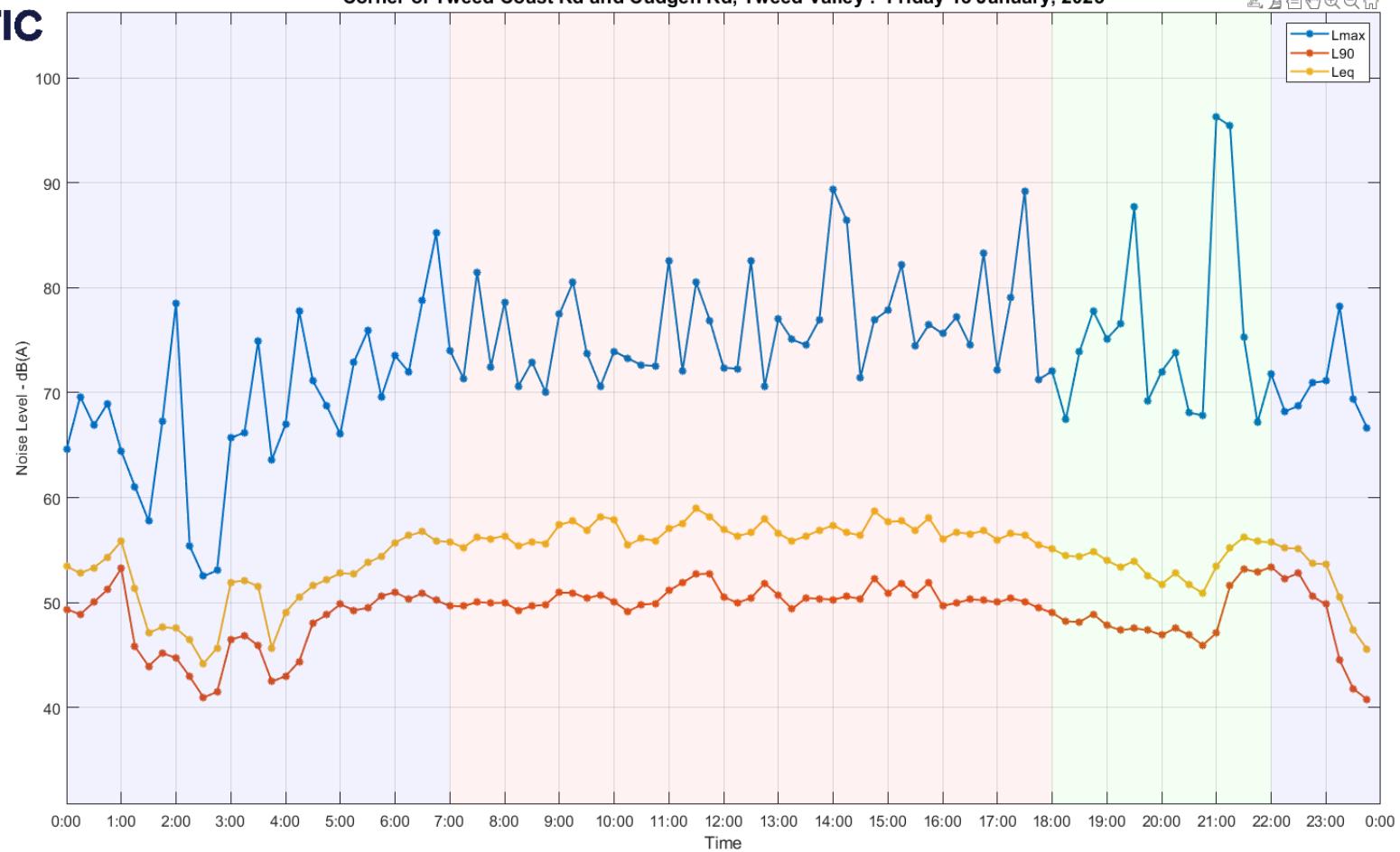
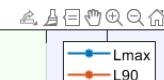
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Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Thursday 12 January, 2023


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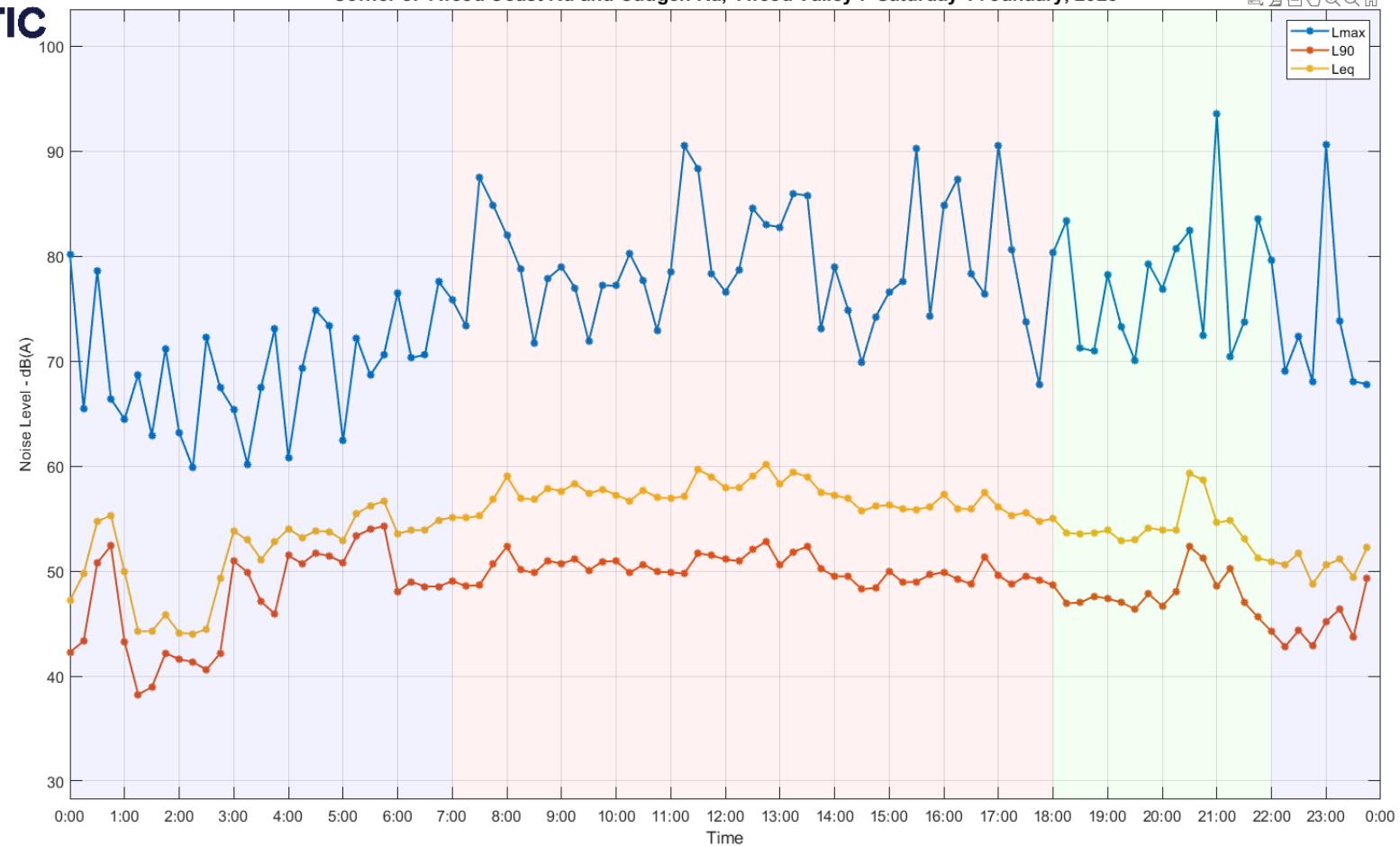


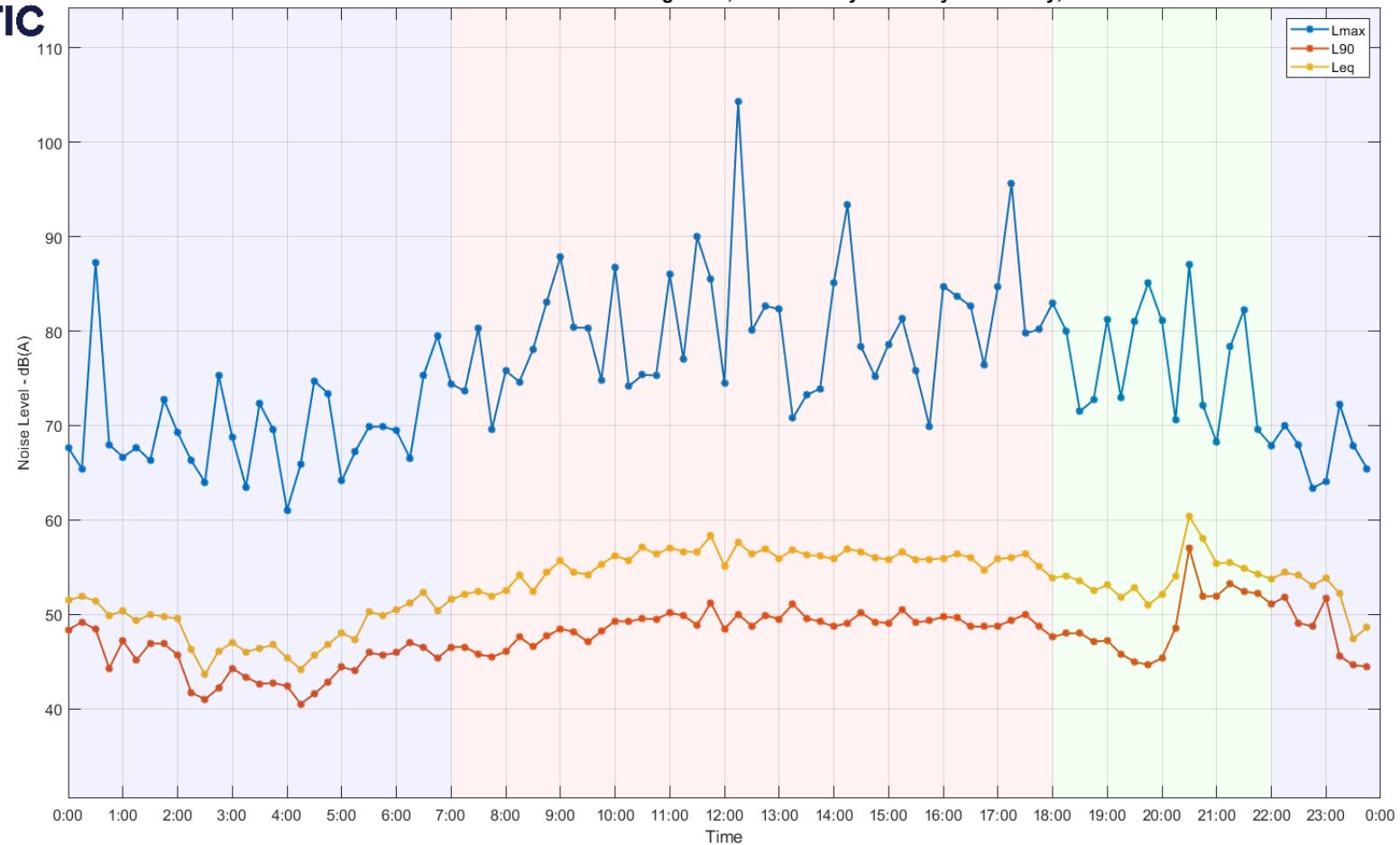
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Friday 13 January, 2023


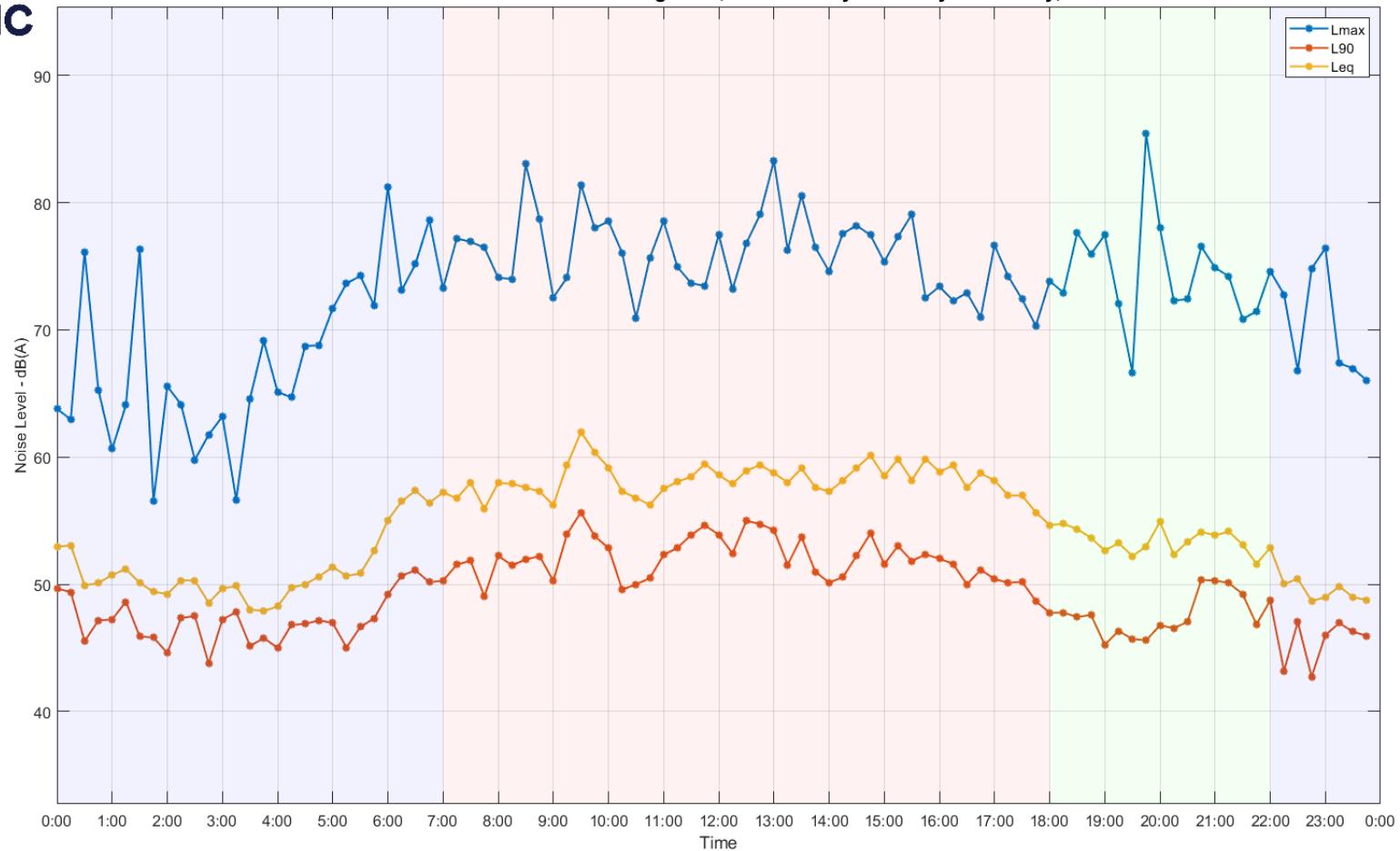
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Saturday 14 January, 2023

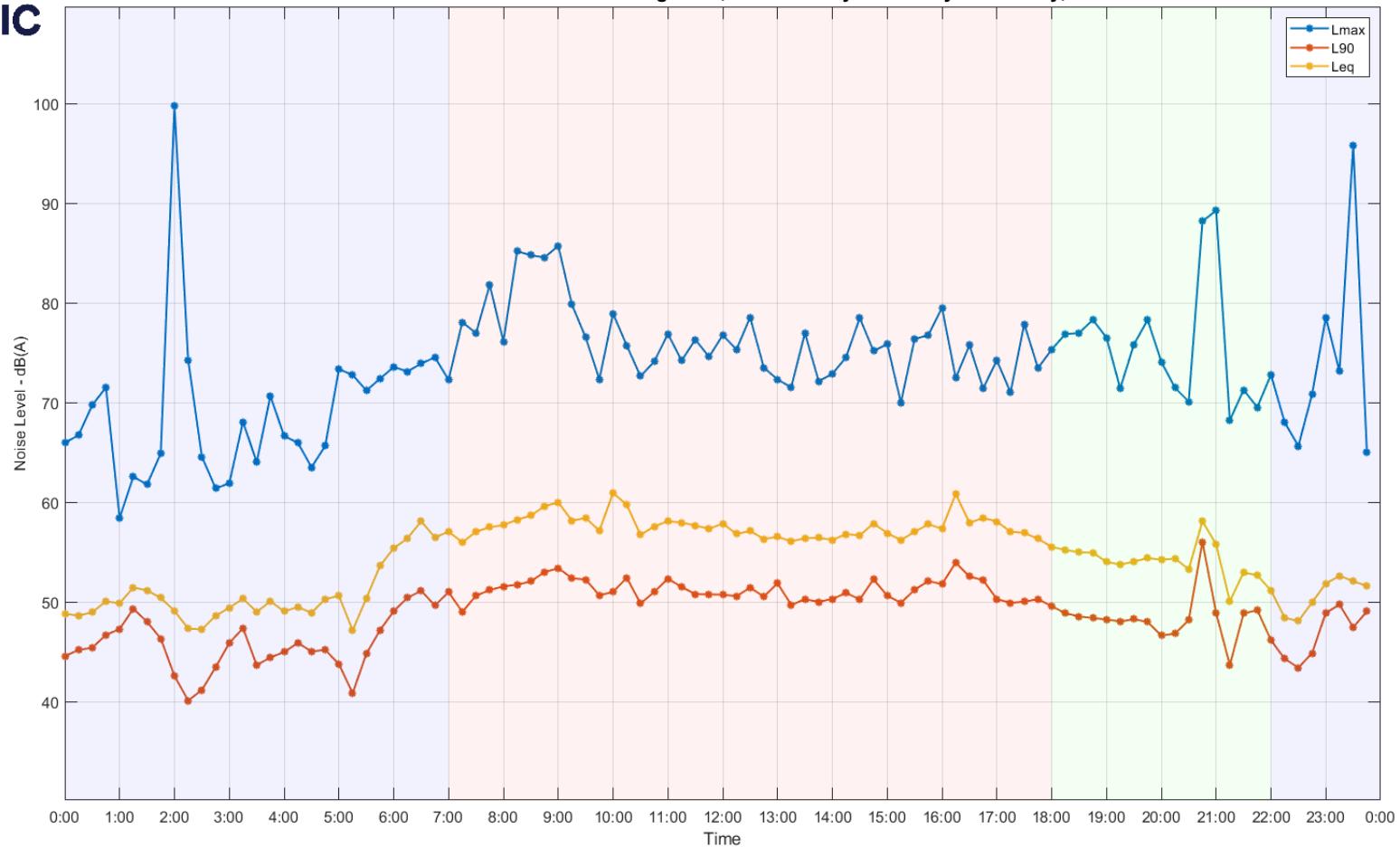


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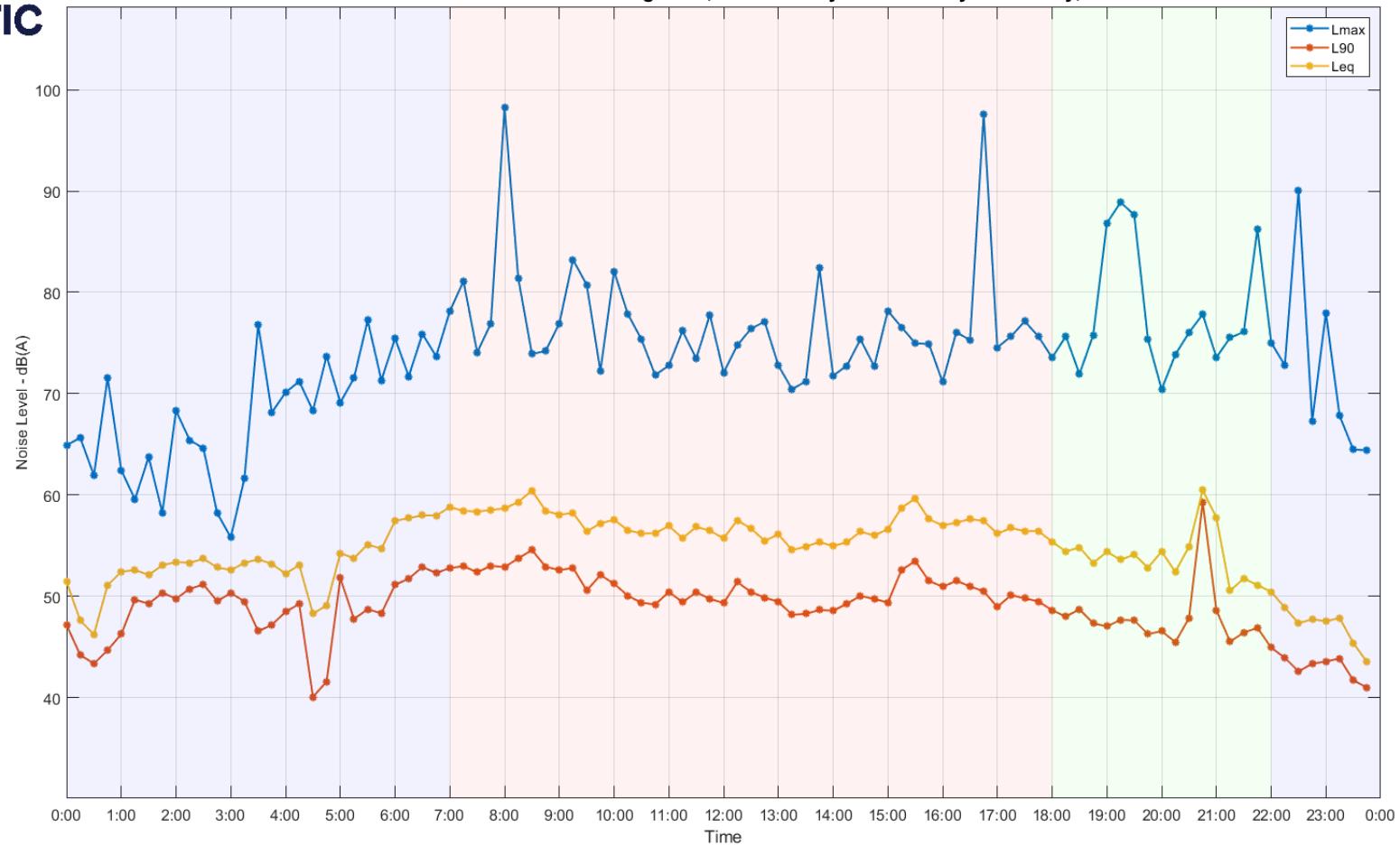


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Sunday 15 January, 2023


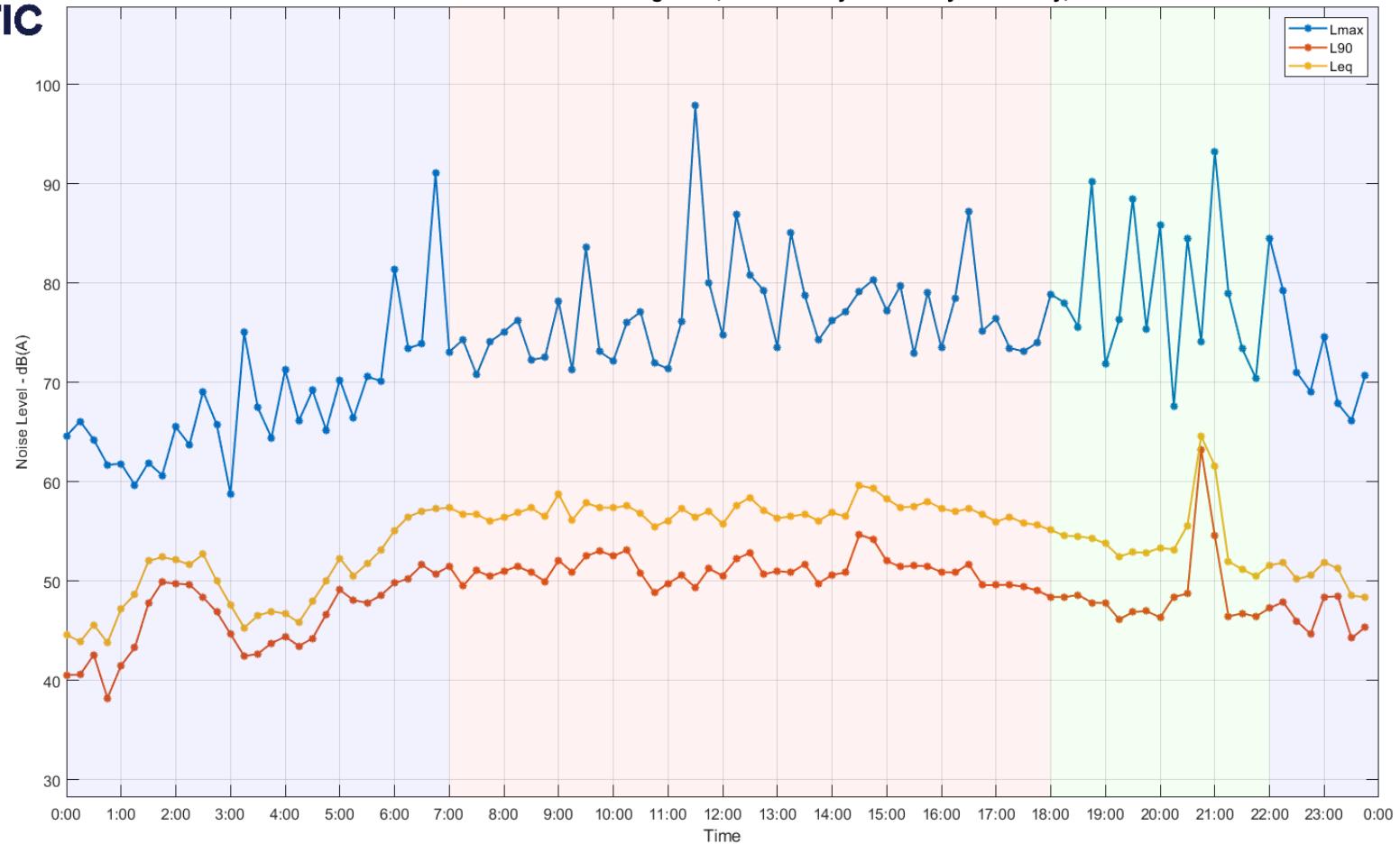
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Monday 16 January, 2023


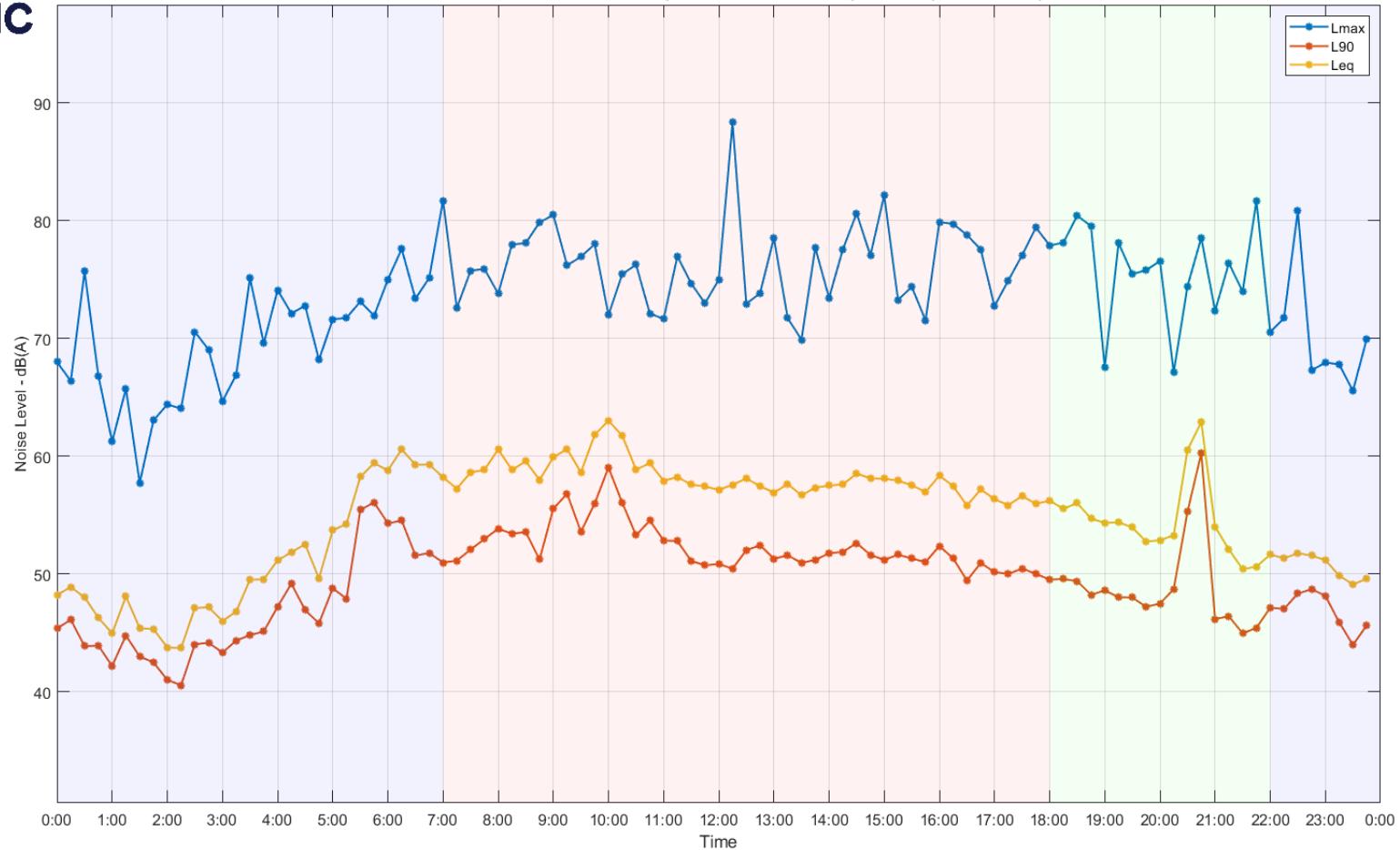
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Tuesday 17 January, 2023


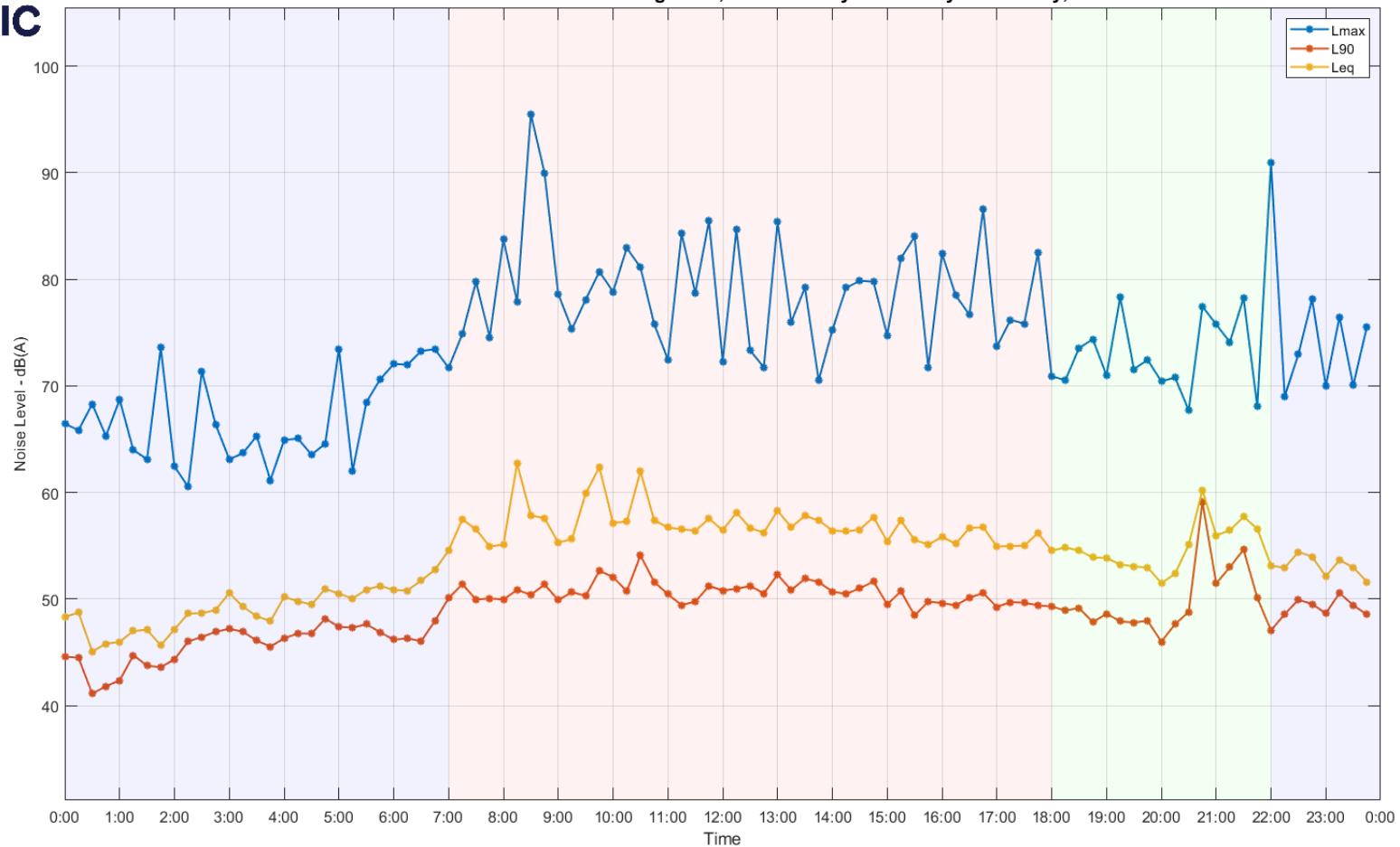
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Wednesday 18 January, 2023



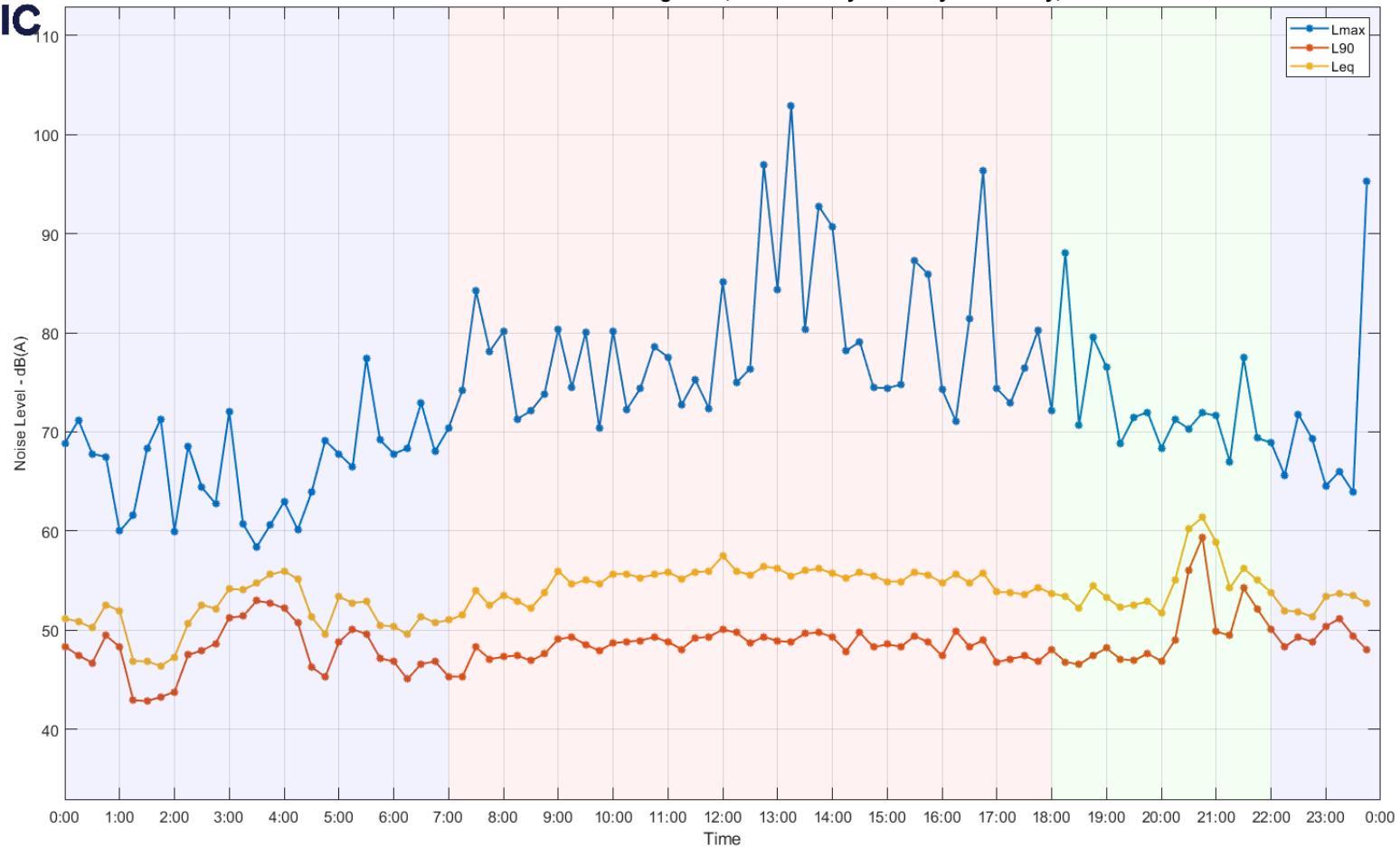
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Thursday 19 January, 2023



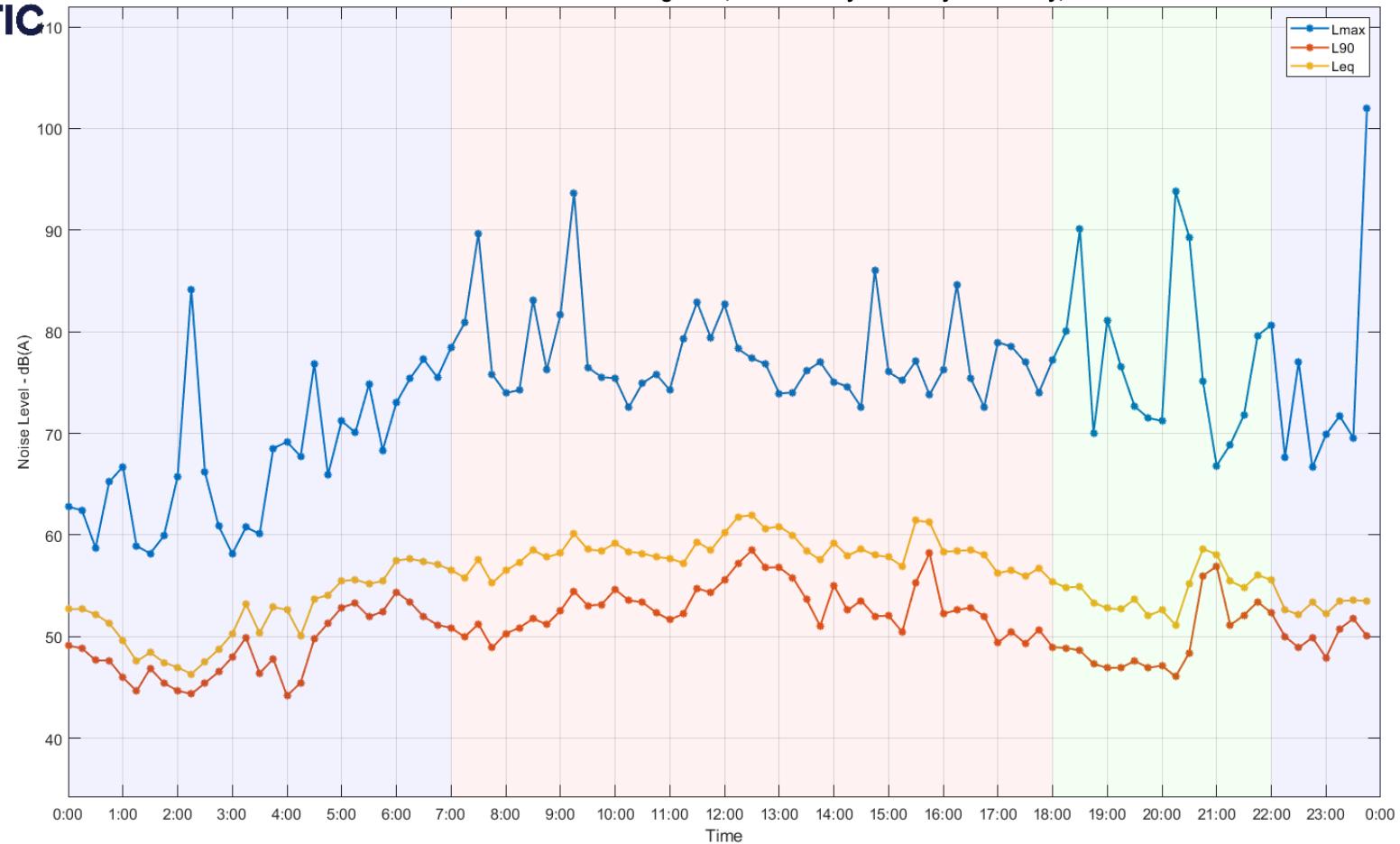
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Friday 20 January, 2023


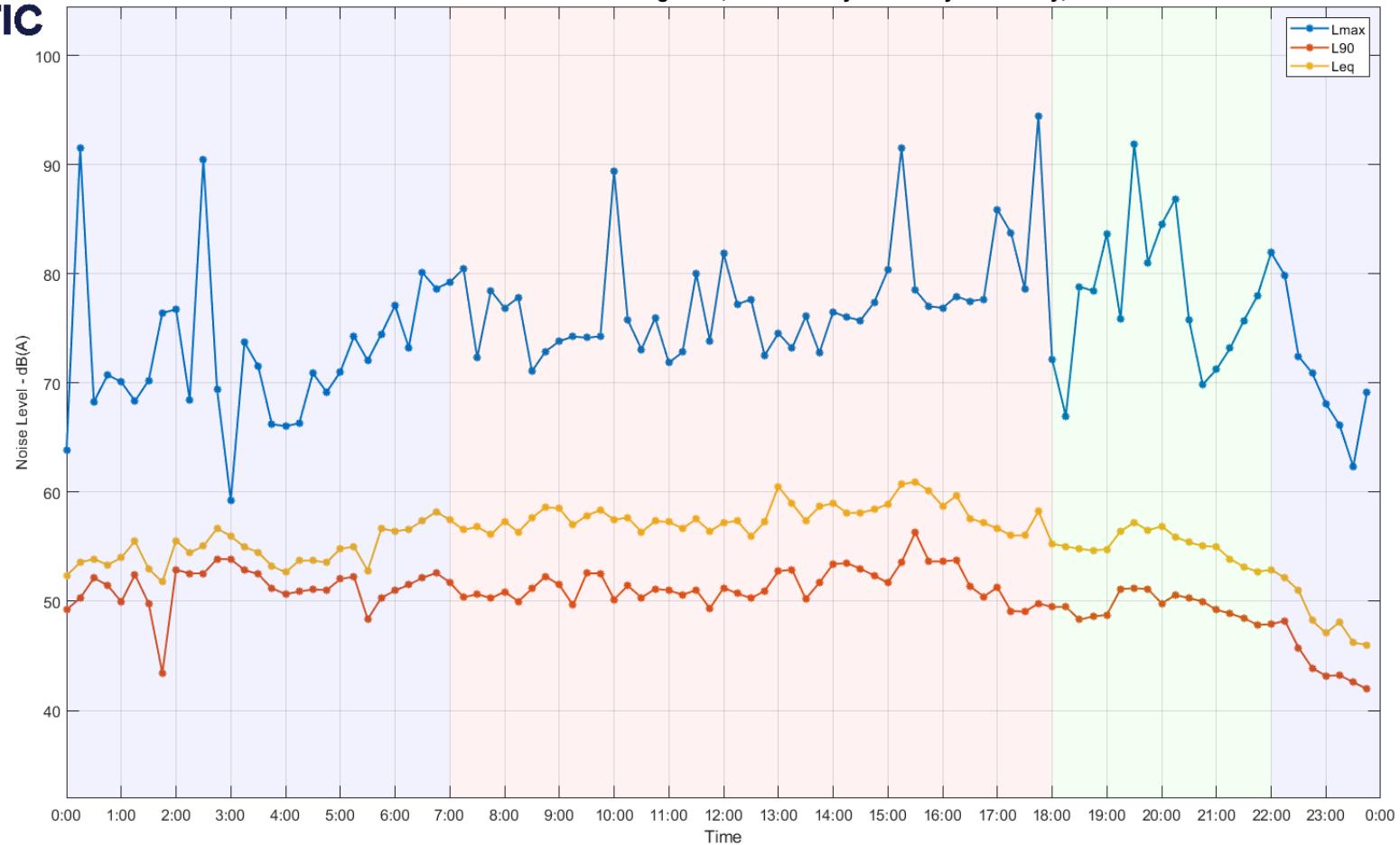
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Saturday 21 January, 2023


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Sunday 22 January, 2023

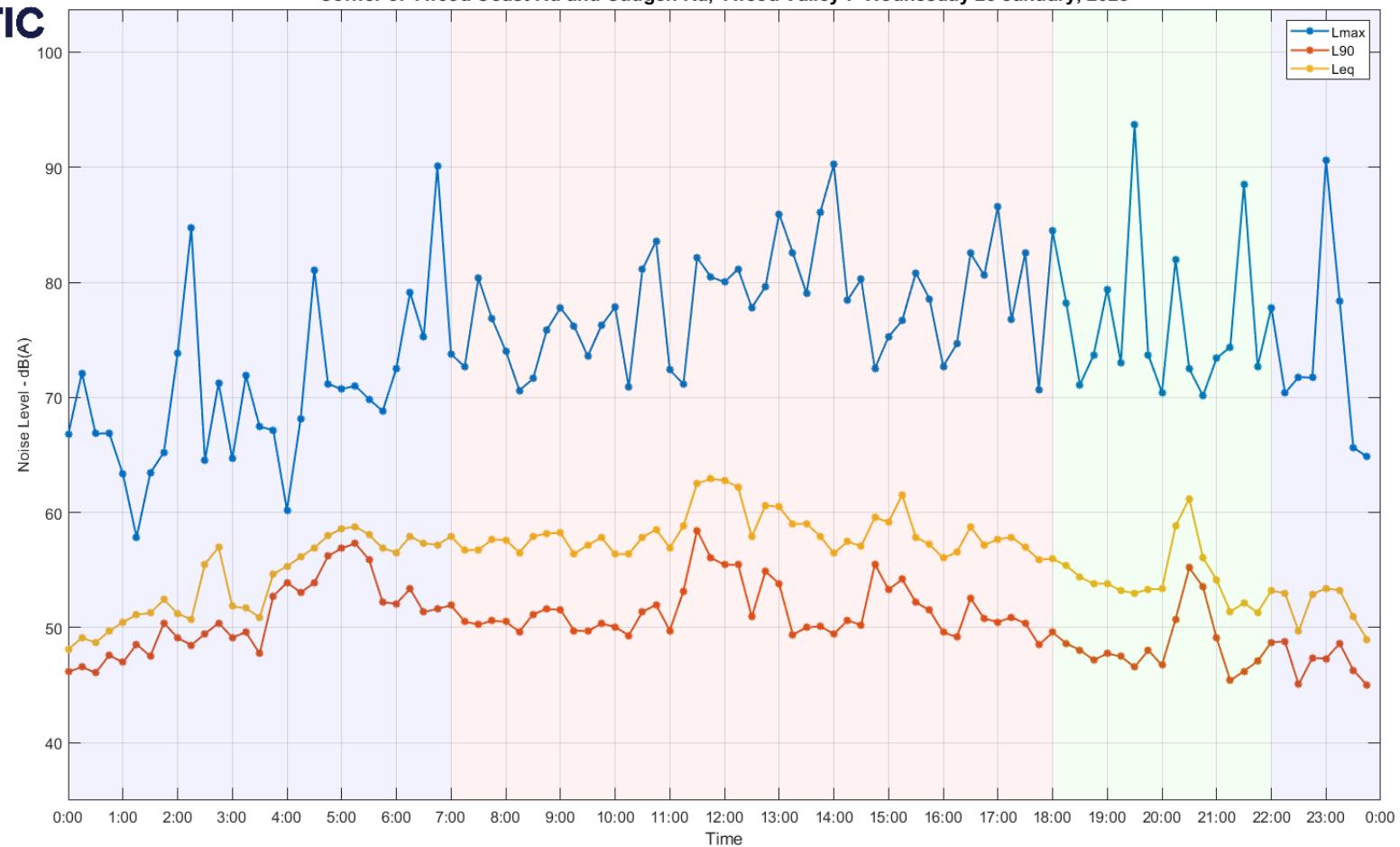


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Monday 23 January, 2023

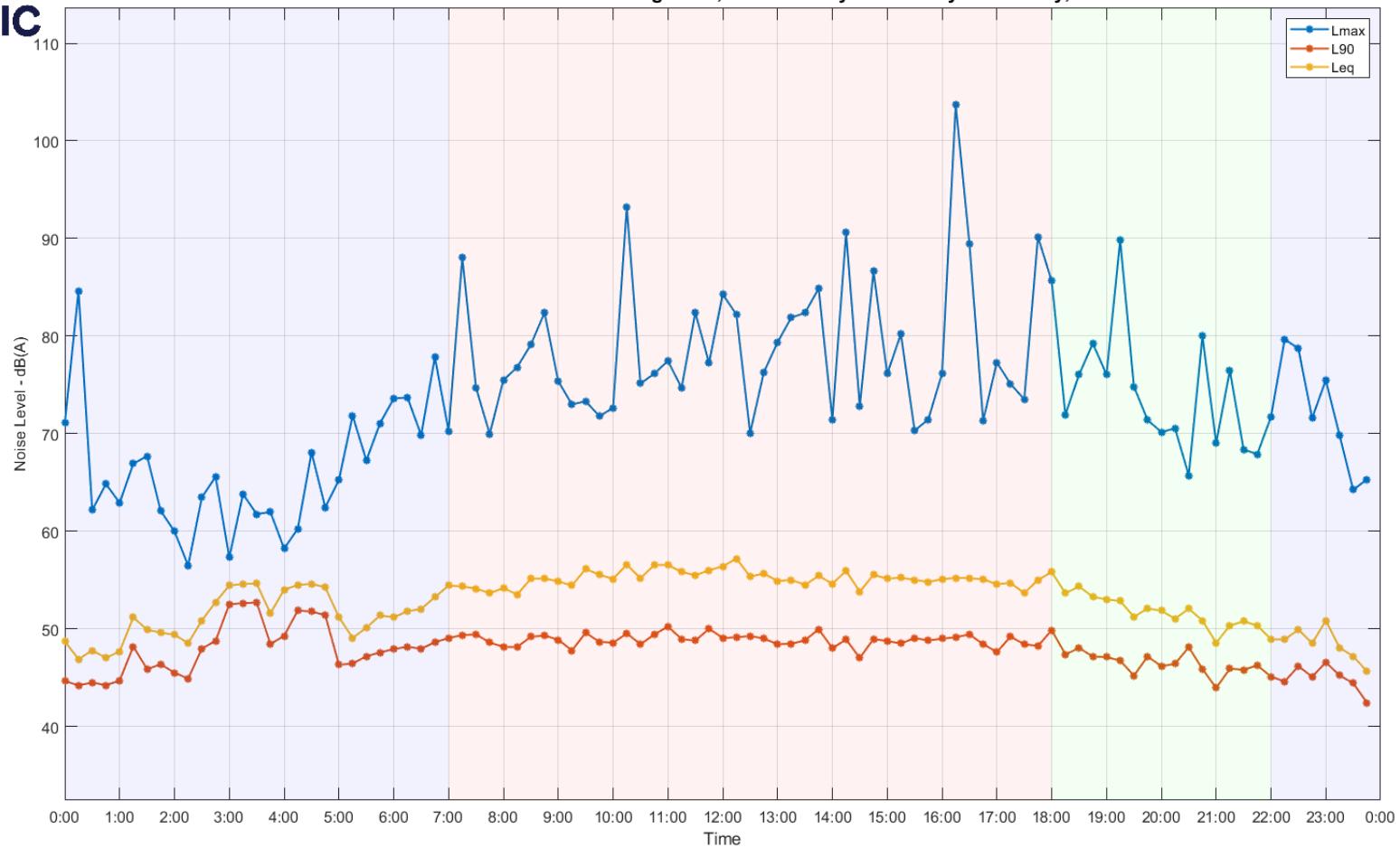


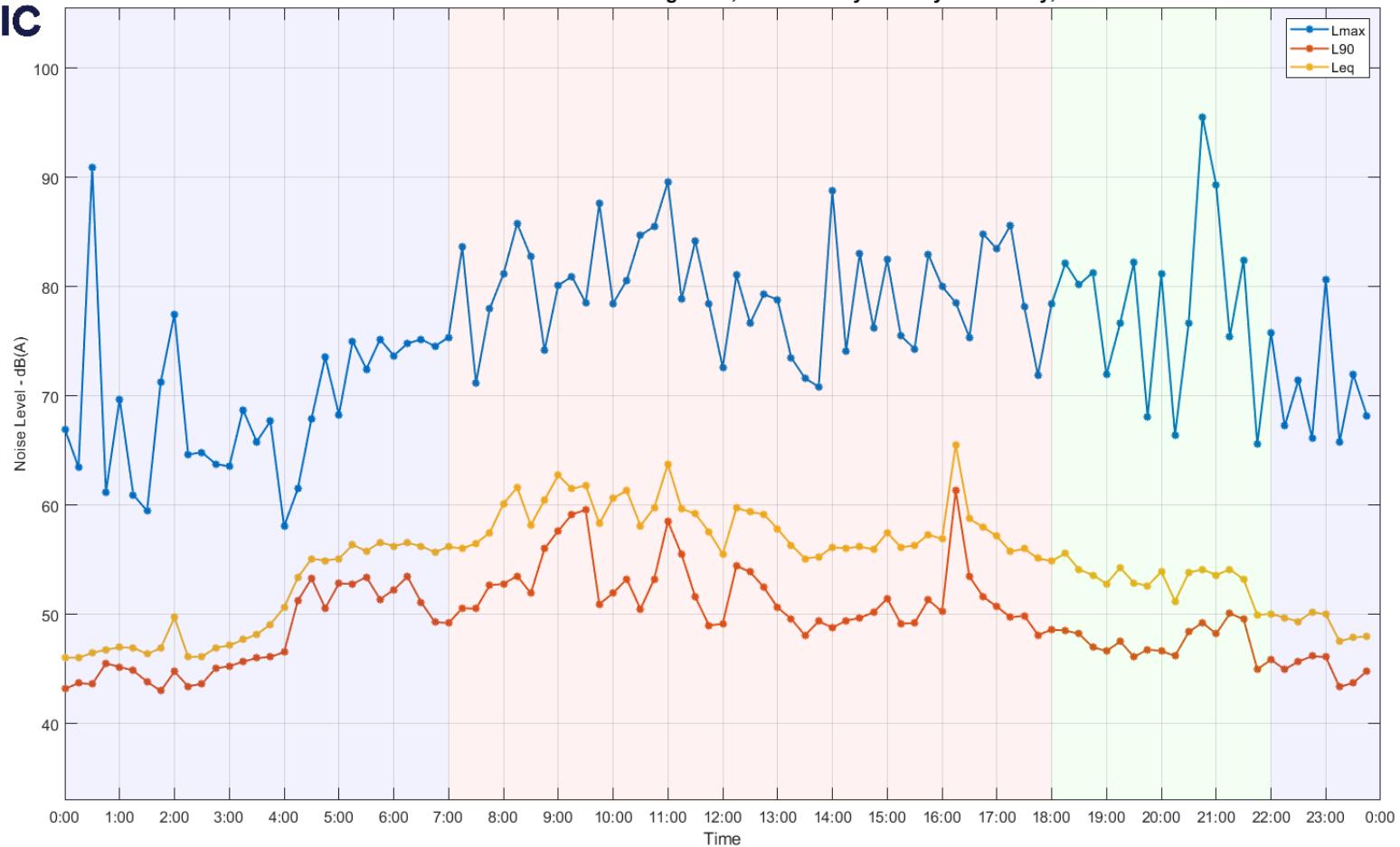
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Tuesday 24 January, 2023


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Wednesday 25 January, 2023

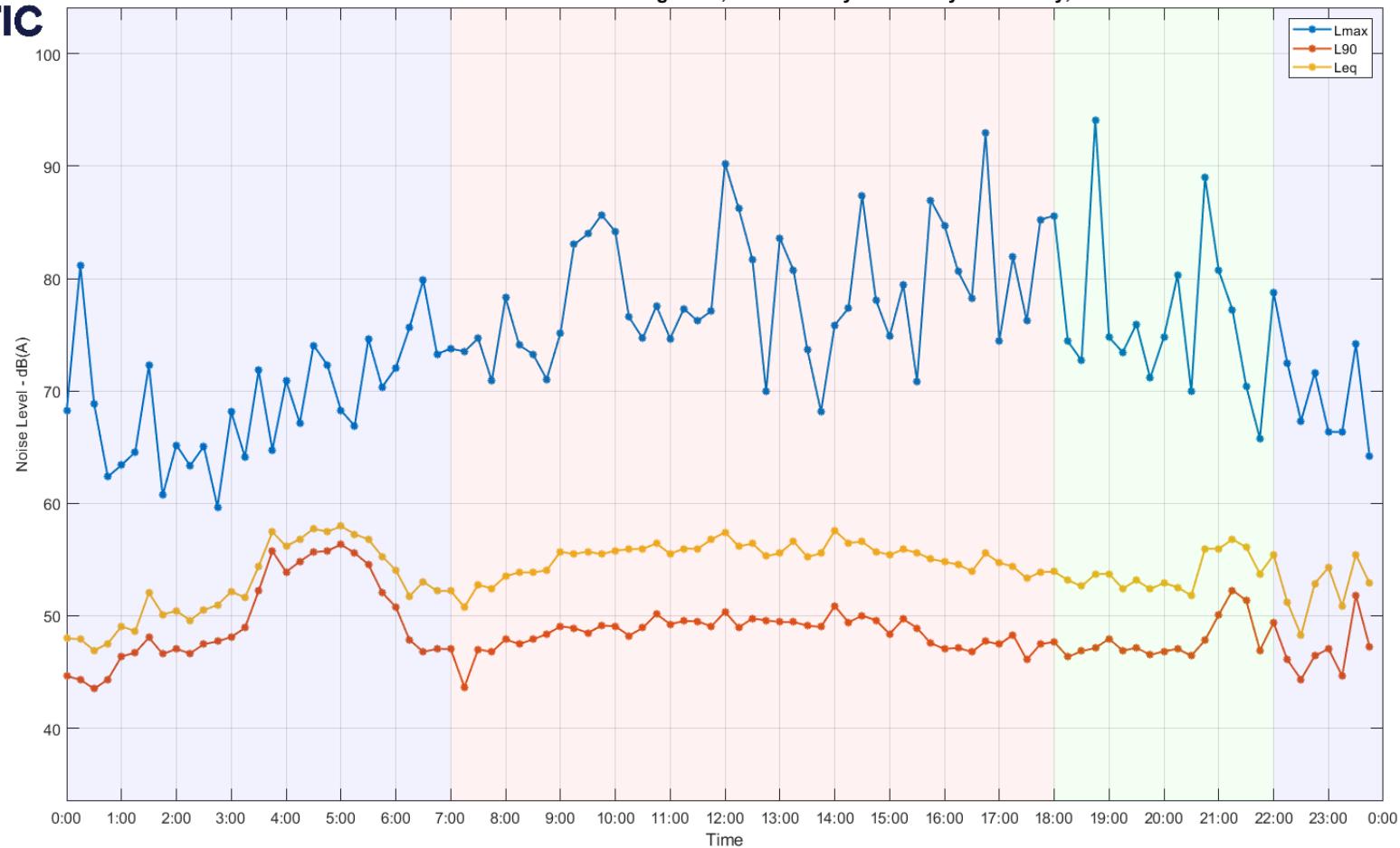


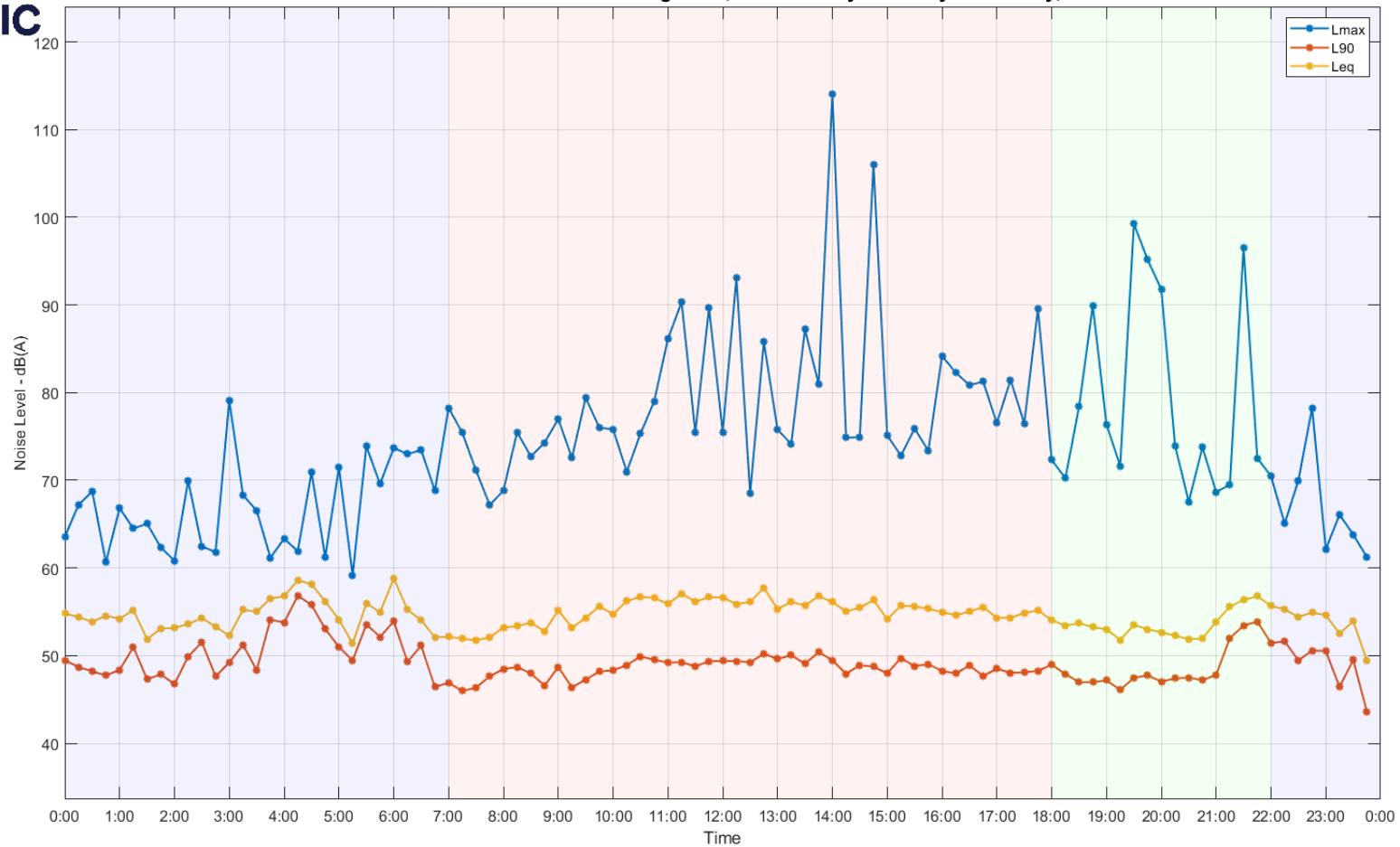
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Thursday 26 January, 2023

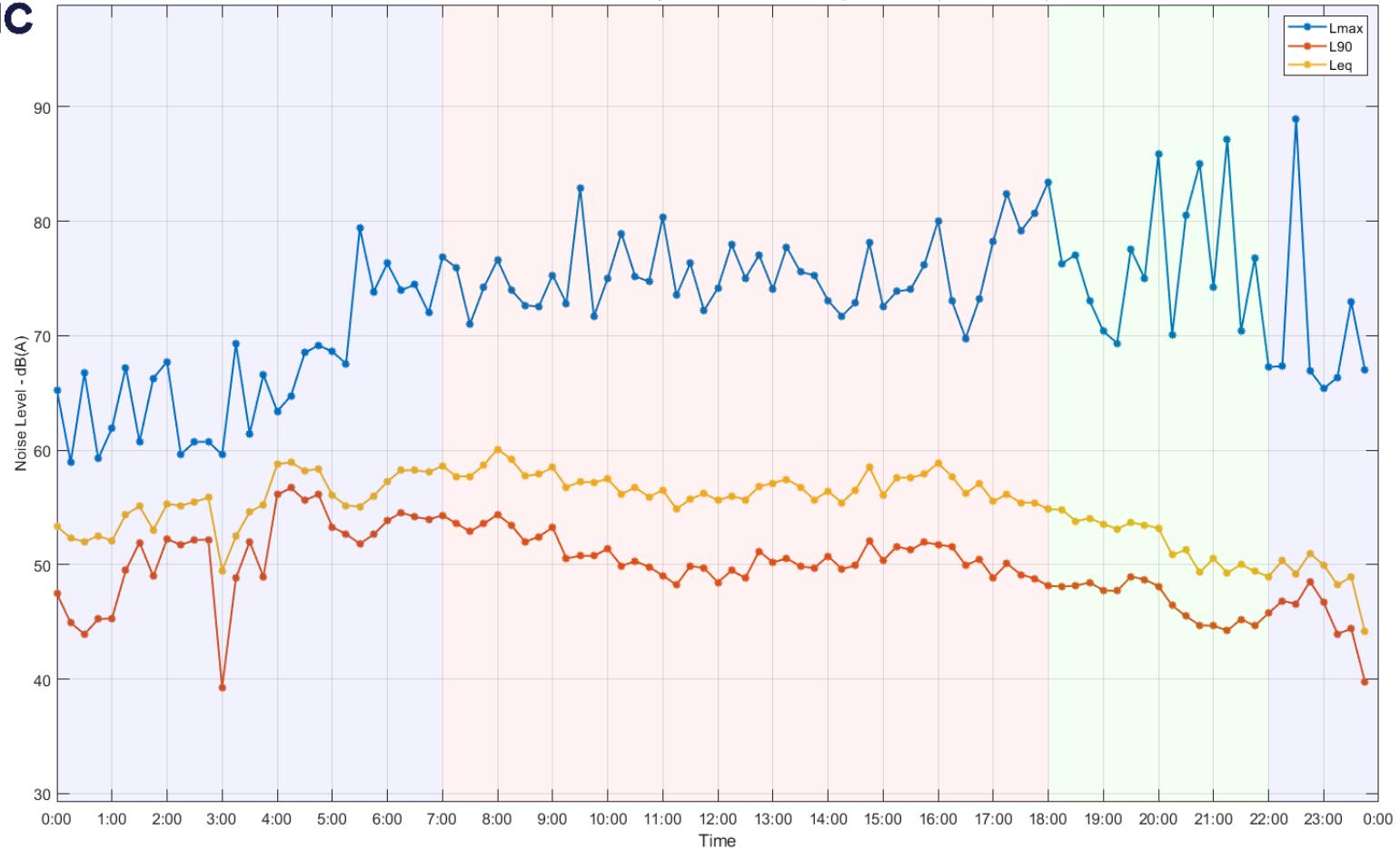


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Friday 27 January, 2023


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Saturday 28 January, 2023

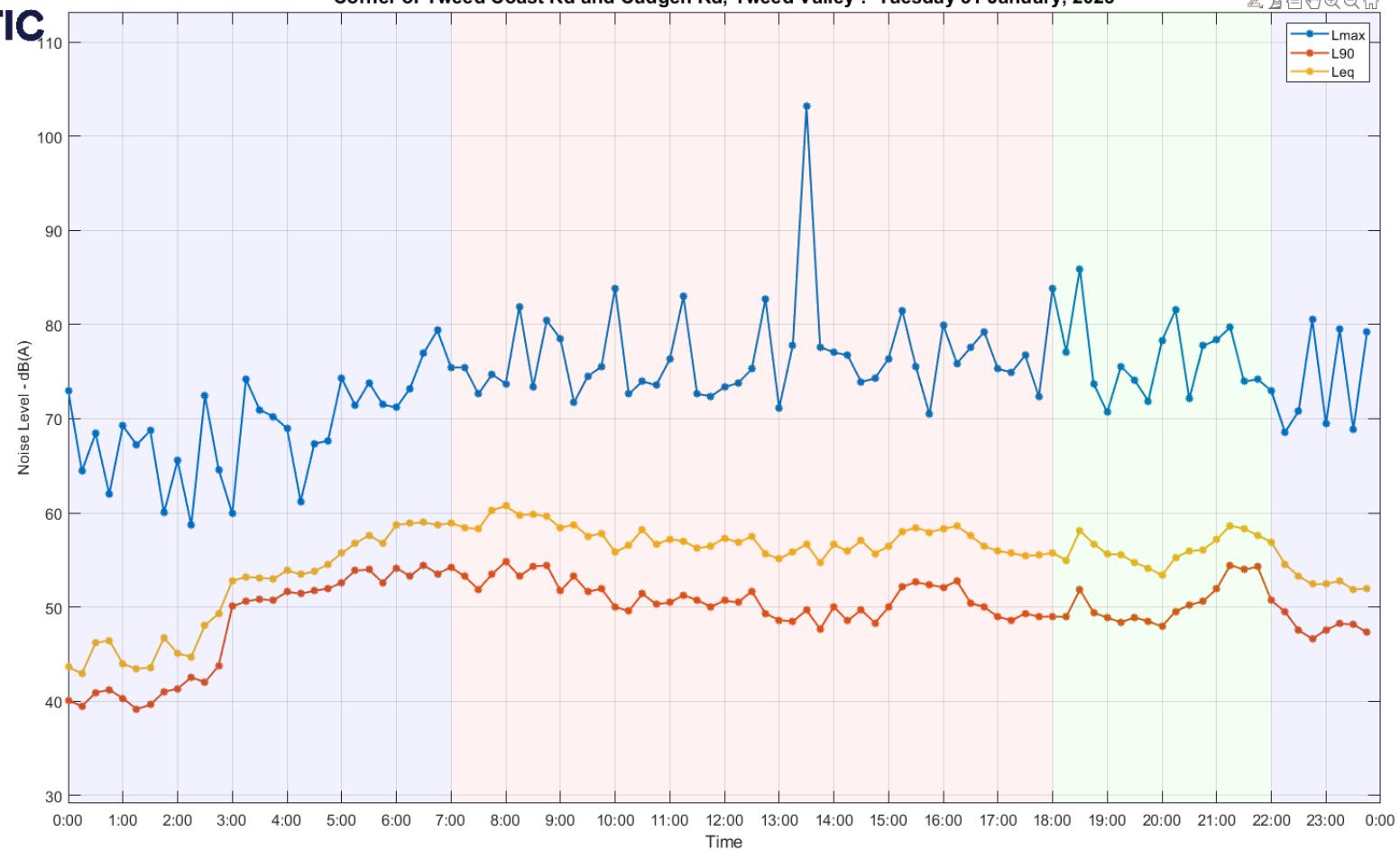


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Sunday 29 January, 2023


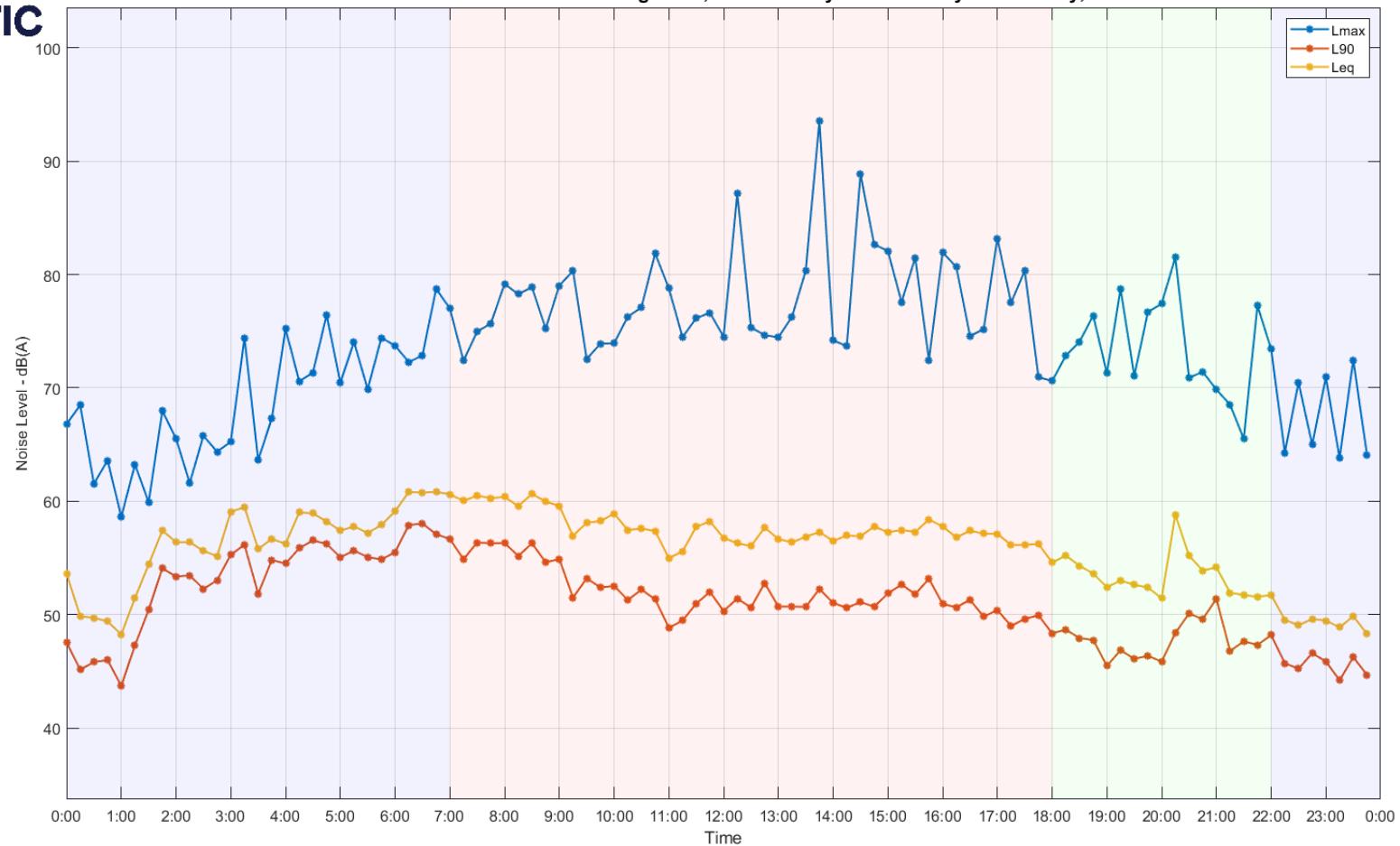
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Monday 30 January, 2023


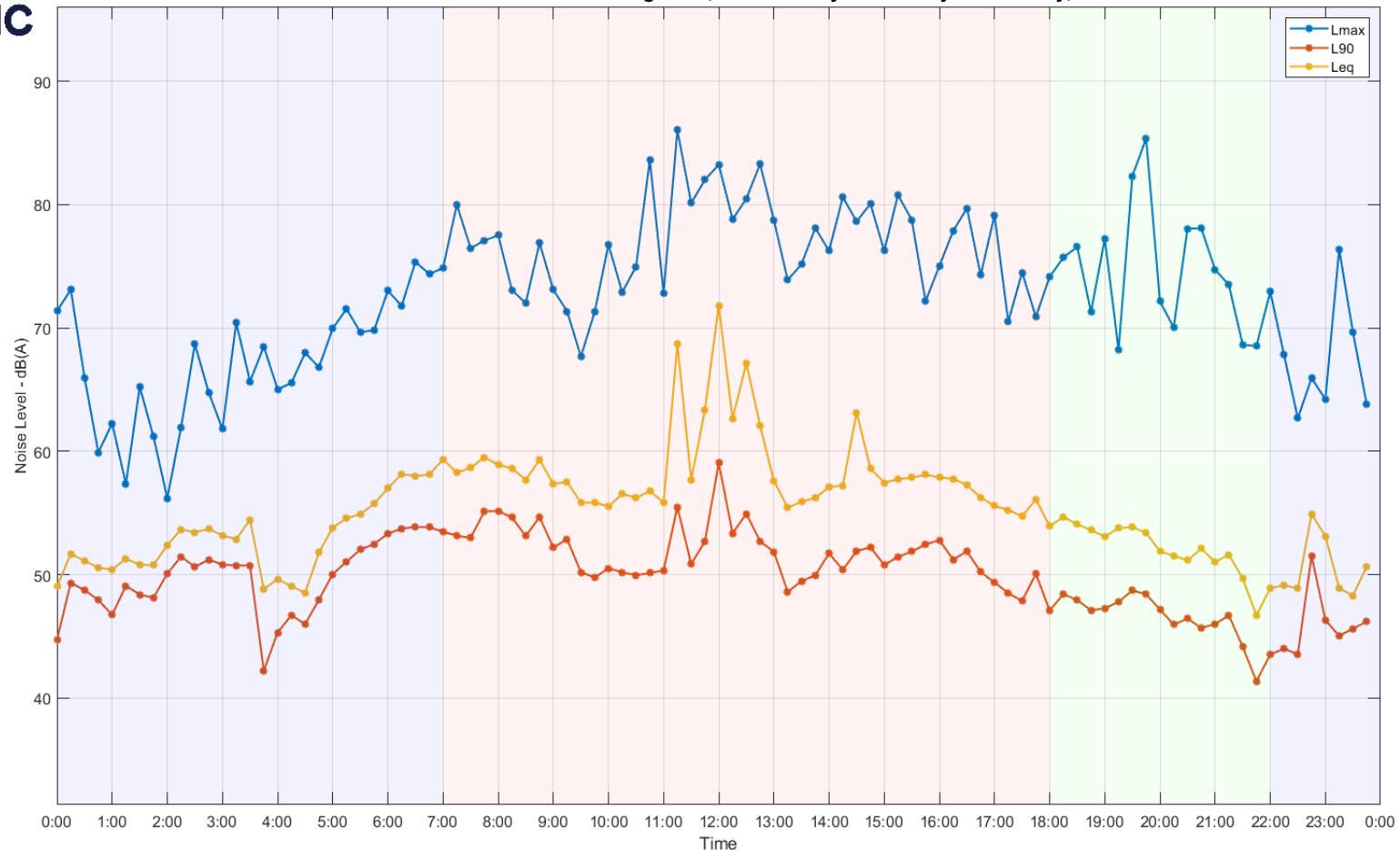
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Tuesday 31 January, 2023

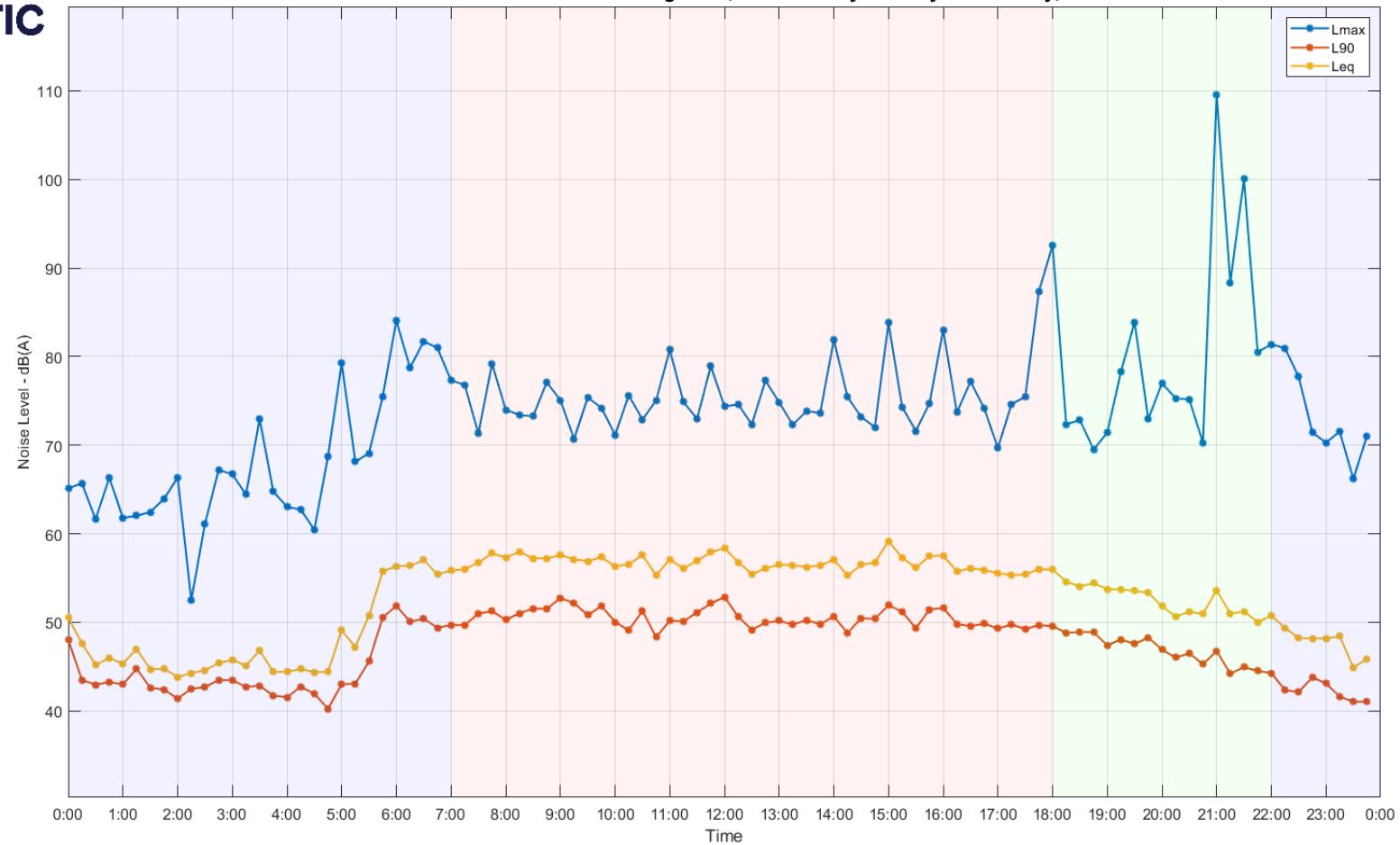

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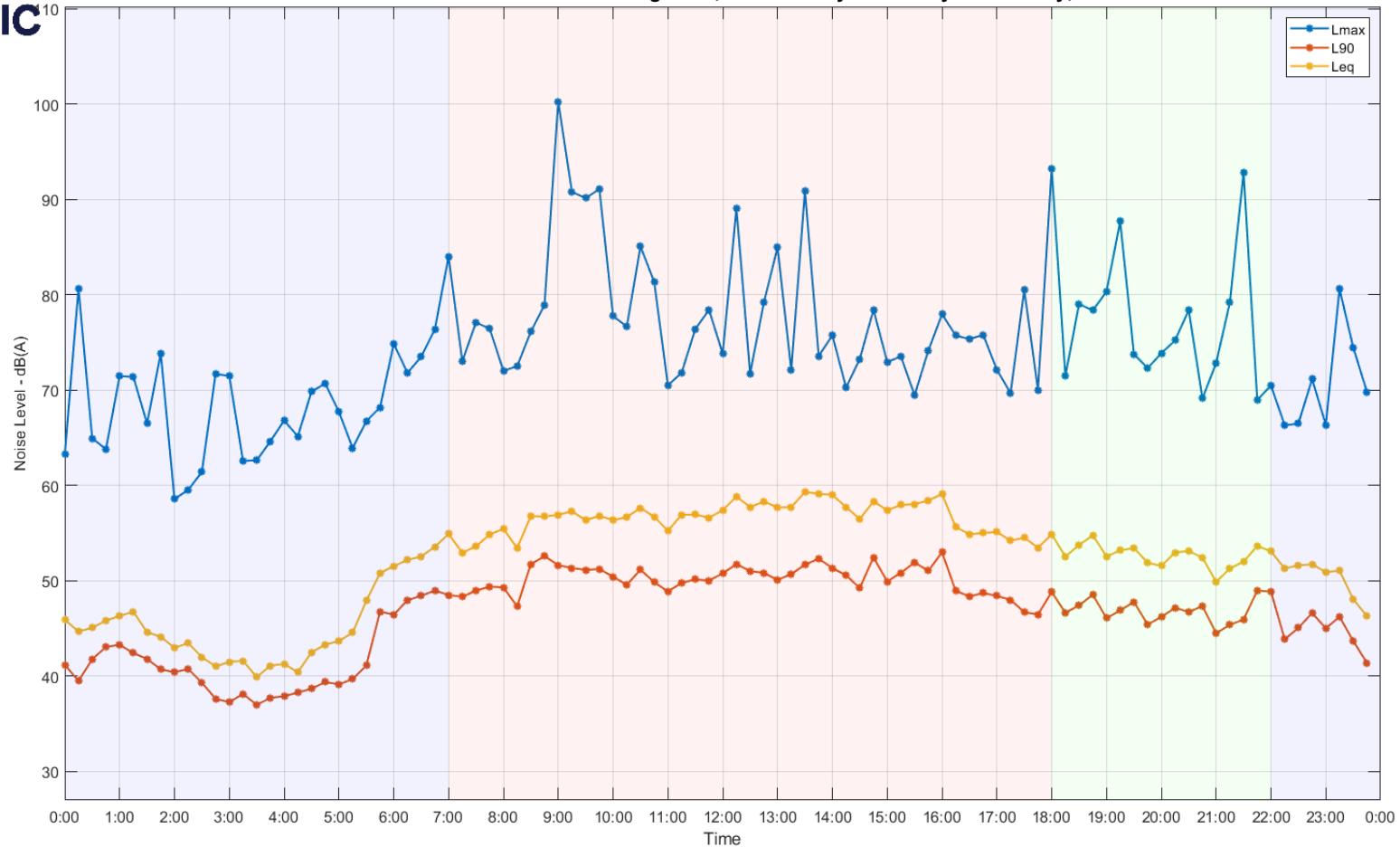


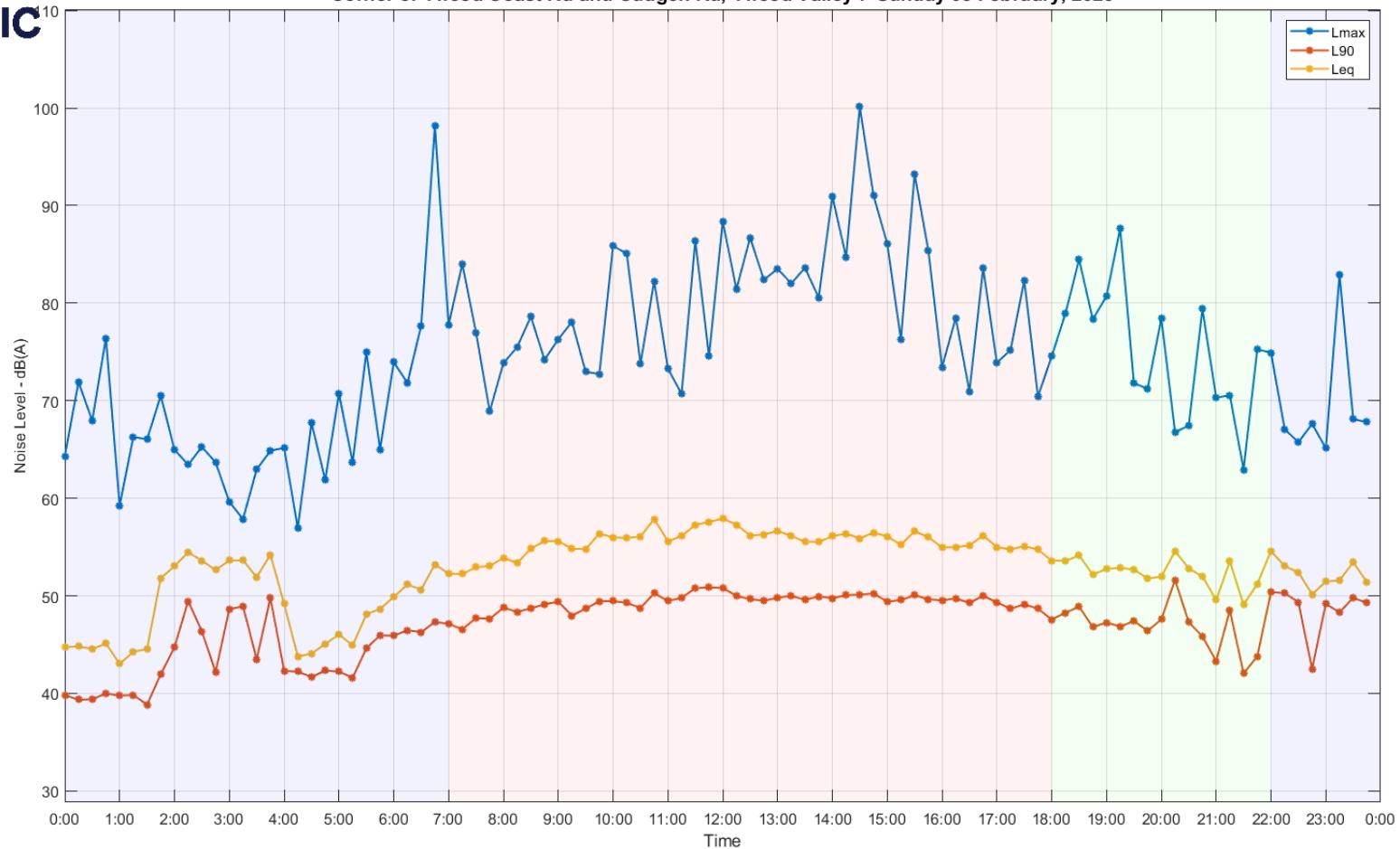
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Wednesday 01 February, 2023

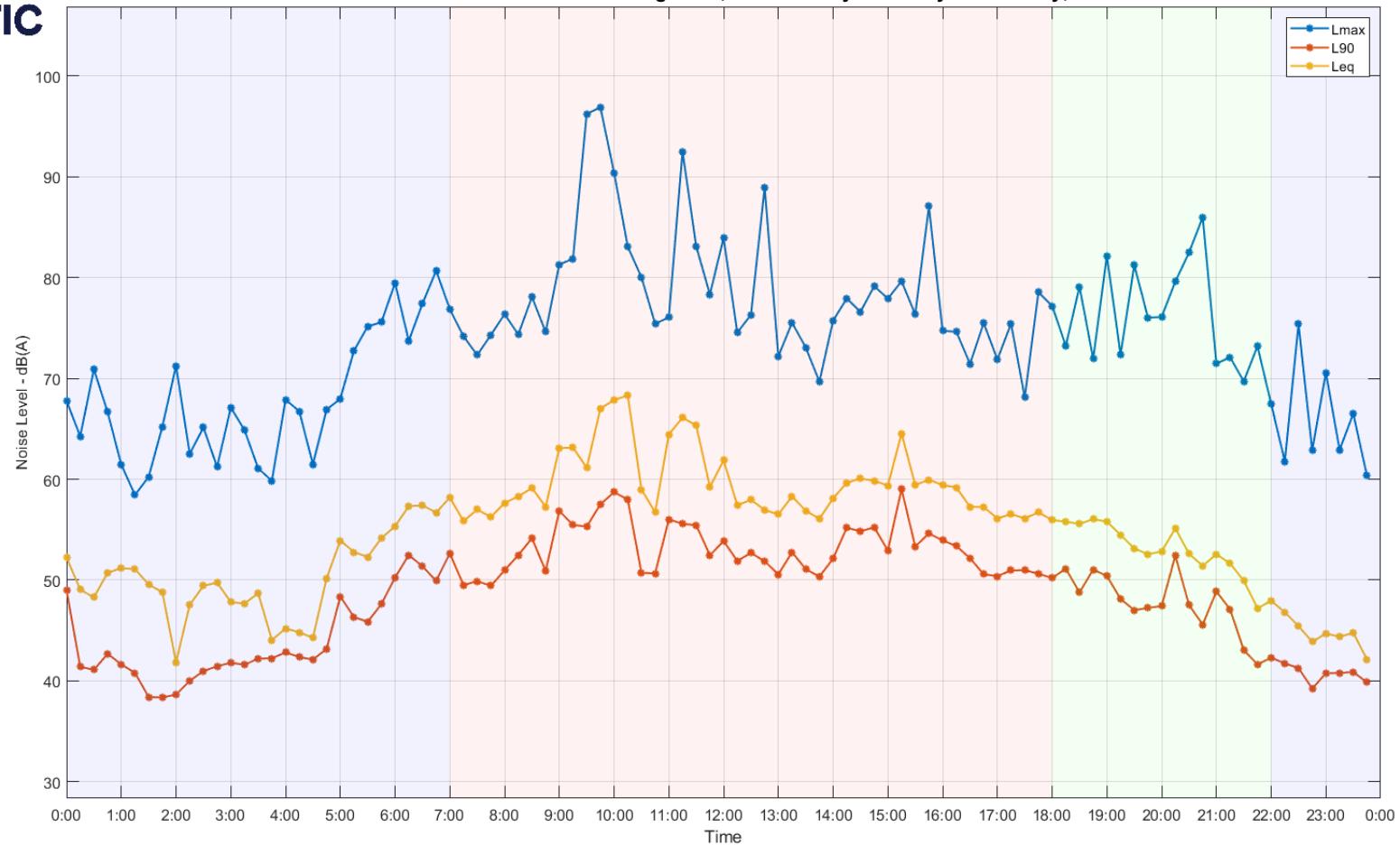


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Thursday 02 February, 2023


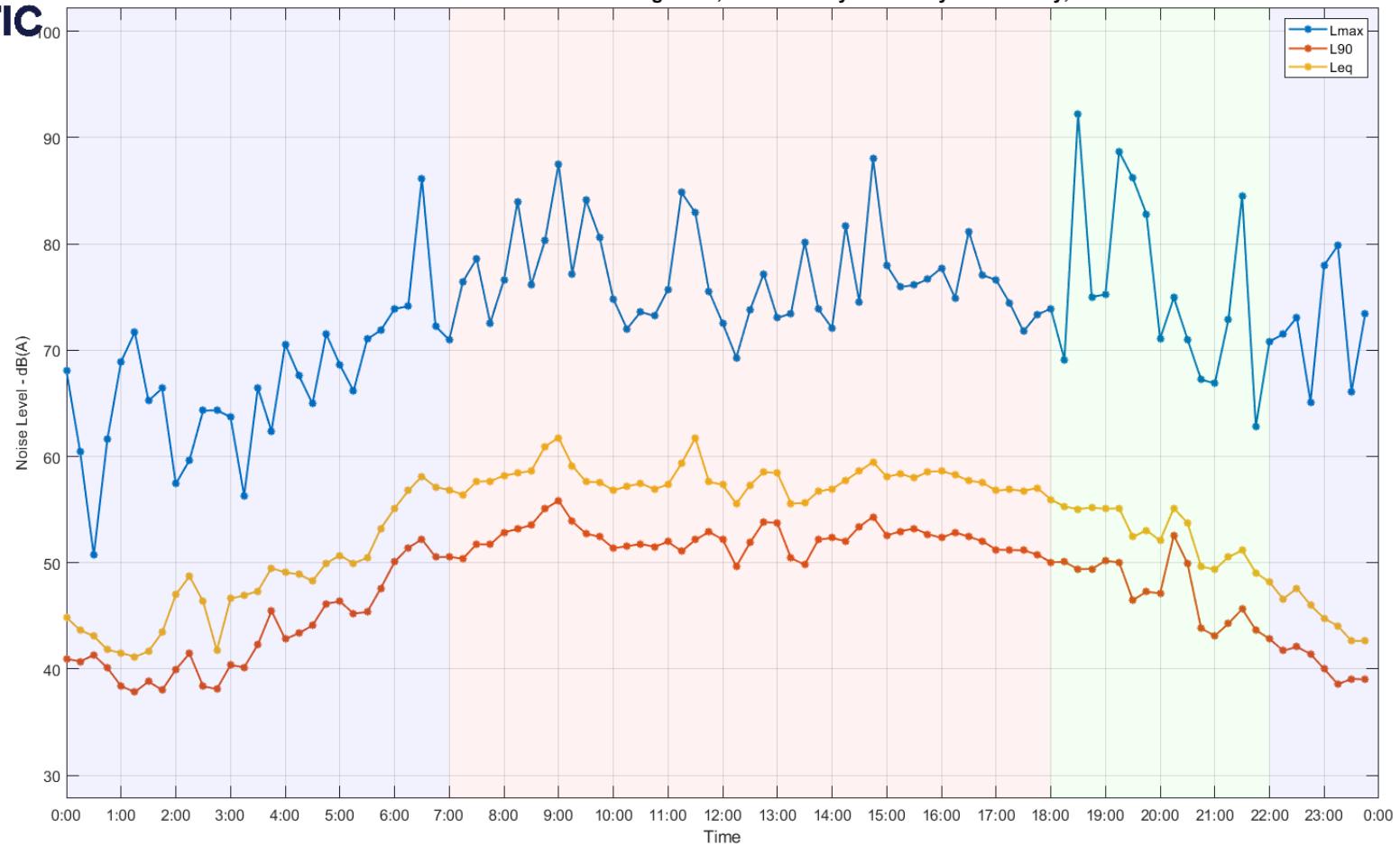
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Friday 03 February, 2023


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Saturday 04 February, 2023


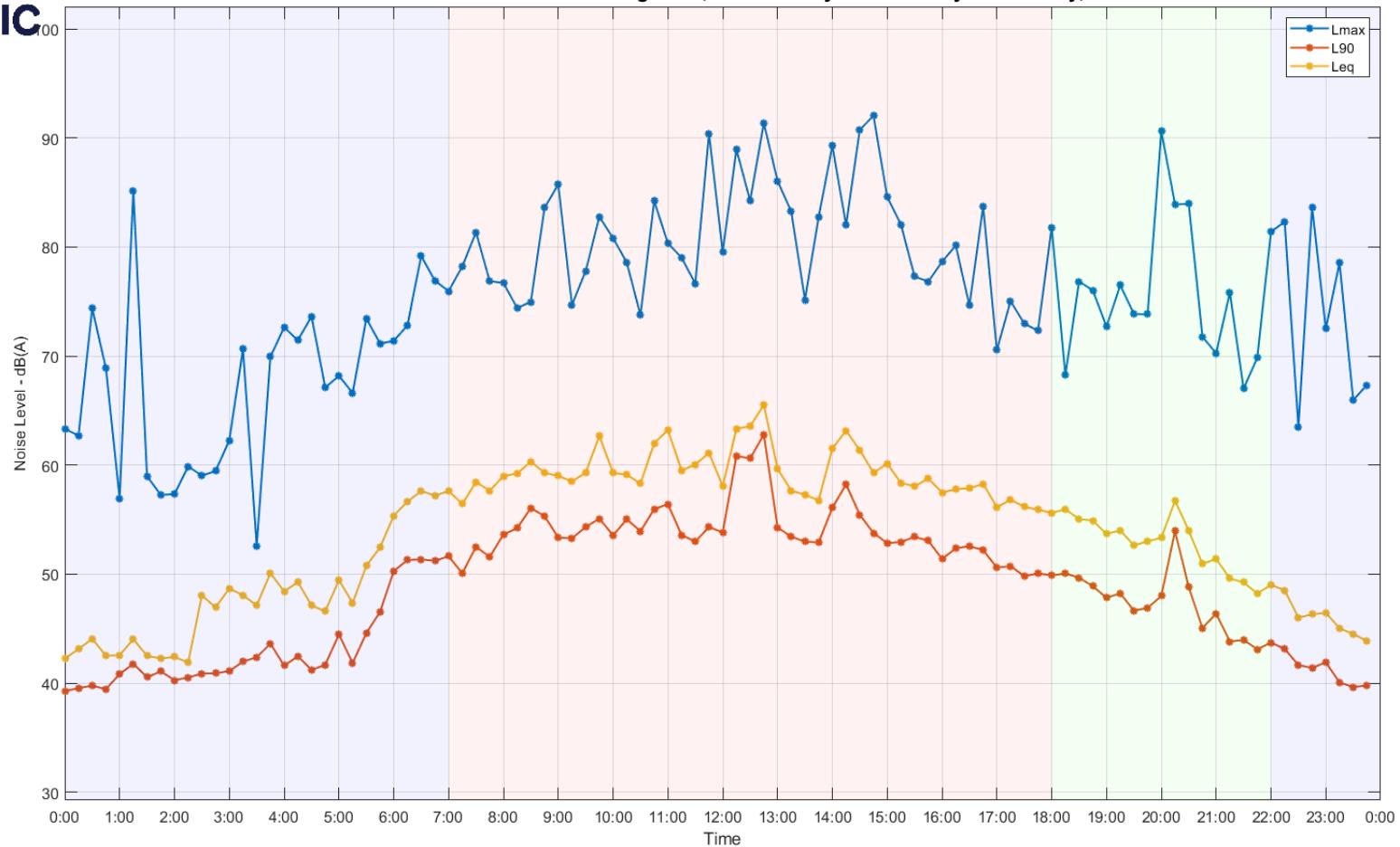
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Sunday 05 February, 2023


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Monday 06 February, 2023


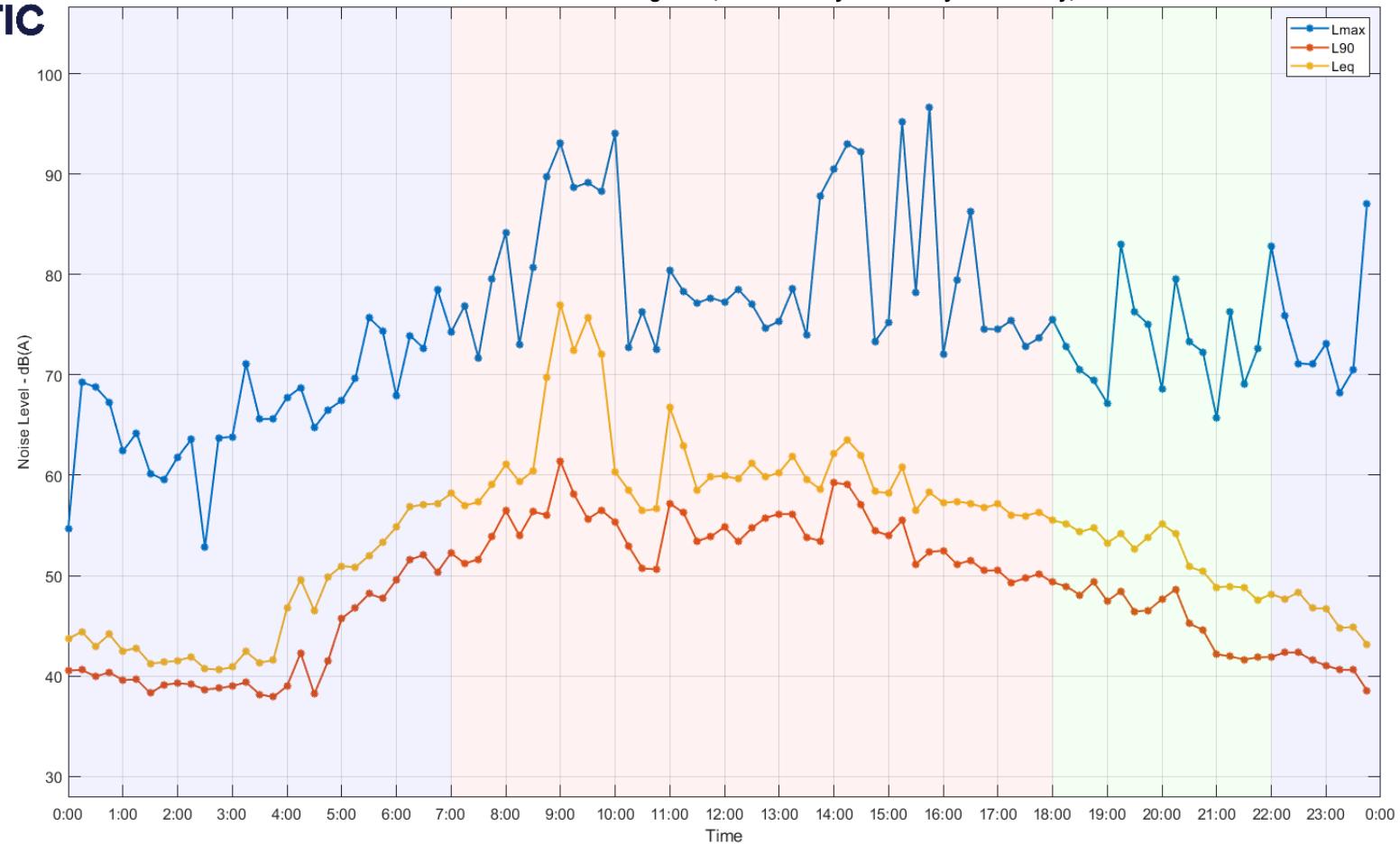
Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Tuesday 07 February, 2023



Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Wednesday 08 February, 2023

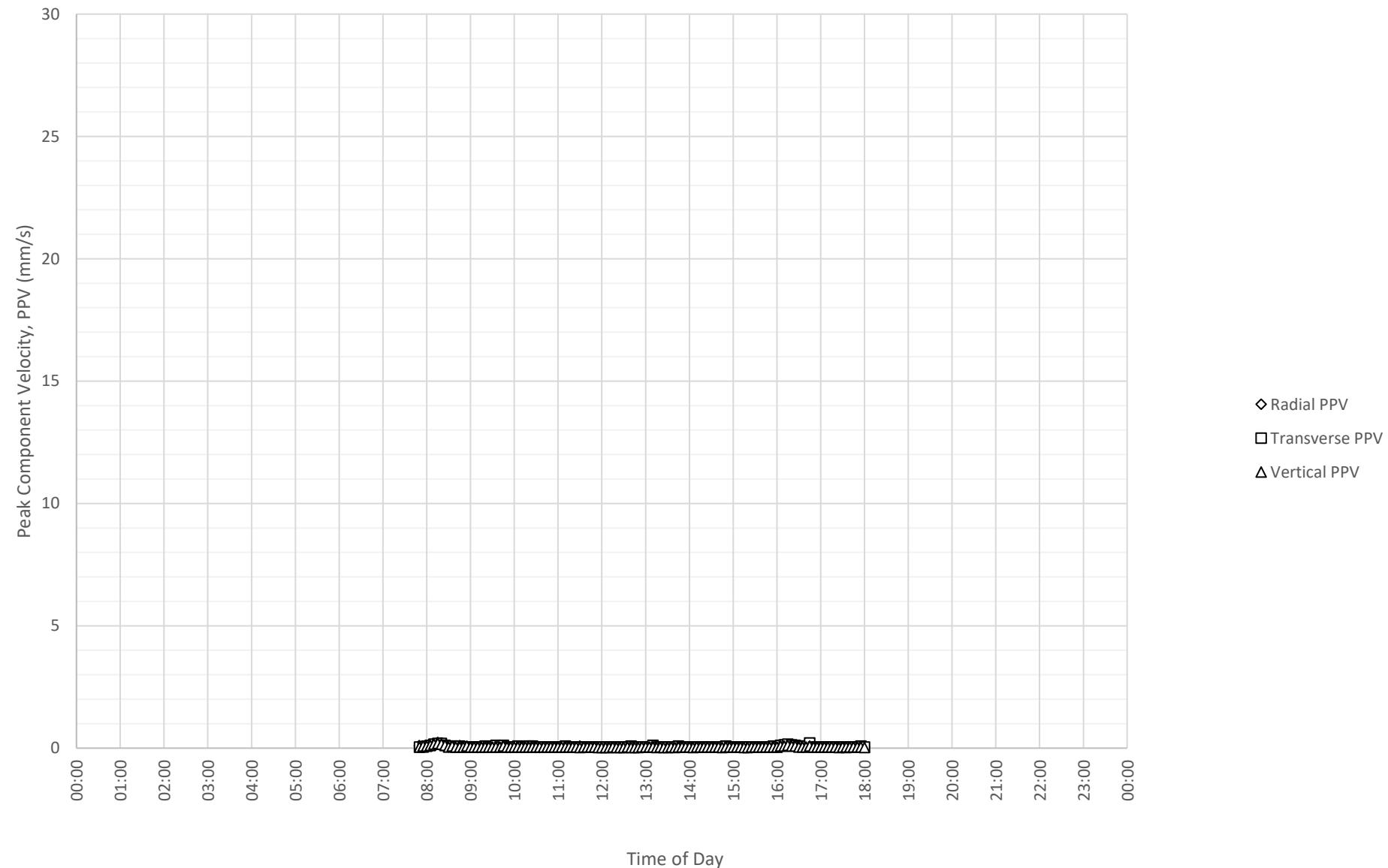


Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley : Thursday 09 February, 2023

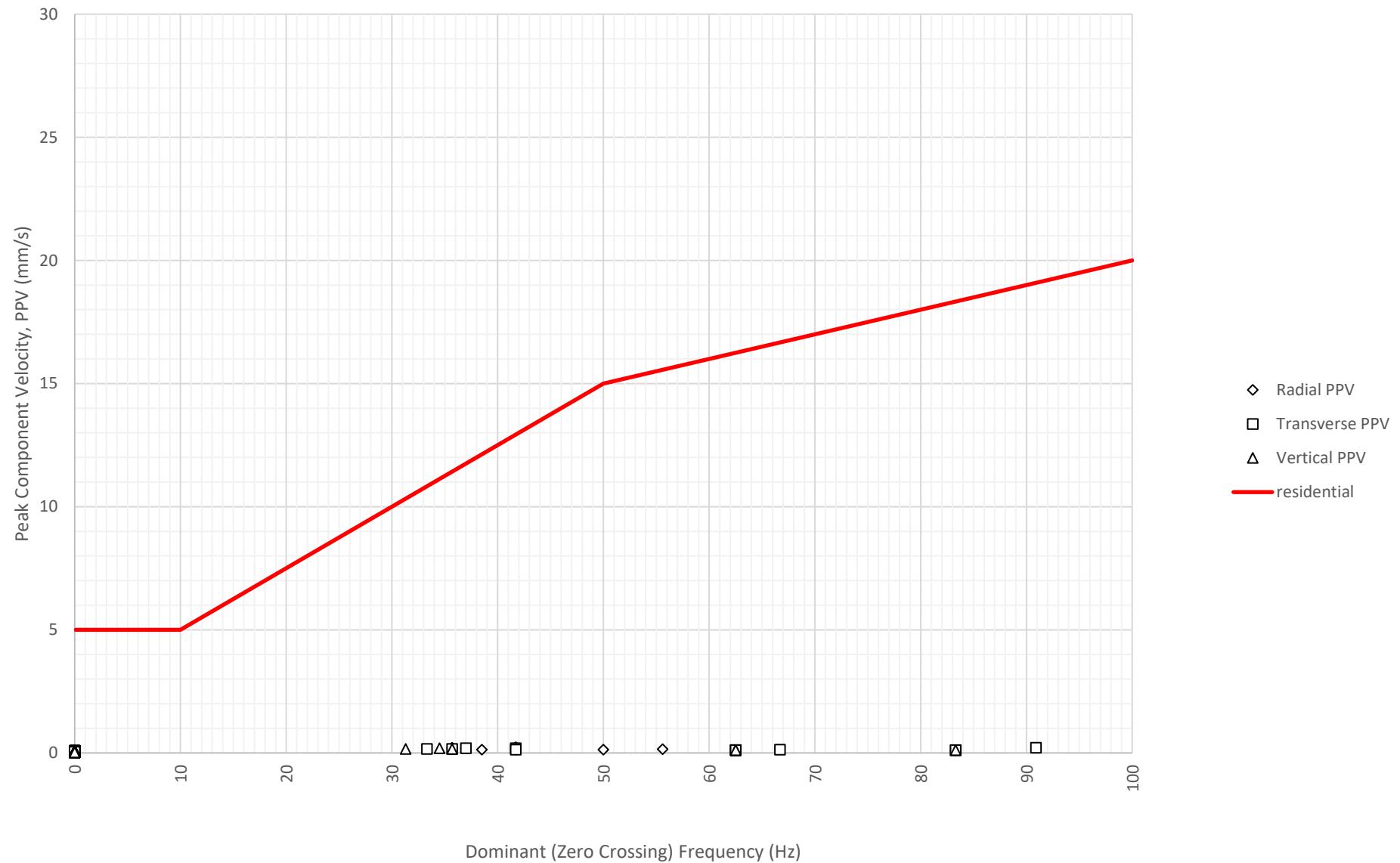


APPENDIX 2 – VIBRATION MONITORING RESULTS

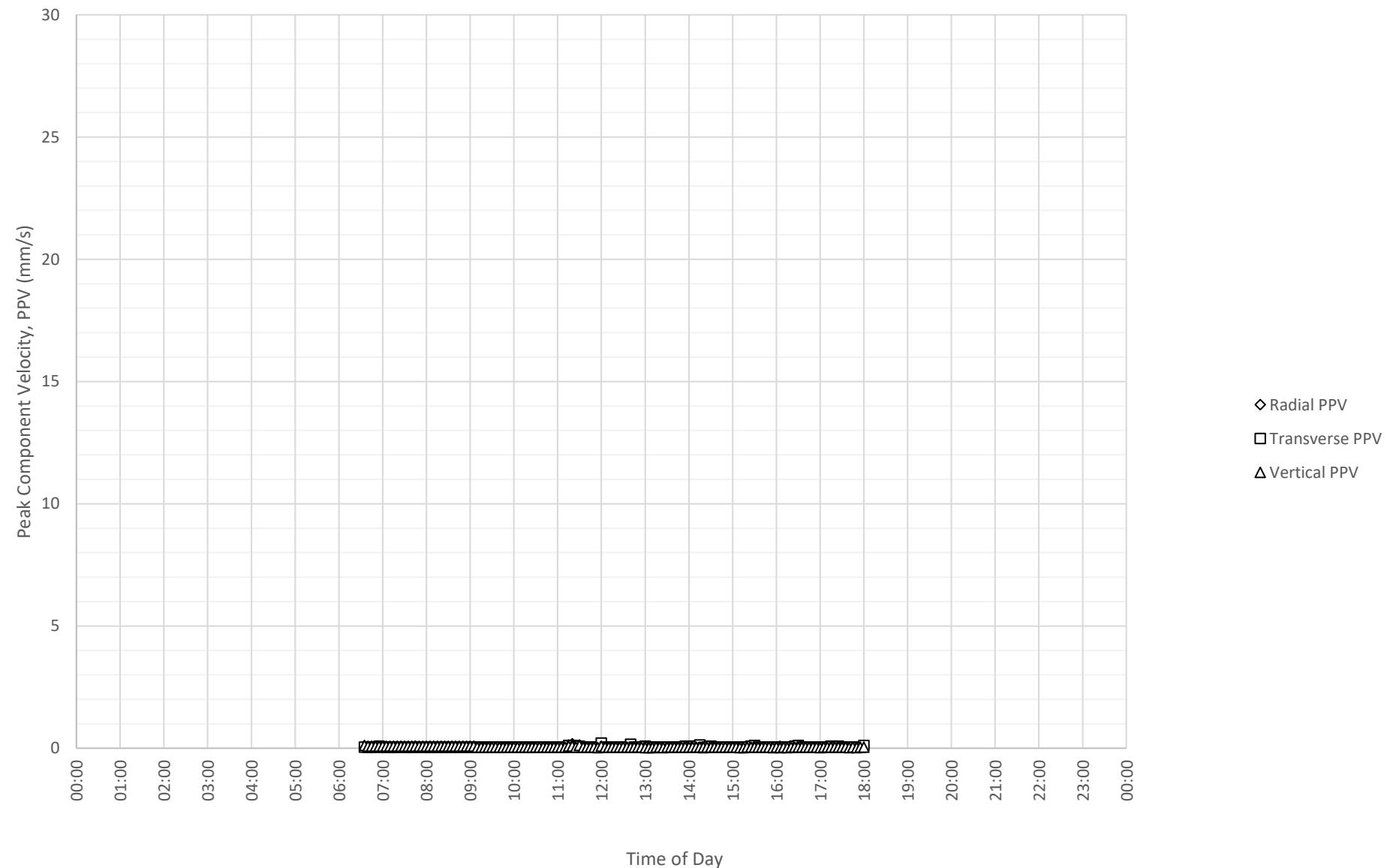
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 10-01-
2023



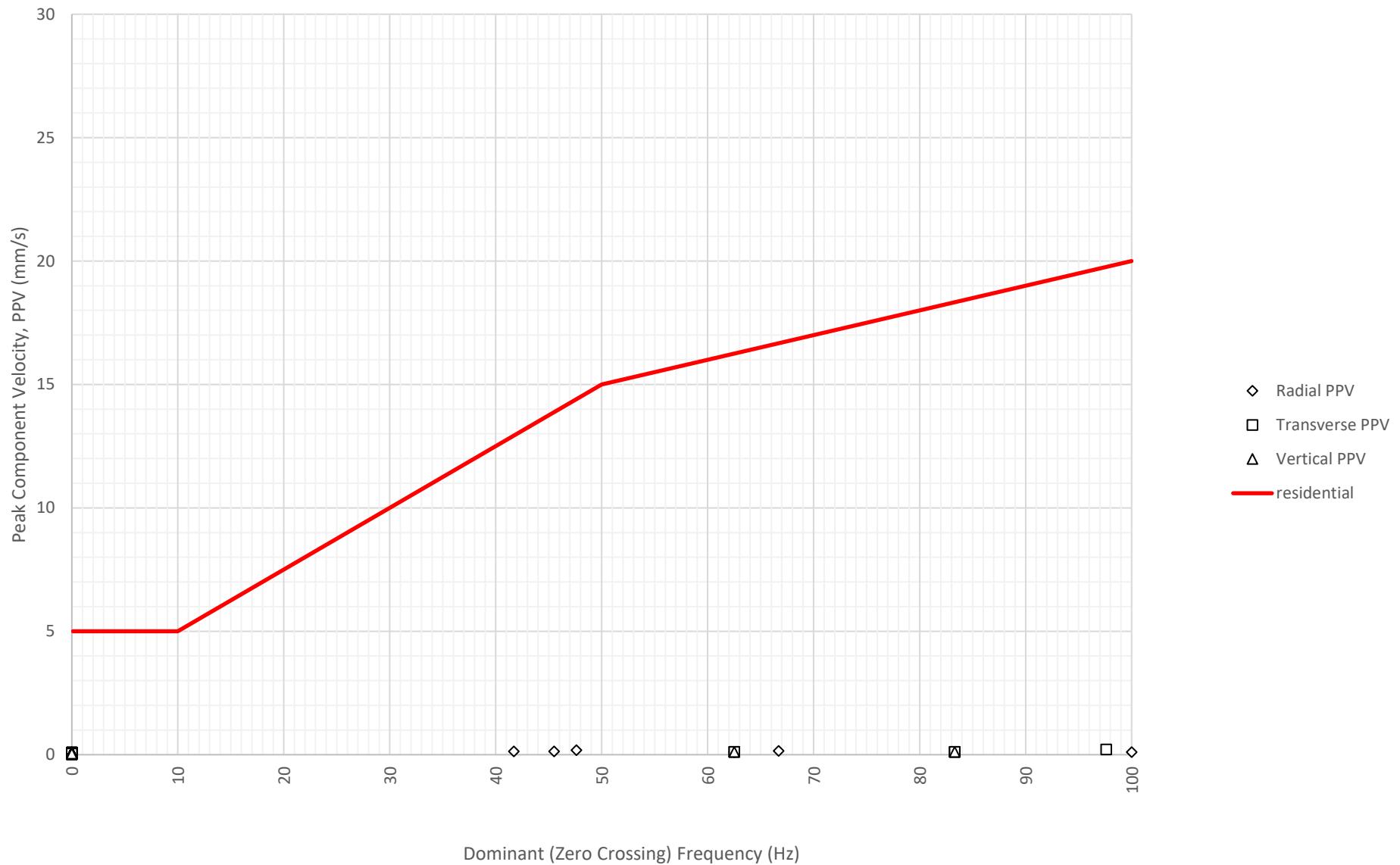
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
10-01-2023



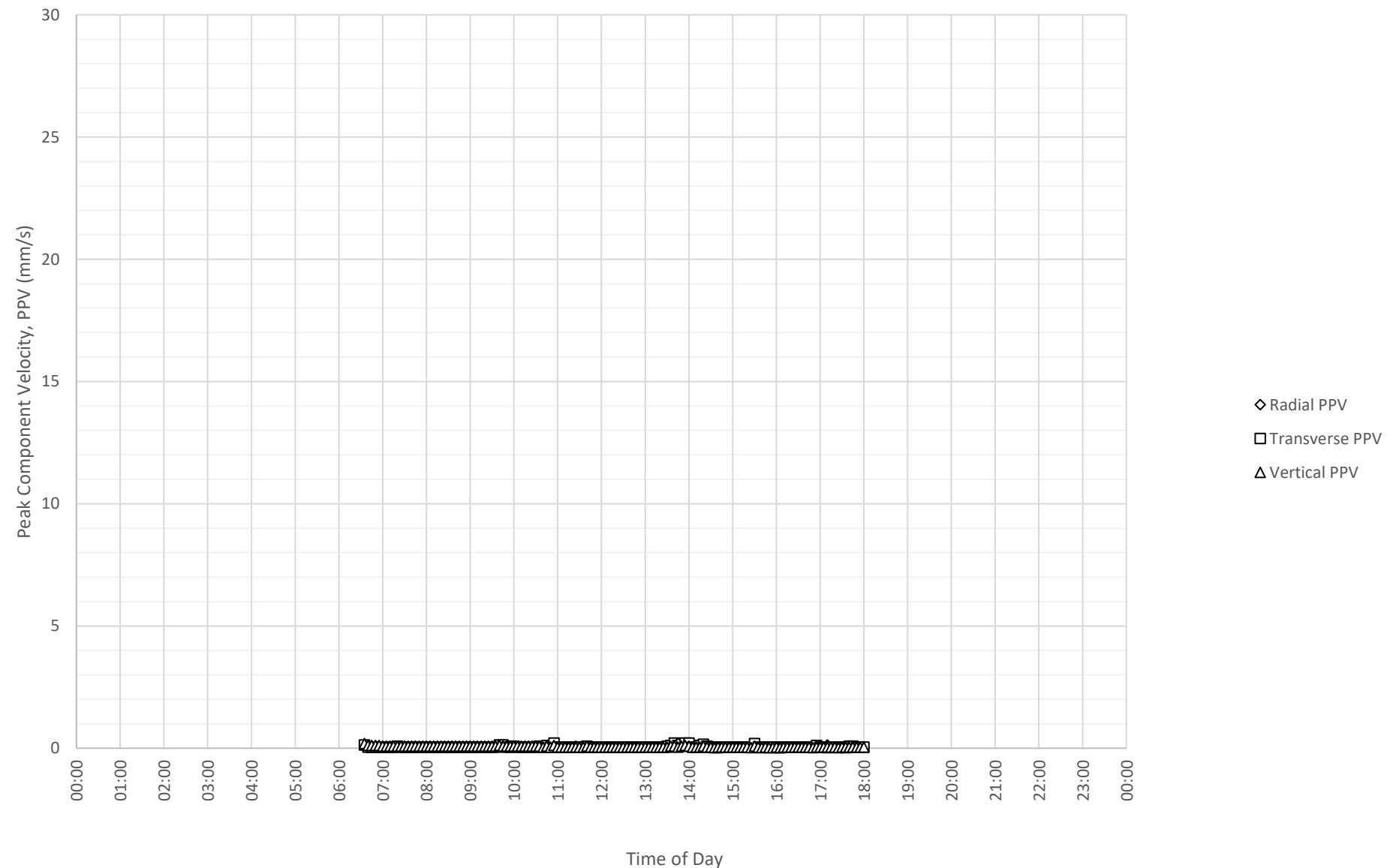
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 11-01-
2023



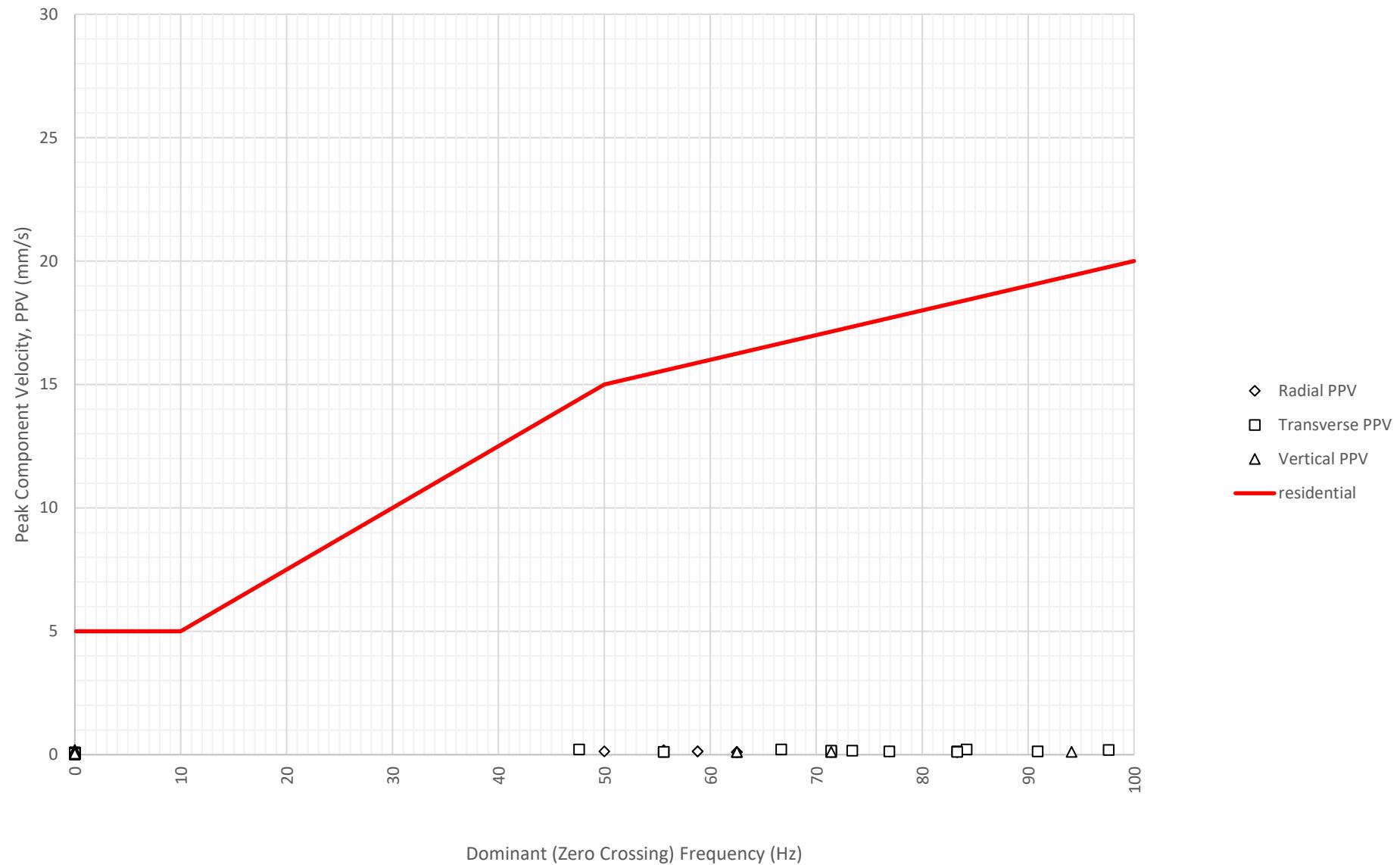
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
11-01-2023



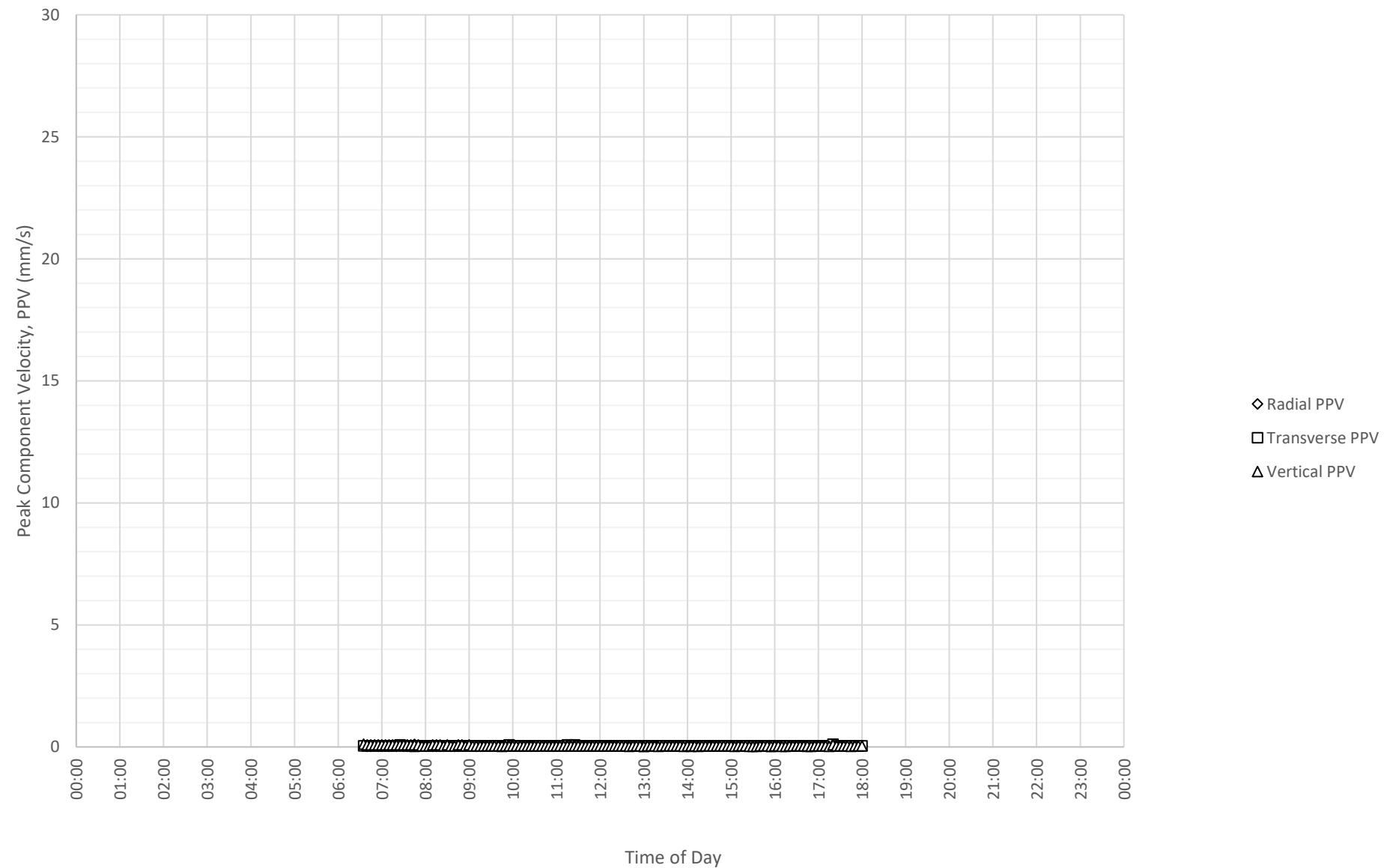
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 12-01-
2023



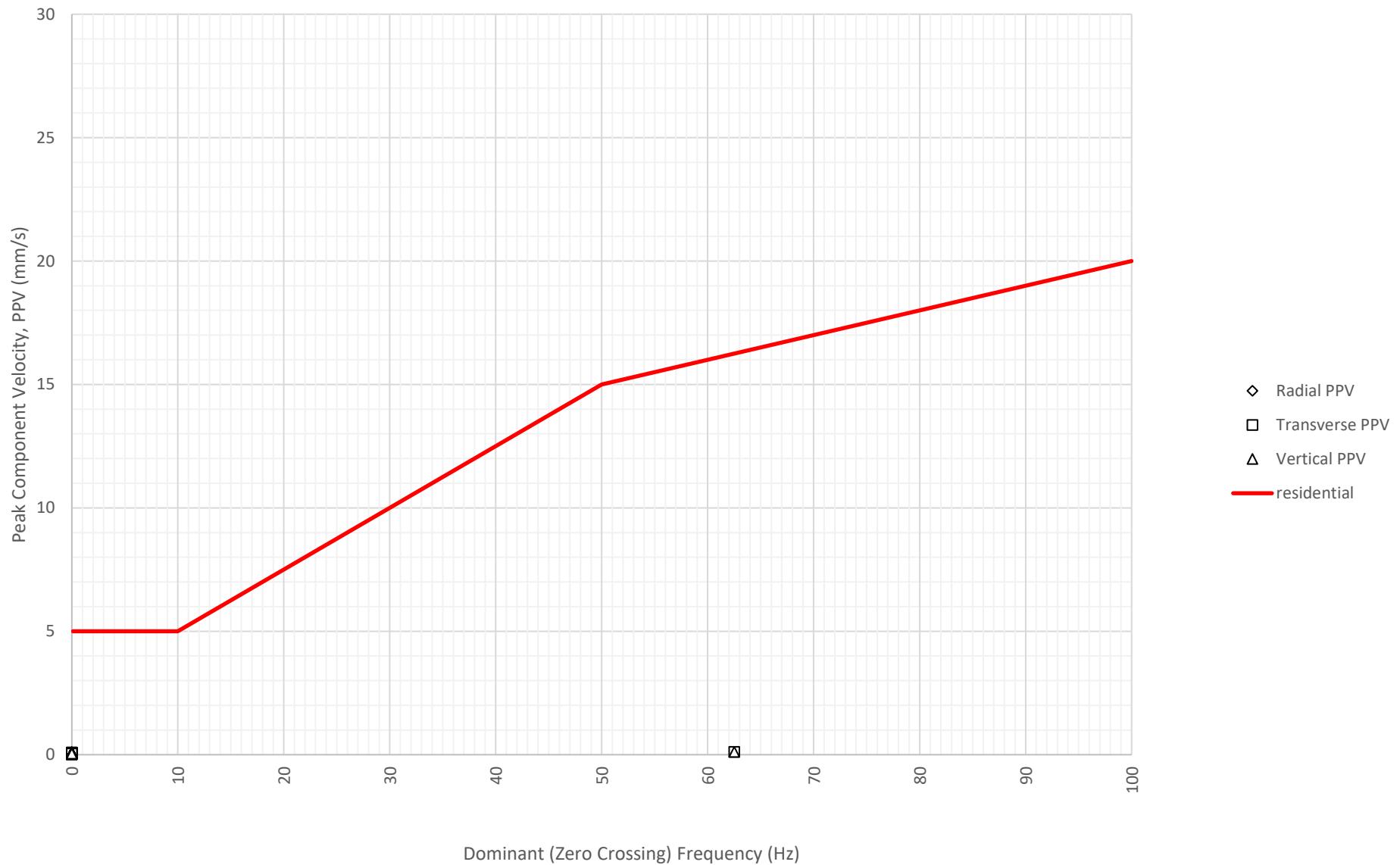
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
12-01-2023



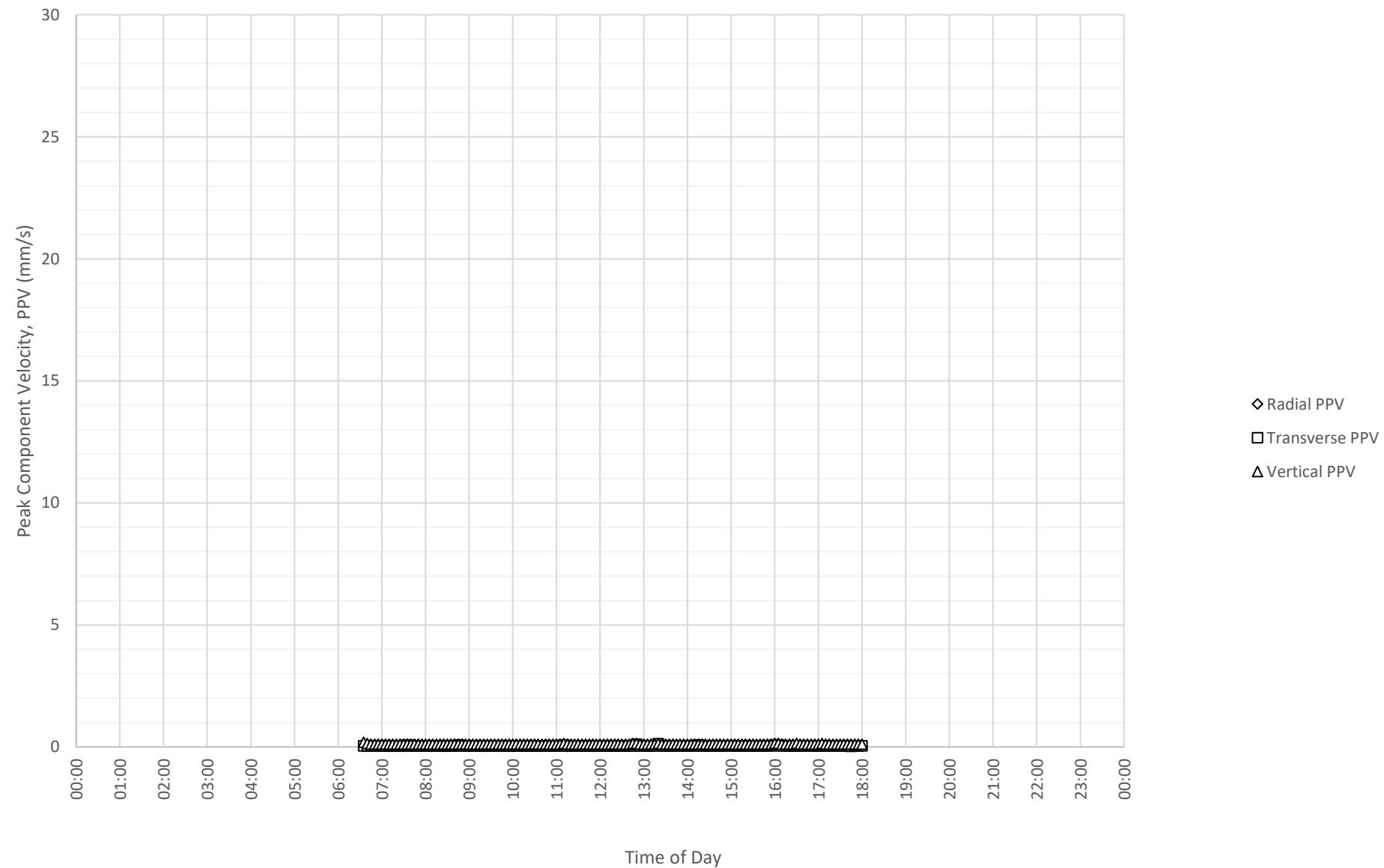
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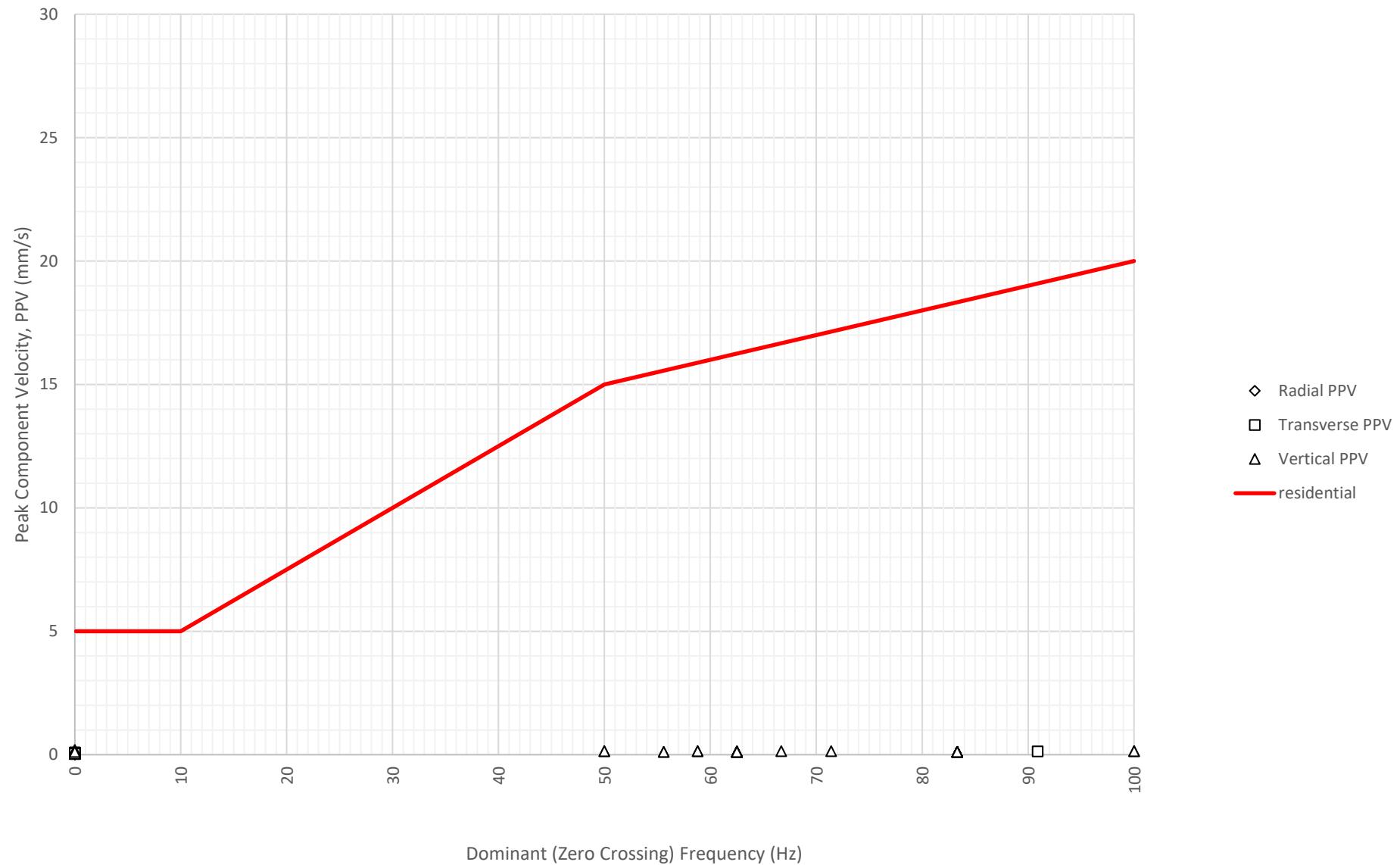
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
13-01-2023



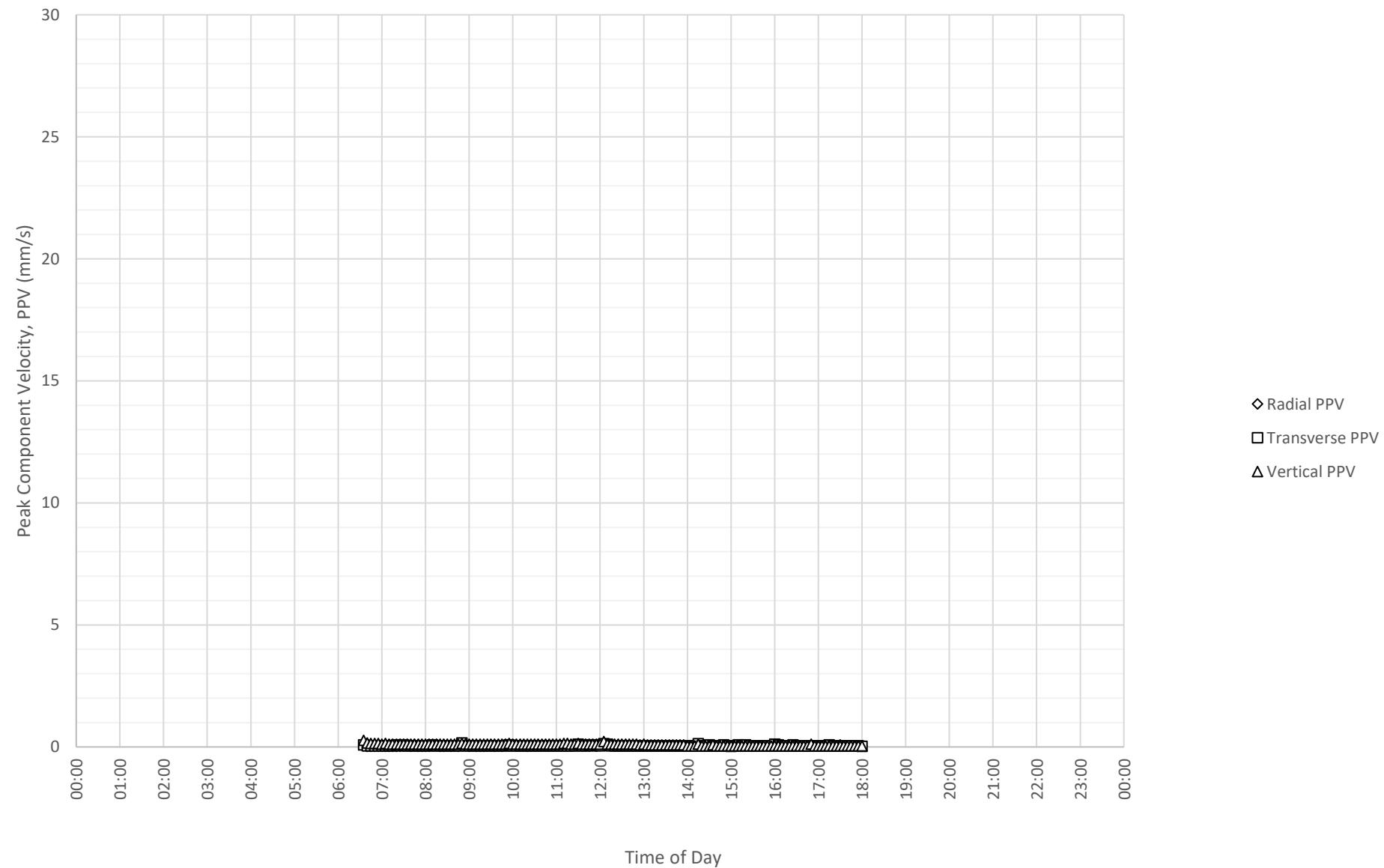
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 14-01-
2023



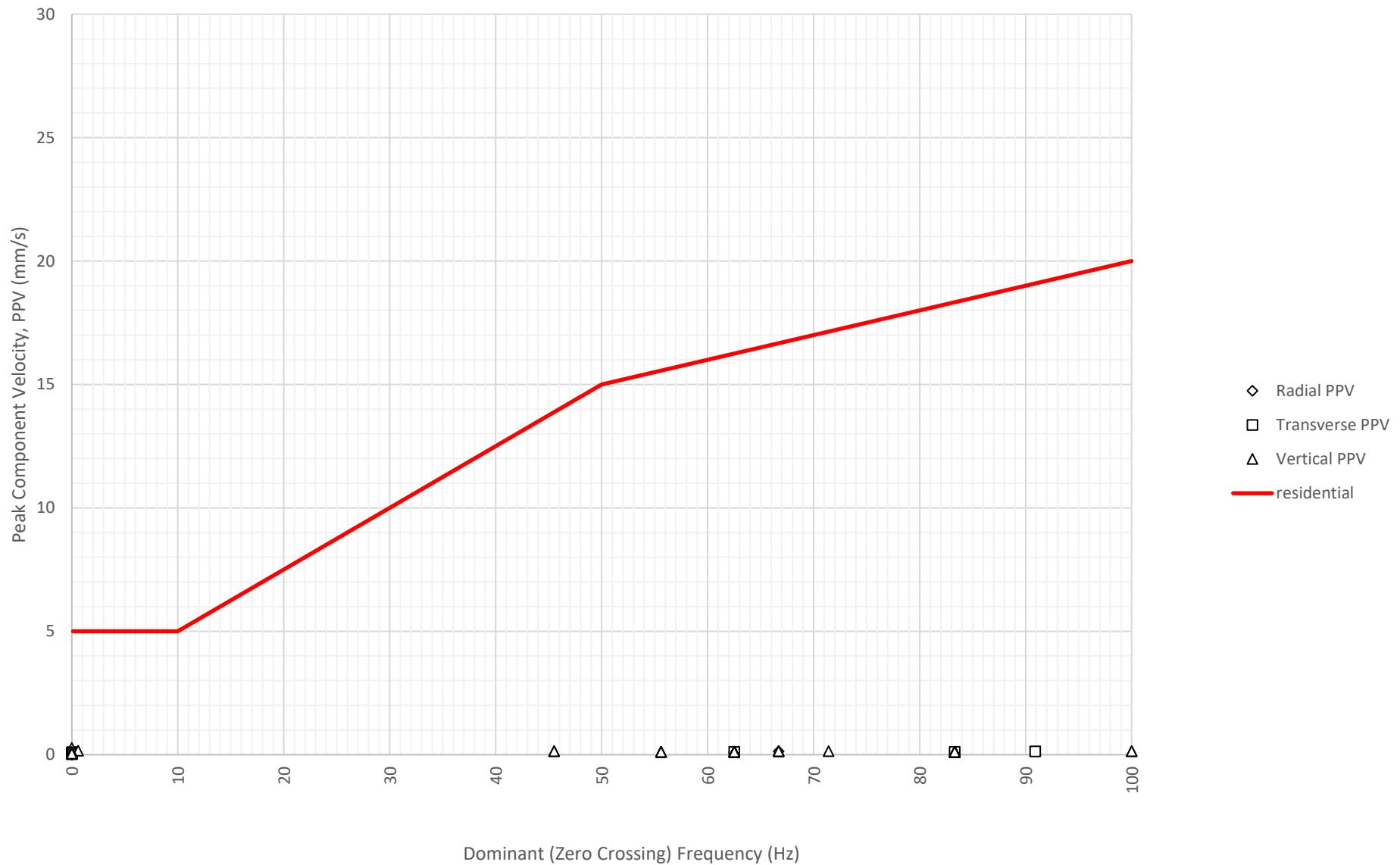
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
14-01-2023



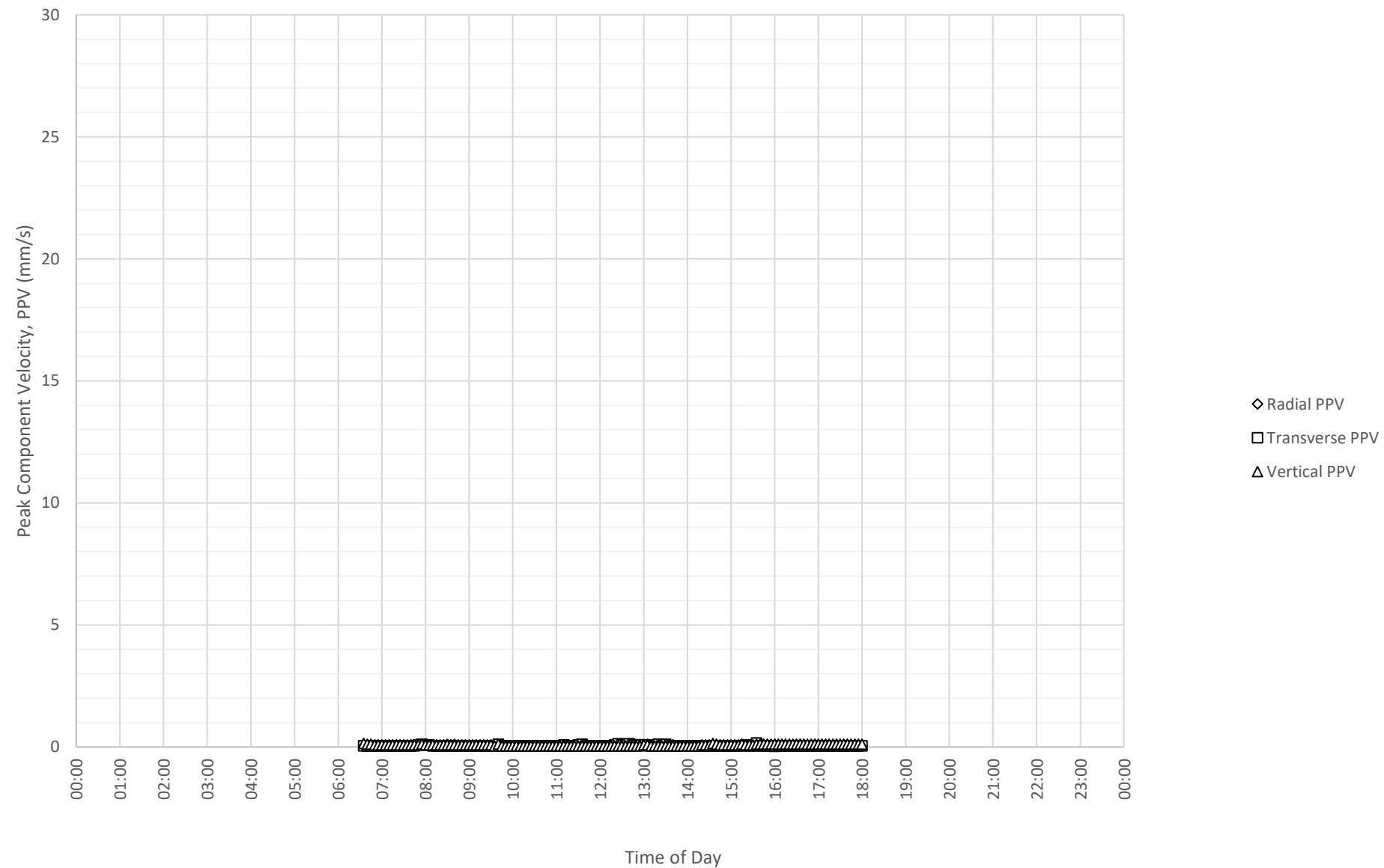
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 15-01-
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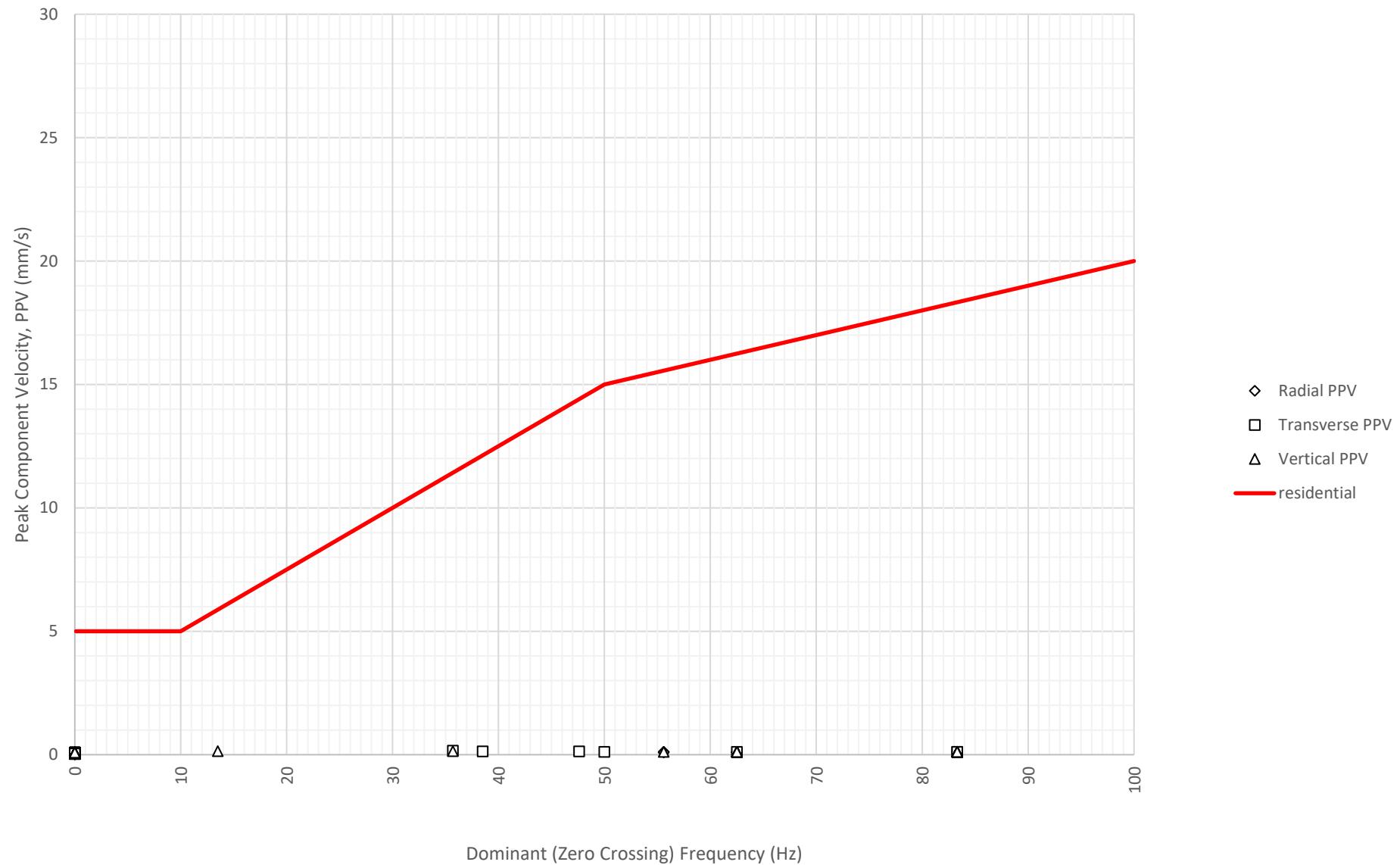
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
15-01-2023



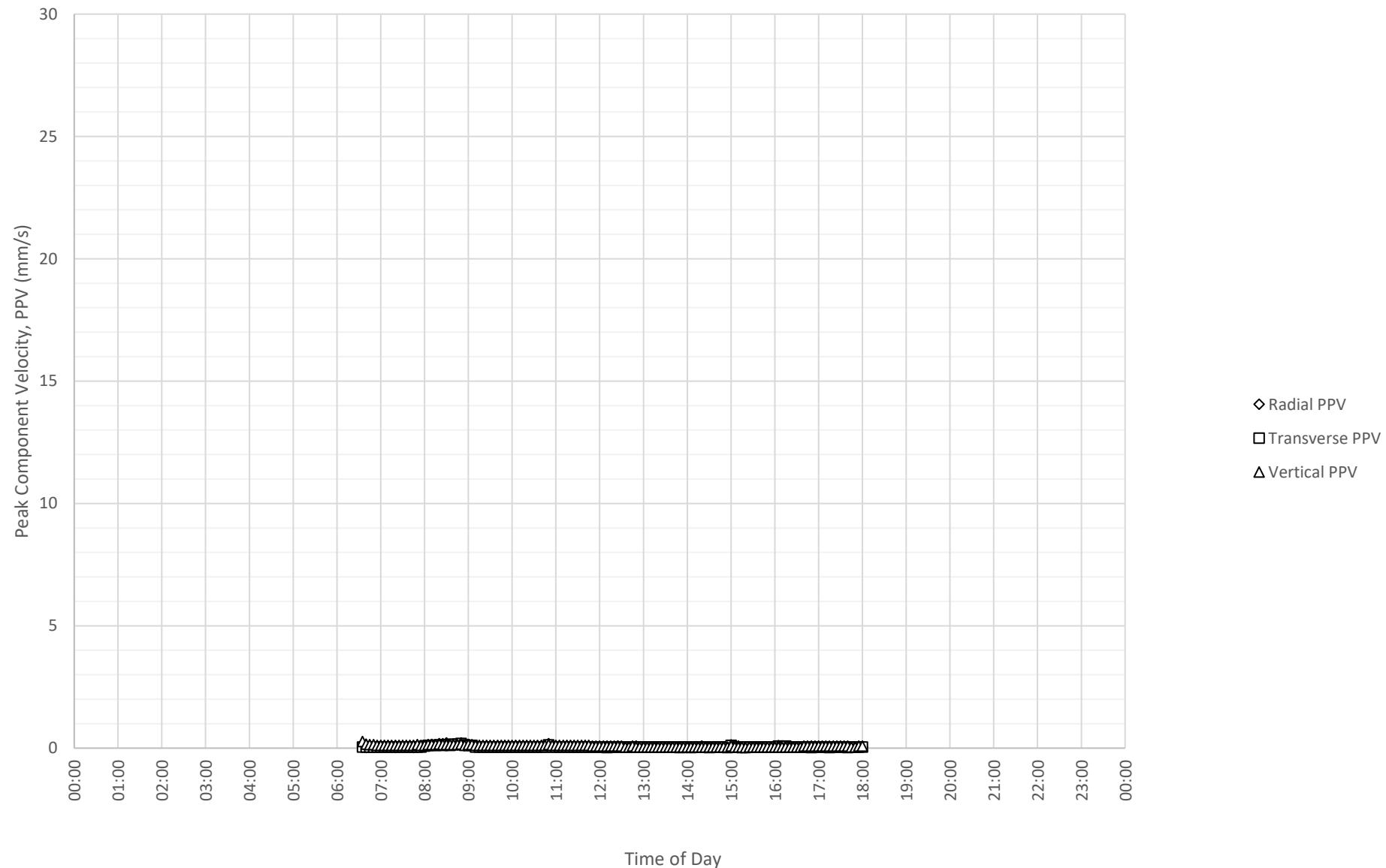
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 16-01-
2023



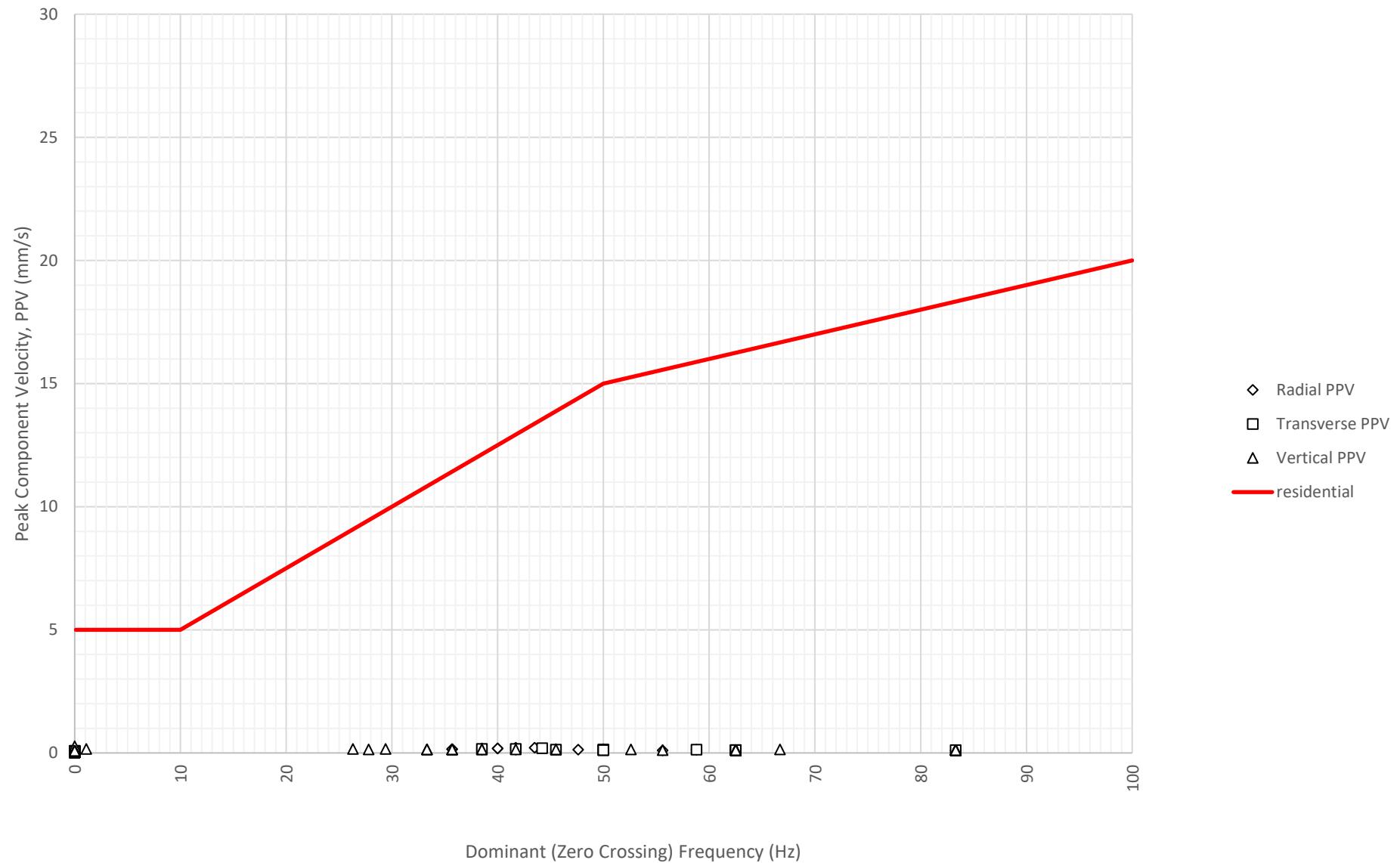
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
16-01-2023



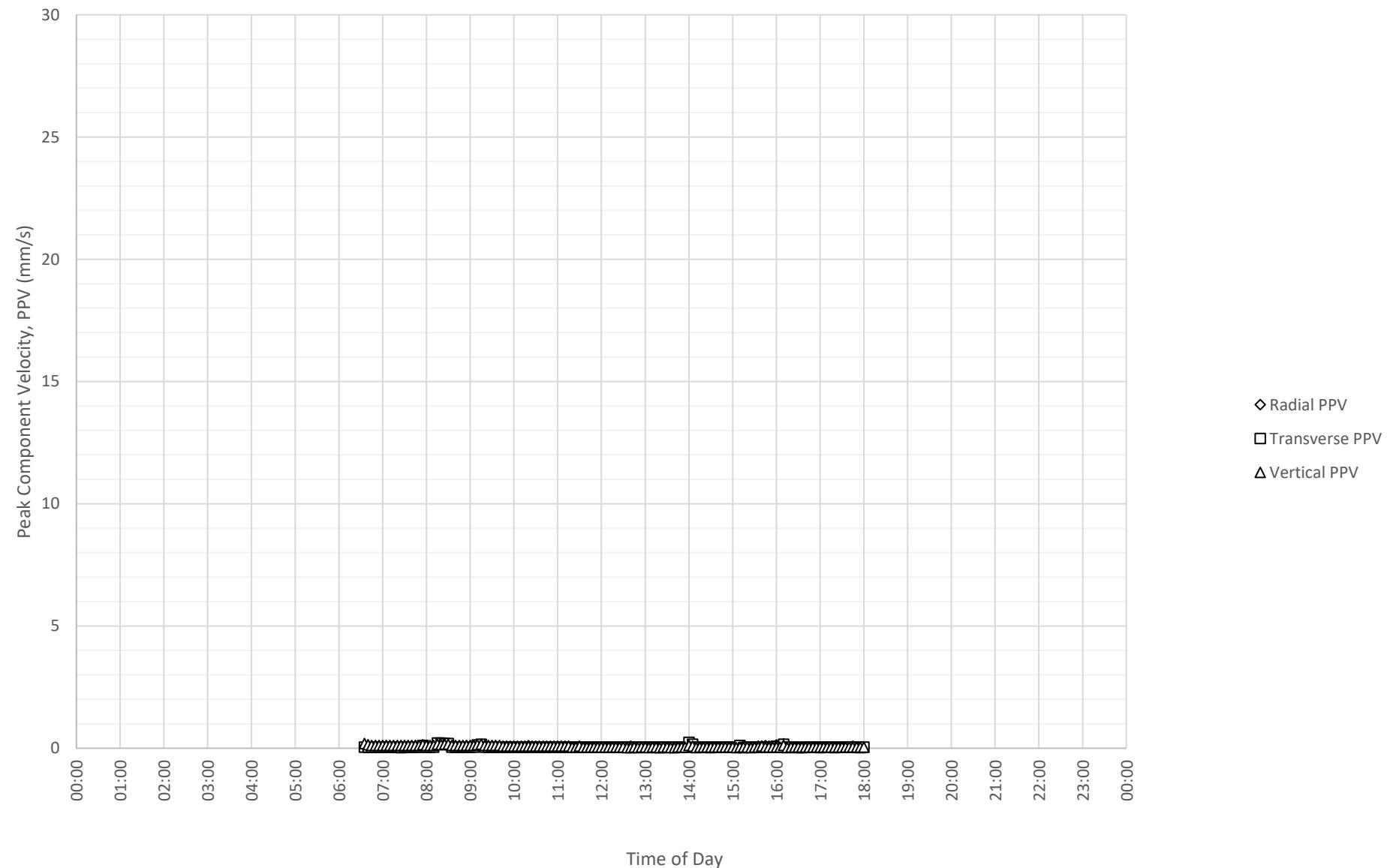
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 17-01-
2023



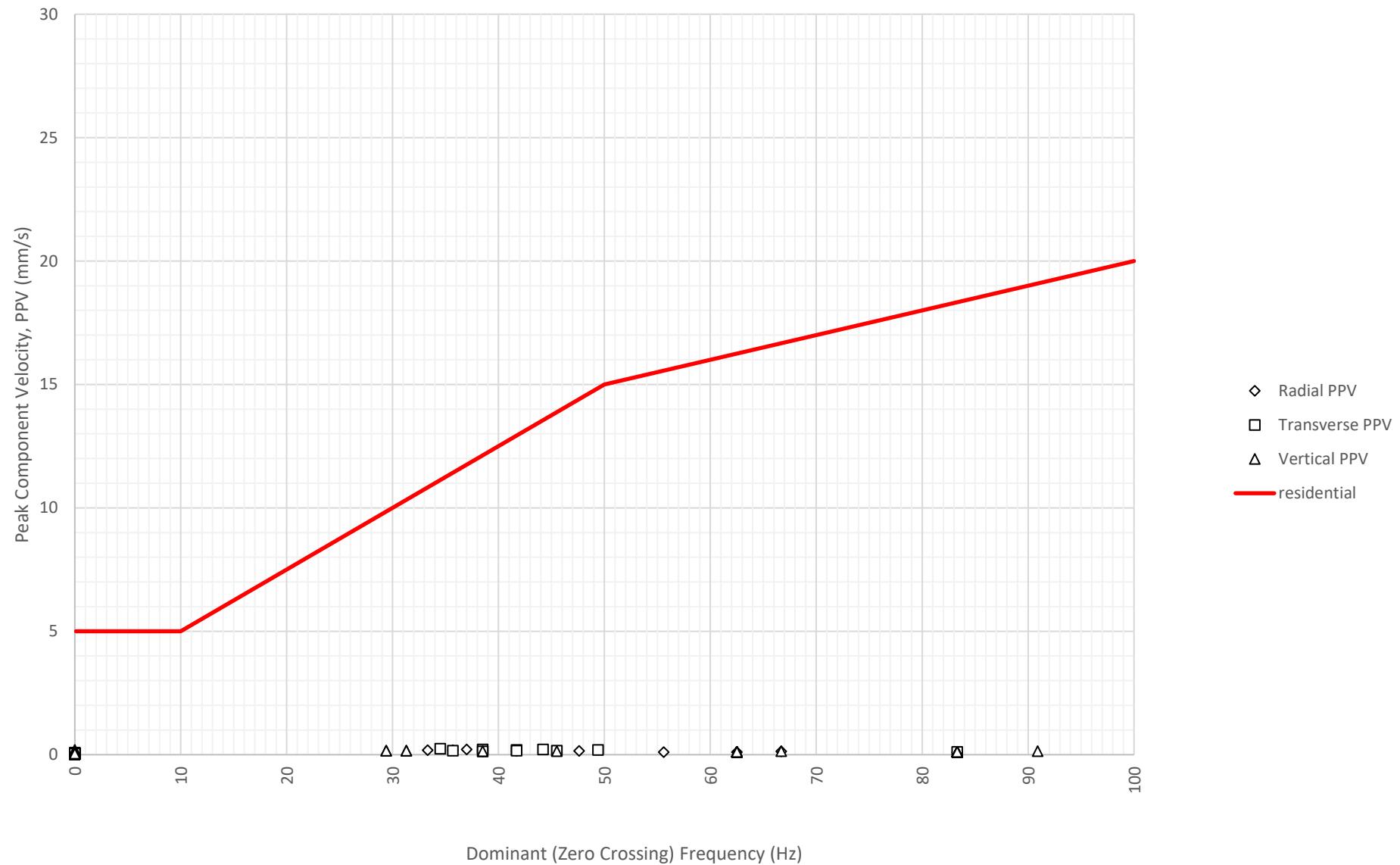
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
17-01-2023



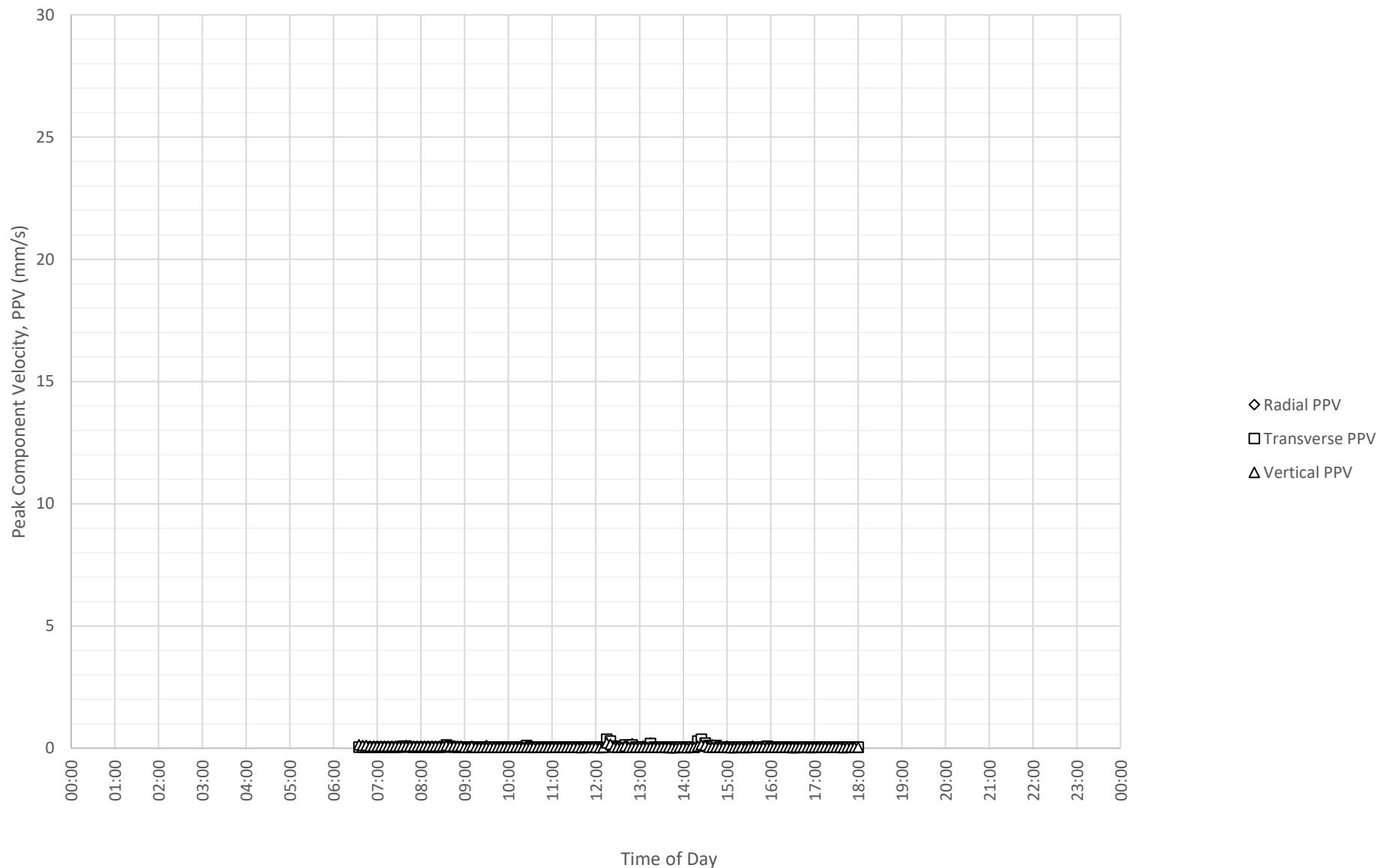
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 18-01-
2023



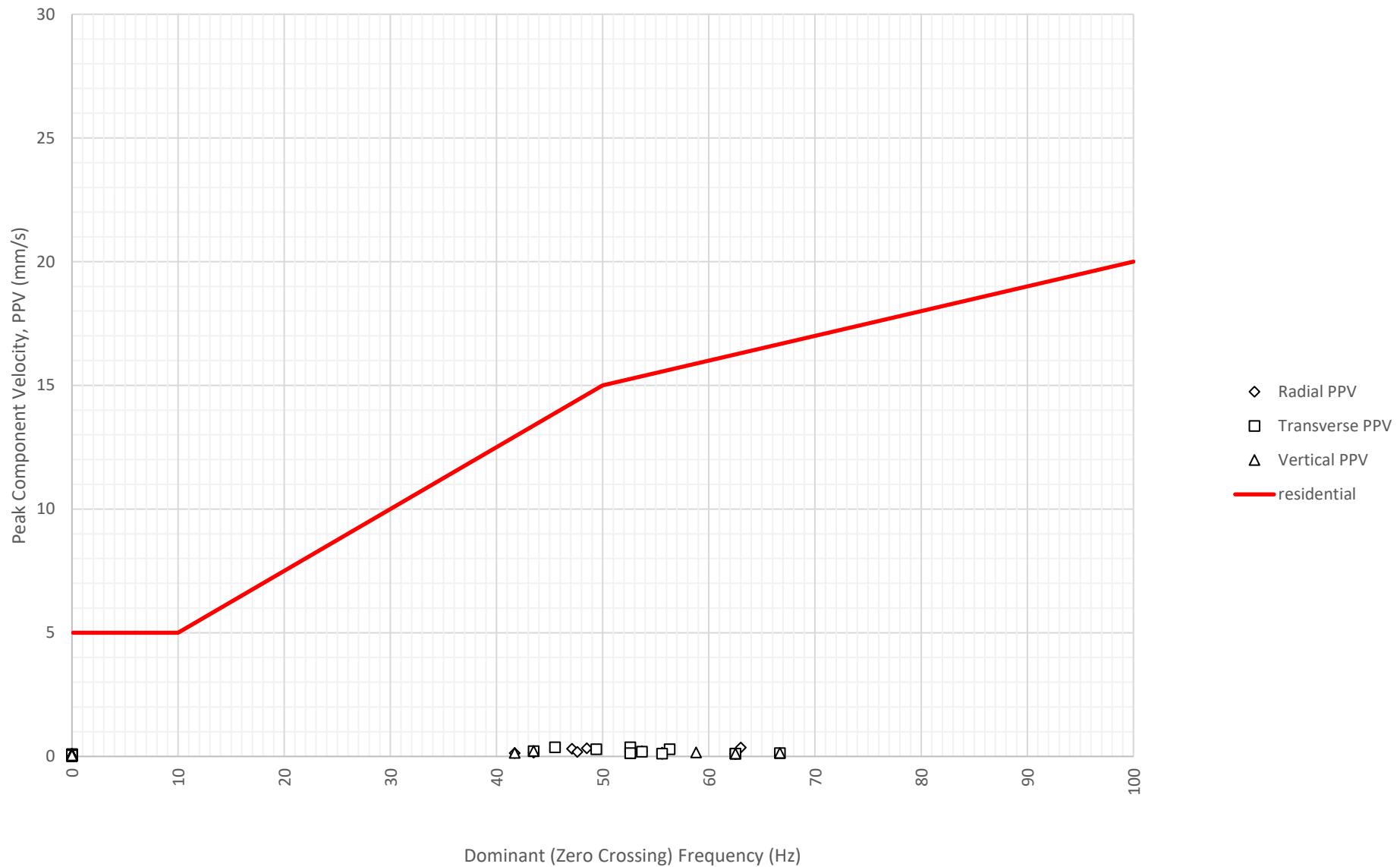
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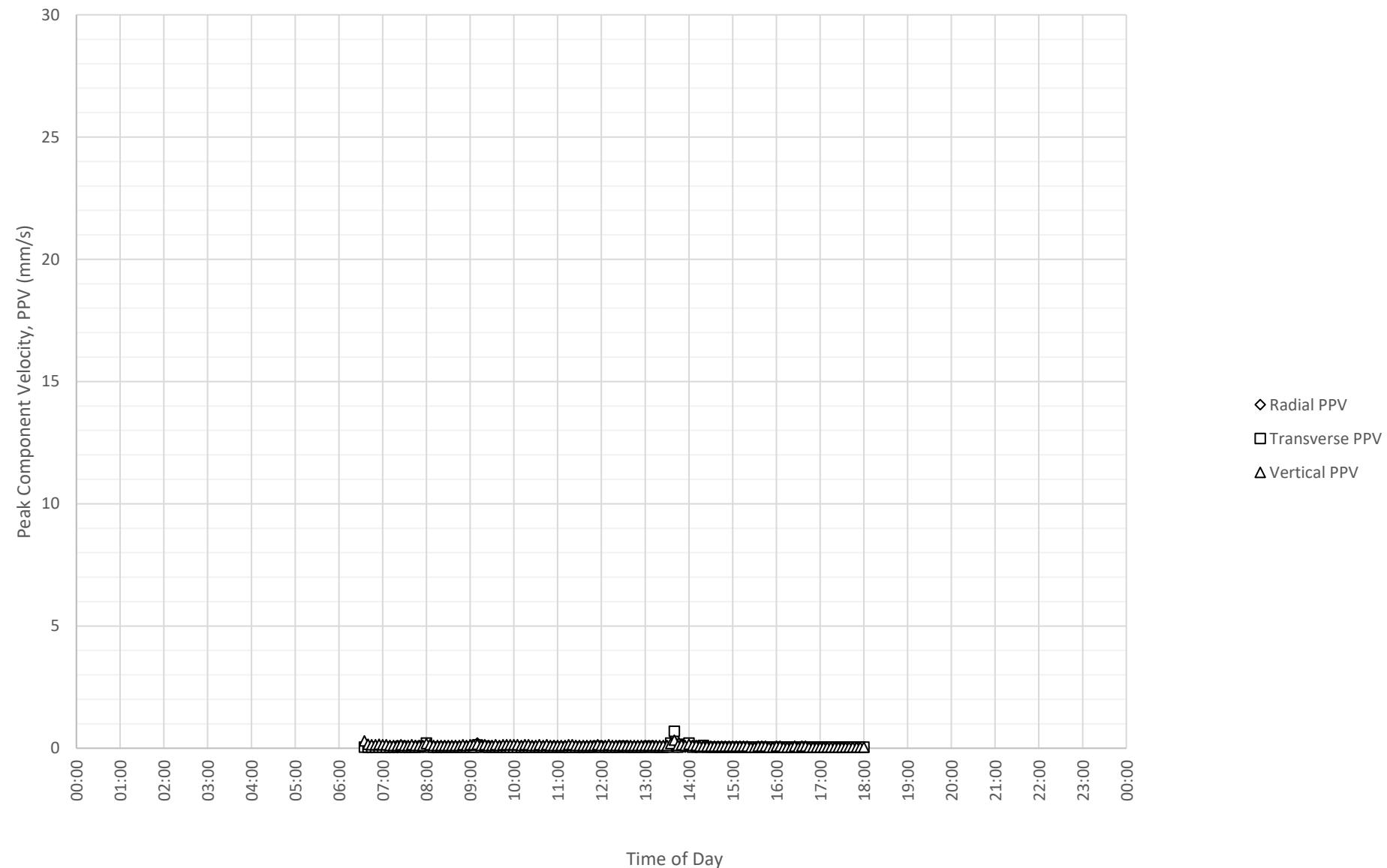
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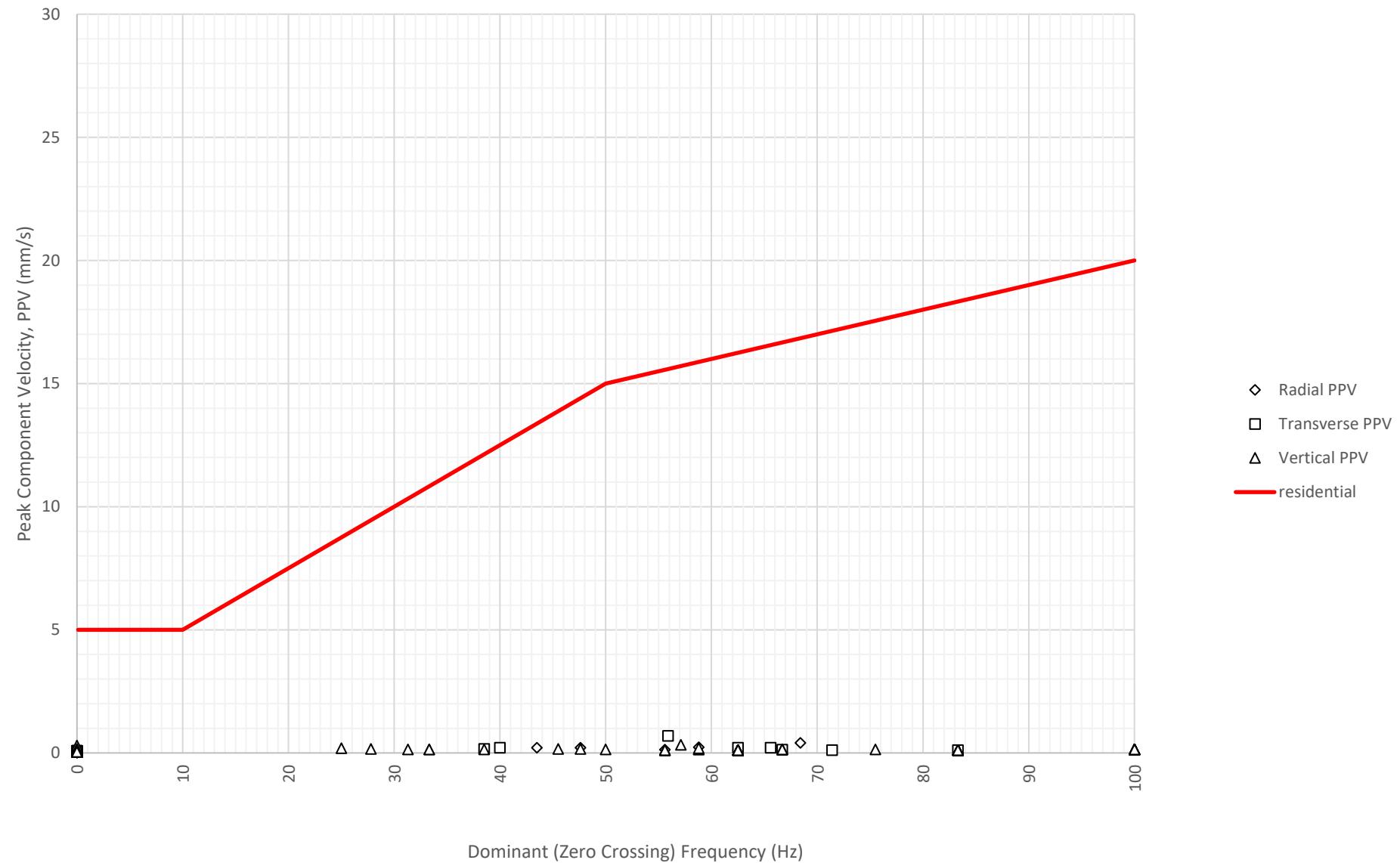
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
19-01-2023



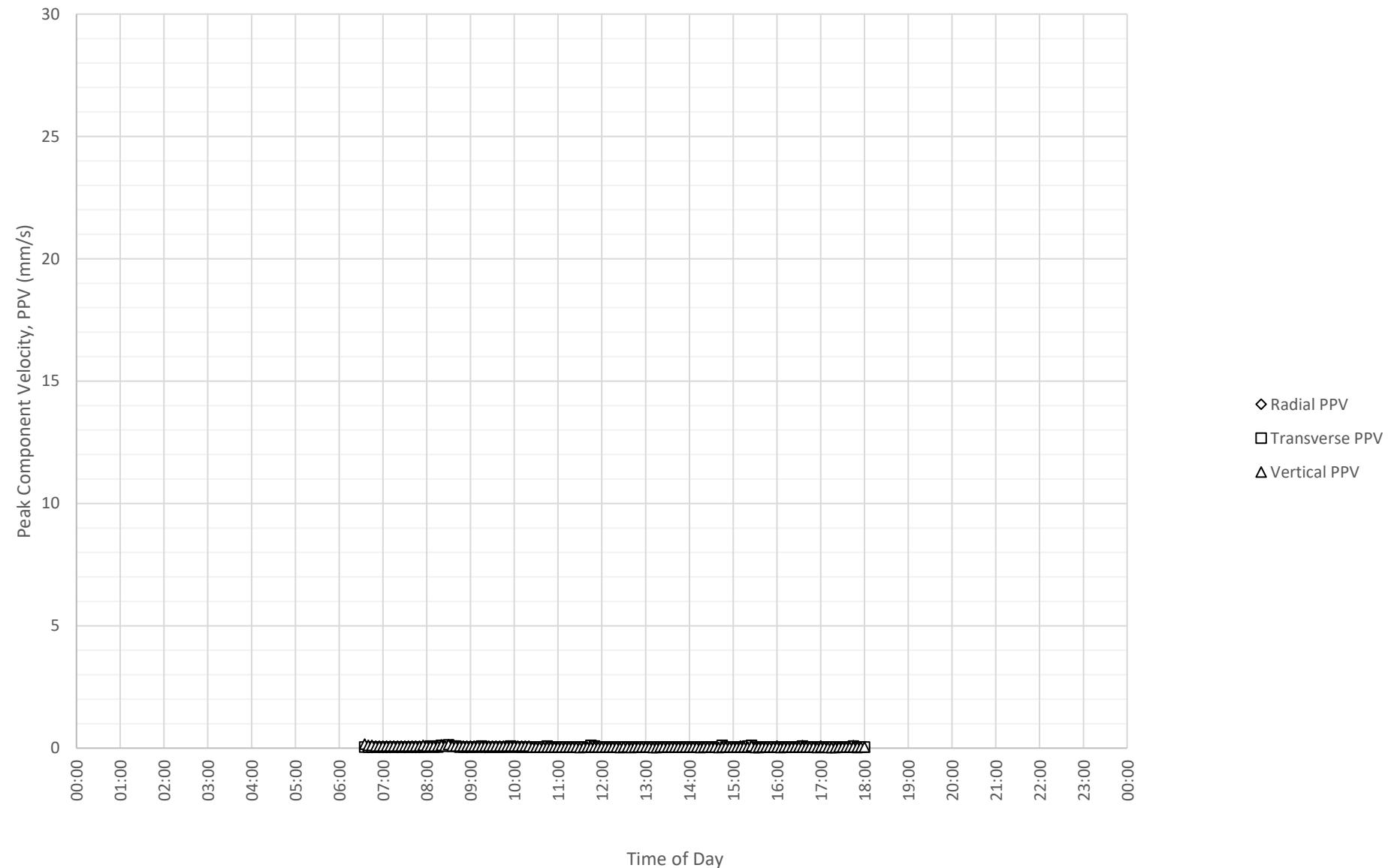
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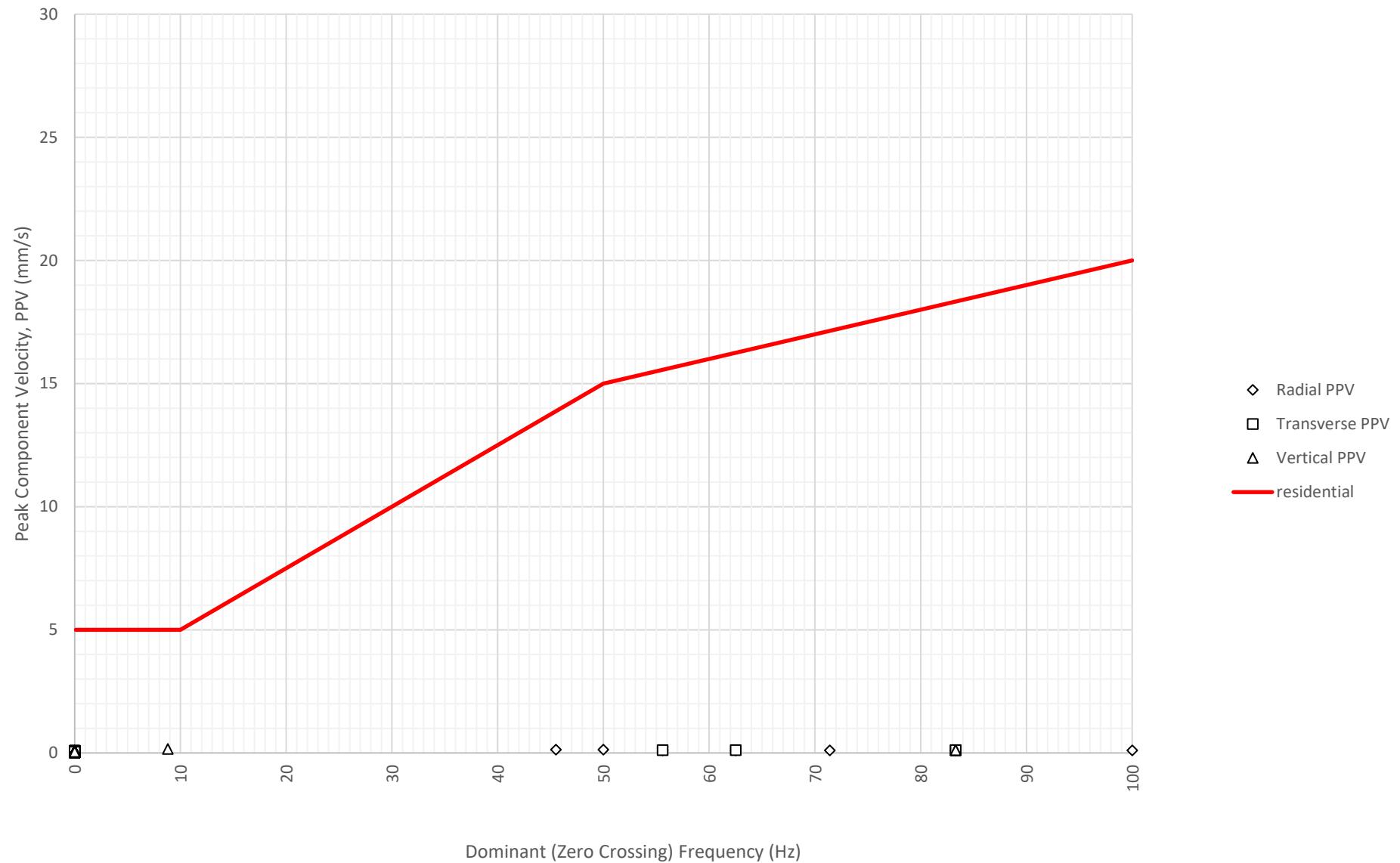
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20-01-2023



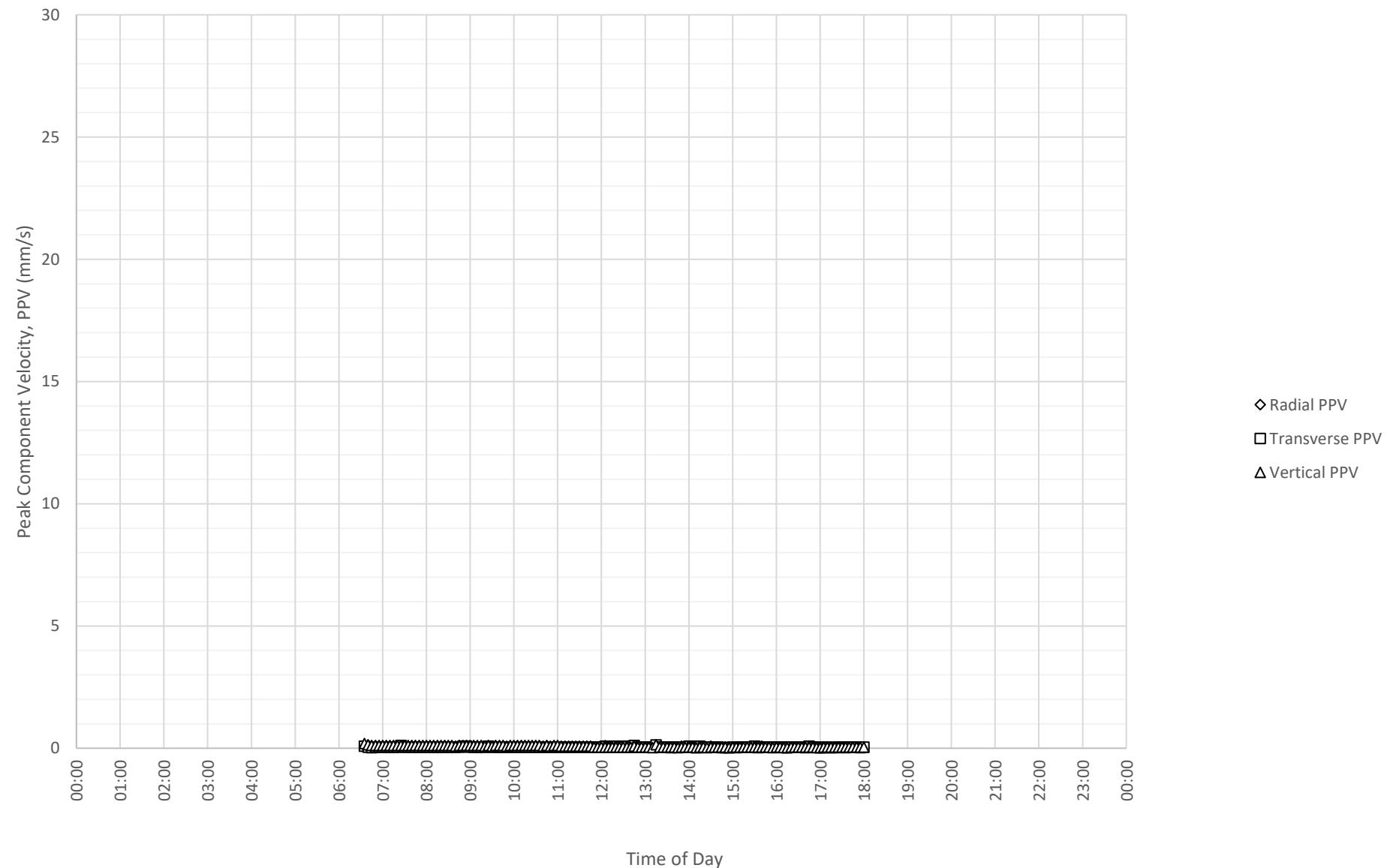
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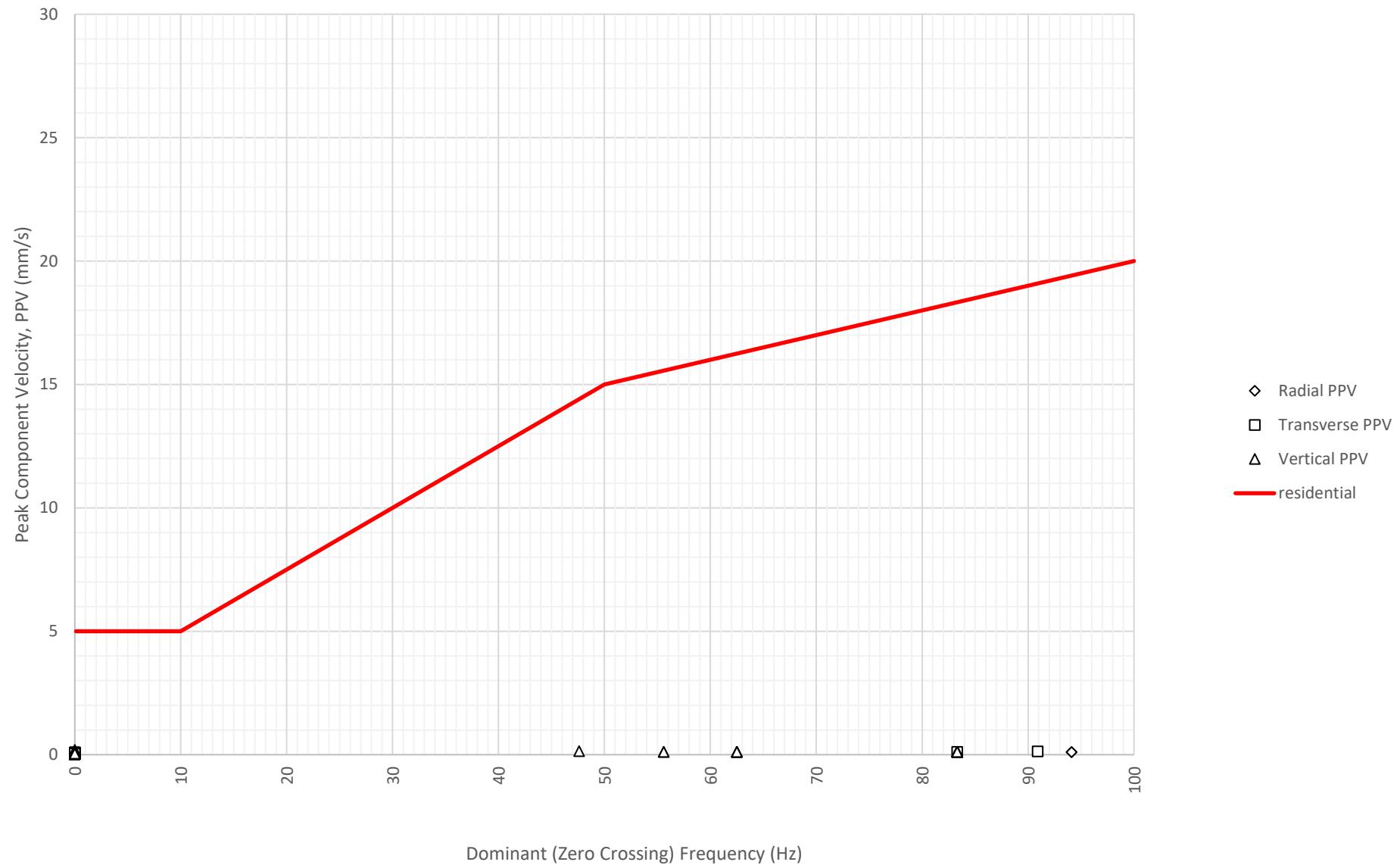
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21-01-2023



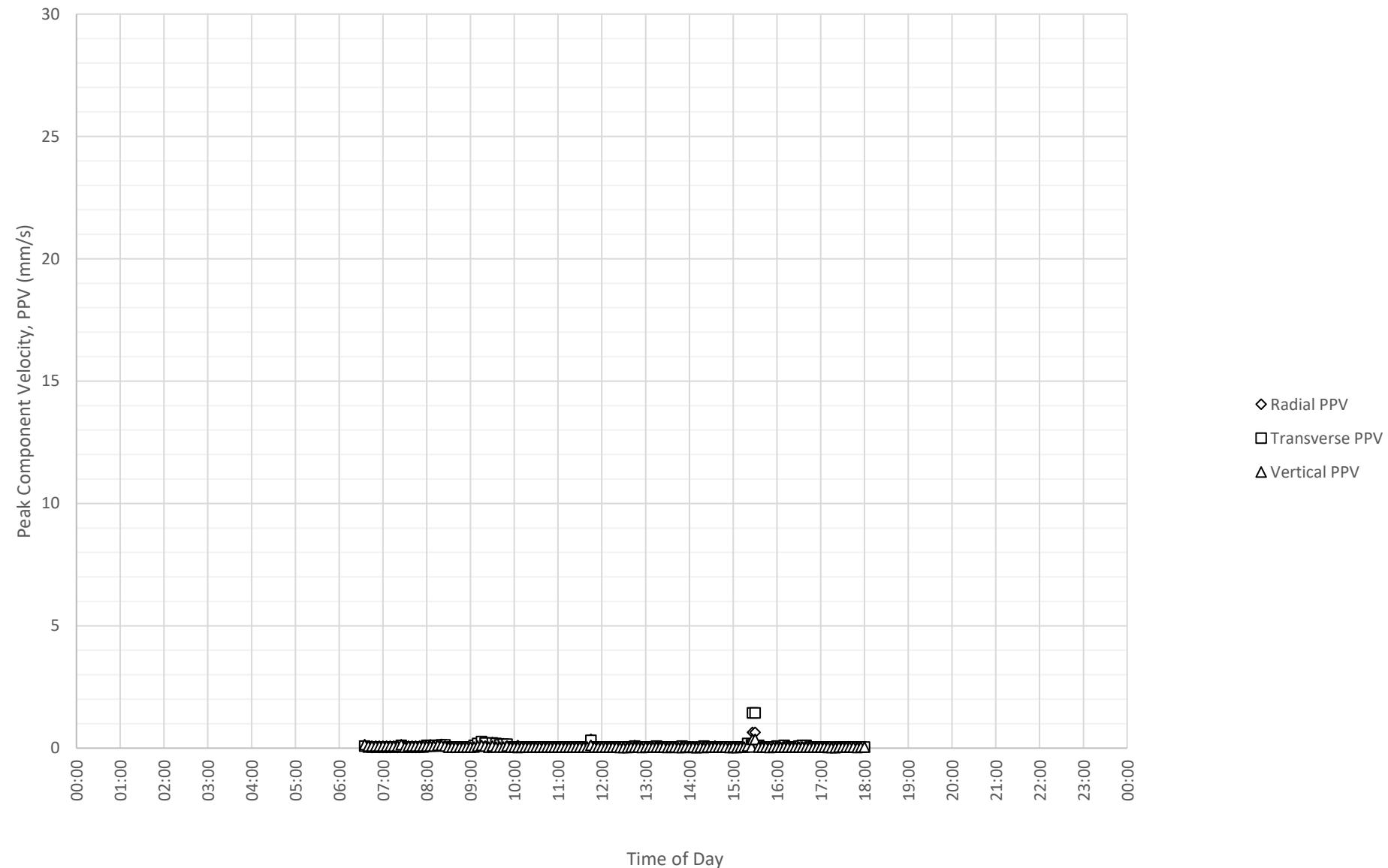
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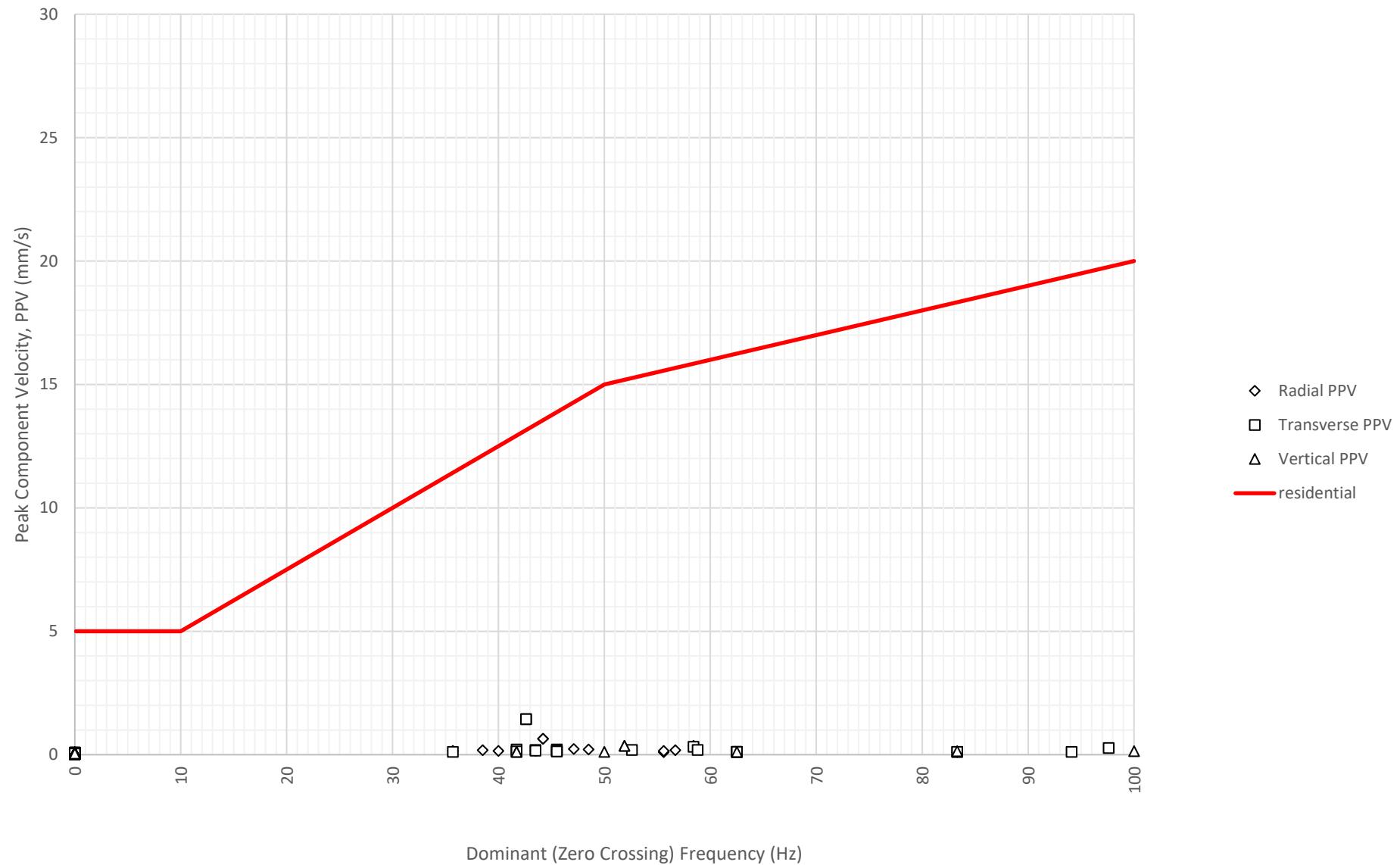
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
22-01-2023



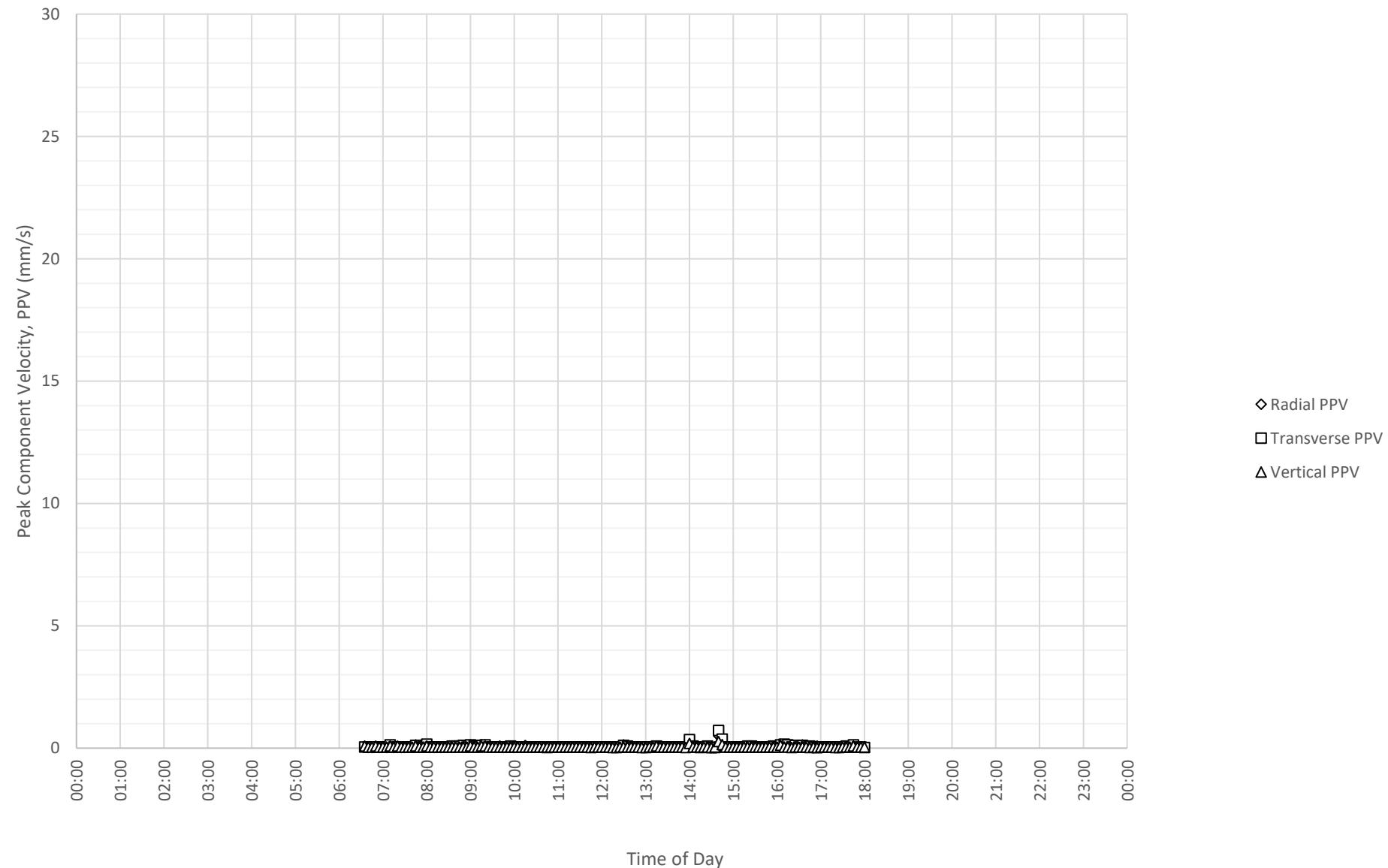
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 23-01-
2023



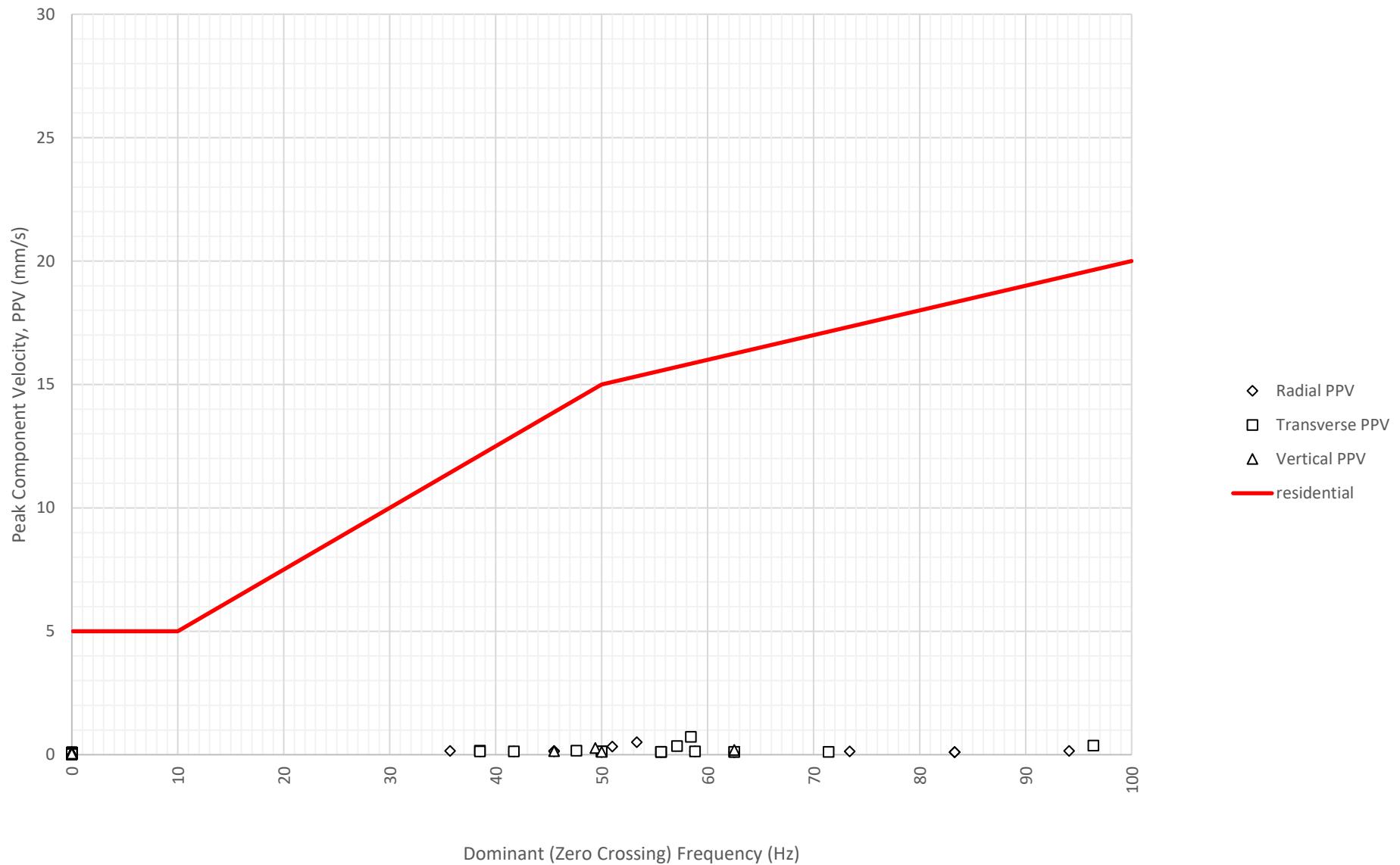
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23-01-2023



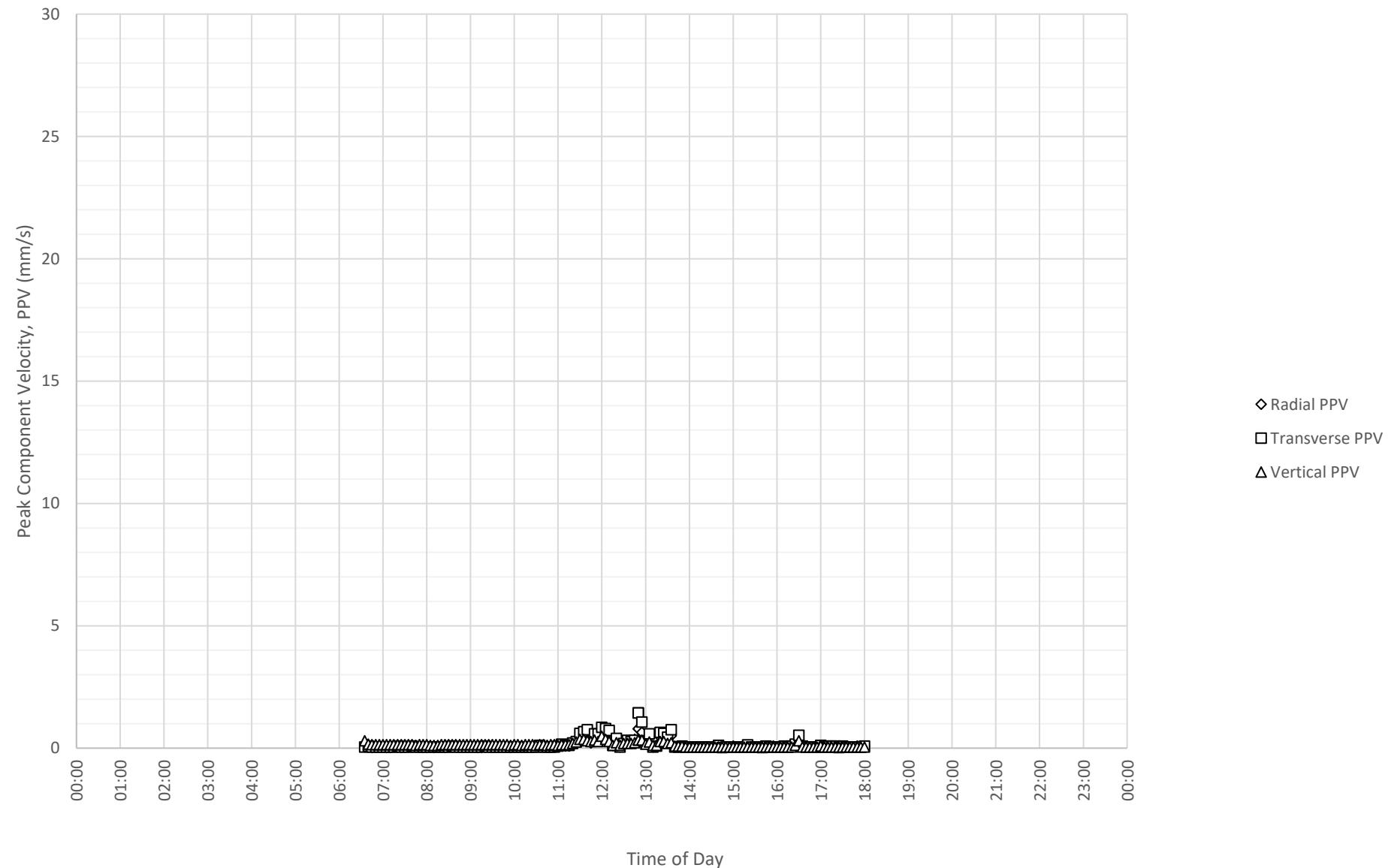
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2023



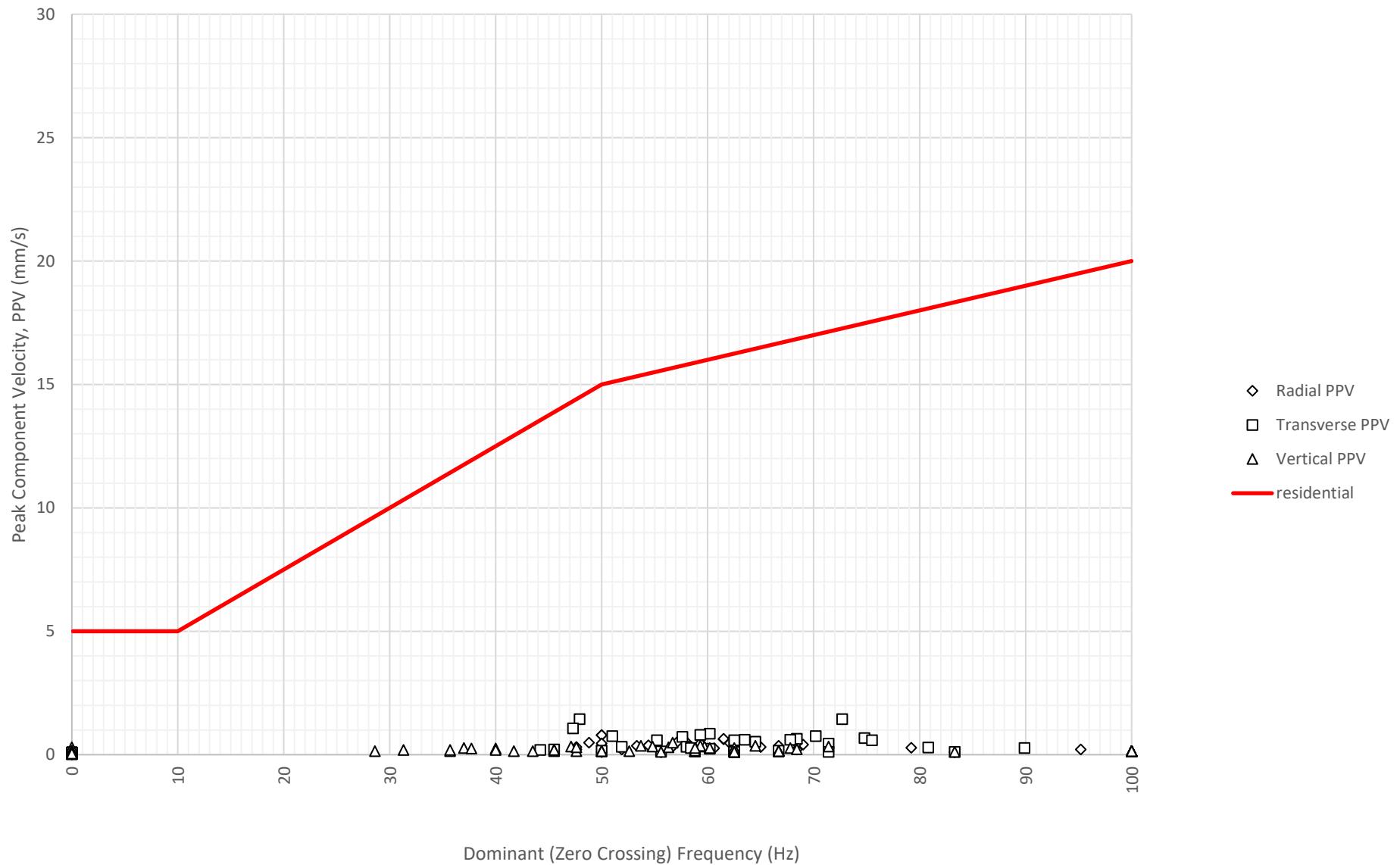
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
24-01-2023



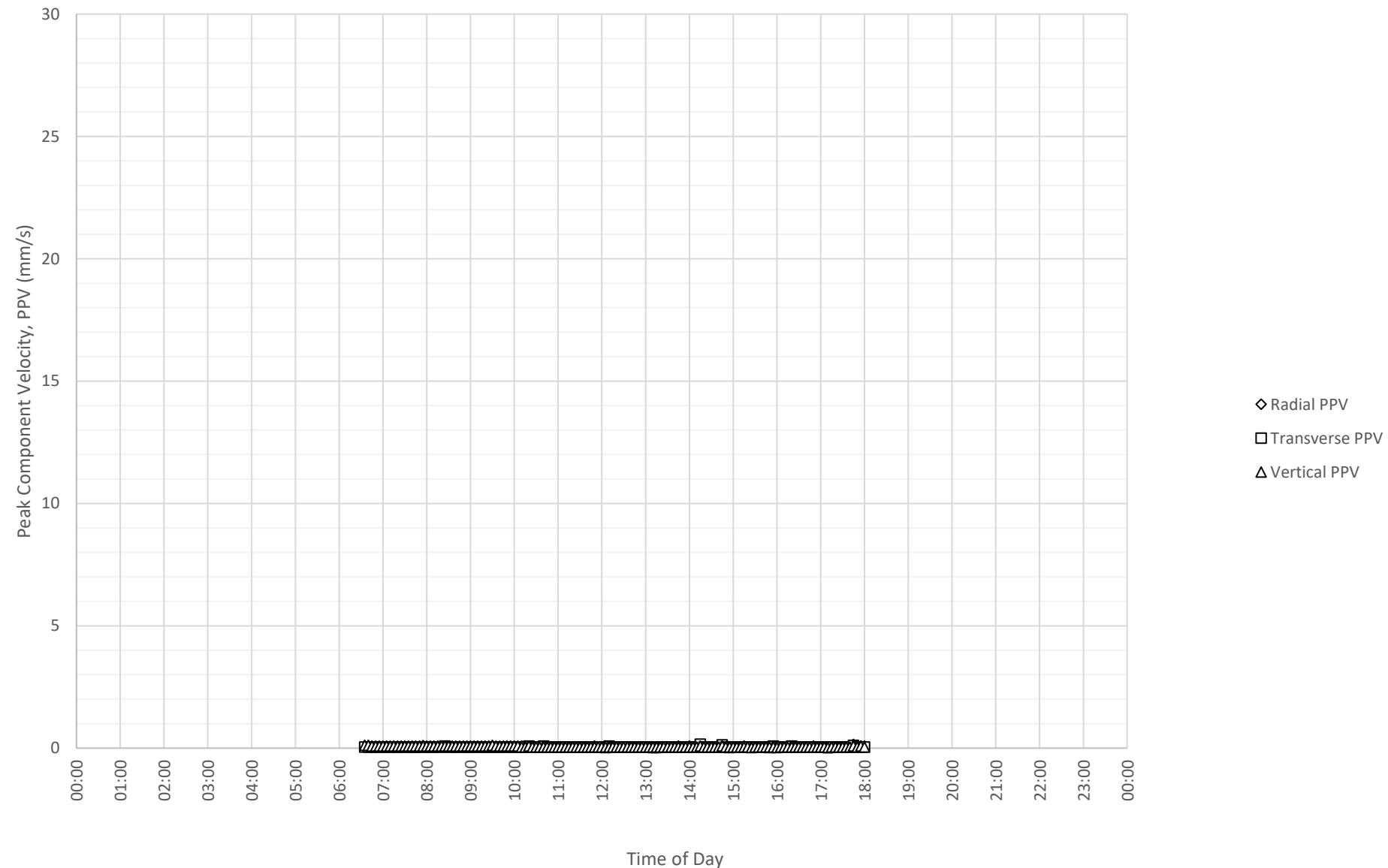
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2023



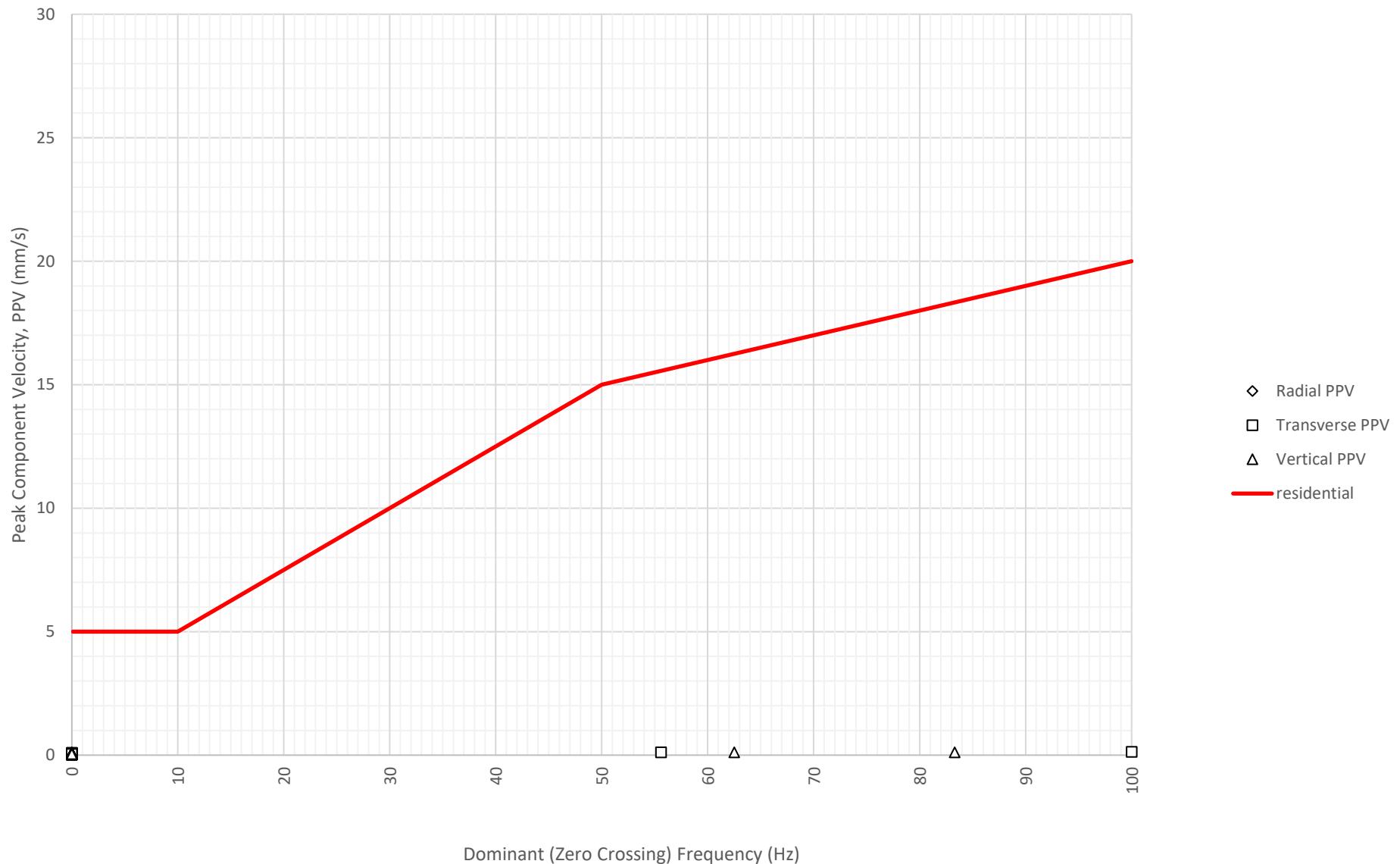
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25-01-2023



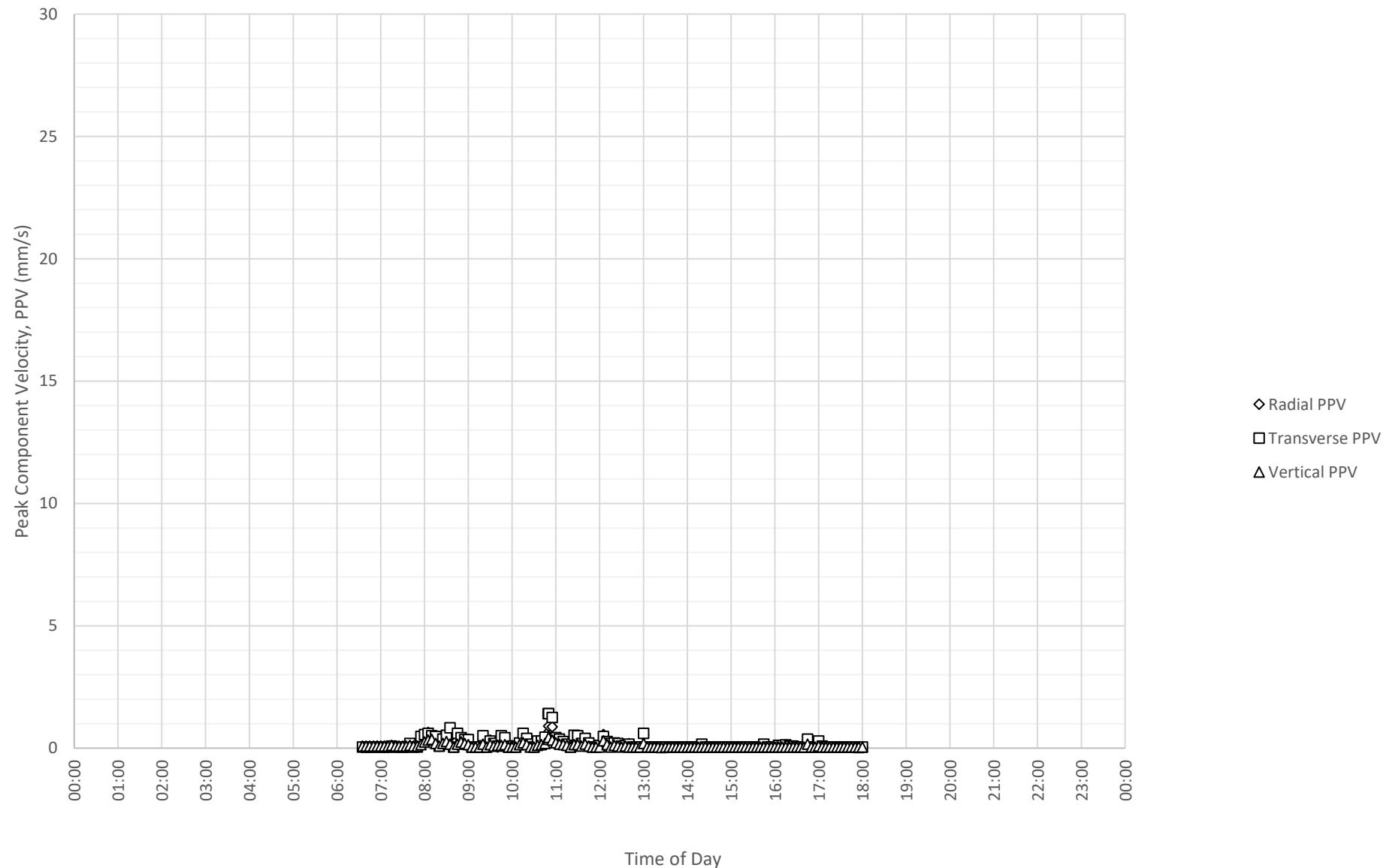
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2023



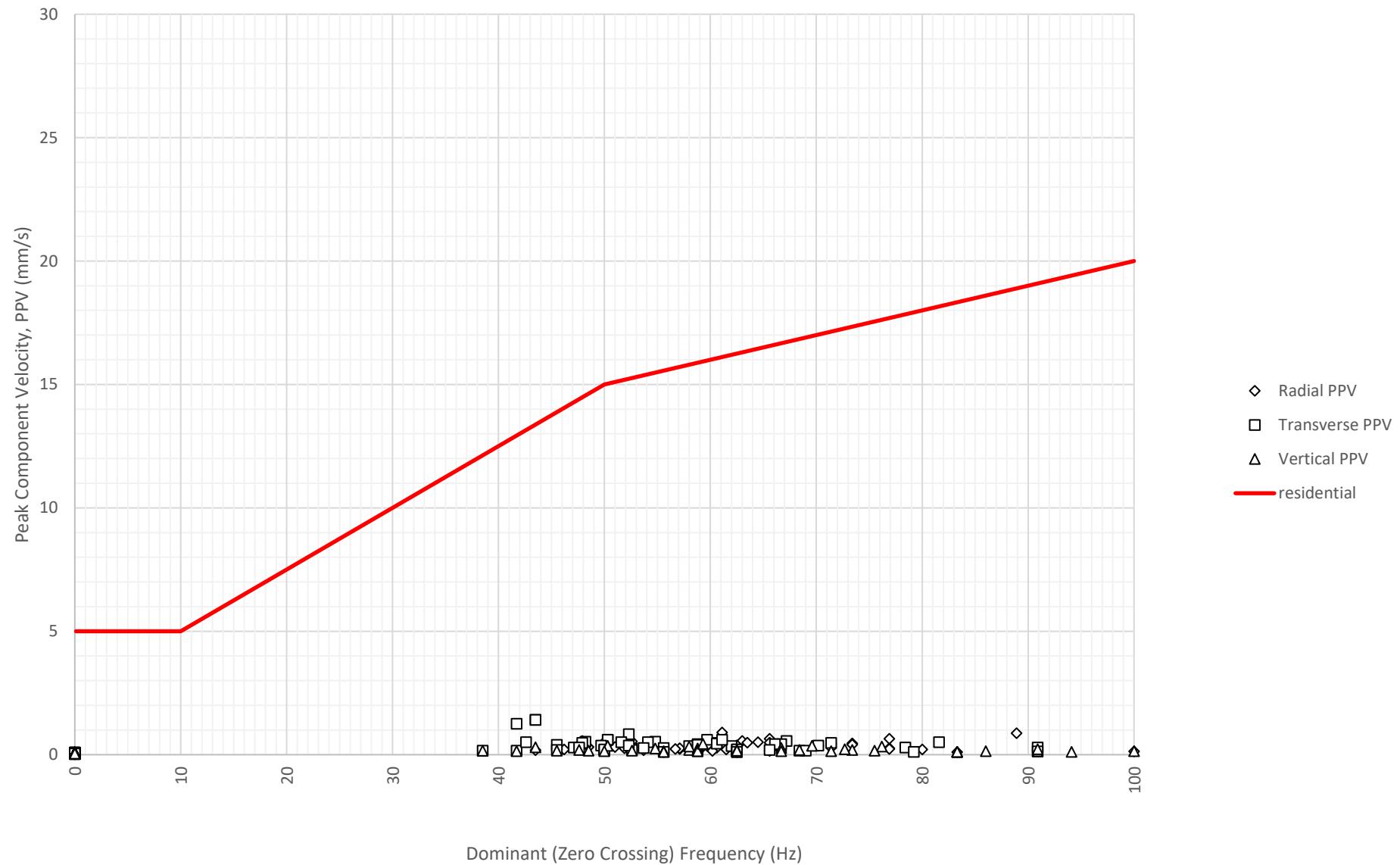
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
26-01-2023



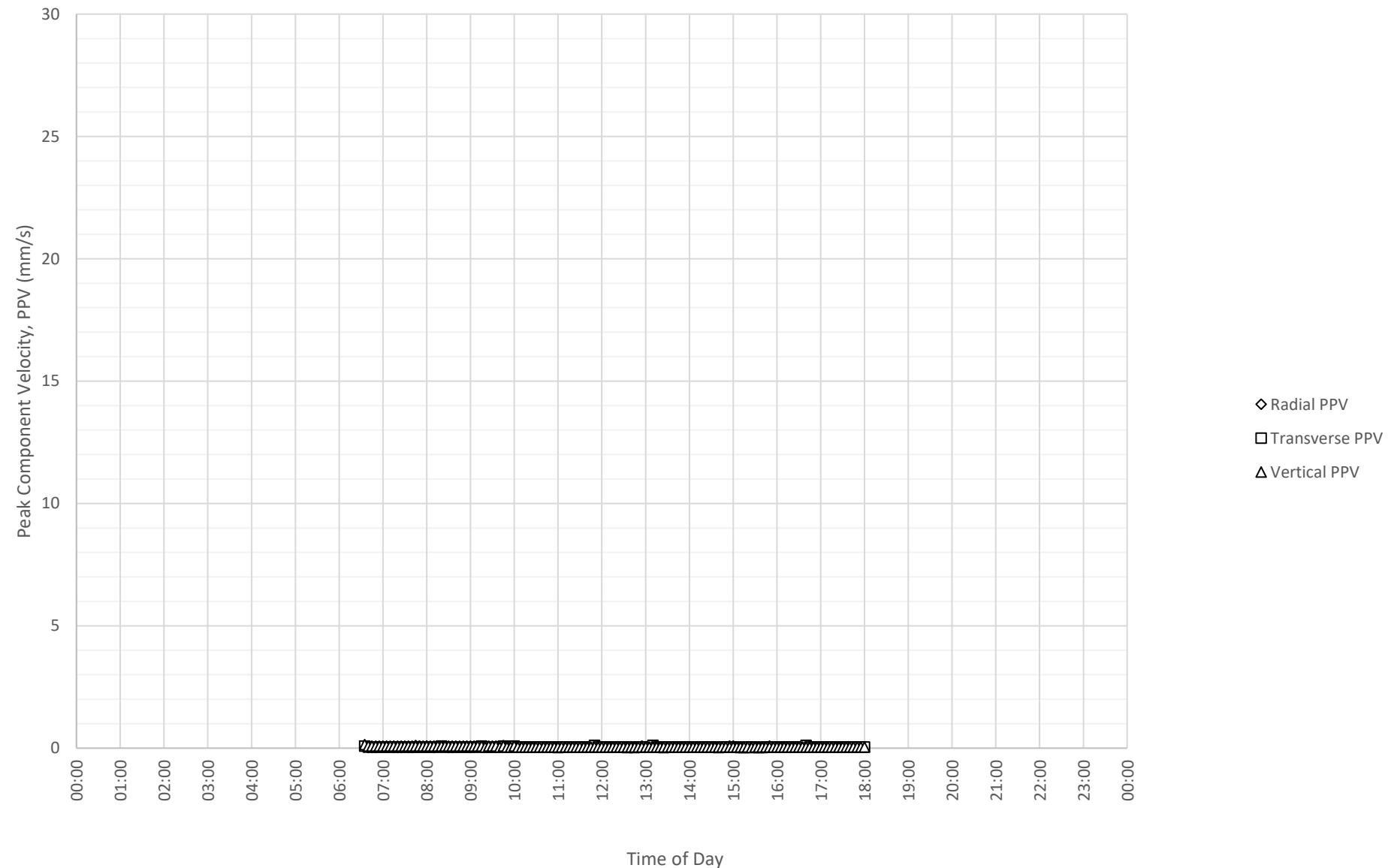
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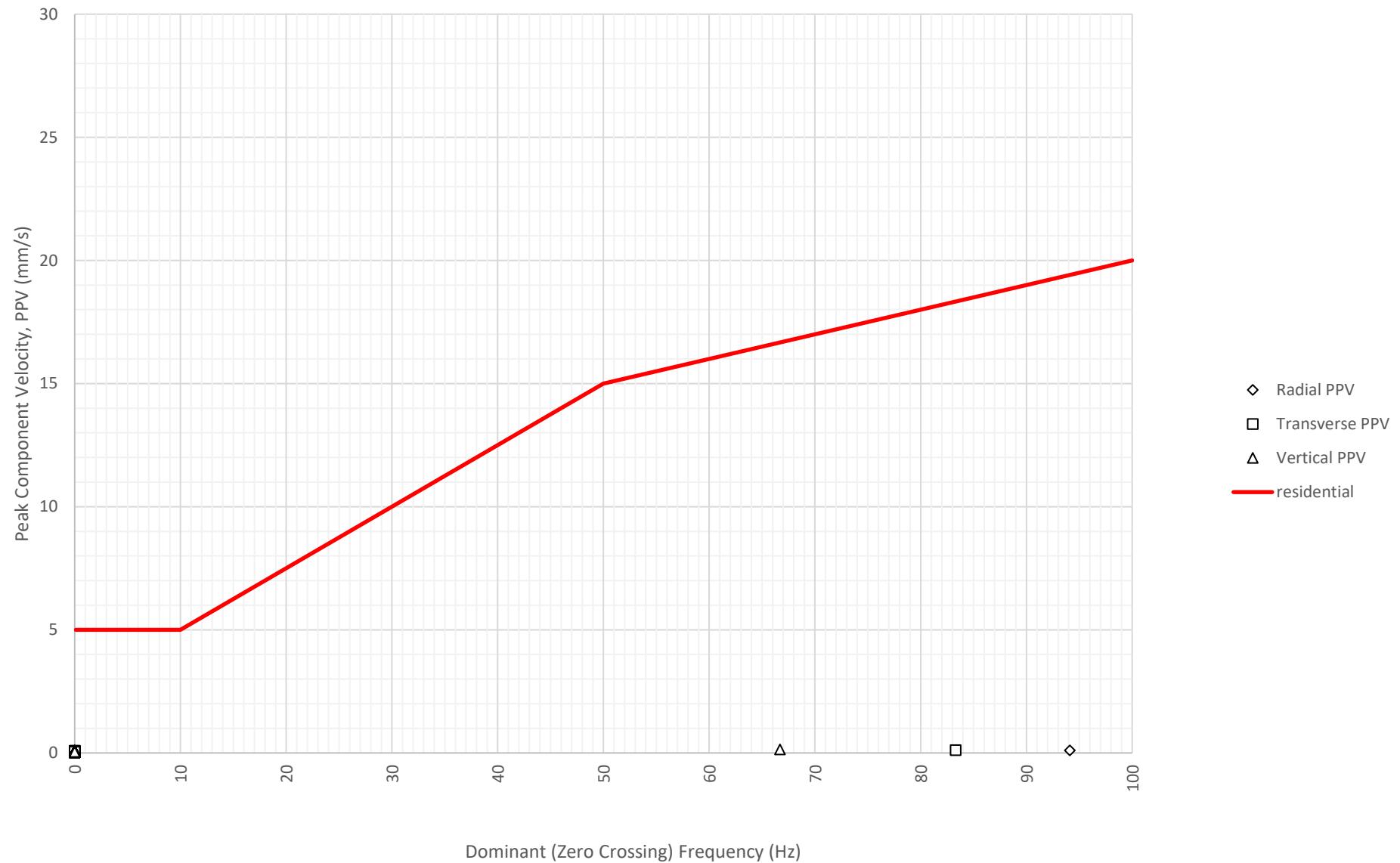
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
27-01-2023



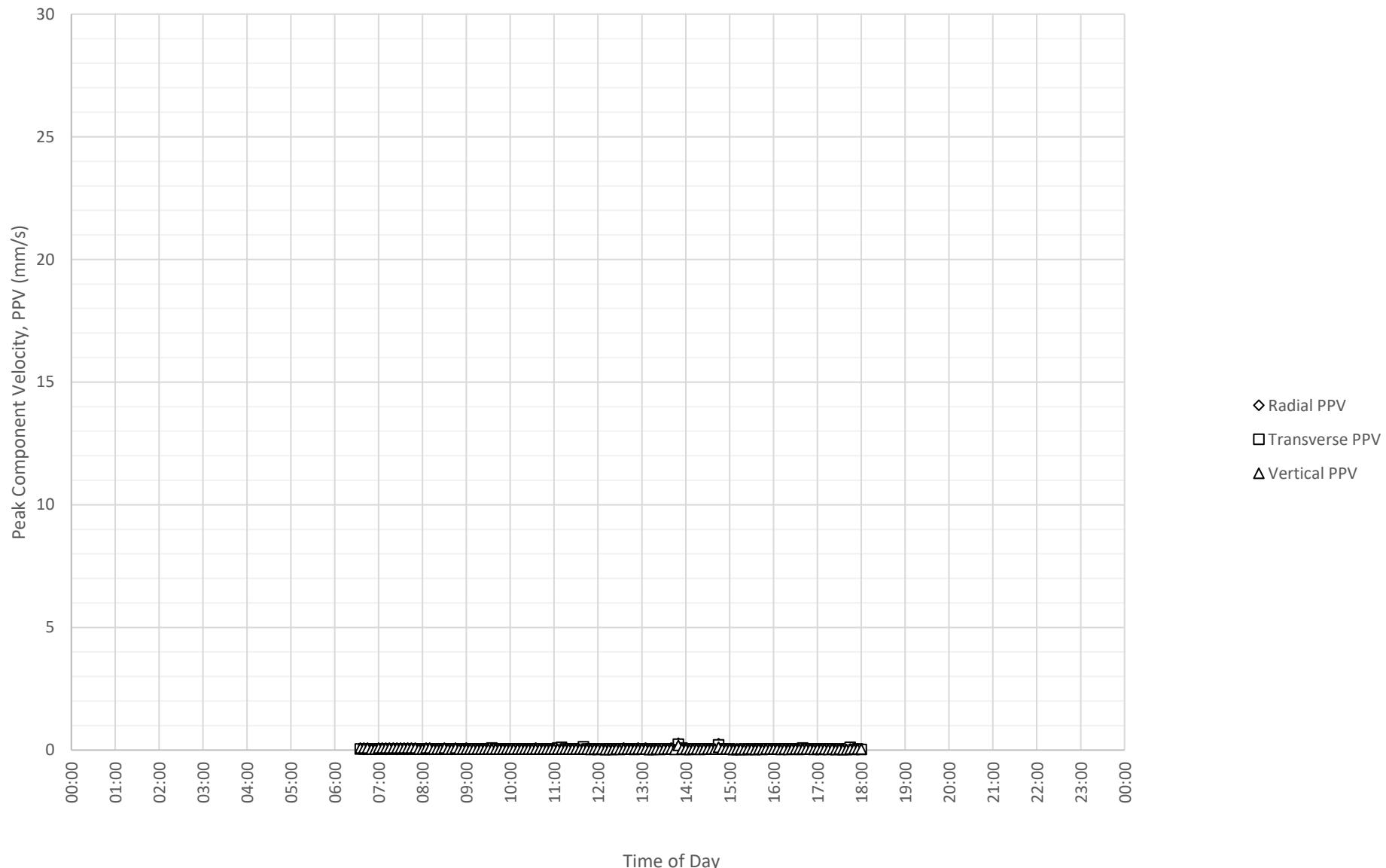
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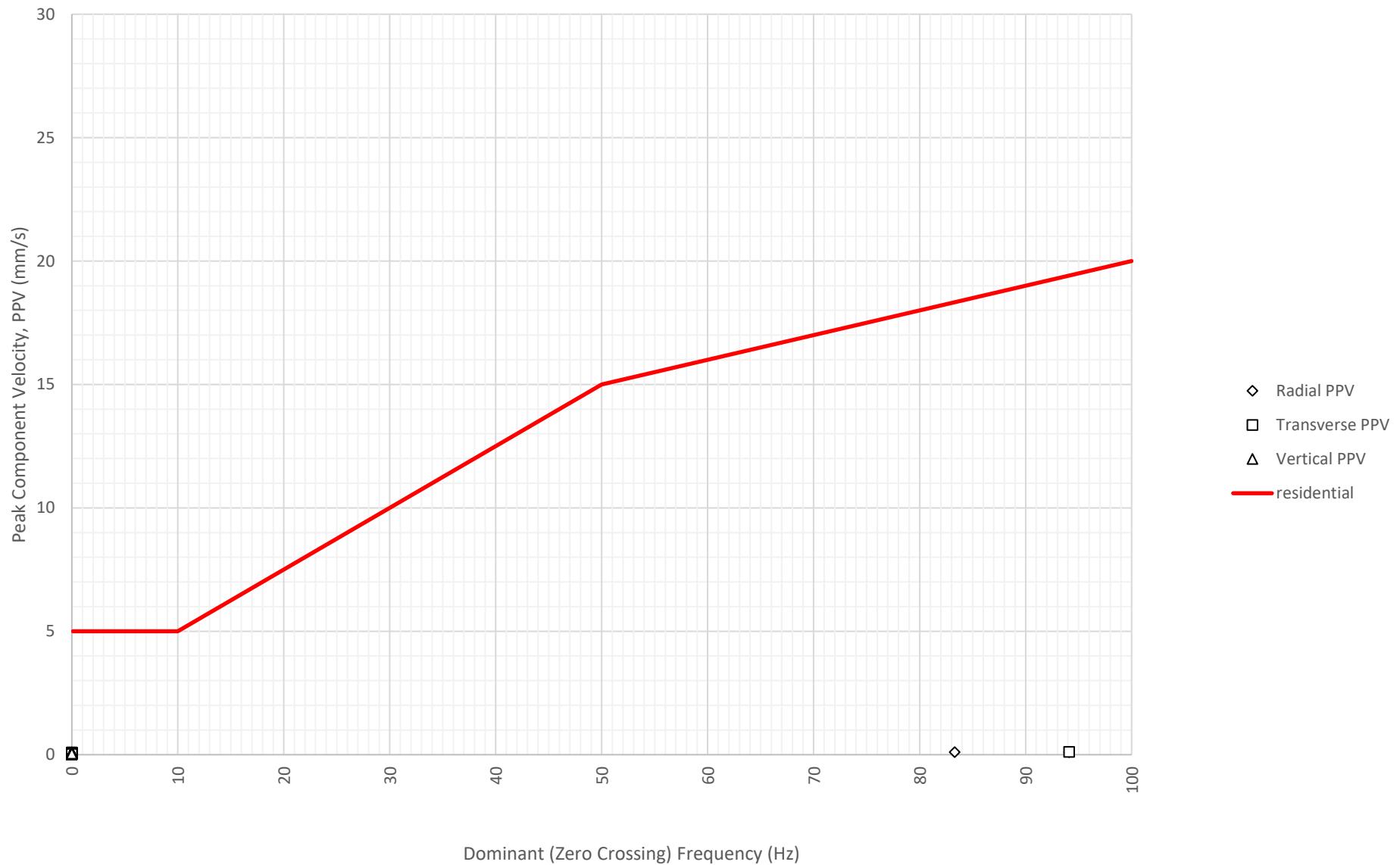
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
28-01-2023



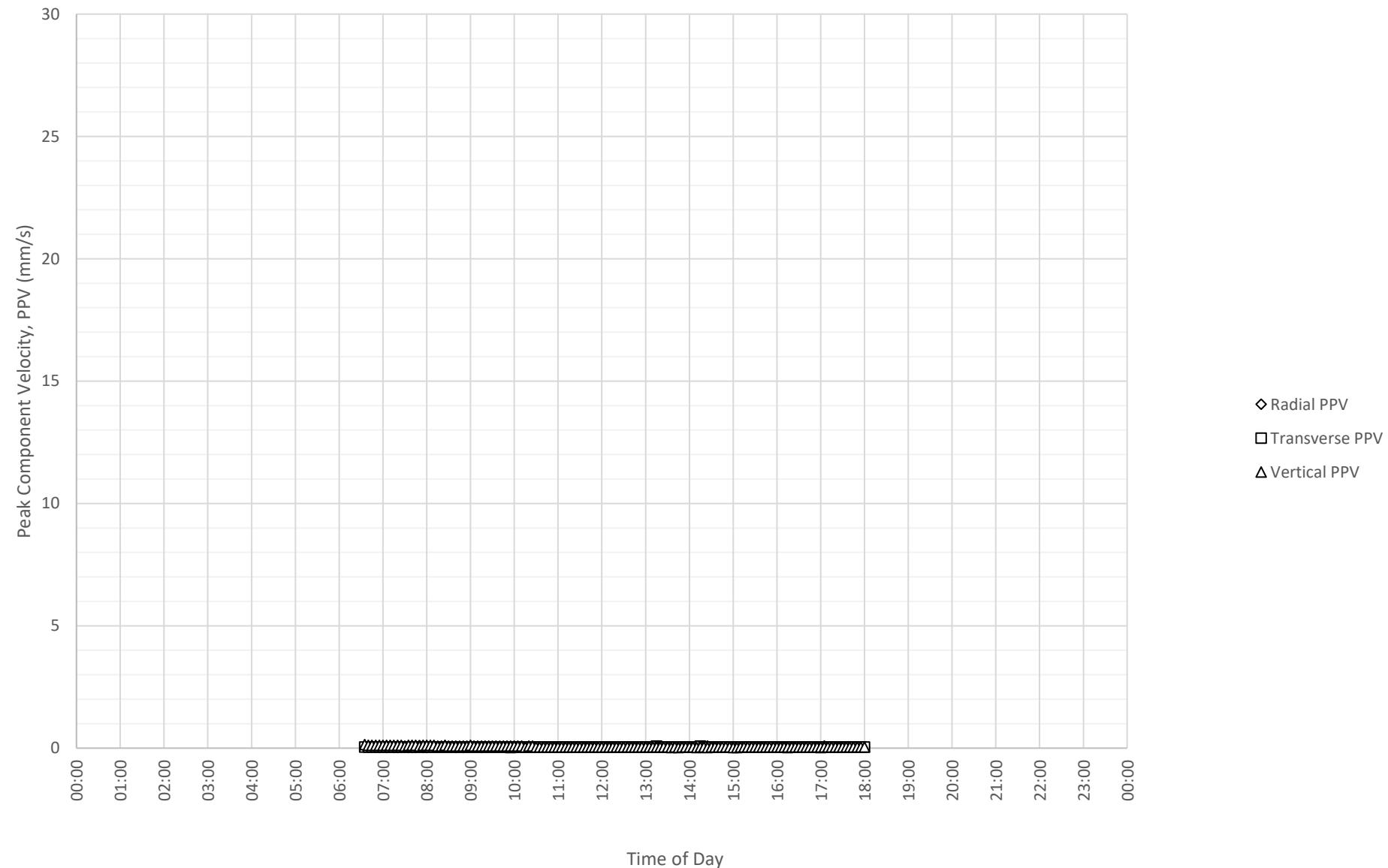
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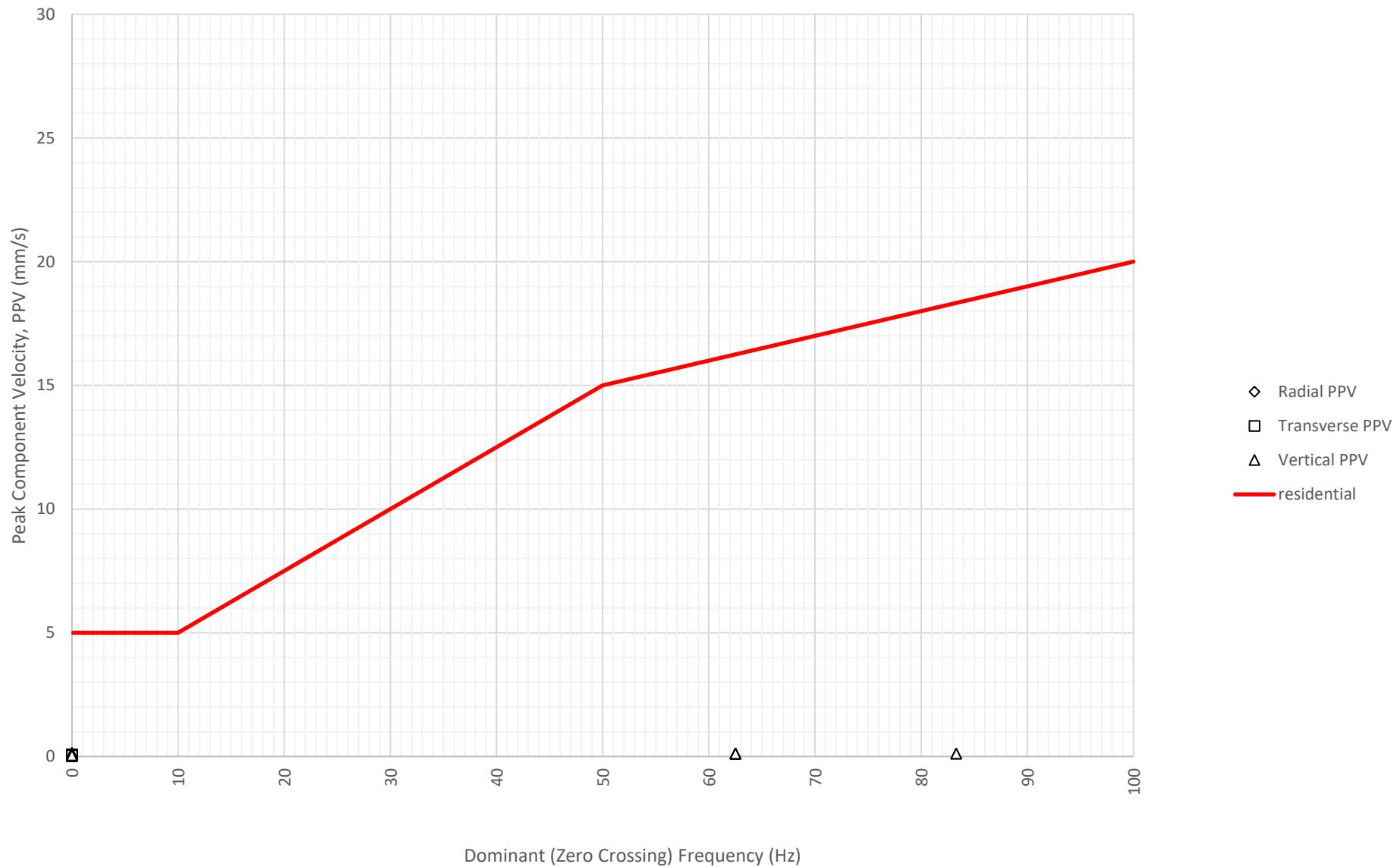
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29-01-2023



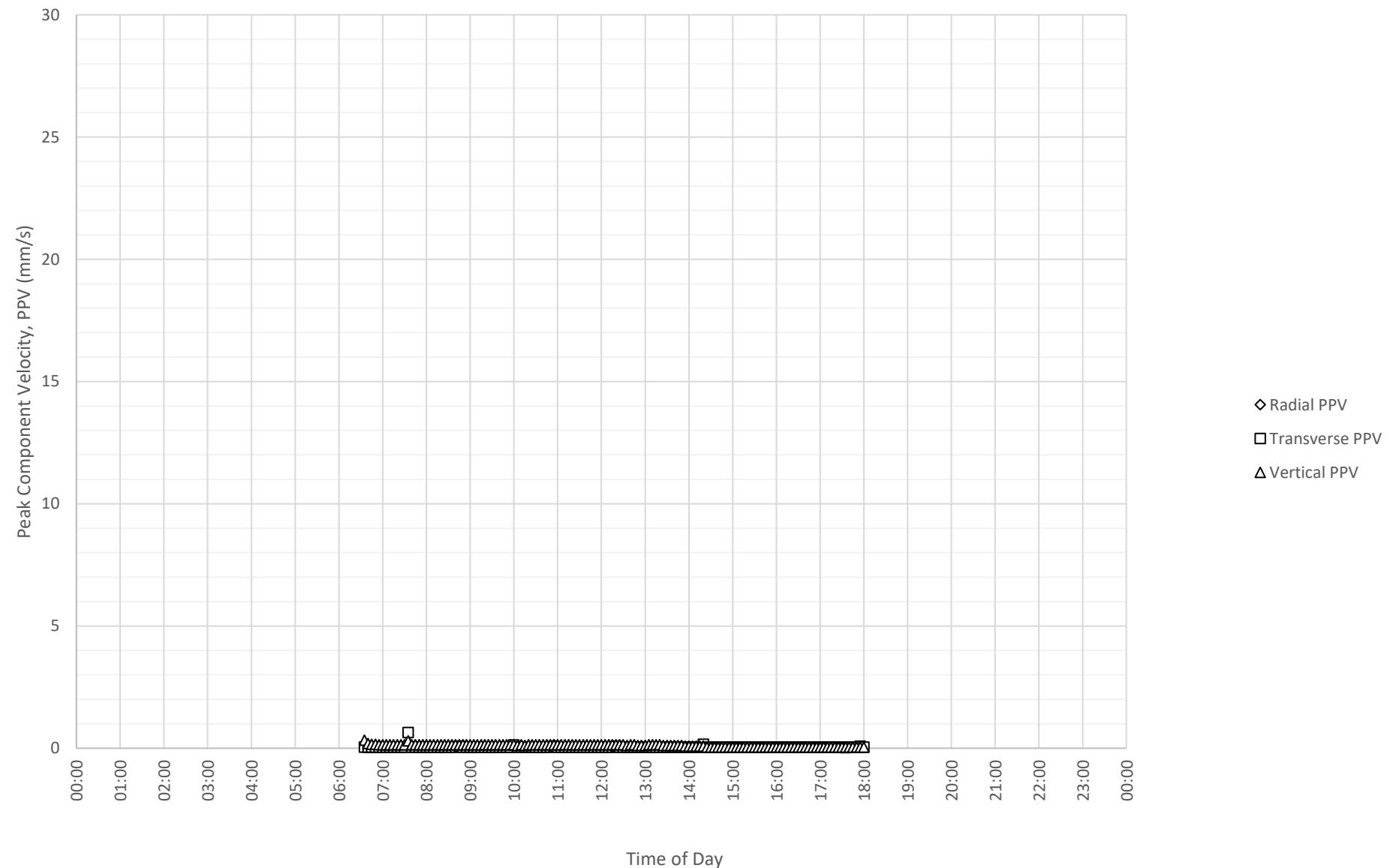
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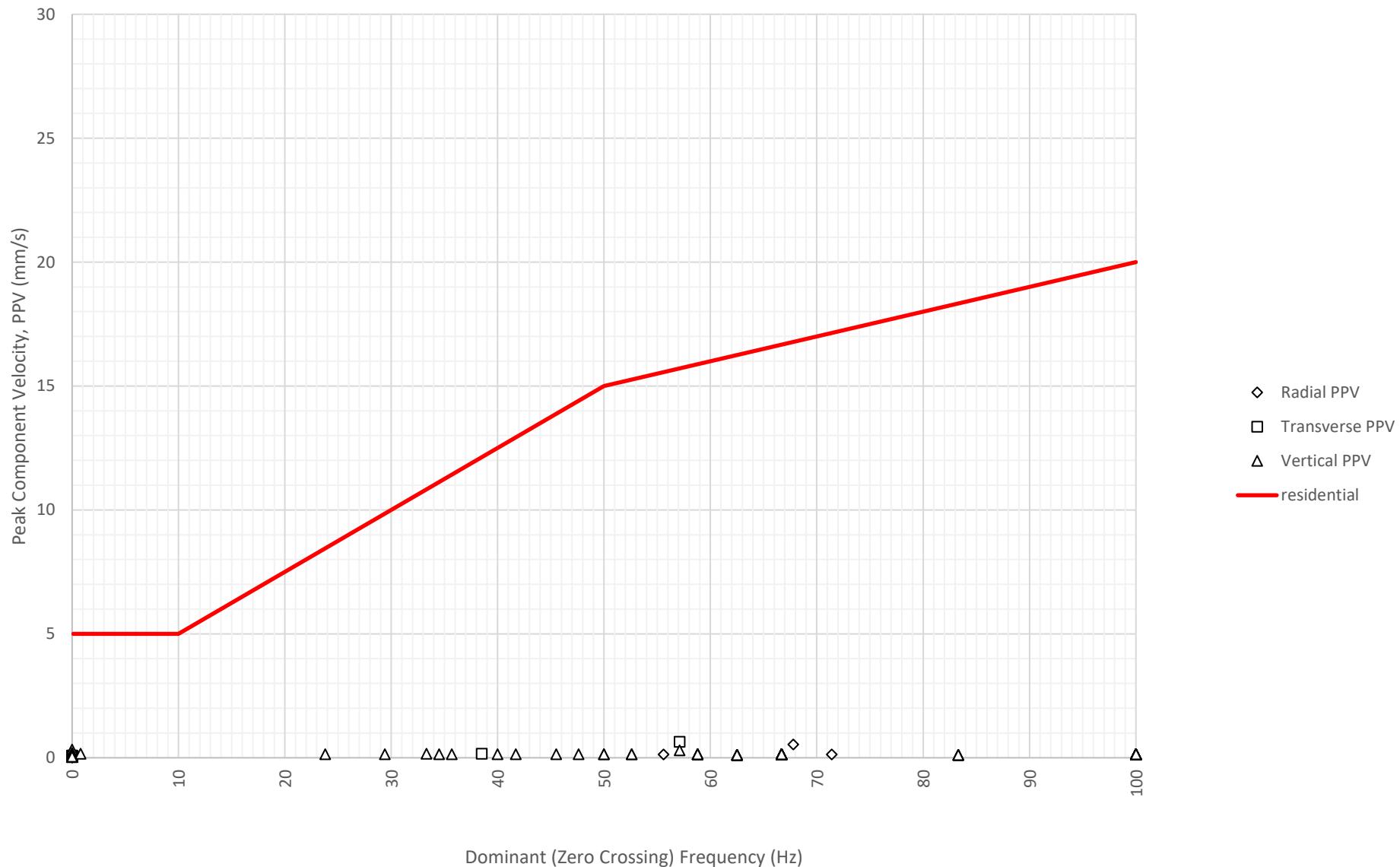
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
30-01-2023



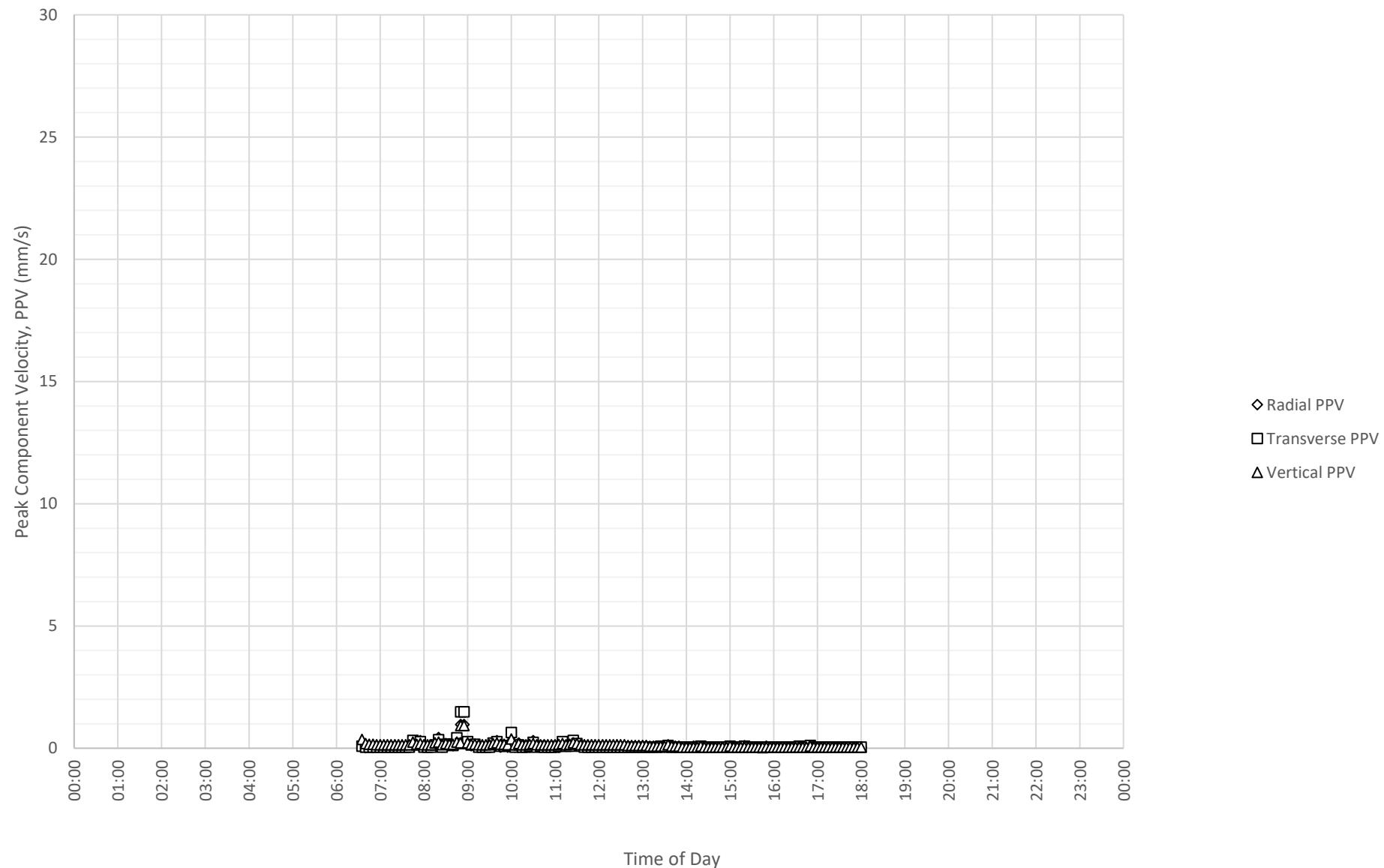
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 31-01-
2023



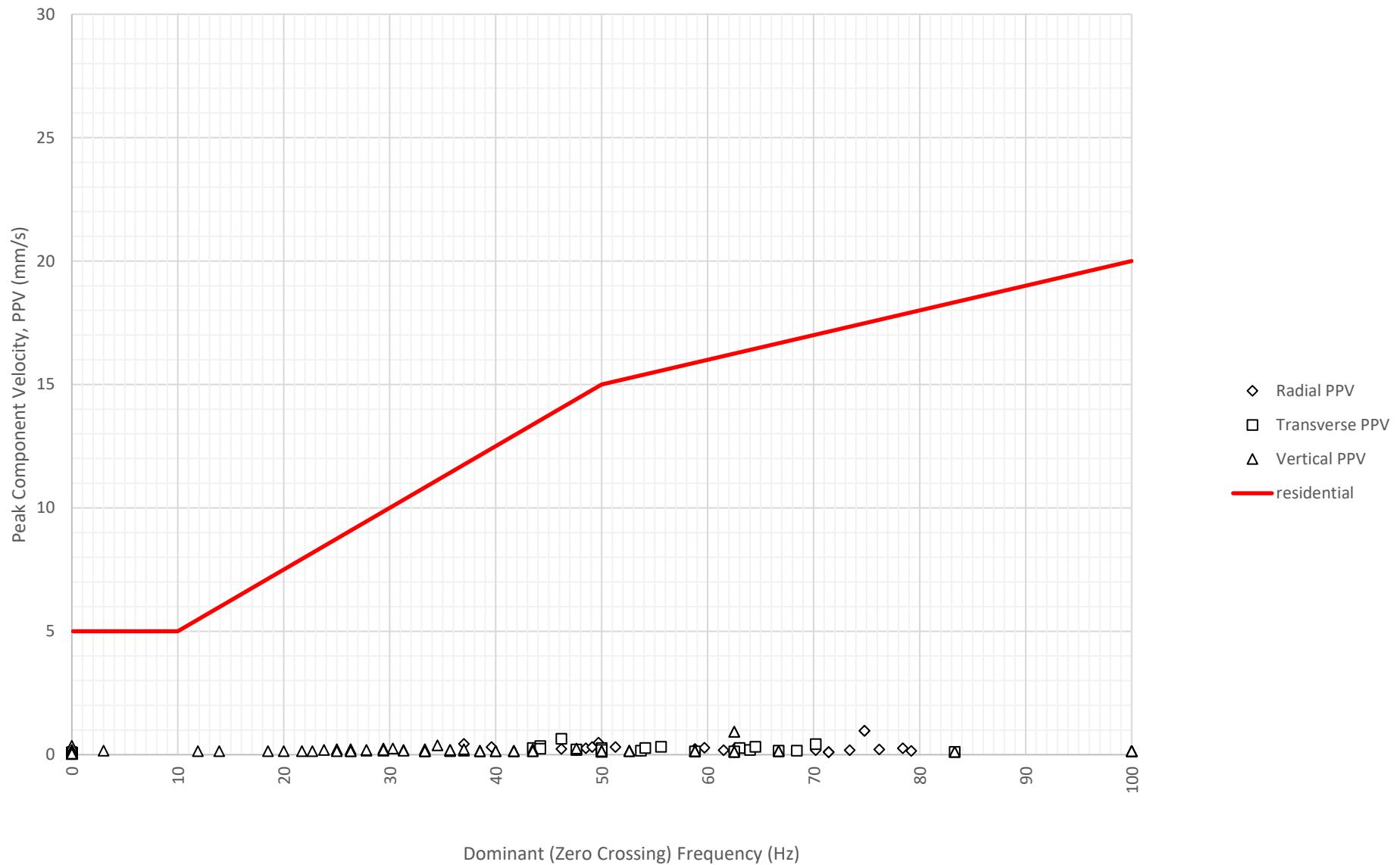
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
31-01-2023



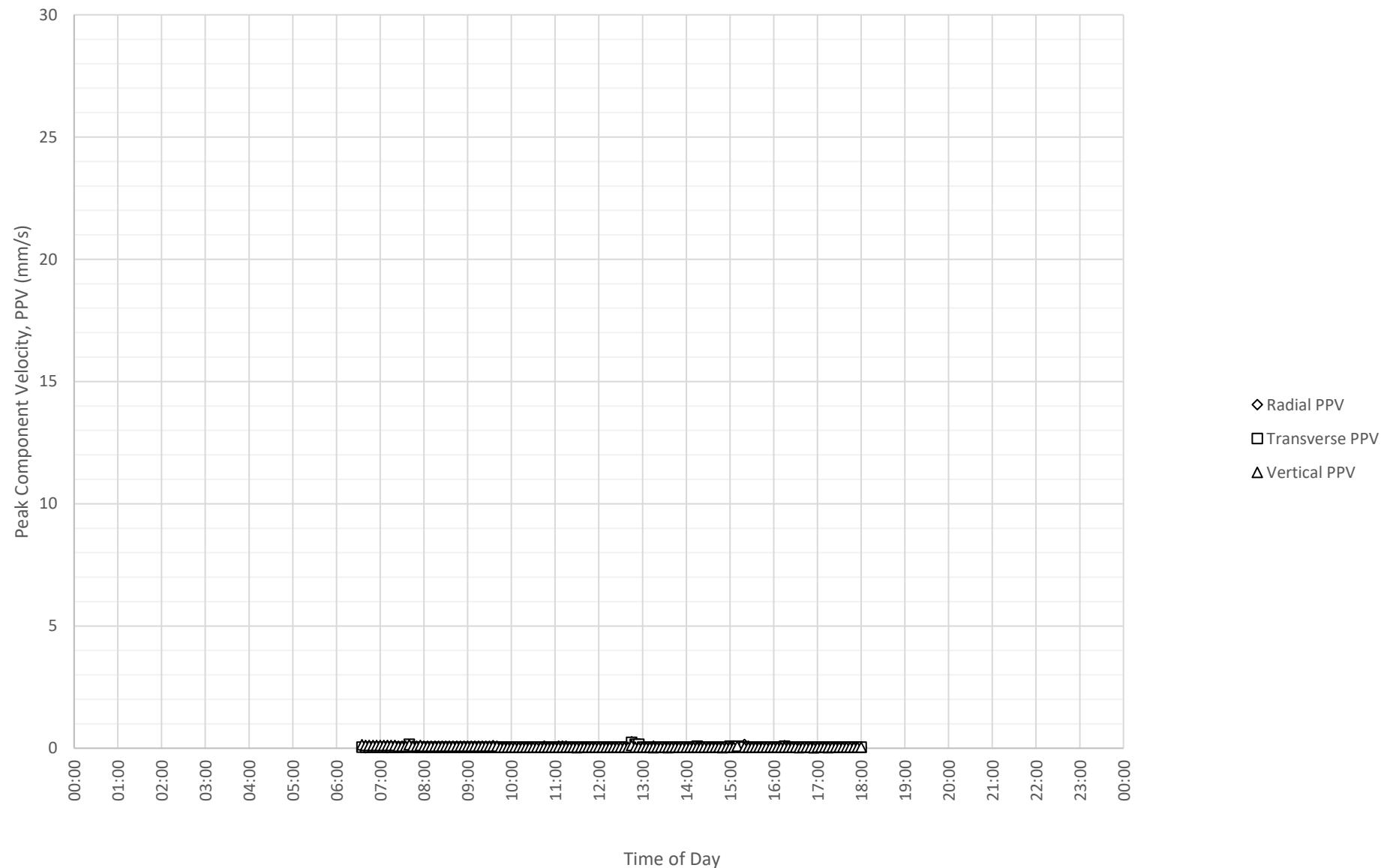
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 1-02-
2023



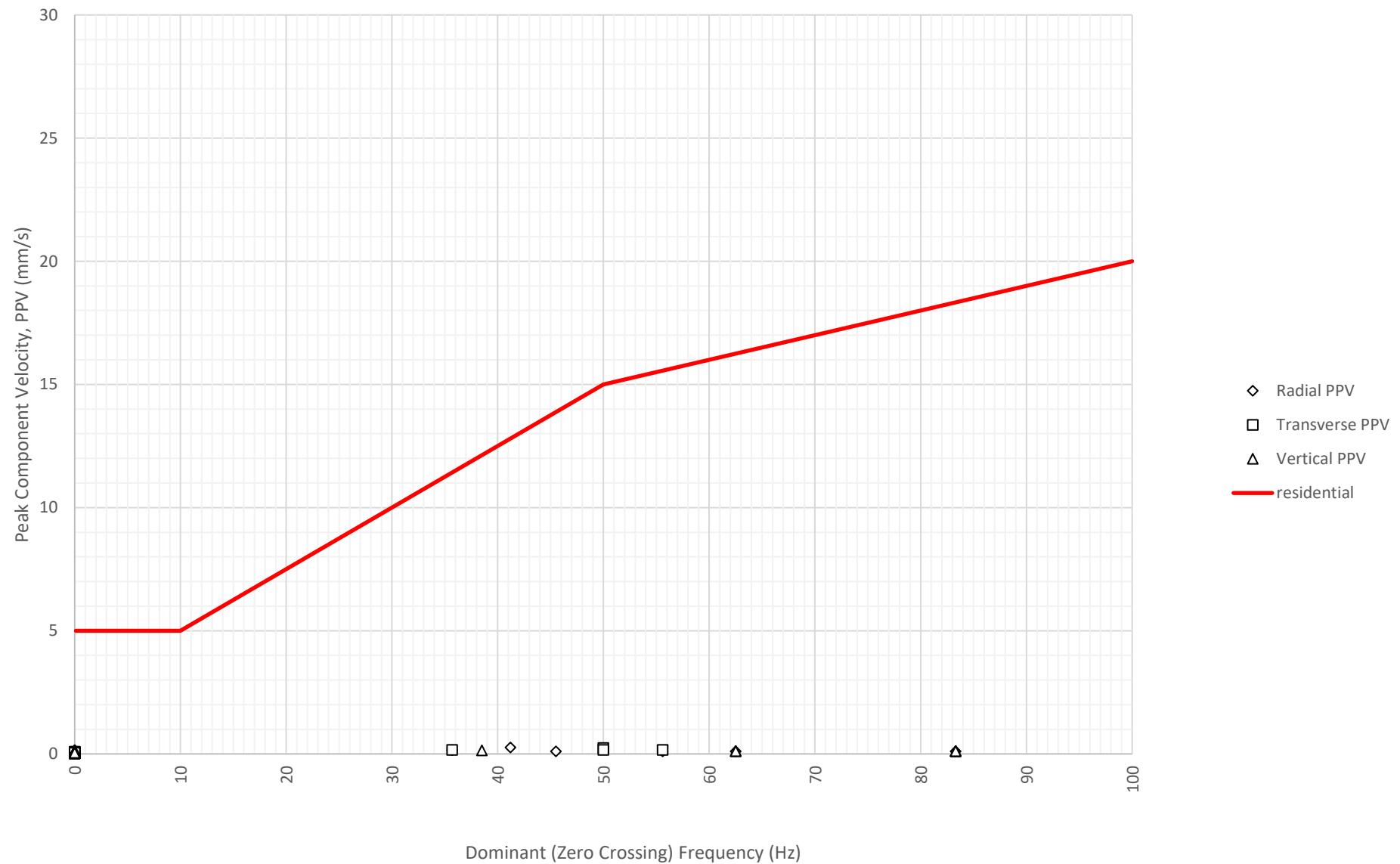
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
1-02-2023



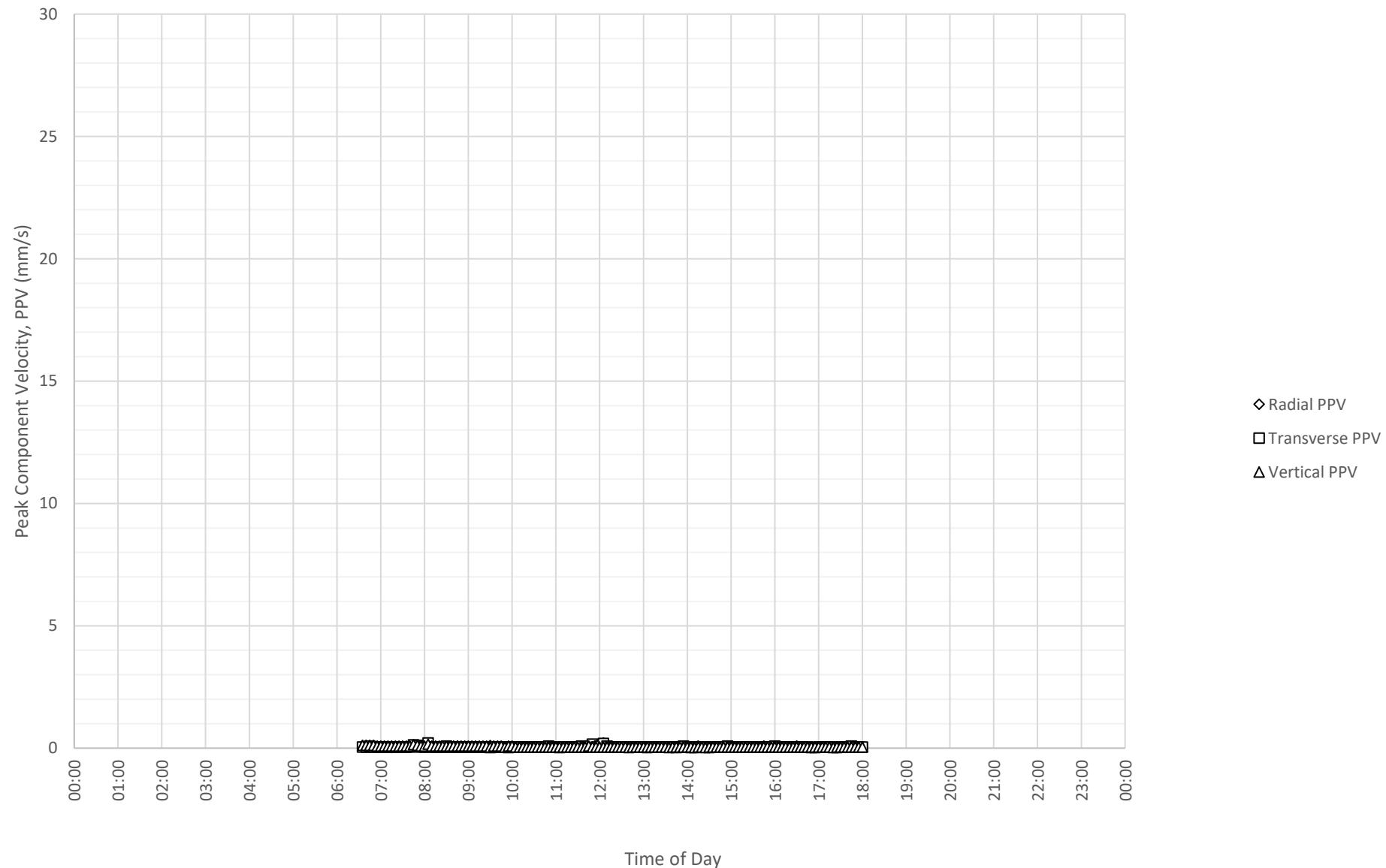
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2023



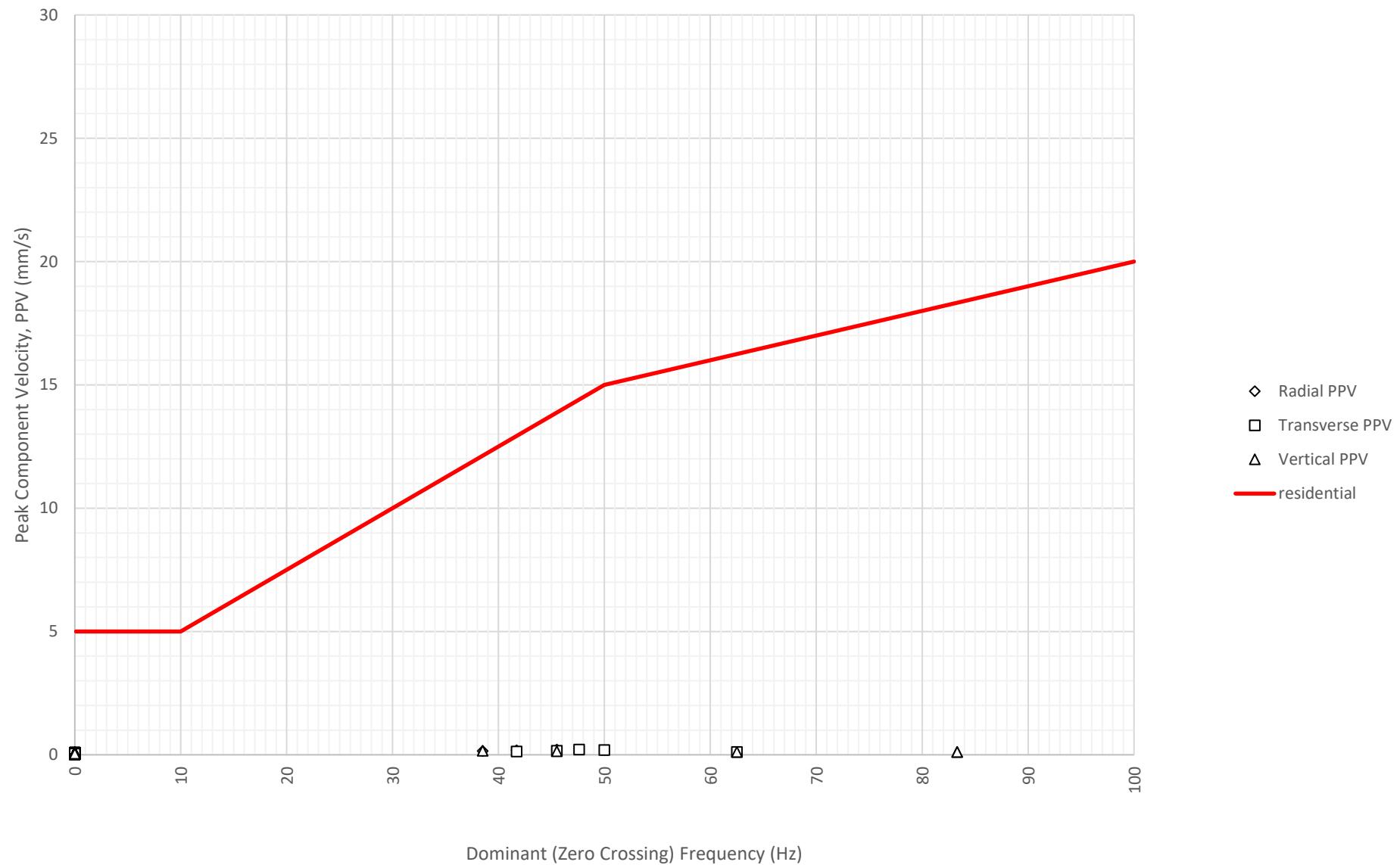
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2-02-2023



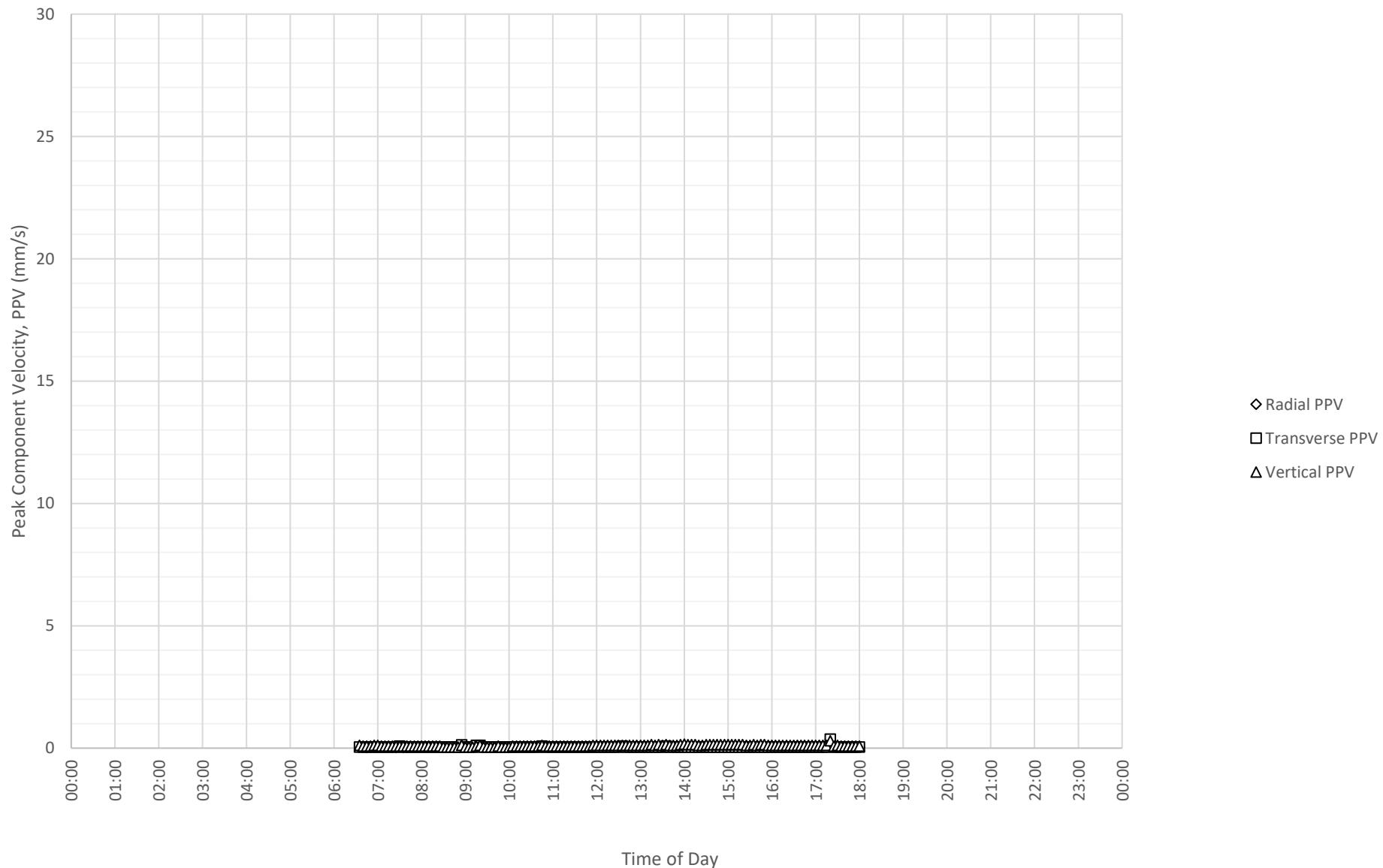
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2023



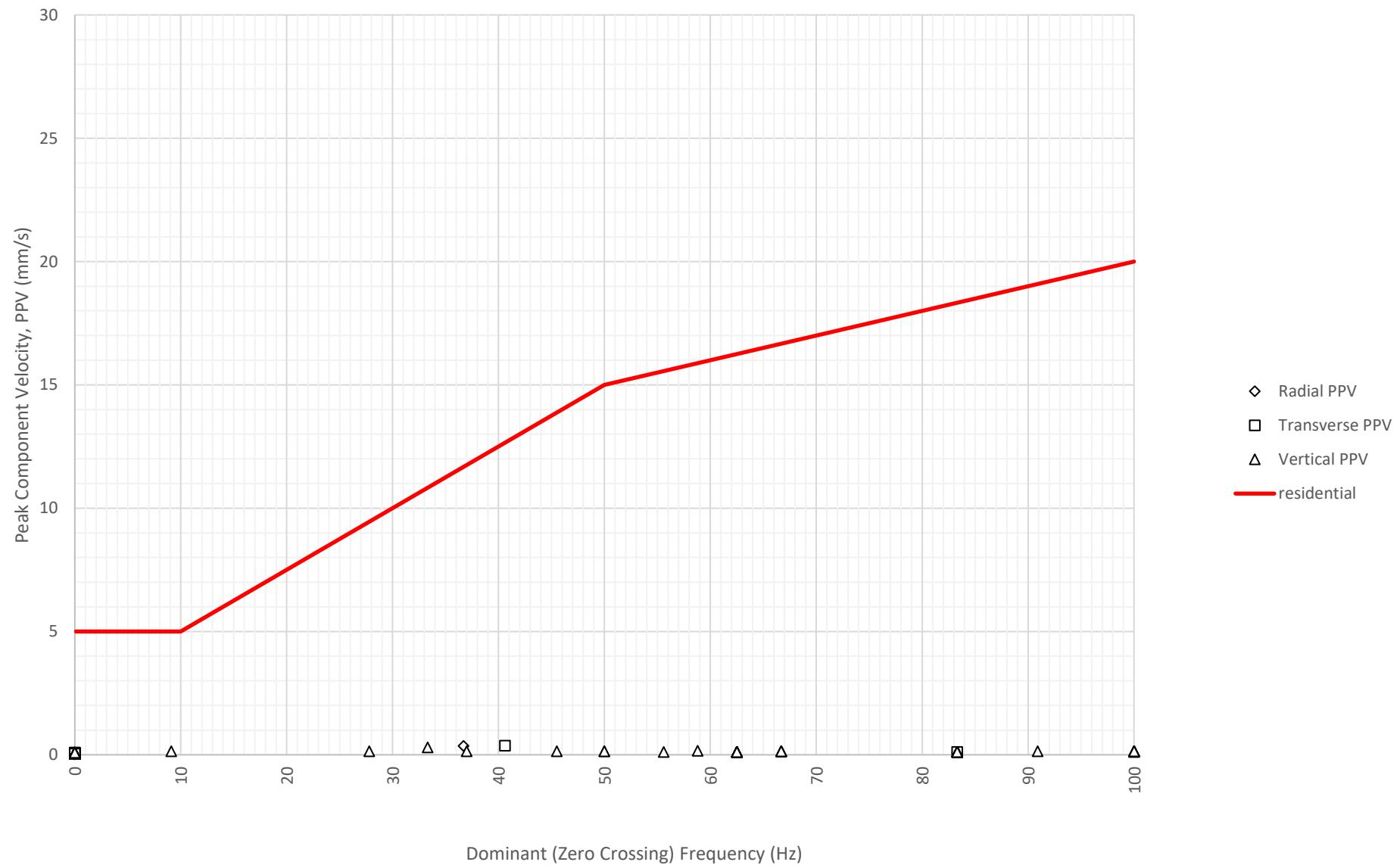
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
3-02-2023



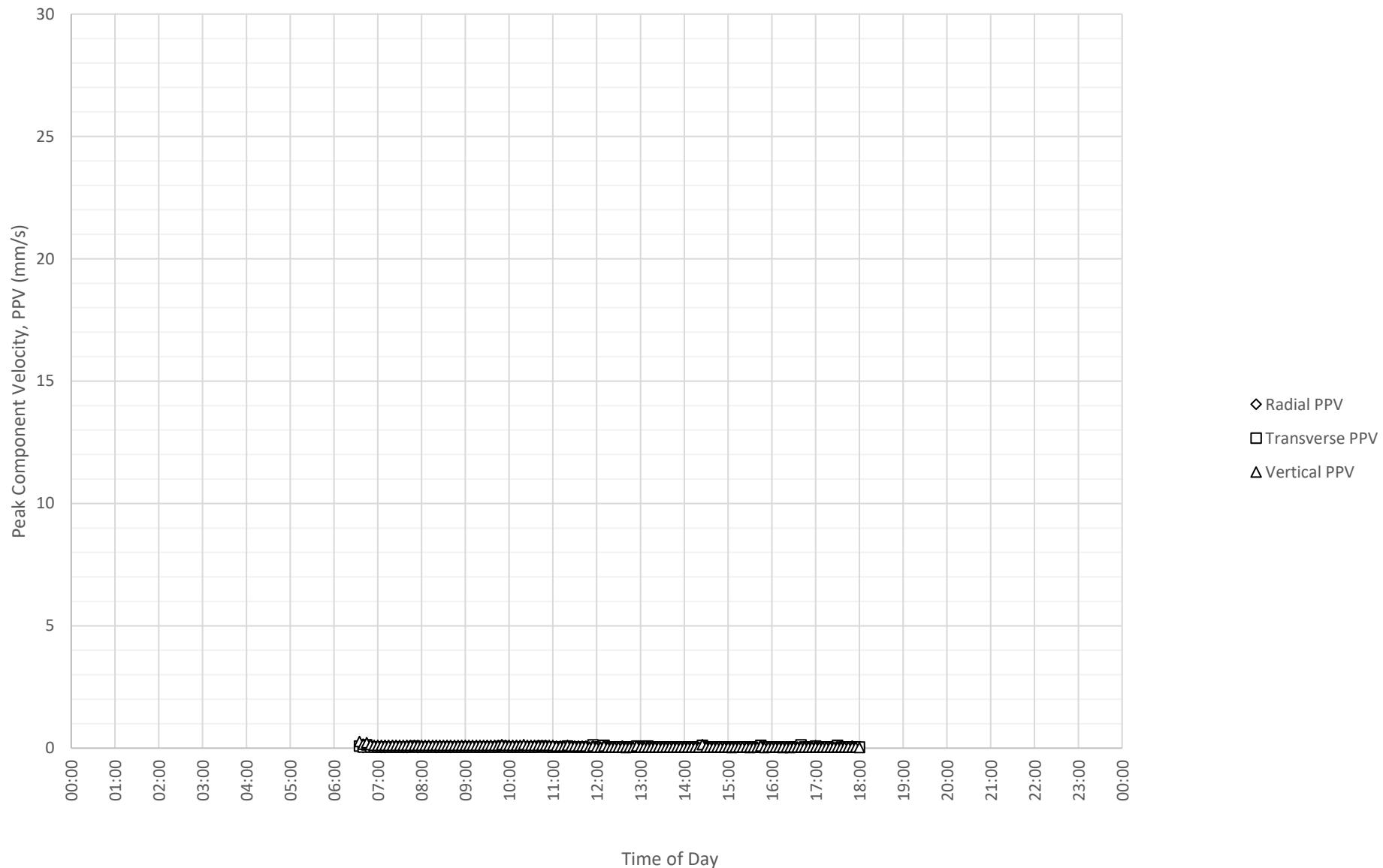
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 4-02-
2023



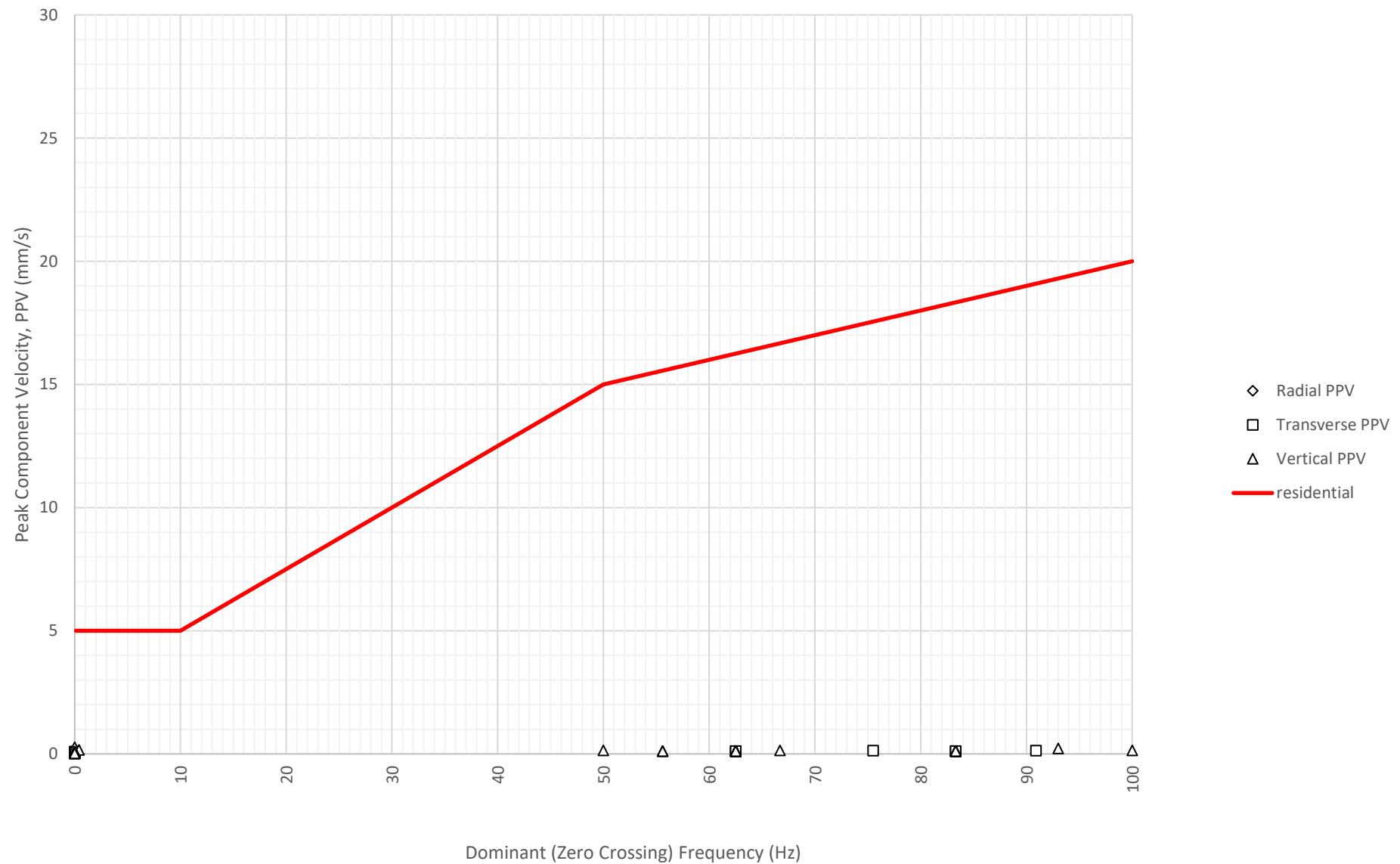
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
4-02-2023



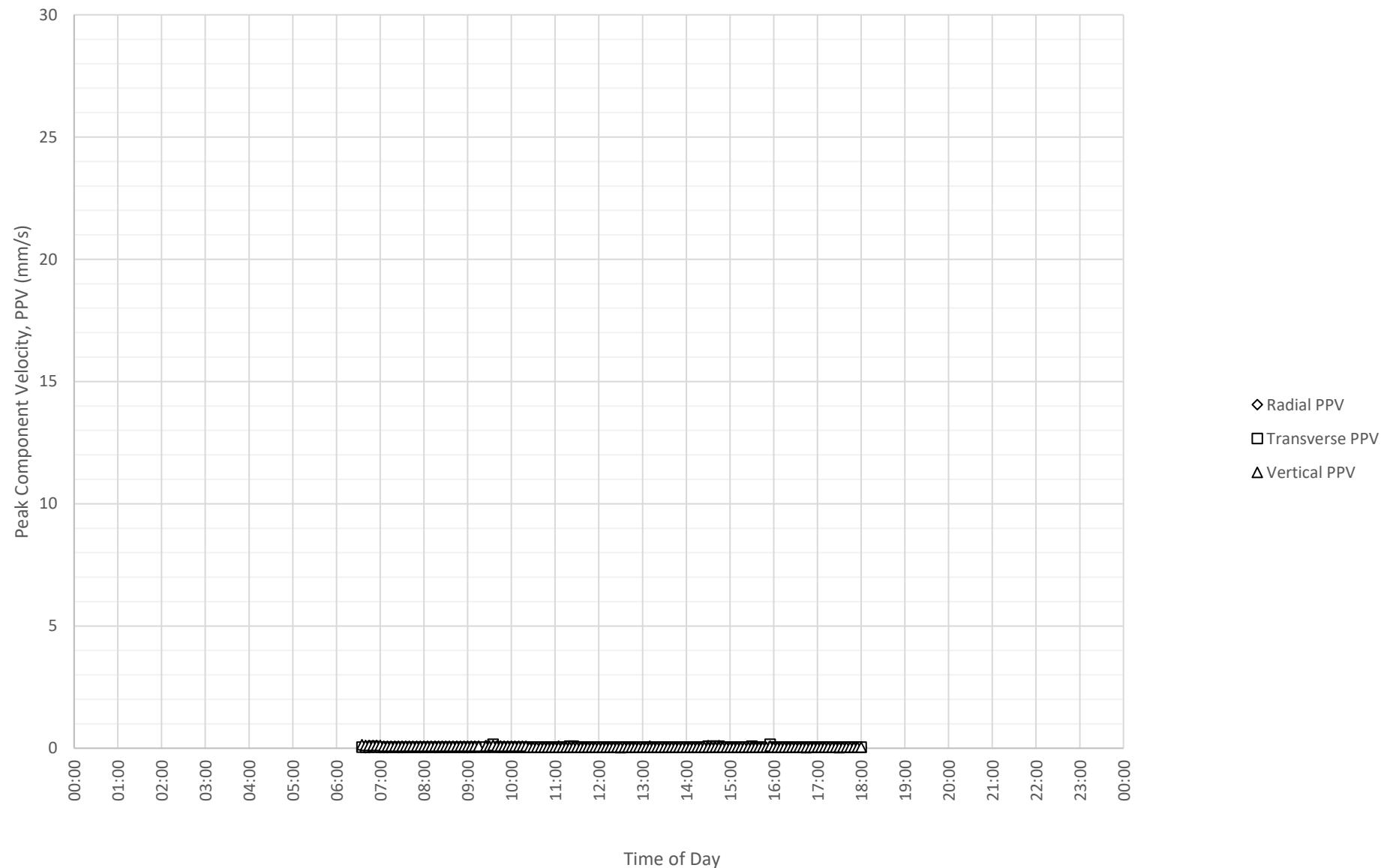
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 5-02-
2023



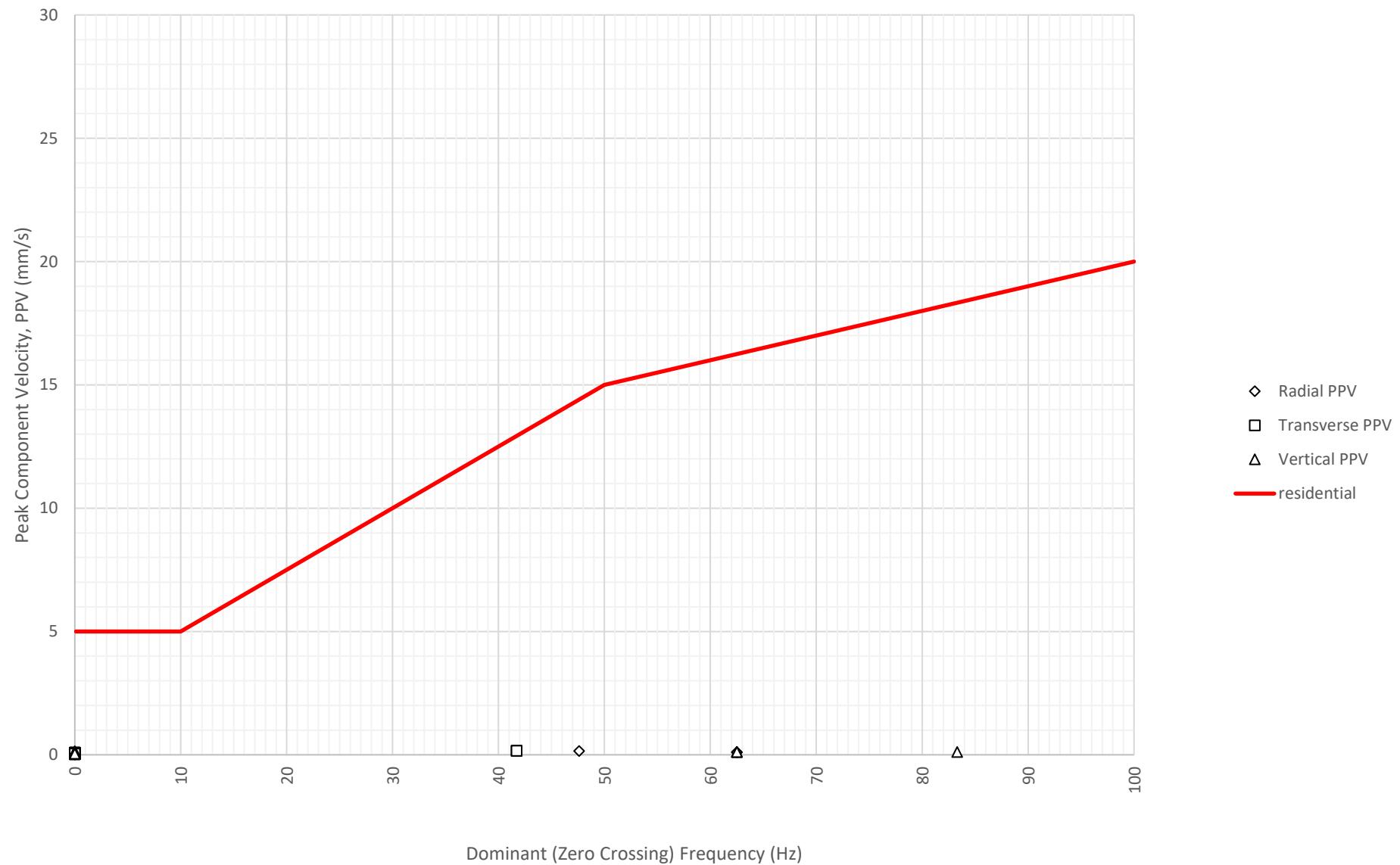
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5-02-2023



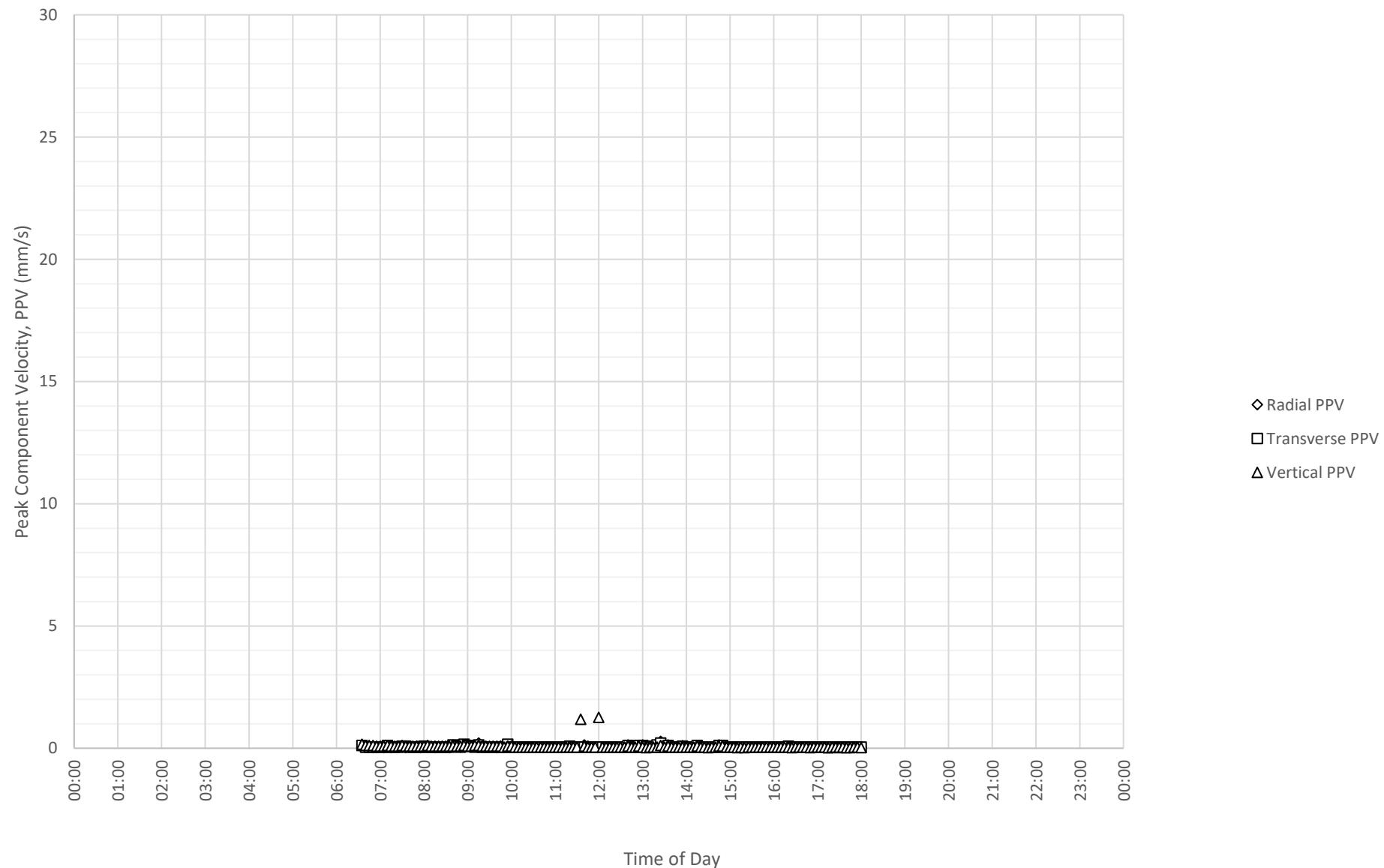
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 6-02-
2023



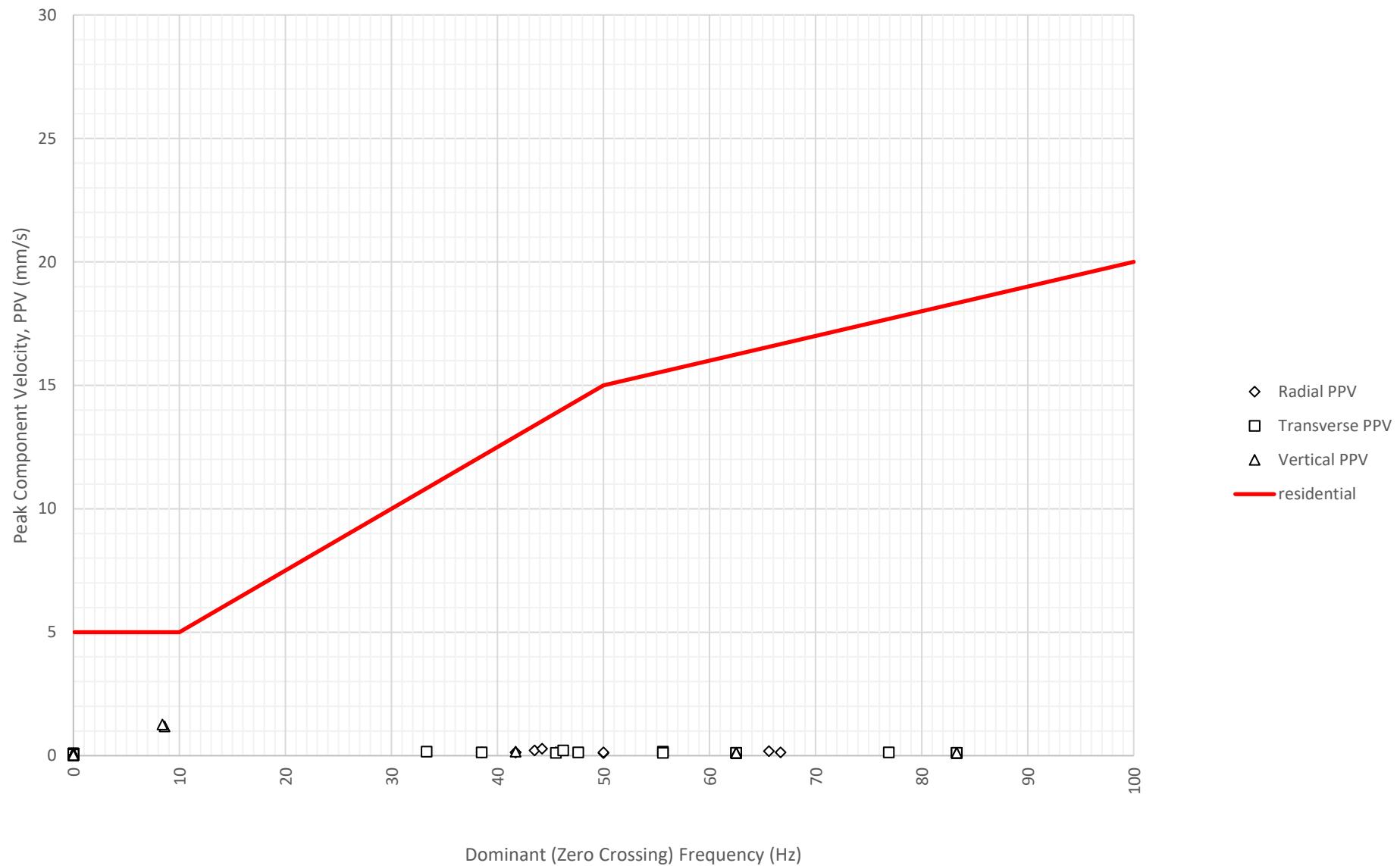
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
6-02-2023



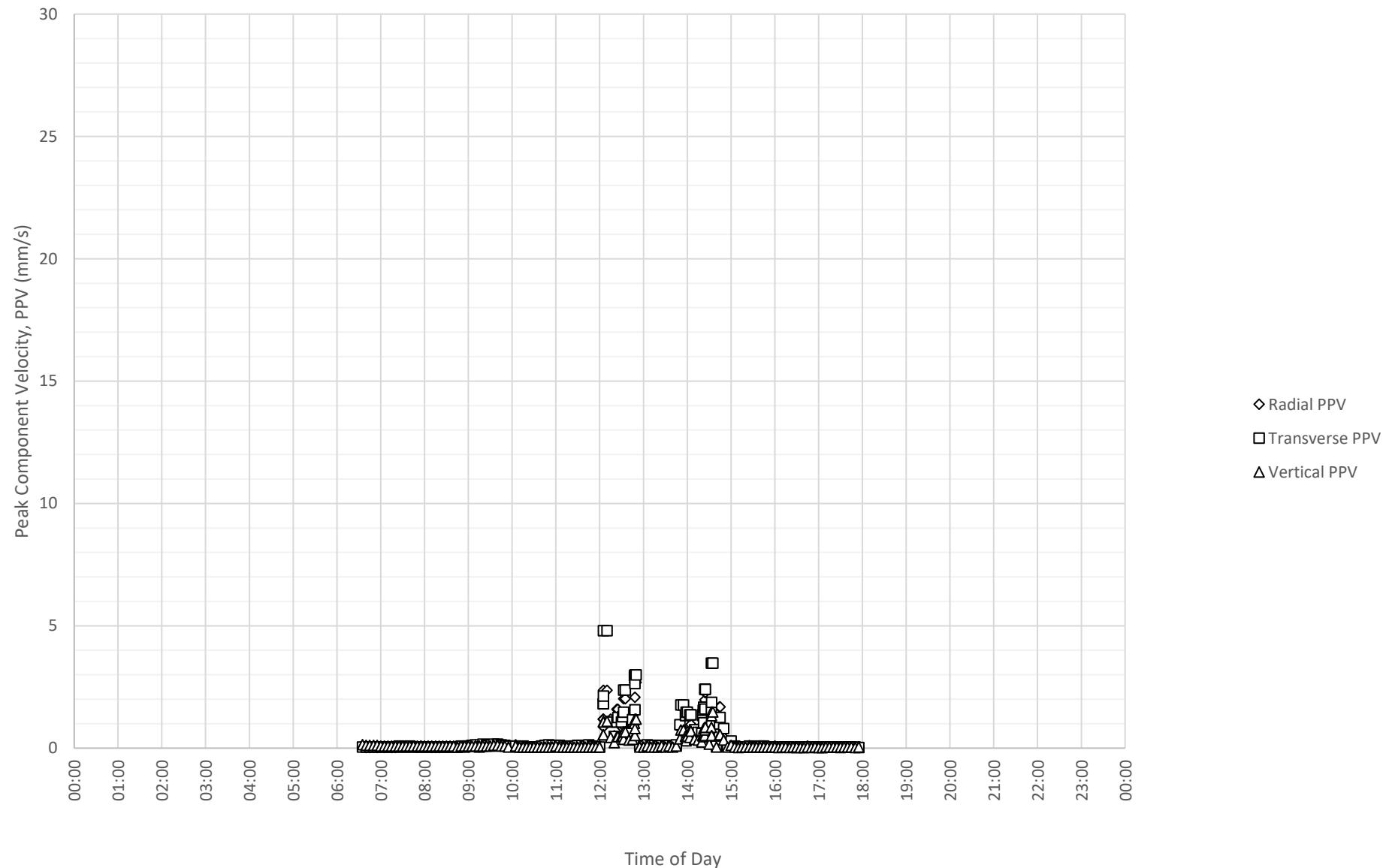
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 7-02-
2023



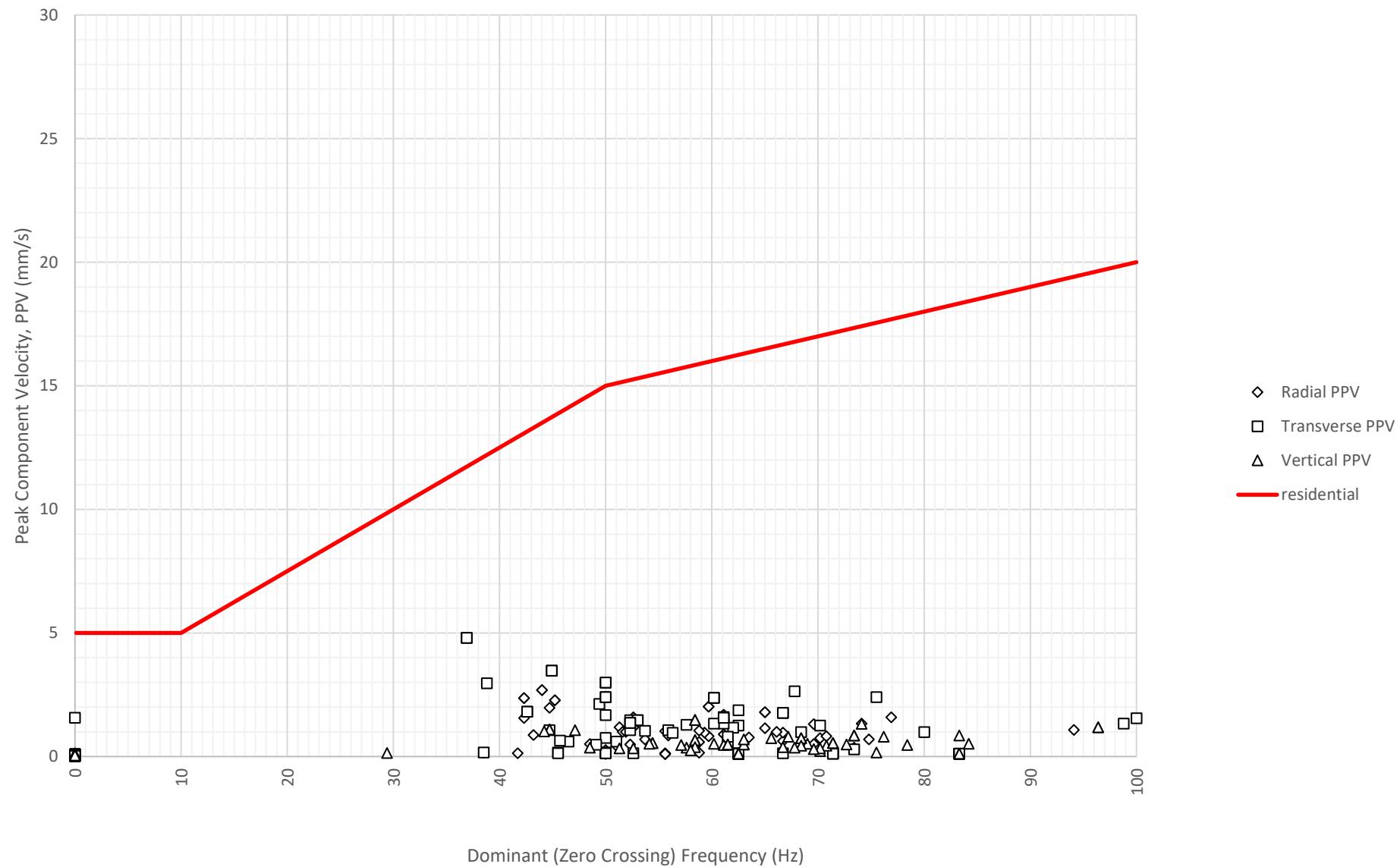
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
7-02-2023



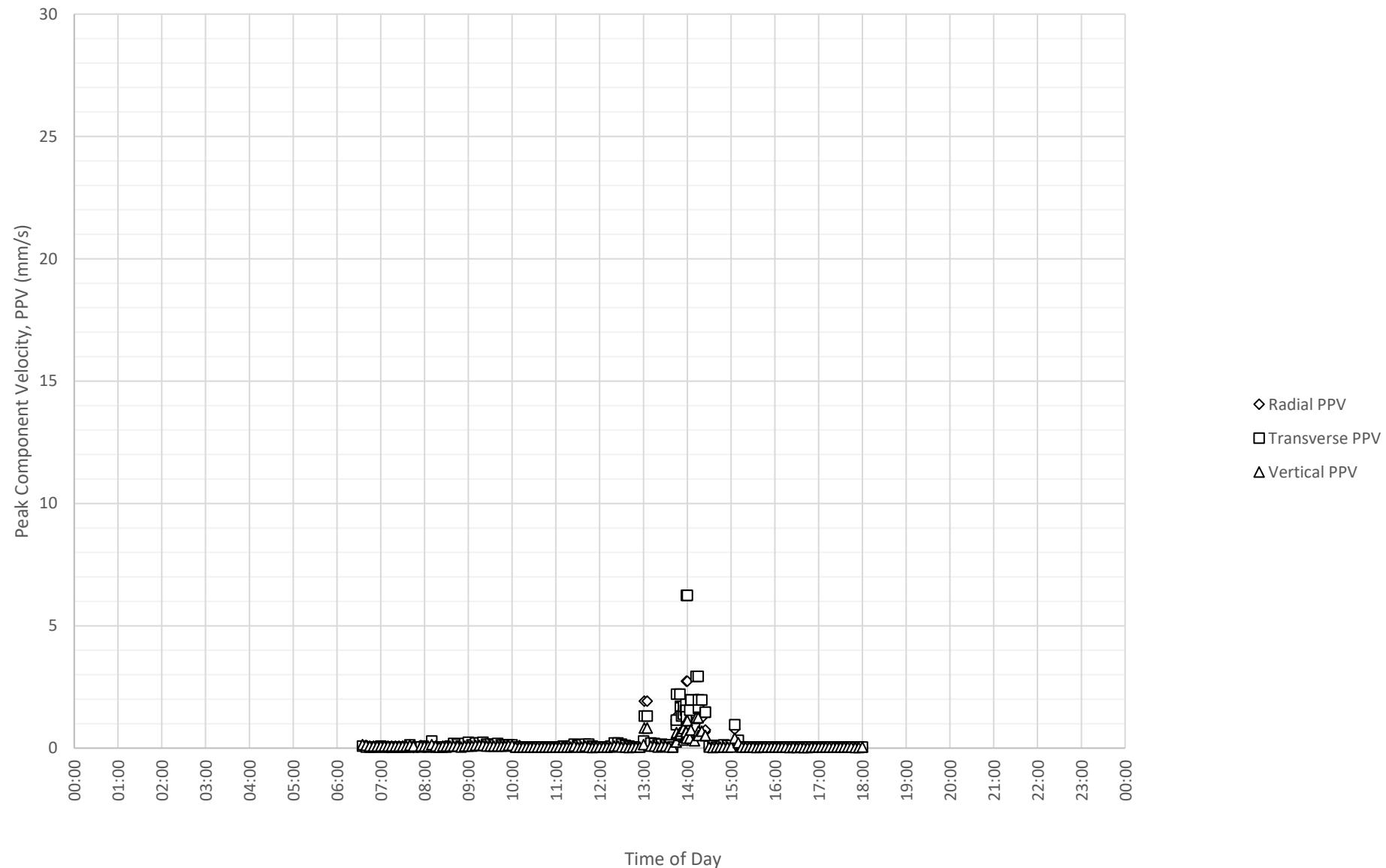
Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 8-02-
2023



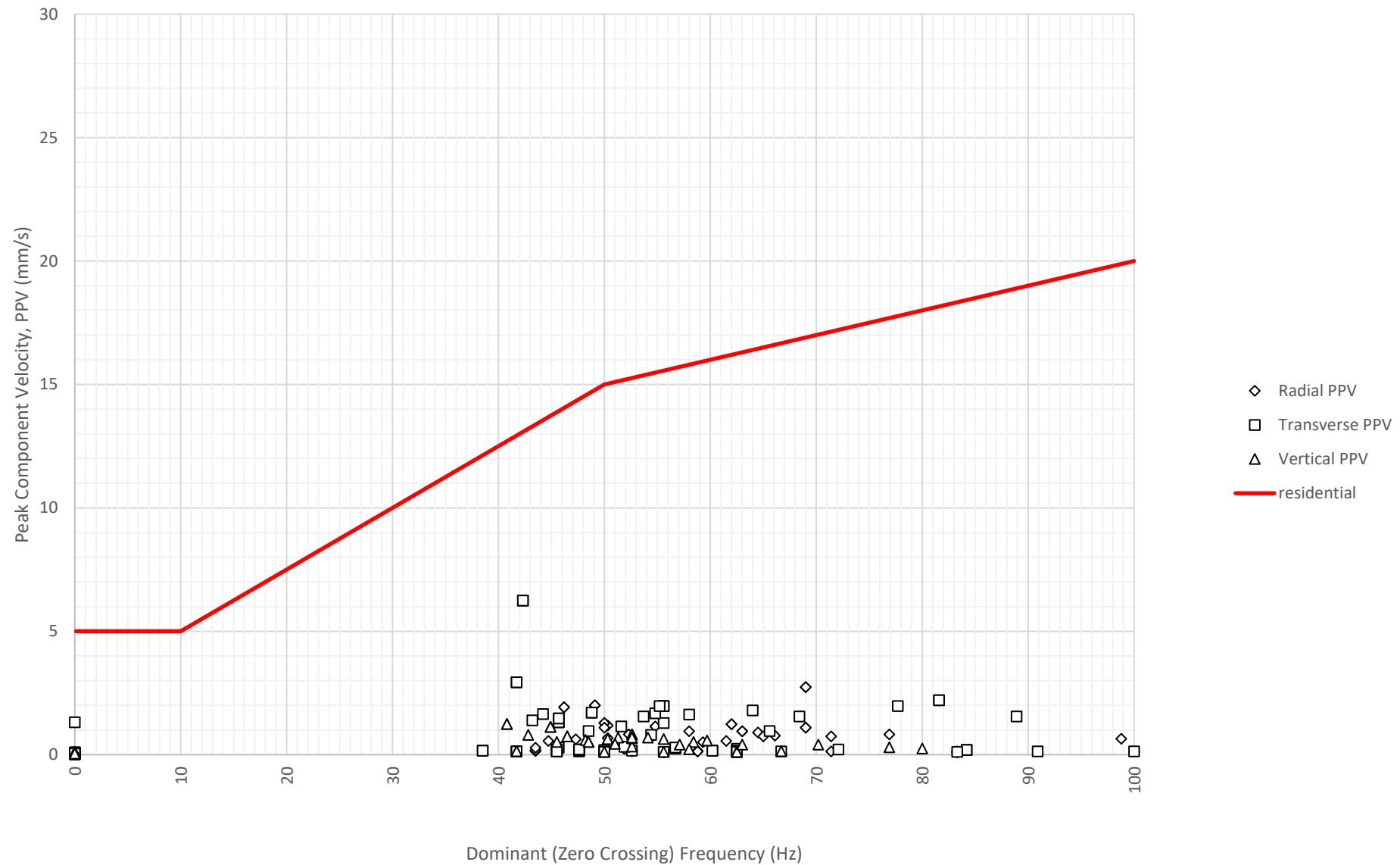
Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
8-02-2023



Daily Monitored Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on 9-02-2023



Frequency Content of Vibration Levels at Corner of Tweed Coast Rd and Cudgen Rd, Tweed Valley on
9-02-2023



APPENDIX 3 – DUST MONITORING RESULTS

Hourly Average

PM2.5

Jan 9 2023 - Feb 9 2023

$\mu\text{g}/\text{m}^3$



PM10

Jan 9 2023 - Feb 9 2023

$\mu\text{g}/\text{m}^3$



Daily average

PM2.5

Jan 9 2023 - Feb 9 2023

µg/m³



PM10

Jan 9 2023 - Feb 9 2023

µg/m³

