8 December 2022
E25639.G11.VM03

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Vibration Monitoring Report No.3 (31/10/2022 – 4/12/2022) Proposed Residential Unit Development 89 John Whiteway Drive, Gosford NSW

1. INTRODUCTION

Deicorp Pty Ltd (the Client) engaged EI Australia to carry out Vibration Monitoring (VM) for the proposed development at 89 John Whiteway Drive, Gosford NSW (the site). The purpose of the monitoring is to monitor the vibration induced during construction. Vibration monitoring is undertaken continuously and will be used to guide the earthworks contractor during construction.

EI has completed following relevant reports for this site:

- Rockfall Mitigation Strategy (RMS) Report for this site, referenced E25639.G15_Rev4, 11 August 2022;
- Geotechnical Monitoring Plan, referenced E25639.G10_Rev1, 12 July 2022; and
- Various Vibration Monitoring Reports, referenced E25639.G11.VM01 to E25639.G11.VM02, for the monitoring period between 19/8/2022 to 30/10/2022, dated between 13 October to 4 November 2022.

2. SCOPE OF WORKS

Five (5) vibration monitors (VM1-7775, VM2-7332, VM3-7341, VM4-7373 and VM5-7773) were installed on 19 August 2022. VM3-7341 was replaced by VM3-7352 on 4 November 2022 due to 7341 experiencing technical difficulties. The vibration measurements were carried out using five (5) unattended vibration monitoring equipment installed following locations shown in **Table 1**. The location of the vibration monitoring geophone is shown on **Figure A**, which is attached at the end of this report.

Table 1 – Vibration Monitor Installation Details

Vibration Monitor	Monitor Serial Number	Location
VM1	7775	At south-western site boundary, adjacent to southern end of 91-95 John Whiteway Drive
VM2	7332	At south-western site boundary, adjacent to northern end of 91-95 John Whiteway Drive
VM3	7352	At north-western site boundary, adjacent to southern end of 97-99 John Whiteway Drive
VM4	7373	At northern site boundary, adjacent to western end of 117 John Whiteway Drive
VM5	7773	At northern site boundary, adjacent to eastern end of 117 John Whiteway Drive

All vibration monitors are fitted with SMS alert sent directly to the site supervisor to make the plant operator aware immediately when the vibration limit is exceeded.

3. VIBRATION MANAGEMENT LEVELS

In terms of the most recent relevant vibration damage criteria, Australian Standard AS 2187: Part 2-2006 “Explosives - Storage and Use - Part 2: Use of Explosives” recommends the frequency dependent guideline values and assessment methods given in BS 7385 Part 2-1993 “Evaluation and measurement for vibration in buildings Part 2” as they “are applicable to Australian conditions”. Based on this information, relevant site vibration control criteria have been recommended and reproduced in **Table 2**.

Table 2 - Recommended Site Vibration Control Criteria

Structures	Operator Warning Level	Operator Halt Level
Residential/Commercial Buildings	8 mm/s	10 mm/s

4. COMMENTS

Based on the monitoring results, the monitors recorded the following events which exceeded the warning level for the monitoring period between 31 October 2022 and 4 December 2022:

- VM1: 0 out of 25,116 recorded events exceeded the threshold for residential / commercial buildings.
- VM2: 0 out of 25,181 recorded events exceeded the threshold for residential / commercial buildings.
- VM3: 0 out of 21,948recorded events exceeded the threshold for residential / commercial buildings.
- VM4: 0 out of 25,110 recorded events exceeded the threshold for residential / commercial buildings.
- VM5: 0 out of 25,123 recorded events exceeded the threshold for residential / commercial buildings.

Note that due to technical issues, VM3-7341 did not record vibrations between 8 October to 4 November 2022. However, considering the low vibrations recorded among other four vibration monitors and its distance away from the excavation, we expect that the vibrations at VM3-7341 locations should not have any exceedance events. The vibration monitor at VM3 location has been replaced by another functional unit (VM3-7352) on 4 November 2022.

Considering the isolated number of exceedance events compared to the number of recorded events, EI is of the opinion that the exceedance events is not likely to have any adverse impact on the surrounding building structures.

EI note that at least one week of background monitoring was completed in this period prior to any commencement of site works. The background vibrations varied from 0.06mm/s to 2.9mm/s.

The vibration monitoring results and event reports are attached at end of the report.

5. CLOSURE

Please do not hesitate to contact the undersigned should you have any questions.

For and on behalf of,
EI AUSTRALIA

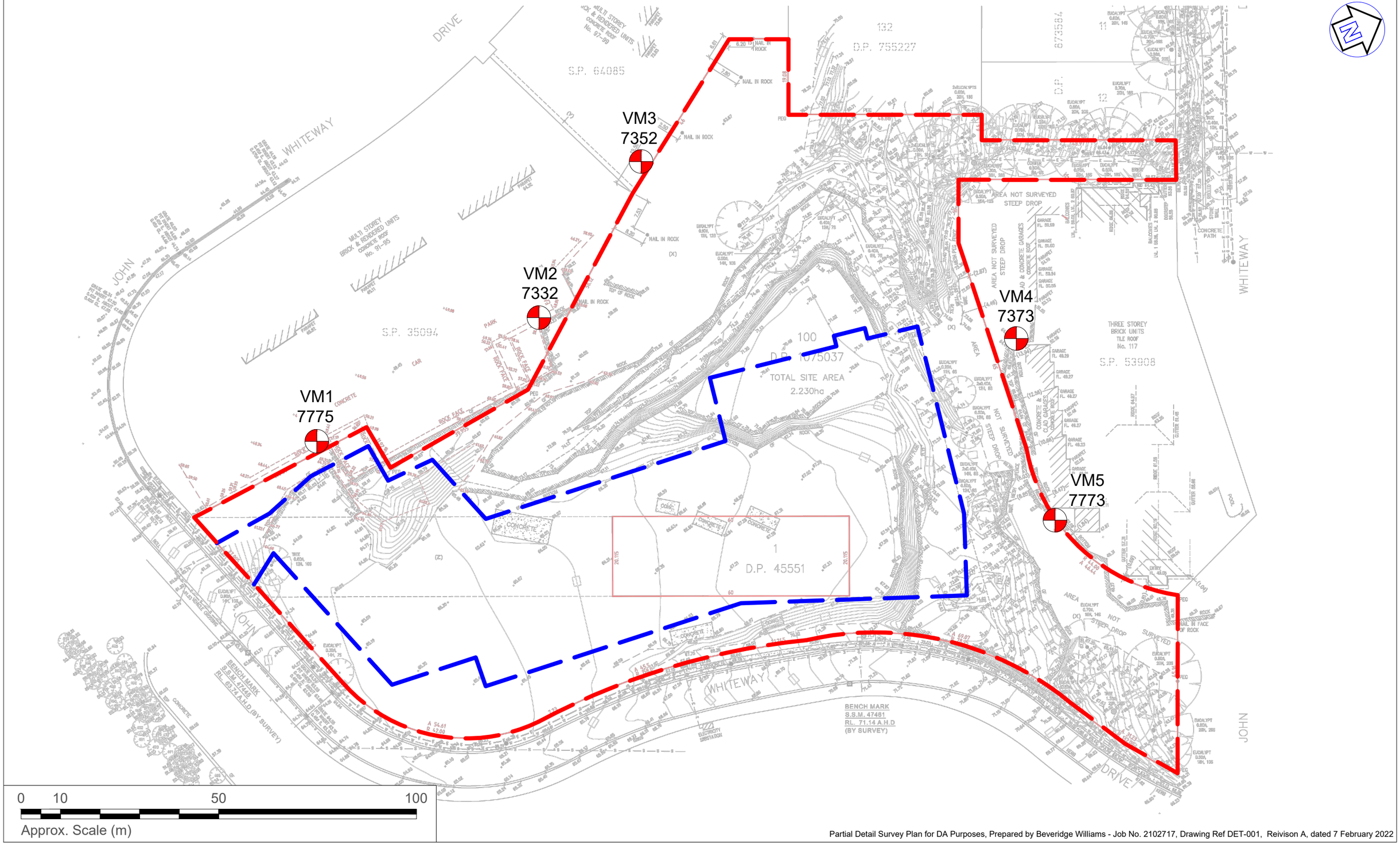
Author

Kaiyu Xu
Geotechnical Engineer

Techcnical Reviewer

Stephen Kim
Senior Geotechnical Engineer

Attachments: Figure A: Vibration Monitor Location Plan
Figure 1.1 and 1.2: Vibration Monitor Results for VM1
Figure 2.1 and 2.2: Vibration Monitor Results for VM2
Figure 3.1 and 3.2: Vibration Monitor Results for VM3
Figure 4.1 and 4.2: Vibration Monitor Results for VM4
Figure 5.1 and 5.2: Vibration Monitor Results for VM5
Important Information



Partial Detail Survey Plan for DA Purposes, Prepared by Beveridge Williams - Job No. 2102717, Drawing Ref DET-001, Reivison A, dated 7 February 2022

LEGEND
(All locations are approximate)

- Site boundary
- Proposed basement outline
- Vibration monitor location

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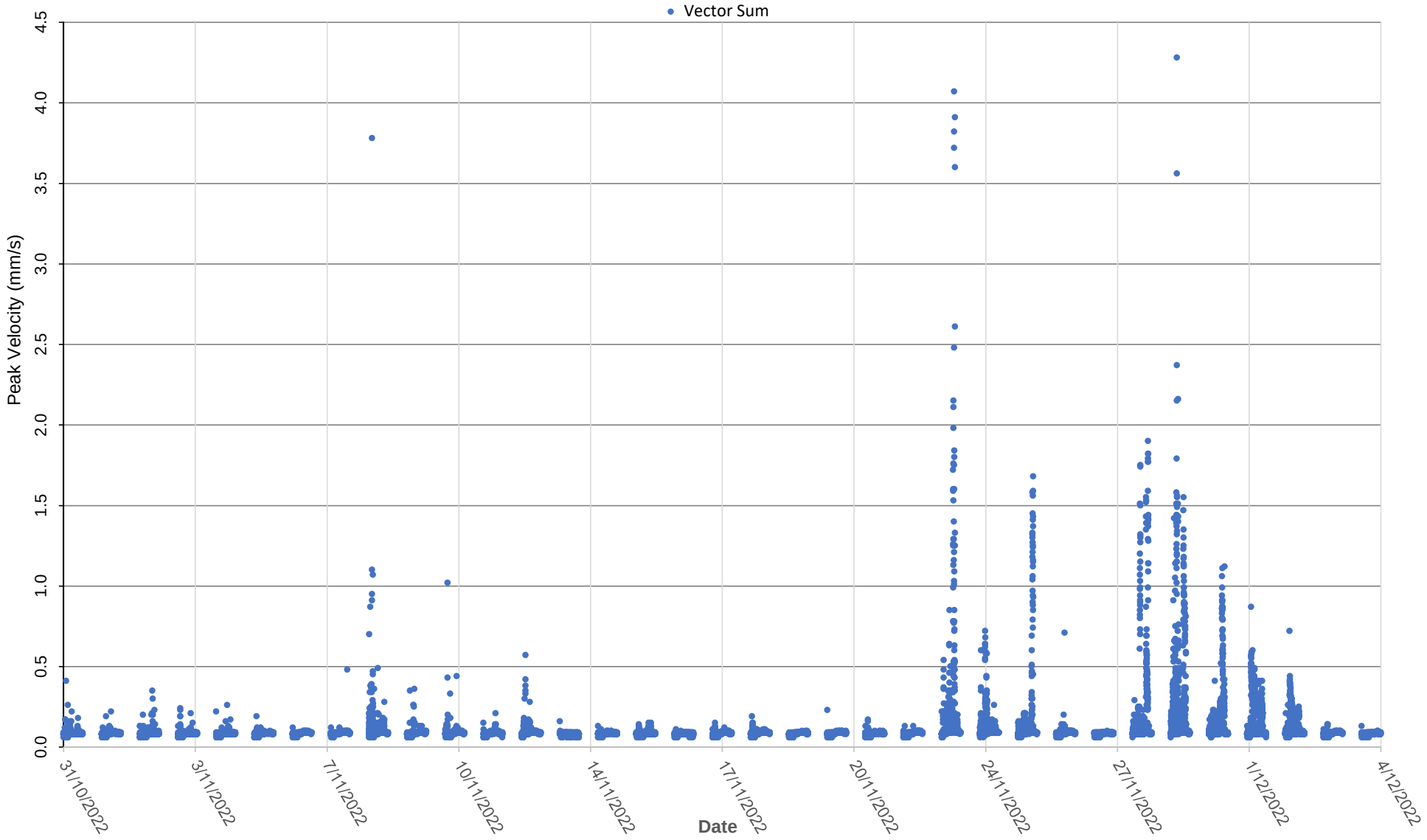
Deicorp Pty Ltd
Vibration Monitoring
87-89 John Whiteway Drive, Gosford NSW
Vibration Monitor Location Plan

Figure: A

Project: E25639.G11

Vibration (Vector Sum) -V- Time From 31/10/22 to 04/12/22



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Vibration Monitoring

89 John Whiteway Drive, Gosford NSW 2250

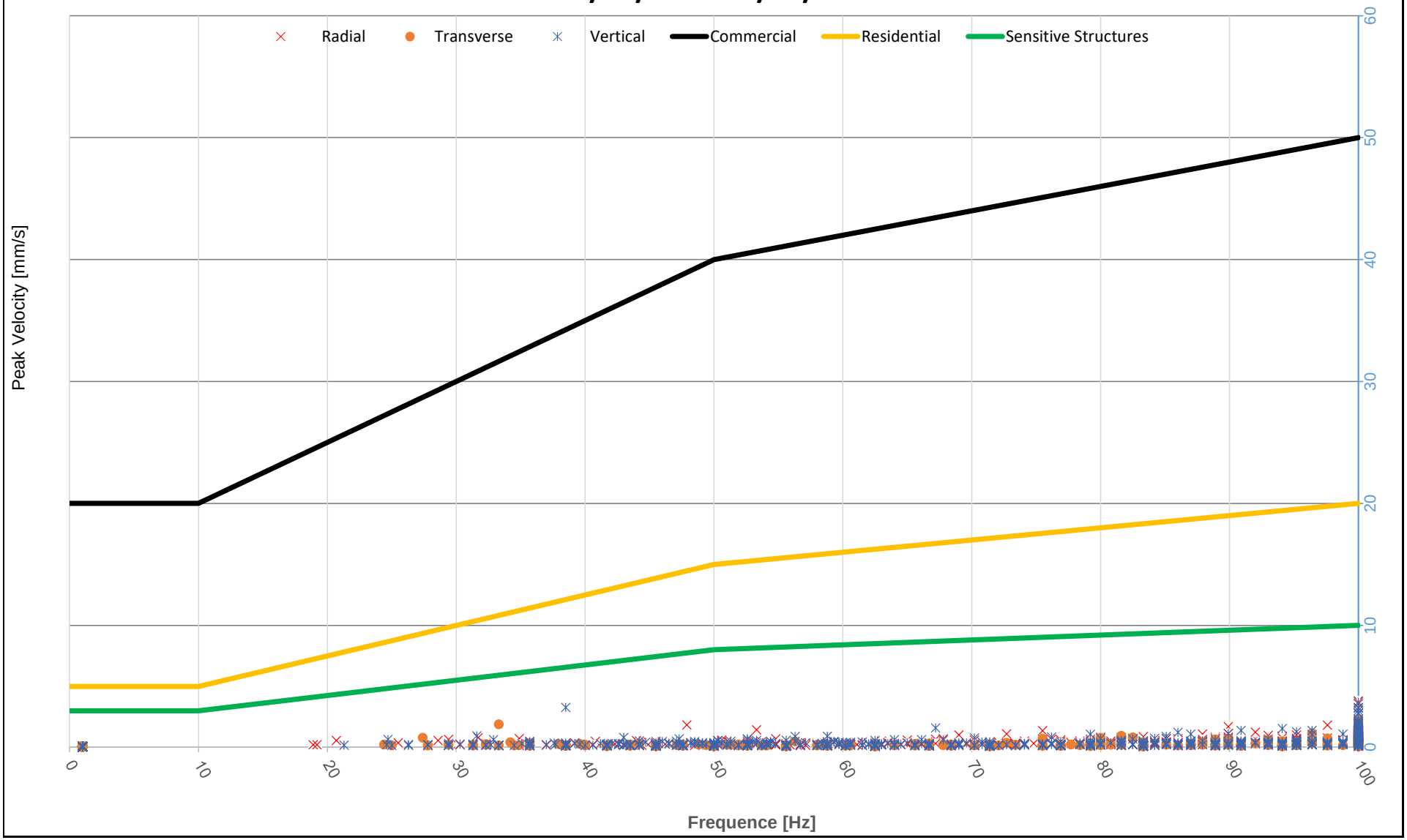
VM1 (7775)

Figure:

1.1

Project No.E25639.G11.VM03

Vibration (Radial, Transverse and Vertical) -V- Frequency adopt the DIN_4150 From 31/10/22 to 04/12/22



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89 John Whiteway Drive, Gosford NSW 2250

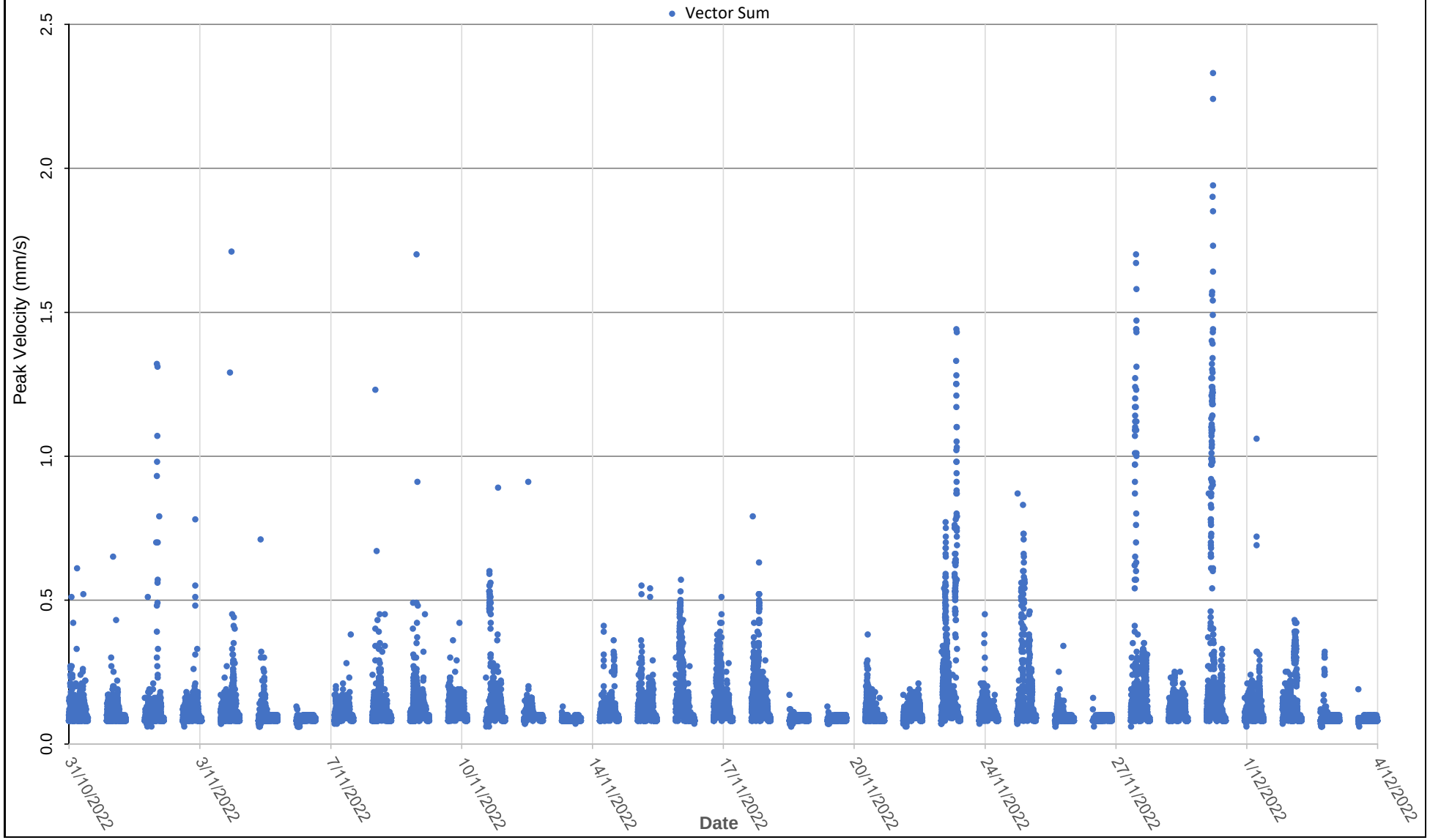
VM1 (7775)

Figure:

1.2

Project No.E25639.G11.VM03

Vibration (Vector Sum) -V- Time From 31/10/22 to 04/12/22



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Vibration Monitoring

89 John Whiteway Drive, Gosford NSW 2250

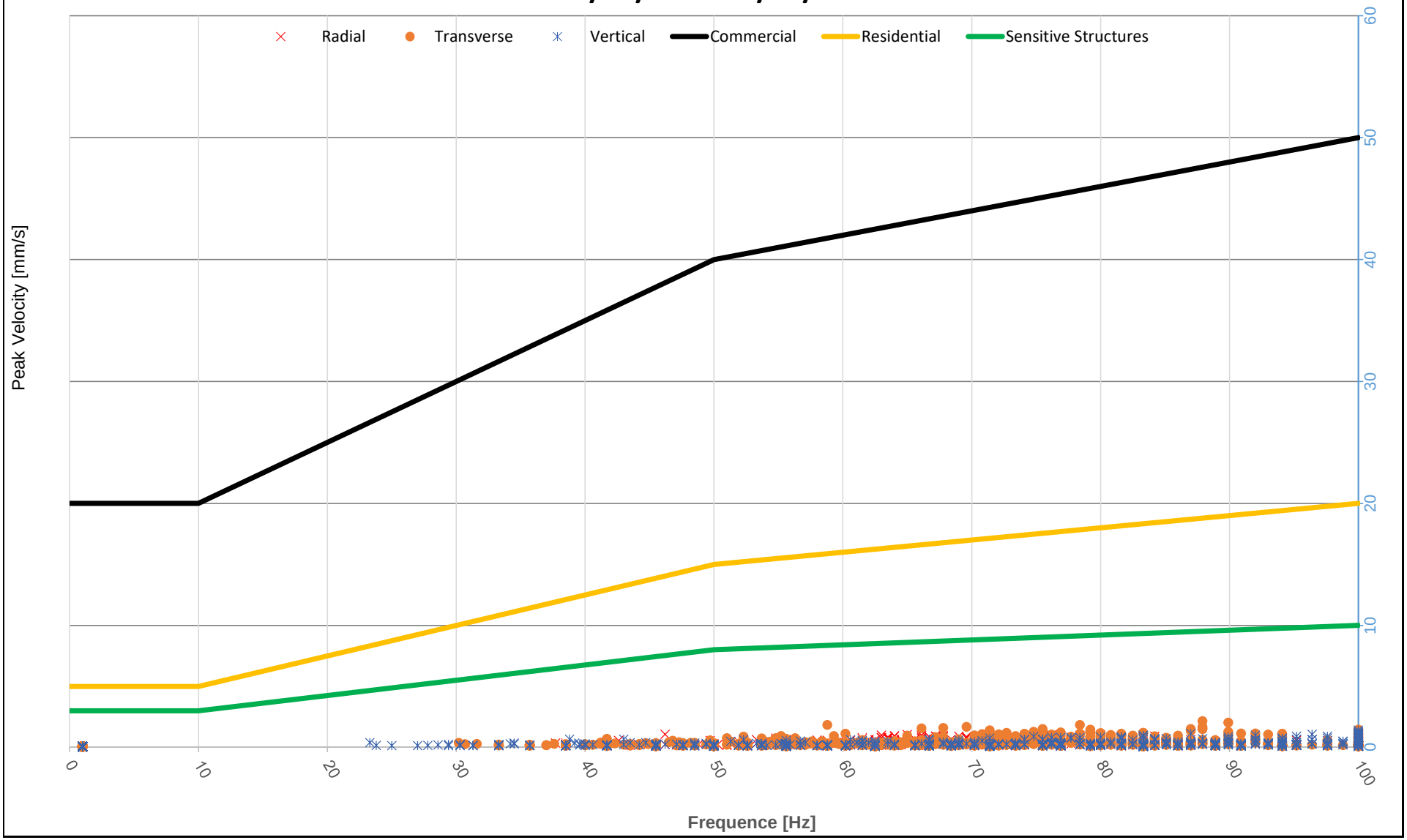
VM2 (7332)

Figure:

2.1

Project No.E25639.G11.VM03

Vibration (Radial, Transverse and Vertical) -V- Frequency adopt the DIN_4150 From 31/10/22 to 04/12/22



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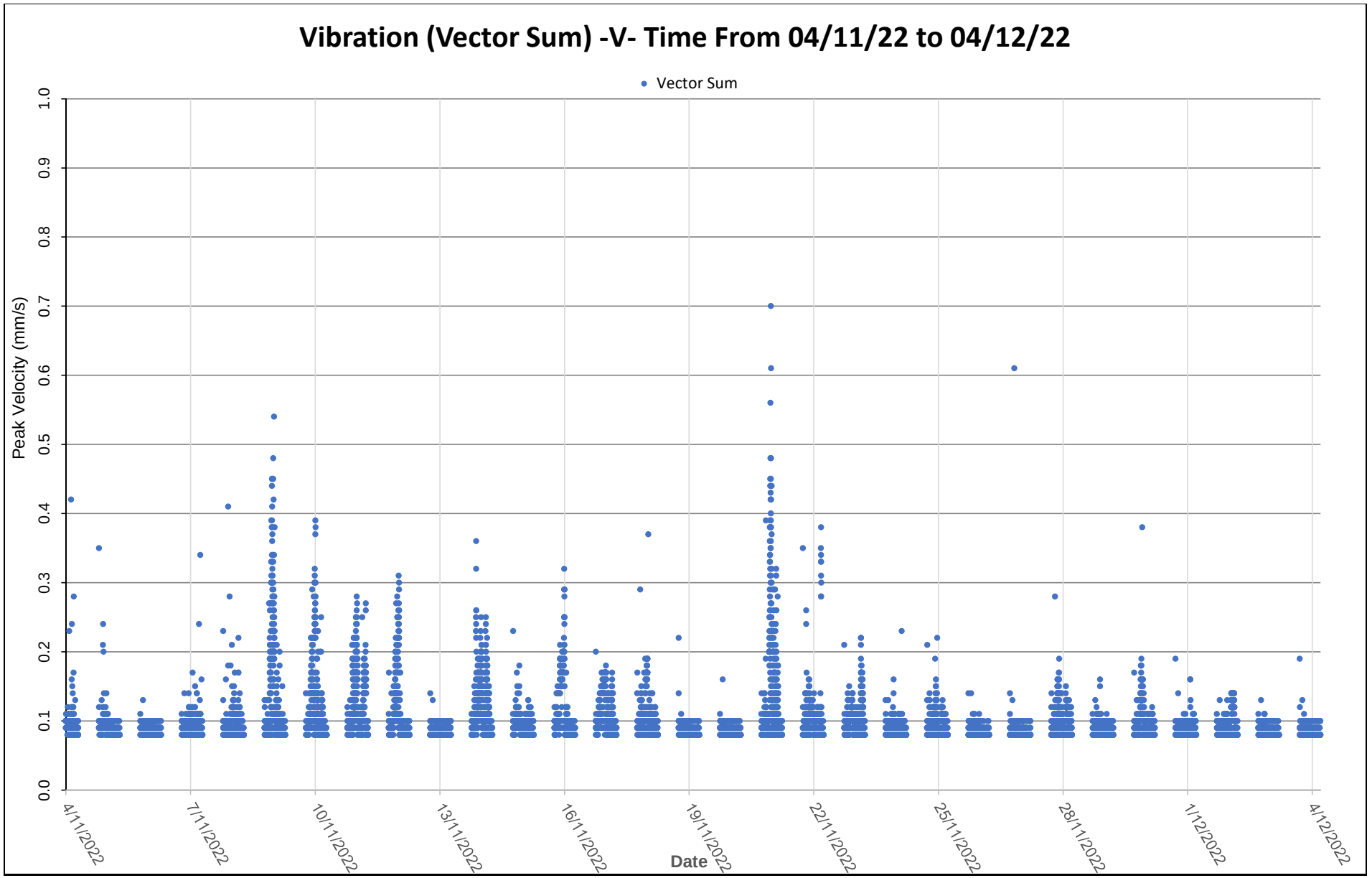
89 John Whiteway Drive, Gosford NSW 2250

VM2 (7332)

Figure:

2.2

Project No.E25639.G11.VM03



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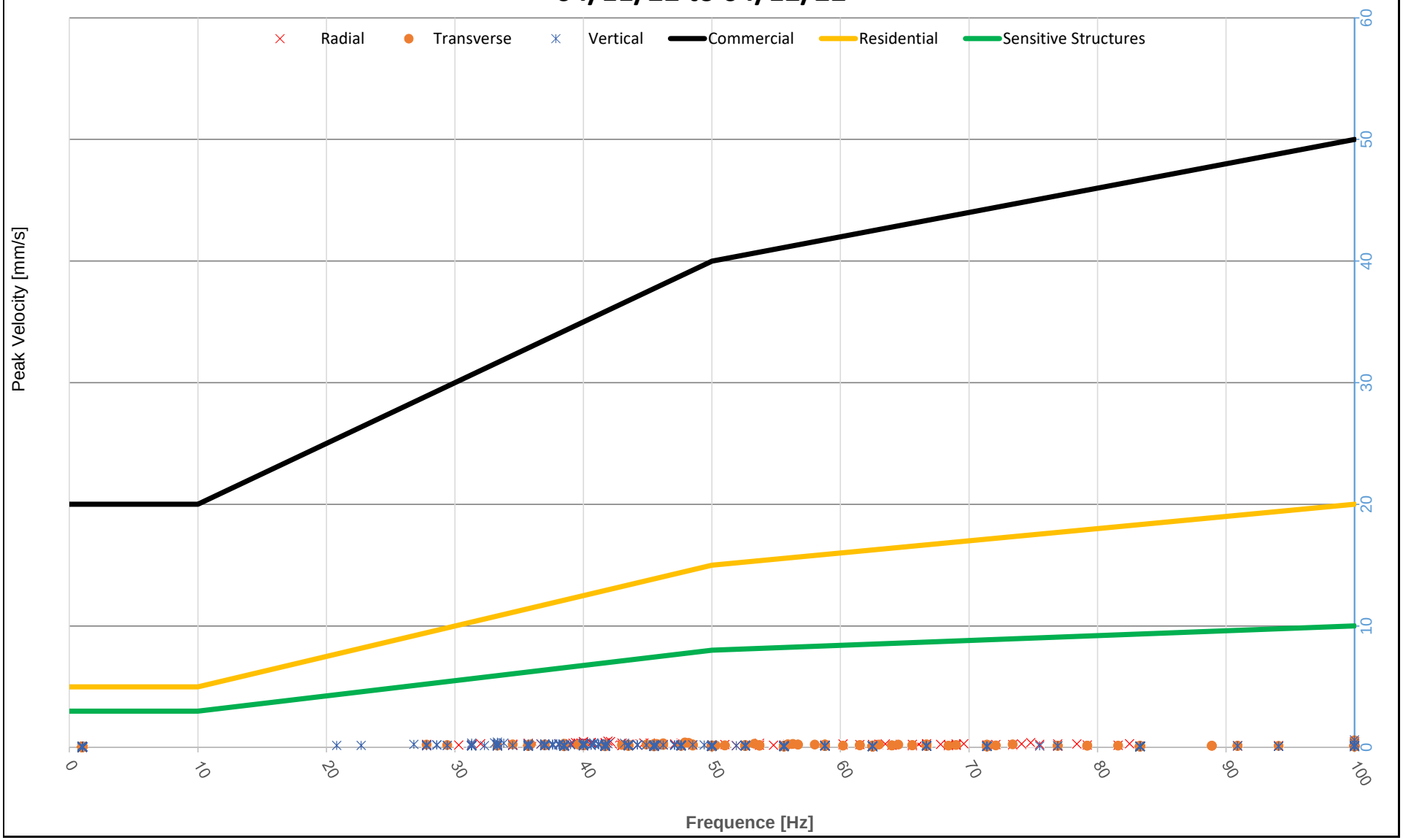
Vibration Monitoring
89 John Whiteway Drive, Gosford NSW 2250
VM3 (7352)

Figure:
3.1

Project No.E25639.G11.VM03

Vibration (Radial, Transverse and Vertical) -V- Frequency adopt the DIN_4150 From 04/11/22 to 04/12/22



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Vibration Monitoring

89 John Whiteway Drive, Gosford NSW 2250

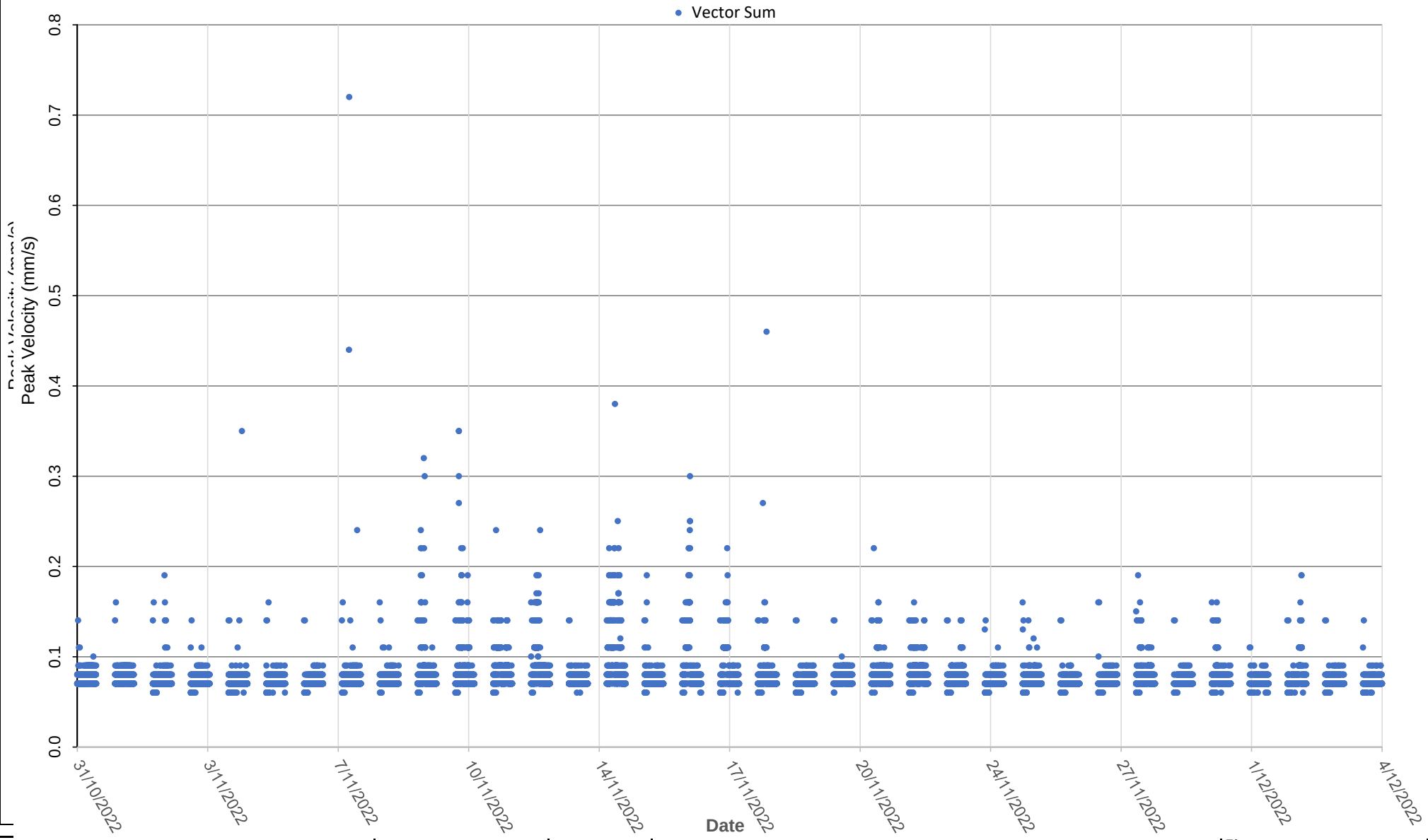
VM3 (7352)

Figure:

3.2

Project No.E25639.G11.VM03

Vibration (Vector Sum) -V- Time From 31/10/22 to 04/12/22



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Vibration Monitoring

89 John Whiteway Drive, Gosford NSW 2250

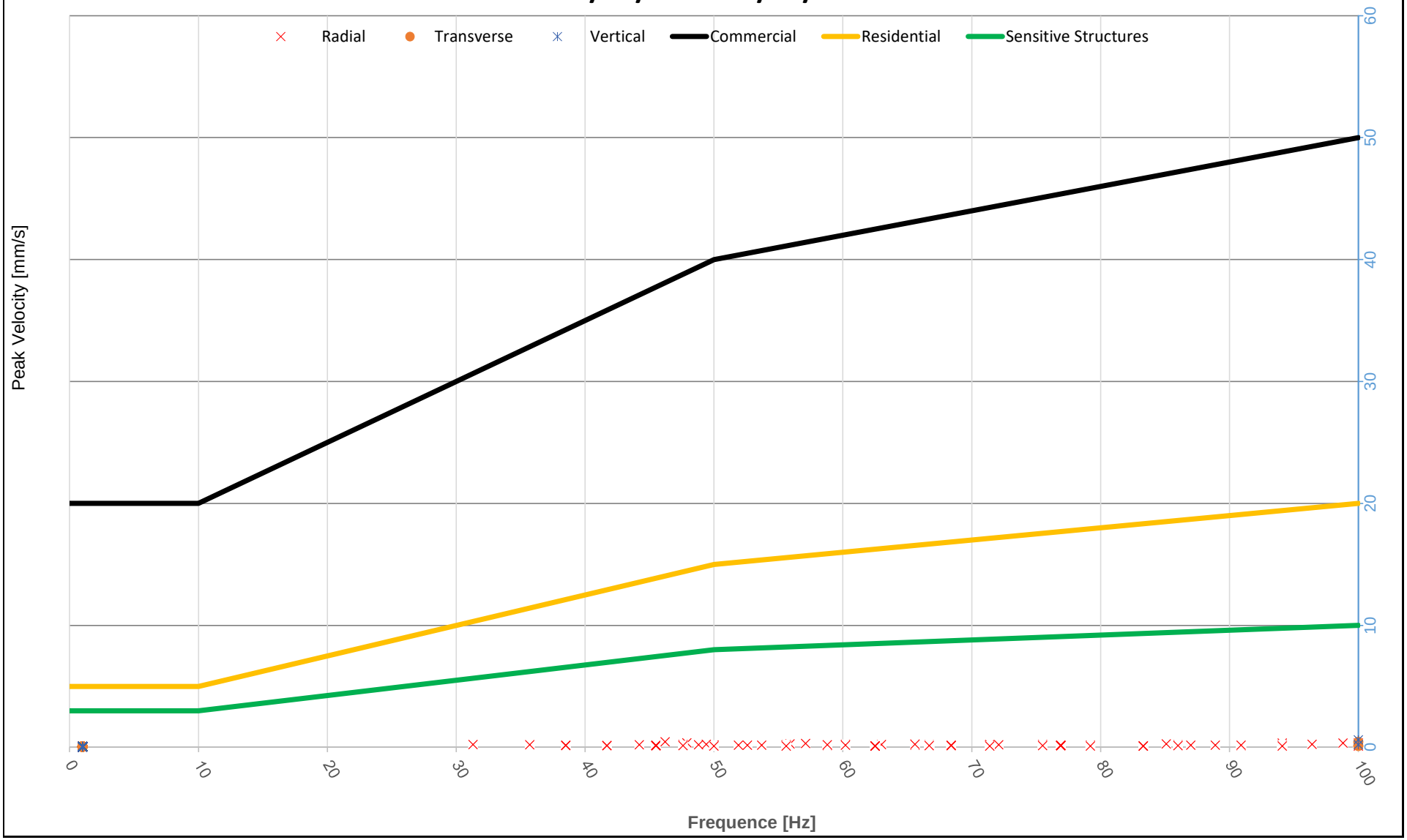
VM4 (7373)

Figure:

4.1

Project No.E25639.G11.VM03

Vibration (Radial, Transverse and Vertical) -V- Frequency adopt the DIN_4150 From 31/10/22 to 04/12/22



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Vibration Monitoring

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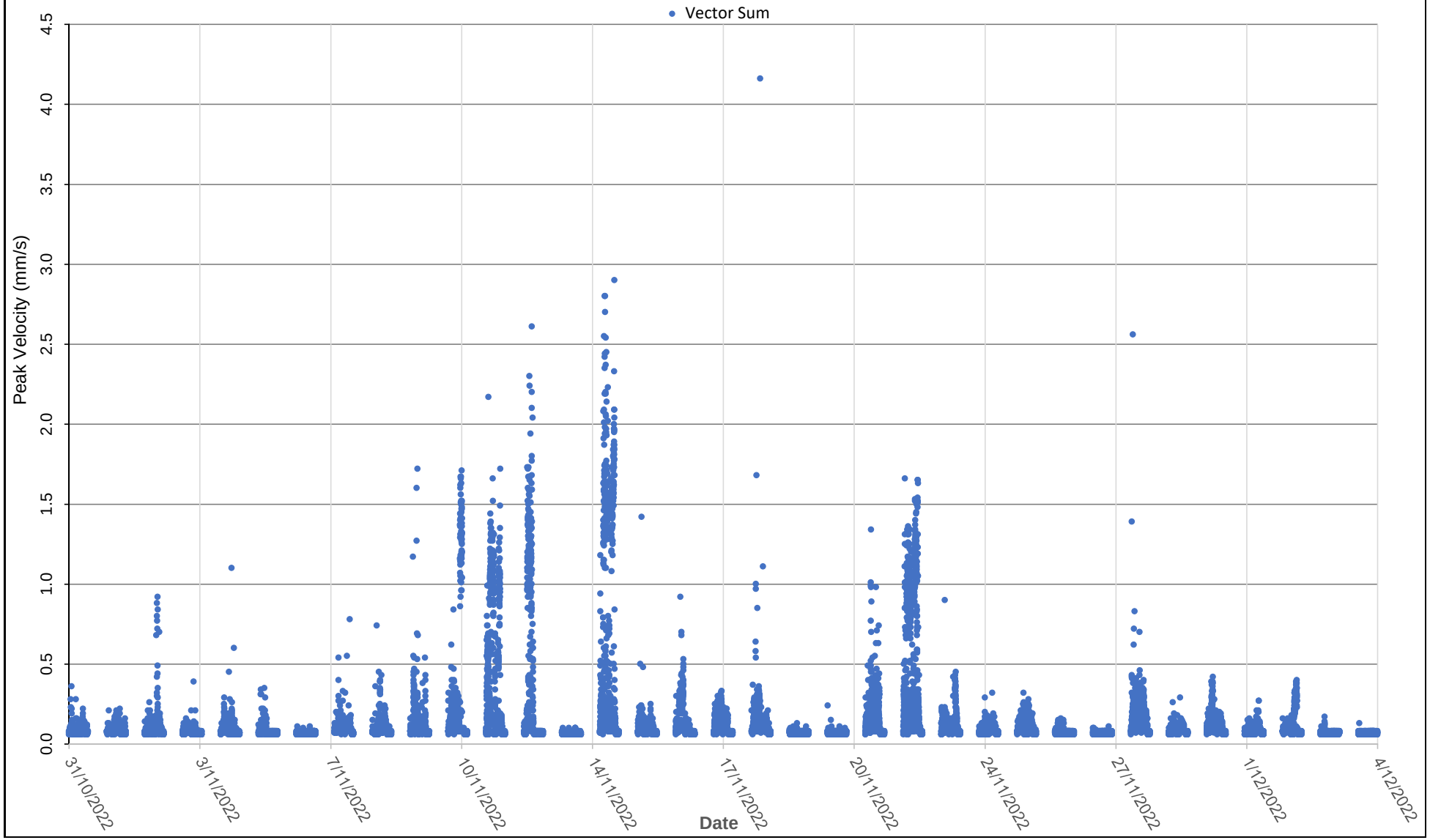
VM4 (7373)

Figure:

4.2

Project No.E25639.G11.VM03

Vibration (Vector Sum) -V- Time From 31/10/22 to 04/12/22



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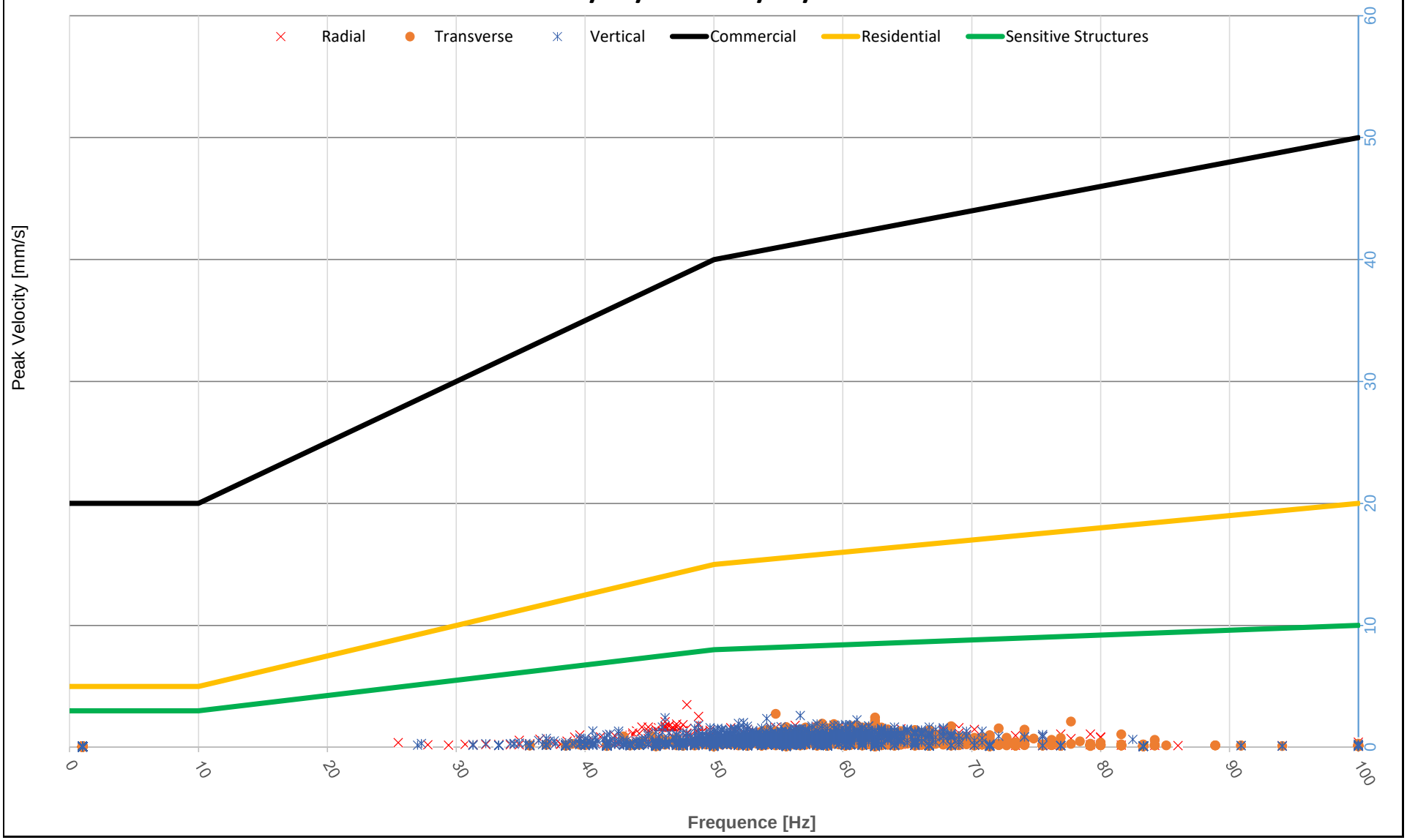
Vibration Monitoring
89 John Whiteway Drive, Gosford NSW 2250
VM5 (7773)

Figure:
5.1
Project No.E25639.G11.VM03

Vibration (Radial, Transverse and Vertical) -V- Frequency adopt the DIN_4150 From 31/10/22 to 04/12/22



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Vibration Monitoring

89 John Whiteway Drive, Gosford NSW 2250

VM5 (7773)

Figure:

5.2

Project No.E25639.G11.VM03

Important Information

SCOPE OF SERVICES

The geotechnical report ("the report") has been prepared in accordance with the scope of services as set out in the contract, or as otherwise agreed, between the Client And EI Australia ("EI"). The scope of work may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

RELIANCE ON DATA

EI has relied on data provided by the Client and other individuals and organizations, to prepare the report. Such data may include surveys, analyses, designs, maps and plans. EI has not verified the accuracy or completeness of the data except as stated in the report. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations ("conclusions") are based in whole or part on the data, EI will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to EI.

GEOTECHNICAL ENGINEERING

Geotechnical engineering is based extensively on judgment and opinion. It is far less exact than other engineering disciplines. Geotechnical engineering reports are prepared for a specific client, for a specific project and to meet specific needs, and may not be adequate for other clients or other purposes (e.g. a report prepared for a consulting civil engineer may not be adequate for a construction contractor). The report should not be used for other than its intended purpose without seeking additional geotechnical advice. Also, unless further geotechnical advice is obtained, the report cannot be used where the nature and/or details of the proposed development are changed.

LIMITATIONS OF SITE INVESTIGATION

The investigation programme undertaken is a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions. The data derived from the site investigation programme and subsequent laboratory testing are extrapolated across the site to form an inferred geological model, and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Despite investigation, the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. The engineering logs are the subjective interpretation of subsurface conditions at a particular location and time, made by trained personnel. The actual interface between materials may be more gradual or abrupt than a report indicates.

SUBSURFACE CONDITIONS ARE TIME DEPENDENT

Subsurface conditions can be modified by changing natural forces or man-made influences. The report is based on conditions that existed at the time of subsurface exploration. Construction operations adjacent to the site, and natural events such as floods, or ground water fluctuations, may also affect subsurface conditions, and thus the continuing adequacy of a geotechnical report. EI should be kept appraised of any such events, and should be consulted to determine if any additional tests are necessary.

VERIFICATION OF SITE CONDITIONS

Where ground conditions encountered at the site differ significantly from those anticipated in the report, either due to natural variability of subsurface conditions or construction activities, it is a condition of the report that EI be notified of any variations and be provided with an opportunity to review the recommendations of this report. Recognition of change of soil and rock conditions requires experience and it is recommended that a suitably experienced geotechnical engineer be engaged to visit the site with sufficient frequency to detect if conditions have changed significantly.

REPRODUCTION OF REPORTS

 Where information from the accompanying report is to be included in contract documents or engineering specification for the project, the entire report should be included in order to minimize the likelihood of misinterpretation from logs.

REPORT FOR BENEFIT OF CLIENT

The report has been prepared for the benefit of the Client and no other party. EI assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of EI or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own inquiries and obtain independent advice in relation to such matters.

OTHER LIMITATIONS

EI will not be liable to update or revise the report to take into account any events or emergent circumstances or fact occurring or becoming apparent after the date of the report.