C336 – Paddington New Yard

BORED PILING VIBRATION MONITORING REPORT

CRL Document Number: C336-COS-T1-RGN-CR076_SD006-50056

MDL C07.003

1. Contractor Document Submittal History:

Revision:	Date:	Prepared by:	Checked by:	Approved by:	Reason for Issue:
1.0	19.01.2016	[redacted]			For ~~Information~~ ACCEPTANCE

2a. Stakeholder Review Required? YES ☐ NO ☒

Stakeholder submission required: LU ☐ NR ☐ DLR ☐ RfL ☐ LO ☐ Other:

Purpose of submission: For no objection ☐ For information ☐

This document has been reviewed by the following individual for coordination, compliance, integration and acceptance and is acceptable for transmission to the above stakeholder for the above stated purpose.

Sign: _____ Role: _____ Name: _____ Date: _____

Sign: _____ Role: _____ Name: _____ Date: _____

2b. Review by Stakeholder (if required):

Stakeholder Organisation	Job Title	Name	Signature	Date	Acceptance
					☐
					☐
					☐

3. Acceptance by *Crossrail*:

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TECHNICAL MEMO

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Date: 25 November 2015

SUBJECT: C336 PADDINGTON NEW YARD - BORED PILING VIBRATION MONITORING REPORT

1 INTRODUCTION

Attended vibration monitoring has been undertaken at the Paddington New Yard project in order to determine the vibration levels generated from piling rig at the canal wall.

This report presents results of the attended vibration monitoring on 11th November 2015. Figure 1 in Appendix A shows both vibration monitoring locations and the locations of the works (highlighted in blue).

2 EQUIPMENT

Profound Vibra+ vibration monitor has been utilised for the duration of this survey. The vibration survey was undertaken in order to gain an understanding of the level of vibrations effecting the canal wall. The monitors also incorporated an email alarm feature set to alert for vibrations above a specified level.

The Profound Vibra+ vibration monitors measure peak particle velocity (PPV) on three axes using a tri-axial geophone.

Table 1: Details of Equipment Used

Monitoring Location(s)	Meter Serial No	Geophone Serial No
V1 / V2	VIB01516	TDA00944

Figure 2 in Appendix A shows photographs of the vibration monitors in situ.

3 STANDARDS, CRITERIA AND GUIDELINES

Measurements have been undertaken in accordance to the Section 61 that has been consented by the local authority (Anderson Acoustics ref: 2273_032A_1-0_AM). The Section 61 sets out threshold values in accordance with BS 5228-2:2014. The thresholds have been reproduced in below Table 2 for information.

Table 2: Vibration Thresholds (PPV mm/s)

ID	Receptor Address / Description	Trigger Action Levels PPV (mm/s)		BS 5228-2 Limits	BS 5228-2 Reference
		Lower	Upper		
V1	Canal Bank	3.0	10.0	15.0	B.4.4
V2	Canal Bank	3.0	10.0	15.0	B.4.4

The BS 5228-2 limits represent the potential on set of cosmetic damage, the lower and upper trigger action levels were used in order to warn the on-site construction team that vibration levels were approaching the BS 5228-2 limit.

4 VIBRATION MONITOR RESULTS

Vibration measurements were taken during the installation of piles.

Table 3 details the 10 highest one-second PPV measurements that occurred as a result of the works during the attended vibration monitoring at location 1 (V1) between 11:49 to 12:20 on 11th November 2015.

Table 3: 20 Highest measured Vibration Levels at Location 1 during active works periods

Date	Time	PPV (mm/s)
11/11/2015	12:04	0.539
11/11/2015	11:58	0.512
11/11/2015	12:03	0.509
11/11/2015	12:03	0.457
11/11/2015	12:01	0.455
11/11/2015	11:58	0.434
11/11/2015	12:05	0.415
11/11/2015	11:50	0.398
11/11/2015	12:00	0.381
11/11/2015	12:03	0.379

Table 4 details the 10 highest one-second PPV measurements that occurred as a result of the works during the attended vibration monitoring at location 2 (V2) between 12:22 to 12:53 on 11th November 2015.

Table 4: 10 Highest measured Vibration Levels at Location 2 during active works periods

Date	Time	PPV (mm/s)
11/11/2015	12:50	0.909
11/11/2015	12:51	0.876
11/11/2015	12:52	0.614
11/11/2015	12:50	0.561
11/11/2015	12:50	0.554
11/11/2015	12:51	0.506
11/11/2015	12:38	0.479
11/11/2015	12:42	0.46
11/11/2015	12:51	0.46
11/11/2015	12:49	0.453

The vibration levels measured fell below the BS 5228-2 limits. It may be concluded that it is unlikely that any damage will have occurred to the surrounding structures as a result of vibration emissions from these works.

5 CONCLUSION

Anderson Acoustics Ltd has been commissioned to assess the vibration impact of construction works for the C336 project on local structures and receptors surrounding the works.

During the monitoring period there were no exceedences of the BS-5228-2 limit due to works associated with the sheet piling. Drawing on guidance from BS 5228-2 it's possible to conclude that it is unlikely that any damage will have occurred to the canal wall as a result of vibration emissions from these works.

APPENDIX A

VIBRATION MONITORING

Figure 1: Vibration Monitoring and Works Locations for survey during piling works

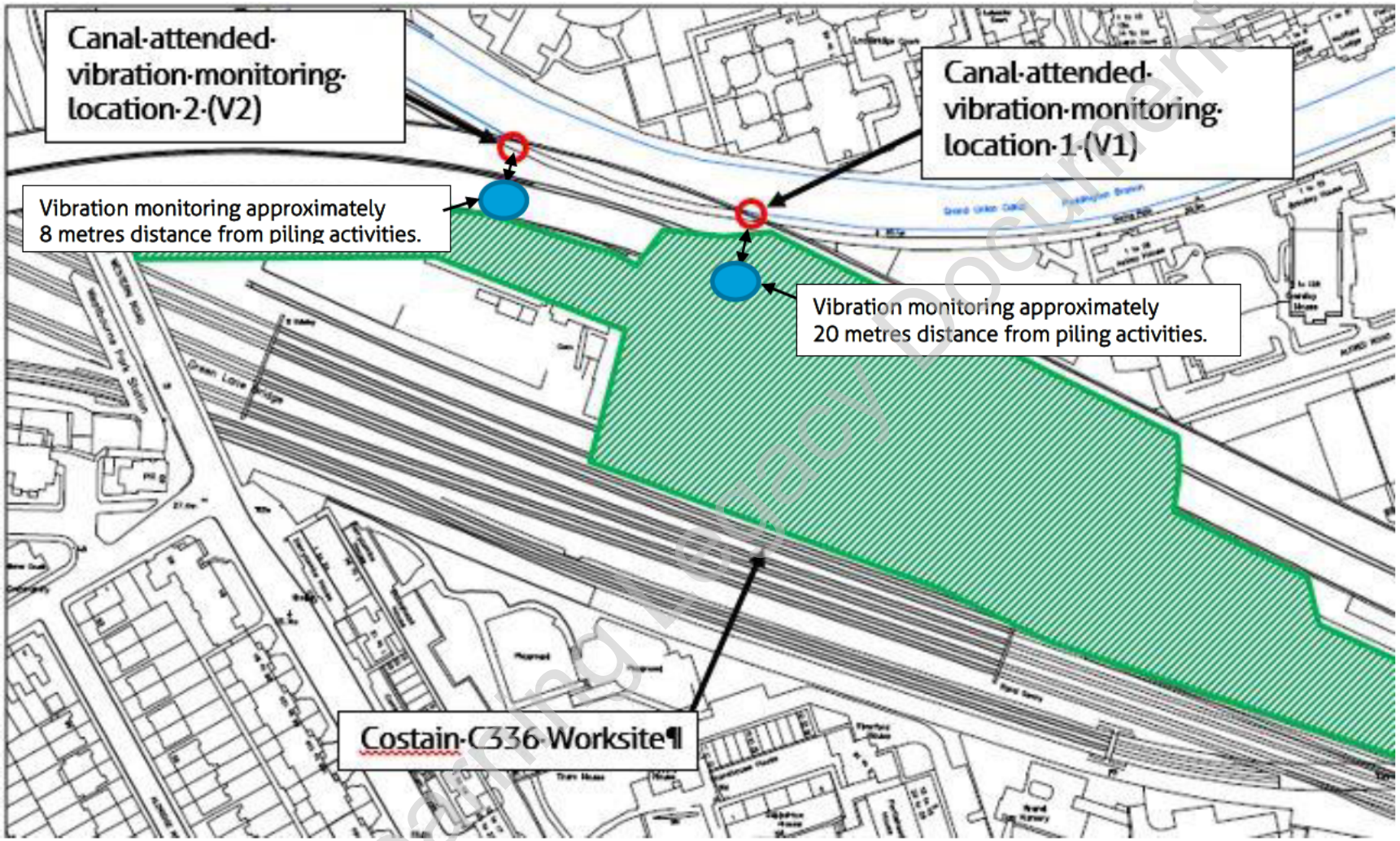

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Figure 2: Vibration Monitoring Photos for survey during piling works (11/11/2015)

Vibration Location 1 (V1) - 11:49 to 12:20:

Vibration Location 2 (V2) - 12:22 to 12:53:

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Figure 3: Vibration Monitoring for survey during piling works – Time History (11/11/2015)

Vibration Location 1 (V1) - 11:49 to 12:20:

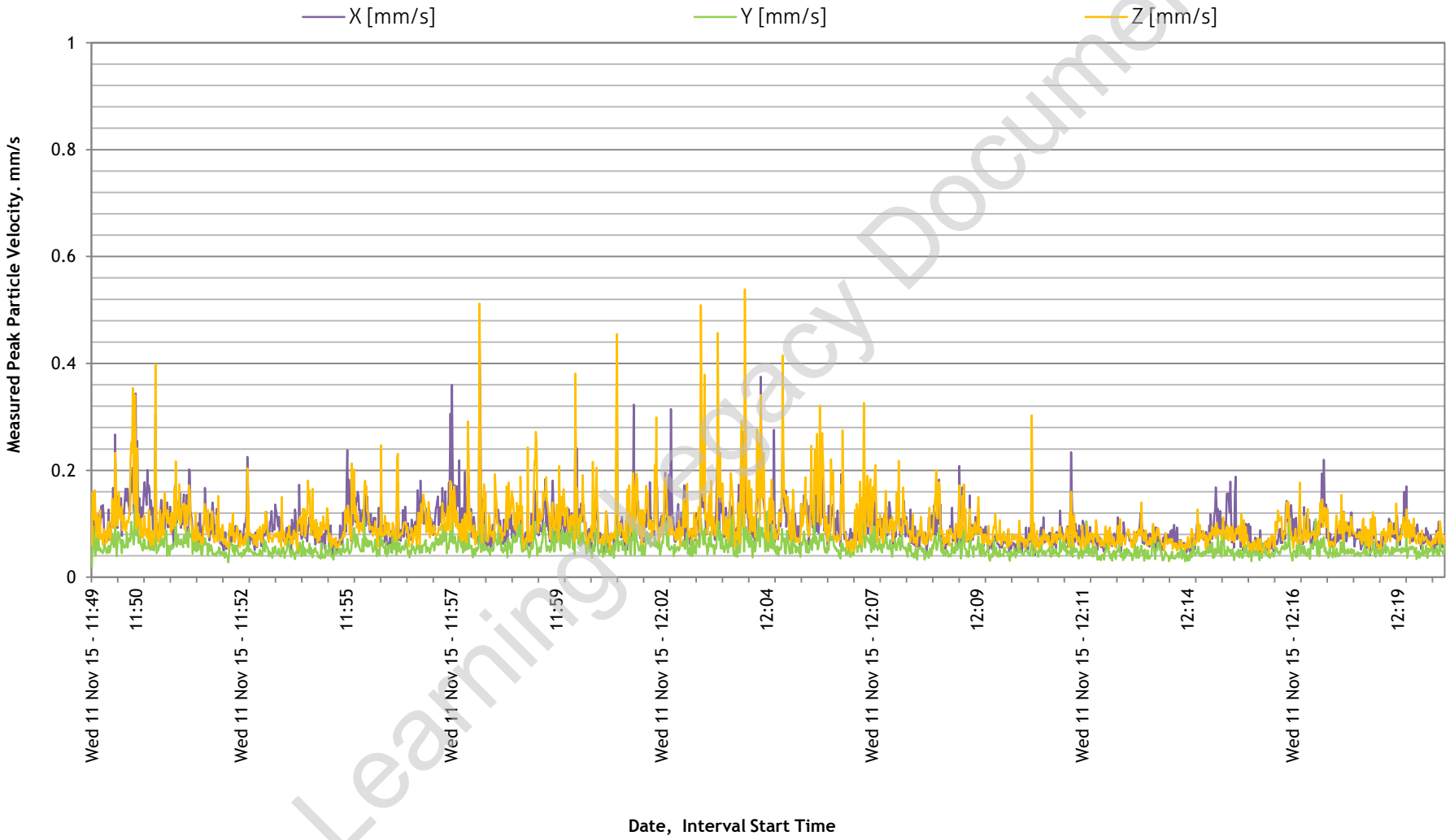

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Figure 4: Vibration Monitoring for survey during piling works – Time History (11/11/2015)

Vibration Location 2 (V2) - 12:22 to 12:53: