Appendix K – Asbestos, Air, Dust & Vibration Monitoring

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

Hansen Yuncken Pty Ltd
Sydney Corporate Park
Building 1, L3, 75-85 O'Riordan Street
Alexandria NSW 2015

Project 94054.06
13 May 2020
R.010.Rev0
JS:TK

Attention: [redacted]
Email: [redacted]

Asbestos Clearance Inspection
Proposed Contractor Car Park, Goulburn Hospital
Corner of Fitzroy Street and Mount Street, Goulburn NSW

1. Introduction

Douglas Partners Pty Ltd (DP) was engaged by Hansen Yuncken Pty Ltd (Hansen Yuncken) to undertake an asbestos clearance inspection at the proposed contractor car park, Goulburn Base Hospital, located on the corner of Fitzroy Street and Mount Street in Goulburn NSW 2580 (the Site). The clearance inspection was undertaken:

- On 5 May 2020 following removal of soil/fill containing non-friable asbestos from a small excavation (approximately 5 x 5 m wide and 0.1 to 0.2 m deep); and
- For Work Health and Safety (WHS) purposes in accordance with requirements of the NSW WHS Regulation 2017 (Regulation 473 & 474).

2. Background

DP previously conducted a preliminary contamination assessment at the Site as outlined in *Report on Preliminary Contamination Assessment, Proposed Contractors Car Park Corner of Fitzroy Street and Mount Street, Goulburn*, 16 April 2020 (ref. 94054.08.R.001.Rev1) (DP, 2020a).

DP (2020a) identified asbestos in soil/fill at Test Pit (TP) 8 at the Site (refer to Attachment 1, Site Plan and Attachment 2, Test Pit Log). The asbestos was confirmed to comprise non-friable asbestos as outlined in DP's letter report *Management of asbestos in fill at proposed contractor's car park, corner Fitzroy Street and Mount Street, Goulburn NSW,* 17 April 2020 (ref. 94054.08.R.002.Rev1) (DP, 2020b)

Hansen Yuncken elected to excavate soil/fill in the vicinity of Test Pit 8 and to dispose this material off-site. DP conducted this asbestos clearance inspection following completion of the excavation work at Test Pit 8. The location and extent of the excavation work was determined by Hansen Yuncken.

3. Method

[redacted] (Licensed Asbestos Assessor, LAA001244) of DP observed the excavation work, and conducted an unassisted visual clearance inspection at the completion of the excavation work on 5 May 2020. The clearance inspection comprised a systematic walkover of the finished excavation along with the associated truck loading area, decontamination area and transit route.

Airborne asbestos monitoring was conducted during the excavation work in accordance with the National Occupational Health and Safety Commission (NOHSC) Guidance Note on the membrane filter method for estimating airborne asbestos fibres, 2nd Edition [NOHSC:3003(2005)]. Refer Attachment 3, Laboratory Certificate(s) of Analysis (Air Monitoring).

The soil/fill comprising the walls and base of the final excavation were sampled by DP and analysed for asbestos by a National Association of Testing Authorities (NATA) accredited laboratory. Refer Attachment 4, Laboratory Certificate(s) of Analysis (Soil/Fill).

Photographs were taken by DP during the visual inspection and selected photographs are presented in Attachment 5, Plates.

4. Area Inspected

The Area Inspected comprised safely accessible exposed ground surfaces of the final excavation centred on Test Pit 8 (approximately 5 x 5 m wide and 0.1 to 0.2 m deep) (refer Attachment 1, Site Plan and Attachment 5, Plates). The Area Inspected excludes all areas and materials below the exposed ground surface.

5. Results

The airborne asbestos fibre level was <0.01 f/mL which is the lower reporting limit of the method used. Refer Attachment 3 Laboratory Certificate(s) of Analysis (Air Monitoring).

Asbestos was not detected in the samples of soil/fill collected from the walls and base of the final excavation. Refer Attachment 4 Laboratory Certificate(s) of Analysis (Soil/Fill).

At completion of the visual inspection the assessor found no visible asbestos residue from asbestos removal work in the Area Inspected, or in the vicinity of the Area Inspected where the work was carried out. The vicinity of the Area Inspected comprises the associated truck loading area, decontamination area and transit route.

6. Conclusion and Recommendations

Asbestos and/or asbestos containing material (ACM) may remain in soil/fill around and/or below the Area Inspected. Such asbestos/ACM may become exposed following any disturbance of the Area Inspected.

Should any asbestos or ACM be identified during future use of the Area Inspected or Site then all activity in the area should cease, access to the area should be appropriately restricted and advice should be sought from a suitably qualified and experienced LAA.

All work involving asbestos must be undertaken in accordance with relevant regulatory requirements including those outlined in the NSW Work Health and Safety Regulation 2017 (WHS Regulation) and following Codes of Practice (CoP):

- SafeWork NSW *Code of Practice: How to Safely Remove Asbestos*; and
- SafeWork NSW *Code of Practice: How to Manage and Control Asbestos in the Workplace*.

7. Limitations

This report is provided for the exclusive use of Hansen Yuncken for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the conditions on the site only at the specific locations inspected and monitored. While work is undertaken in a professional manner the nature of the contaminant and limitations of the method(s) used mean that we cannot guarantee that all asbestos or ACM has been identified.

Inspections and monitoring are limited to areas that are safely accessible at the time of the work and exclude hidden and inaccessible locations such as within stockpiles, below the exposed ground surface and within enclosed areas. Any disturbance of the surface(s) inspected may result in the exposure of additional asbestos or ACM that is outside the scope the visual inspection conducted.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in conditions across the site between and beyond the inspection, sampling and/or monitoring locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or

conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

DP and our personnel are not licenced quantity surveyors. Any quantities included in this report are provided as a general guide only and should not be relied upon. The services of a licenced quantity surveyor should be engaged if reliable quantities are required.

The inspection(s) conducted do not constitute an Environmental Site Investigation (ESI) under the Contaminated Land Management (CLM) Act. Further testing of soils and other bulk materials pursuant to the National Environment Protection (Assessment of Site Contamination) Measure (NEPM) may be required to ensure the site is suitable for the proposed land use.

This asbestos clearance certificate does not certify removal of all asbestos, ACM and/or special waste from the Site or that the Site is suitable for any particular use.

While work is undertaken in a professional manner DP cannot guarantee that all asbestos, ACM or issues of concern have been identified.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

8. Closure

We trust that the foregoing is of assistance. Please contact the undersigned if you have any queries regarding this matter.

Yours faithfully
Douglas Partners Pty Ltd

[redacted]

Occupational Hygienist / Environmental Scientist
Licenced Asbestos Assessor (LAA001244)

Reviewed by

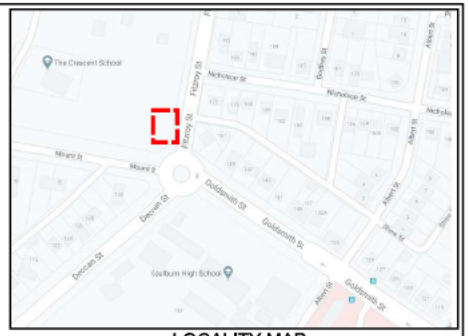
[redacted]

Associate / Senior Occupational Hygienist
Licenced Asbestos Assessor (LAA001015)

Attachments:
Attachment 1 – Site Plan
Attachment 2 – Test Pit Log
Attachment 3 - Laboratory Certificate(s) of Analysis (Air Monitoring)
Attachment 4 – Laboratory Certificate(s) of Analysis (Soil/Fill)
Attachment 5 – Plates

Attachment 1

Site Plan



LOCALITY MAP

Notes:
1. Basemap from nearmap.com (dated 18/04/2020)
2. Test locations shown are approximate only

Legend

- TP 8 Location
- Area Inspected (approx.)
- Site Boundary

10 20 30 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Hanson Yuncken		
OFFICE:	Sydney	DRAWN BY:	JS
SCALE:	As Shown	DATE:	13.05.2020

TITLE: **Site Plan**
Asbestos Clearance Inspection
Proposed Contractor Car Park

N

PROJECT No:	94054.06
DRAWING No:	1
REVISION:	0

Attachment 2

Test Pit Log

TEST PIT LOG

CLIENT: Hansen Yunken Pty Ltd
PROJECT: Proposed Contractor's Car Park
LOCATION: Corner Fiztroy Street and Mount Street, Goulburn

SURFACE LEVEL: --
EASTING: 748180
NORTHING: 6151889

PIT No: 8
PROJECT No: 94054.08
DATE: 20/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		FILL/TOPSOIL: Clayey SILT OL, low plasticity, brown, with trace fine to coarse grained sand and fine to coarse gravel (ironstone) and rootlets throughout, w > PL. fibre cement fragment observed (contains asbestos)		E	0.1				
	0.4	Silty CLAY CH : medium to high plasticity, brown-orange, with fine to coarse gravel (ironstone) and trace rootlets, w ~ PL, firm to stiff		E	0.5		pp = 100-150		
	1	- w < PL, very stiff to hard		E	1.0		pp = 400-450		
	1.2	Pit discontinued at 1.2m Refusal							
	2								

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: 1.5 tonne excavator with 300mm gummy bucket

LOGGED: KJ

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: BR2 taken at 0.1m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

Attachment 3

Laboratory Certificate(s) of Analysis
(Air Monitoring)

eurofins | Environment Testing

Certificate of Analysis

Douglas Partners (Syd)
96 Hermitage Road
West Ryde
NSW 2114

Attention:	[redacted]
Report	717365-AFC
Project Name	GOULBURN HOSPITAL
Project ID	94054.08
Received Date	May 05, 2020
Date Reported	May 05, 2020

METHODOLOGY:

Asbestos Sampling	Sampling as per the National Occupational Health & Safety Commission - Guidance Note on The Membrane Filter Method For Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)]
Pump Calibration	Defender 520M: Calibrated against National Institute of Standards & Technology (NIST) SOP 13 Standard Operating Procedure for Calibration of Volumetric Ware, Gravimetric Method utilising a 1000 mL burette with a digital stop watch.
Asbestos Counting	Conducted in accordance with the National Occupational Health & Safety Commission - Guidance Note on The Membrane Filter Method For Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)] and in-house Method LTM-ASB-8010.

Project Name GOULBURN HOSPITAL
Project ID 94054.08
Date Sampled May 05, 2020
Report 717365-AFC

Eurofins Sample No.	Client Sample ID	Pump ID	Location	Start (time)	End (time)	Start Flow Rate (L/min)	End Flow Rate (L/min)	Result (Fibres/Fields)	Result (Fibres/mL)
20-My04353	DL026485	DP12	WEST OF WORK AREA	6:45	8:45	4.0	4.0	0/100	< 0.01*
20-My04354	DL026419	DP04	SOUTH OF WORK AREA	6:45	8:45	4.0	4.0	0/100	< 0.01*
20-My04355	DL026467	DP15	NORTH EAST OF WORK AREA	6:45	8:45	4.0	4.0	0/100	< 0.01*
20-My04356	DL026532	DP11	EAST OF WORK AREA	6:45	8:45	4.0	4.0	0/100	< 0.01*
20-My04357	CO865961	BLANK	BLANK	--	--	--	--	0/100	--

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8010	Sydney	May 05, 2020	Indefinite
Asbestos - LTM-ASB-8010	Sydney	May 05, 2020	Indefinite

eurofins | Environment Testing

ABN – 50 005 085 521 web : www.eurofins.com.au e.mail : EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name:	Douglas Partners (Syd)	**Order No.:**	**Received:** May 5, 2020 1:49 PM
Address:	96 Hermitage Road West Ryde NSW 2114	**Report #:** 717365 **Phone:** 02 9809 0666 **Fax:**	**Due:** May 5, 2020 **Priority:** Same day **Contact Name:** [redacted]
Project Name:	GOULBURN HOSPITAL		
Project ID:	94054.08		**Eurofins Analytical Services Manager :** [redacted]

Sample Detail						Asbestos (concentration of fibres in air)
Melbourne Laboratory - NATA Site # 1254 & 14271						
Sydney Laboratory - NATA Site # 18217						X
Brisbane Laboratory - NATA Site # 20794						
Perth Laboratory - NATA Site # 23736						
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	DL026485	May 05, 2020	8:45AM	Air	S20-My04353	X
2	DL026419	May 05, 2020	8:45AM	Air	S20-My04354	X
3	DL026467	May 05, 2020	8:45AM	Air	S20-My04355	X
4	DL026532	May 05, 2020	8:45AM	Air	S20-My04356	X
5	CO865961	May 05, 2020		Air	S20-My04357	X
Test Counts						5

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
5. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Sample is dried by heating prior to analysis
LOR	Limit of Reporting
COC	Chain of Custody
SRA	Sample Receipt Advice
ISO	International Standards Organisation
AS	Australian Standards
WA DOH	Reference document for the NEPM. Government of Western Australia, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009), including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil (2011)
NEPM	National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended)
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded and/or sound condition. For the purposes of the NEPM, ACM is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
AF	Asbestos Fines. Asbestos containing materials, including friable, weathered and bonded materials, able to pass a 7mm x 7mm sieve. Considered under the NEPM as equivalent to “non-bonded / friable”.
FA	Fibrous Asbestos. Asbestos containing materials in a friable and/or severely weathered condition. For the purposes of the NEPM, FA is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory’s remit to assess degree of friability.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres in the matrix.

Comments

Volume Measurement : Jack Snowden, Douglas Partners (Syd), has been trained by Eurofins and they conducted the sampling in accordance with the National Occupational Health & Safety Commission - Guidance Note on The Membrane Filter Method For Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)]methodology. Sampling pumps used by Douglas Partners (Syd) were calibrated by Eurofins Environment Testing and therefore volume measurements contained in this report are traceable back to Eurofins Environment Testing. Eurofins Environment Testing are responsible for all data contained in this report.

*The sampling pumps used are not Eurofins approved for volume measurement.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N/A	Not applicable

Asbestos Counter/Identifier:

[redacted] Senior Analyst-Asbestos (NSW)

Authorised by:

[redacted] Senior Analyst-Asbestos (NSW)

[redacted]
General Manager

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Attachment 4

Laboratory Certificate(s) of Analysis
(Soil/Fill)

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 242247

Client Details

Client	Douglas Partners Pty Ltd
Attention	[redacted]
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**94054.08. Goulburn**
Number of Samples	5 SOIL
Date samples received	05/05/2020
Date completed instructions received	05/05/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	12/05/2020
Date of Issue	07/05/2020

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Asbestos Approved By
Analysed by Asbestos Approved Identifier: [redacted]
Authorised by Asbestos Approved Signatory: [redacted]
Results Approved By
[redacted] Asbestos Supervisor

Authorised By
[redacted]
[redacted] Laboratory Manager

Asbestos ID - soils NEPM						
Our Reference		242247-1	242247-2	242247-3	242247-4	242247-5
Your Reference	UNITS	VAL-01	VAL-02	VAL-03	VAL-04	VAL-05
Date Sampled		05/05/2020	05/05/2020	05/05/2020	05/05/2020	05/05/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	06/05/2020	06/05/2020	06/05/2020	06/05/2020	06/05/2020
Sample mass tested	g	537.84	518.23	584.4	550.56	673.85
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	-	-	-	-	-
FA and AF Estimation*	g	-	-	-	-	-
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE #1** Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE #2** The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	[redacted]

Sample Login Details

Your reference	94054.08, Goulburn
Envirolab Reference	242247
Date Sample Received	05/05/2020
Date Instructions Received	05/05/2020
Date Results Expected to be Reported	12/05/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	5 SOIL
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	21.2
Cooling Method	None
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

[redacted]	[redacted]
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: [redacted]	**Email:** [redacted]

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	Asbestos ID - soils NEPM
VAL-01	✓
VAL-02	✓
VAL-03	✓
VAL-04	✓
VAL-05	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No: 94054.08	**Suburb:** Goulburn	**To:** Lab name	
Project Name: Goulburn Carparks	**Order Number**		
Project Manager: TK	**Sampler:** JS	**Attn:**	
Emails: jack.snowden@douglaspartners.com.au	[redacted]	**Phone:**	
Date Required: Standard		**Email:**	
Prior Storage: ☒ Shelved	Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 8	Analytes: AF/FA 500 mL	Notes/preservation
VAL-01	1	5/5/20	S	G P		X	
02	2	↓	↓	↓		↓	
03	3						
04	4						
05	5		↓				

Enviroleb Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 242247
Date Received: 5/5/20
Time Received: 1330
Received by: CAS
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL (S) mg/kg	**ANZECC PQLs req'd for all water analytes** ☐
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit	**Lab Report/Reference No:**
Metals to Analyse: 8HM unless specified here:	
Total number of samples in container: **Relinquished by:**	**Transported to laboratory by:**
Send Results to: Douglas Partners Pty Ltd **Address:**	**Phone:** **Fax:**
Signed: JS **Received by:** [redacted]	**Date & Time:** 5/5/20 1330

Attachment 5

Plates

Photograph 1: Final excavation at Test Pit 8 (looking west).

Photograph 2: Final excavation at Test Pit 8 (looking east).

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **Asbestos Clearance Inspection** **Proposed Contractor Car Park, Goulburn Hospital**	PROJECT:	94054.08
		PLATE No:	1
		REV:	A
	CLIENT: Hansen Yuncken Pty Ltd	DATE:	5-May-20

Douglas Partners
Geotechnics / Environment / Groundwater

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

Memorandum

To	Anthony Dreizi	Hansen Yuncken Pty Ltd	ADreizi@hansenyuncken.com.au	
From	Jeremy Hill		**Date**	01 Apr 2020
Subject	Vibration Monitoring Report 11 Goulburn Base Hospital Redevelopment		**Project No.** **Doc. No.**	94054.07 94054.07.R.011.Rev0

Installation and Monitoring

On 21 January 2020 Texcel Construction Vibration Monitors #7221, #7153 were relocated to the positions shown in the attached Monitoring Location Plan, before the start of augered piling. Both monitors were coupled to the ground with a surcharge, close to and at ground level of the adjacent building, which includes Pathology (upper floor) and the Mortuary (lower floor). The monitors were installed to manage vibrations generated during piling works. On 26 February 2020, Monitor #7221 was replaced with Omnidot Vibration Monitor "Vujaca".

With reference to the CNVMP (the Monitoring Plan), an "Allowed Vibration Limit" of 25 mm/s vector sum peak particle velocity (VSPPV) was assigned by DP based on the potential for damage to the adjacent structures and a Vibration Dose Value (VDV) of 0.20 $m/s^{1.75}$ for comfort of the occupants (whole body vibration). The monitors were configured for continuous monitoring Mon - Sat, 6 am - 6 pm, with SMS (text message) alarms to be sent automatically to Eugene Godfrey and DP in the event of vibration exceedances (vibration levels exceeding 7 mm/s VSPPV, as a contingency for impulsive events).

The eVDV shown in the attached graphs is a calculated estimate of VDV from velocity data rather than acquired acceleration data. The Dose Rate and Maximum Values refer to accumulated vibration activity per day during daytime hours and includes summations of RMS velocities, wavelength durations and amplitudes (as detailed in NSW EPA Assessing Vibration: A Technical Guideline, February 2006). "Critical Areas" includes hospital operating theatres and precision laboratories where sensitive operations are occurring, and these criteria are indicative only, therefore consideration of continuous and impulsive vibrations is included (as recommended), see attached graphs. The table of acceptable daily Dose Values, Table 2.4, includes a "Preferred Value", being half of the "Maximum Value".

Outcome this period: 23 March to 30 March 2020

Location	Monitor	Exceedances		Time of maximum exceedance
		No.	Max (VSPPV)	
Monitoring Location A	Vujaca	0	n/a	n/a
Monitoring Location B	7153	0	n/a	n/a

Douglas Partners Pty Ltd

[redacted]

Senior Geophysicist

Reviewed by

[redacted]

Principal

Attachments: Graphs of Vibration Levels, Monitor Location Plan, About This Report

Limitations

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DP's advice may be based on observations, measurements, tests, or derived interpretations. The accuracy of the advice provided by DP in this report may be affected by unobserved features and variations in ground conditions and conditions affecting vibration across the site, between and beyond the testing locations or by variations with time. Vibration monitoring and advice may also be limited by budget constraints imposed by others or by site accessibility.

The results provided in the report are indicative of the vibration levels at the sensor location(s) only and only during the specified period of monitoring. Vibration levels in other locations may therefore differ from those reported herein.

As neither estimations of safe operating distances for vibrations (if provided) nor the presence of an unattended vibration monitor can prevent exceedances, the real-time management of vibration remains the responsibility of Hansen Yuncken Pty Ltd and its plant operators. Interference with (e.g. movement or damage to) the monitoring equipment may influence readings and the Client is responsible for advising DP immediately to assess whether readings are affected, re-installation and/or repair is required.

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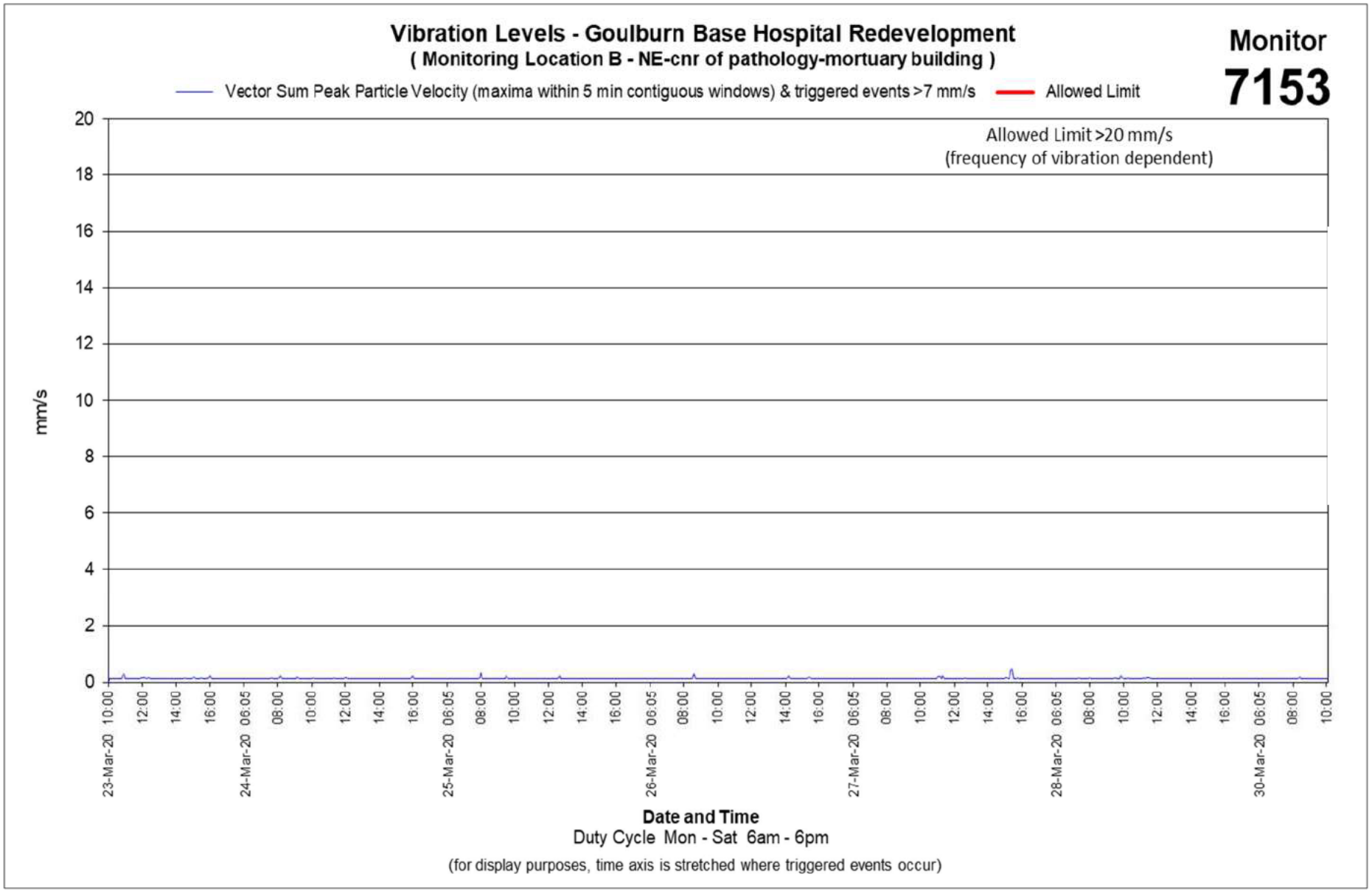
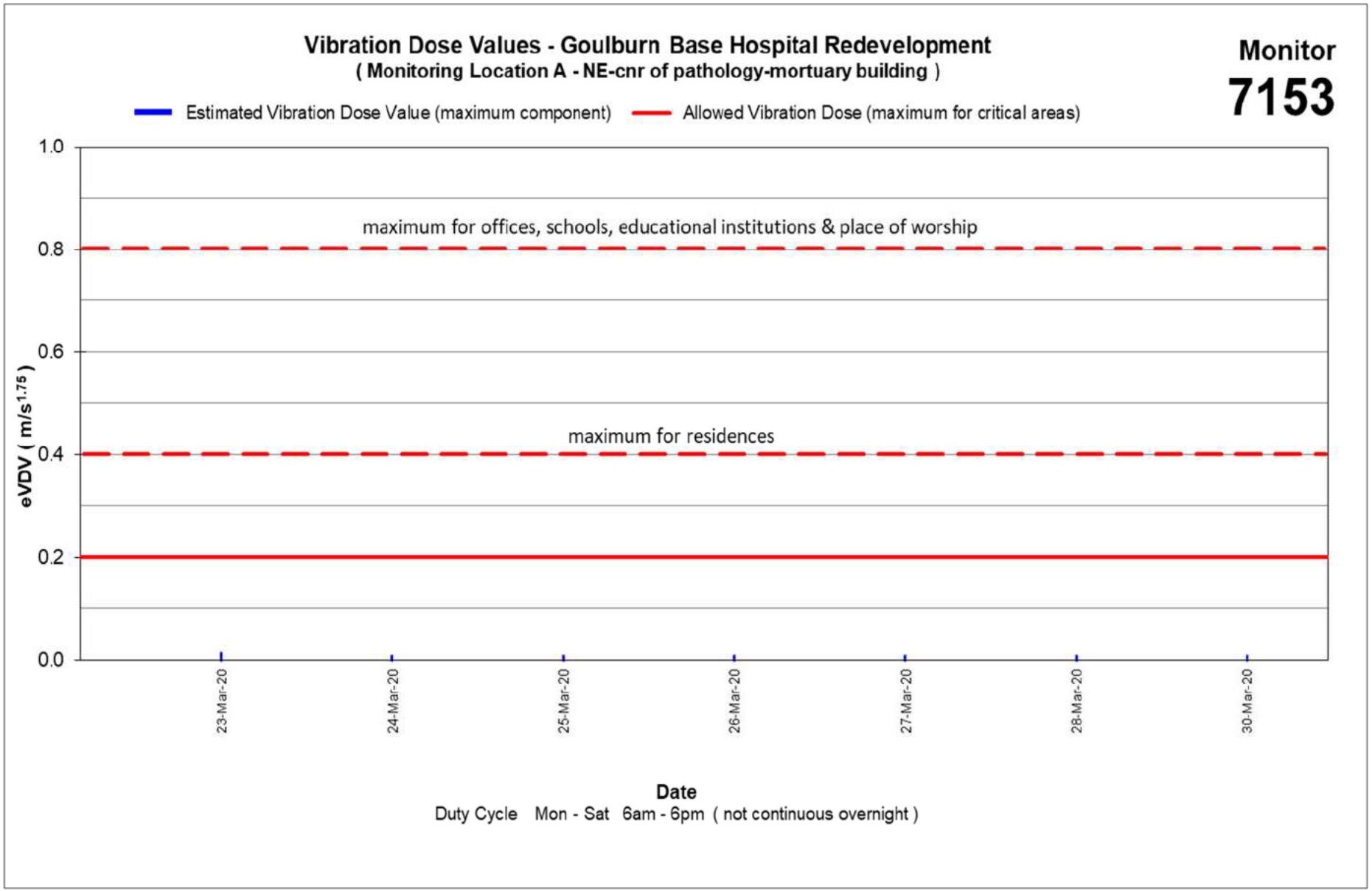
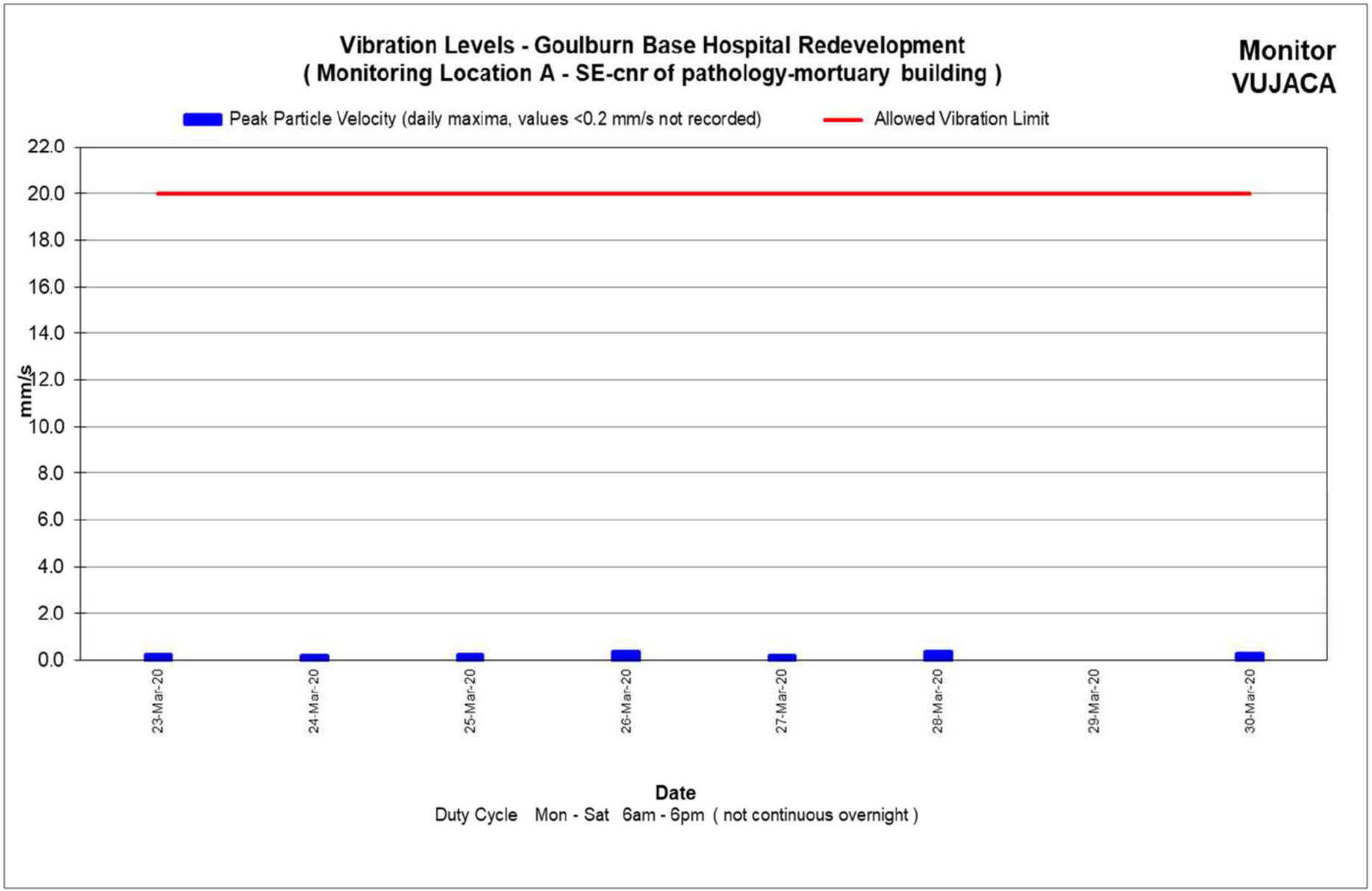
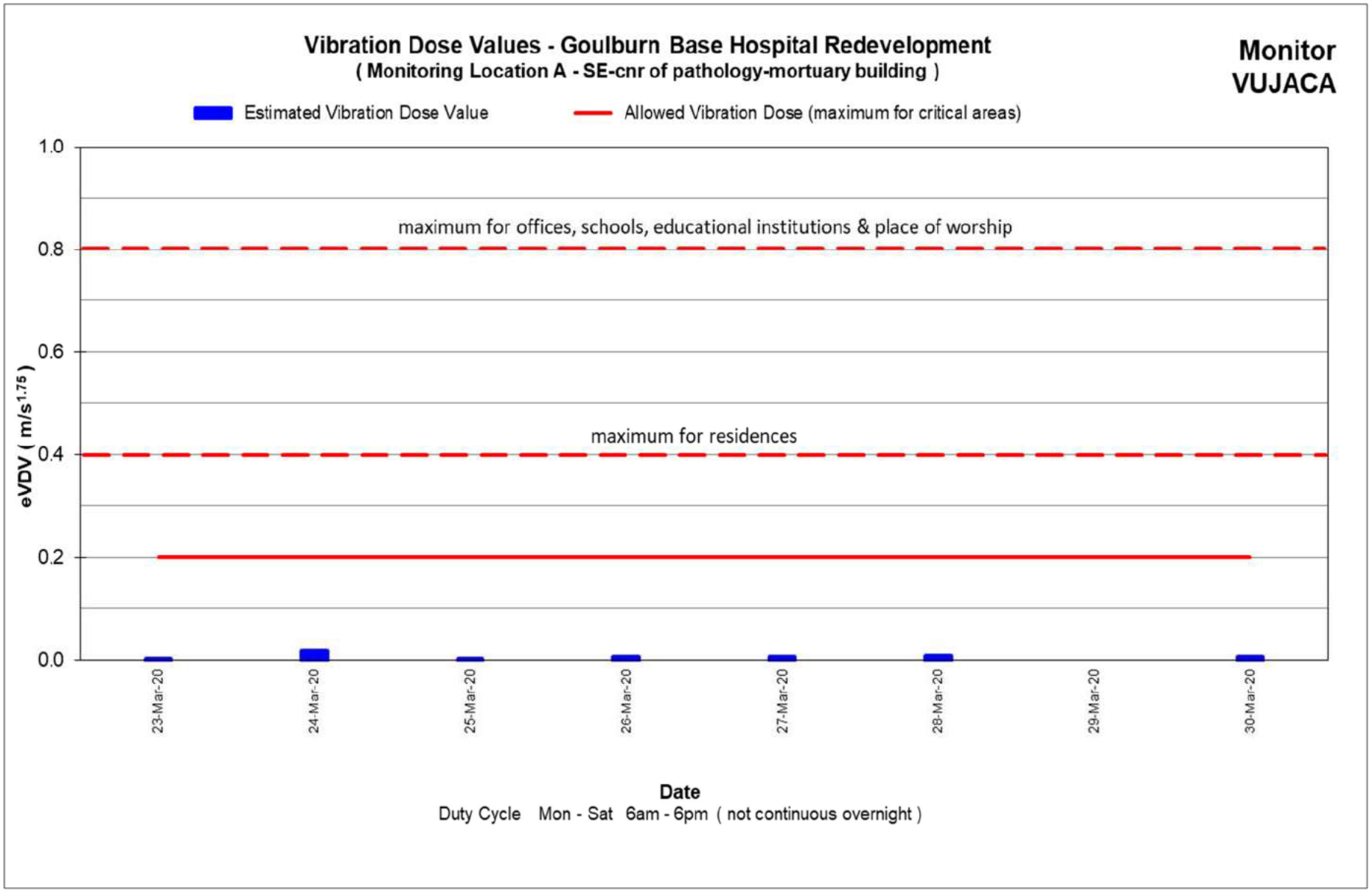
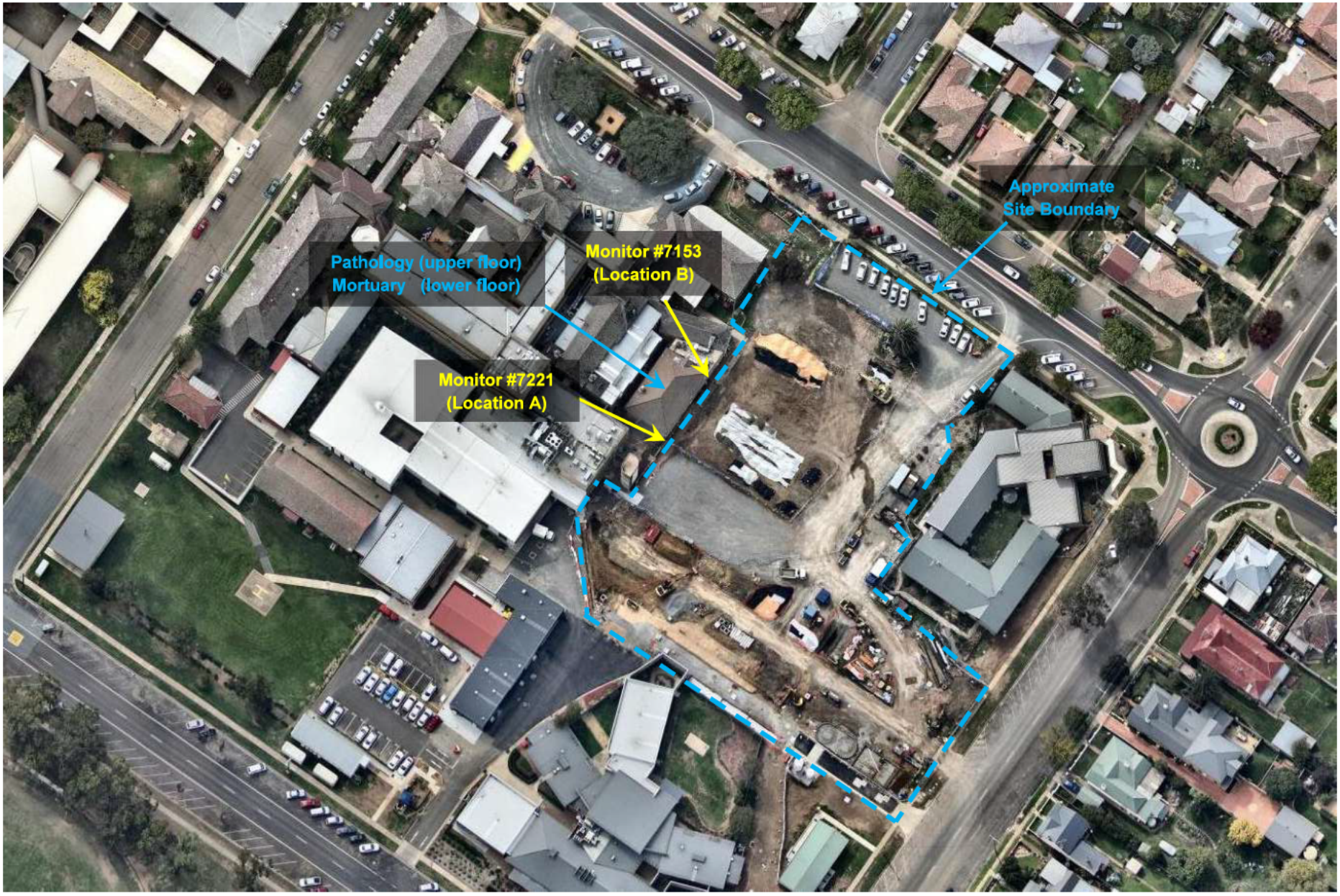

Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
10
8
6
4
2
0
23-Mar-20 10:00
24-Mar-20 06:05
25-Mar-20 06:05
26-Mar-20 06:05
27-Mar-20 06:05
28-Mar-20 06:05
30-Mar-20 06:05
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
(for display purposes, time axis is stretched where triggered events occur)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location A - NE-cnr of pathology-mortuary building)
Monitor
7153
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
eVDV (m/s1.75)
1.0
0.8
0.6
0.4
0.2
0.0
23-Mar-20
24-Mar-20
25-Mar-20
26-Mar-20
27-Mar-20
28-Mar-20
30-Mar-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
VUJACA
Peak Particle Velocity (daily maxima, values <0.2 mm/s not recorded)
Allowed Vibration Limit
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
mm/s
23-Mar-20
24-Mar-20
25-Mar-20
26-Mar-20
27-Mar-20
28-Mar-20
29-Mar-20
30-Mar-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
VUJACA
Estimated Vibration Dose Value
Allowed Vibration Dose (maximum for critical areas)
1.0
0.8
0.6
0.4
0.2
0.0
eVDV (m/s1.75)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
23-Mar-20
24-Mar-20
25-Mar-20
26-Mar-20
27-Mar-20
28-Mar-20
29-Mar-20
30-Mar-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Approximate
Site Boundary
Pathology (upper floor)
Mortuary (lower floor)
Monitor #7153
(Location B)
Monitor #7221
(Location A)

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Douglas Partners
Geotechnics / Environment / Groundwater

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ABN 75 053 980 117
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96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

Memorandum

To	[redacted] Hansen Yuncken Pty Ltd	[redacted]	
From	[redacted]	**Date**	07 Apr 2020
Subject	Vibration Monitoring Report 12 Goulburn Base Hospital Redevelopment	**Project No.** **Doc. No.**	94054.07 94054.07.R.012.Rev0

Installation and Monitoring

On 21 January 2020 Texcel Construction Vibration Monitors #7221, #7153 were relocated to the positions shown in the attached Monitoring Location Plan, before the start of augered piling. Both monitors were coupled to the ground with a surcharge, close to and at ground level of the adjacent building, which includes Pathology (upper floor) and the Mortuary (lower floor). The monitors were installed to manage vibrations generated during piling works. On 26 February 2020, Monitor #7221 was replaced with Omnidot Vibration Monitor "Vujaca".

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Outcome this period: 30 March to 6 April 2020

Location	Monitor	Exceedances		Time of maximum exceedance
		No.	Max (VSPPV)	
Monitoring Location A	Vujaca	0	n/a	n/a
Monitoring Location B	7153	0	n/a	n/a

Douglas Partners Pty Ltd

[redacted]

Senior Geophysicist

Reviewed by

[redacted]

Principal

Attachments: Graphs of Vibration Levels, Monitor Location Plan, About This Report

Limitations

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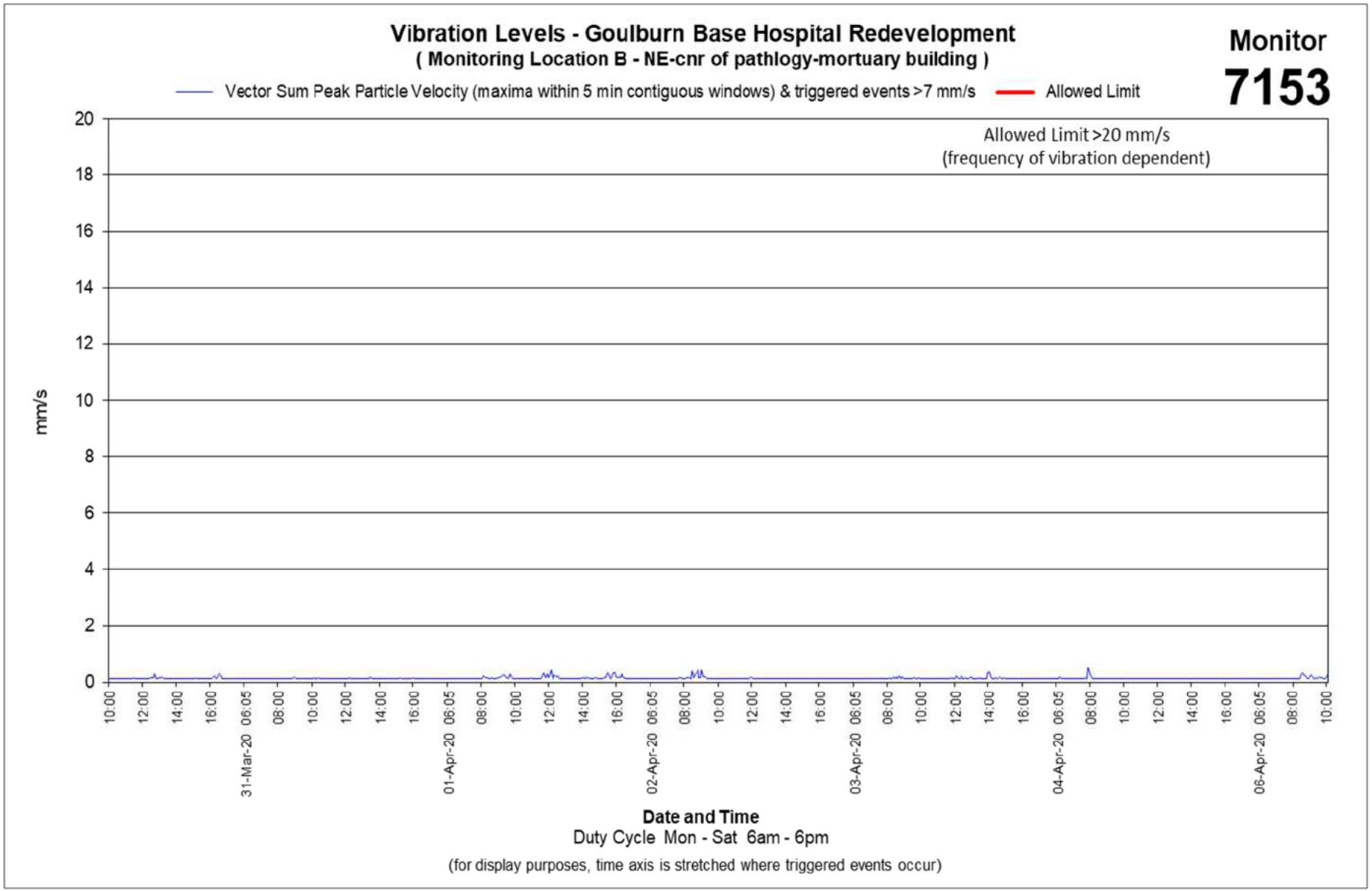
Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location B - NE-cnr of pathlogy-mortuary building)
Monitor
7153
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
10
8
6
4
2
0
10:00
12:00
14:00
16:00
31-Mar-20 06:05
08:00
10:00
12:00
14:00
16:00
01-Apr-20 06:05
08:00
10:00
12:00
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16:00
02-Apr-20 06:05
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08:00
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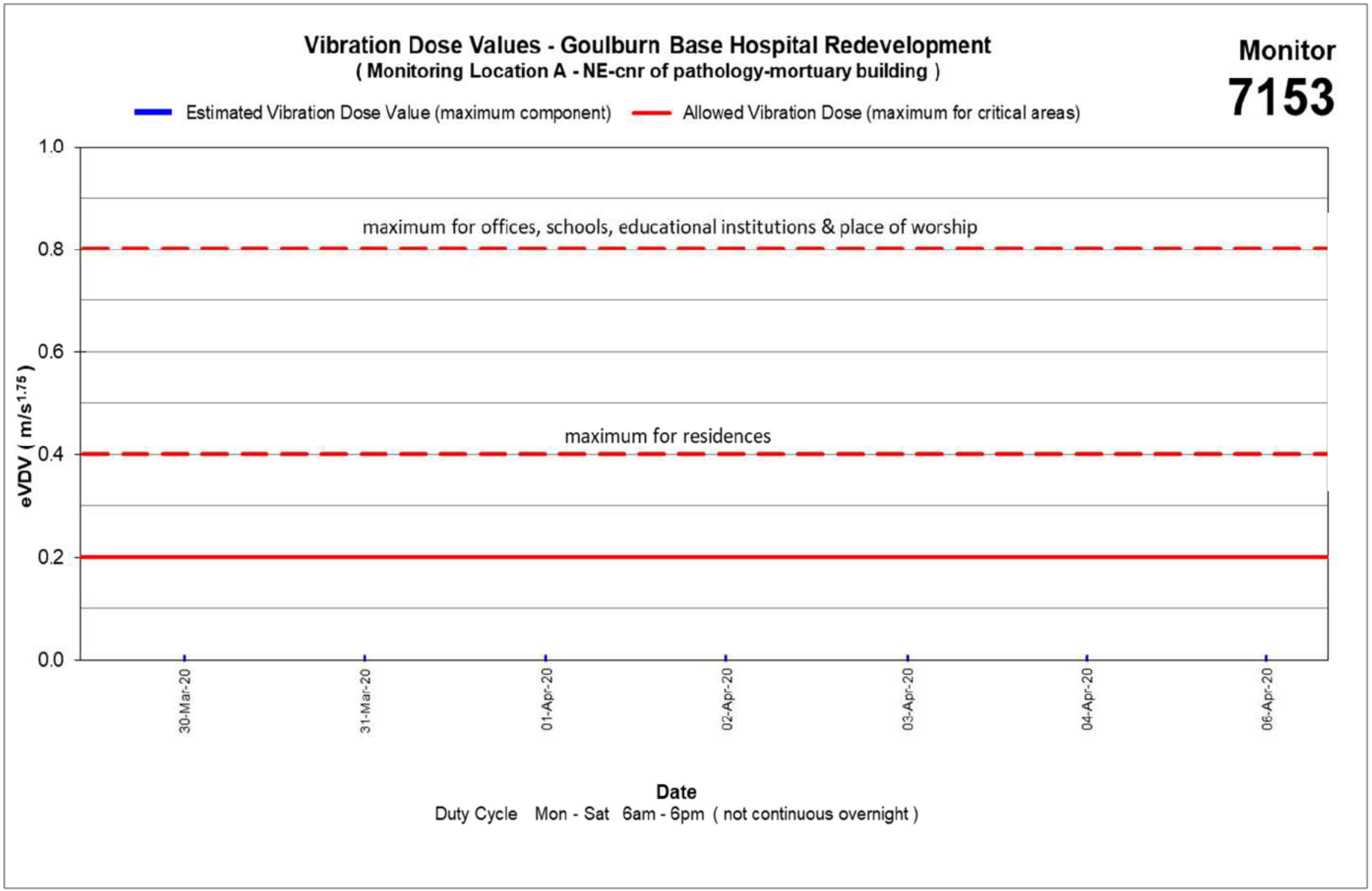
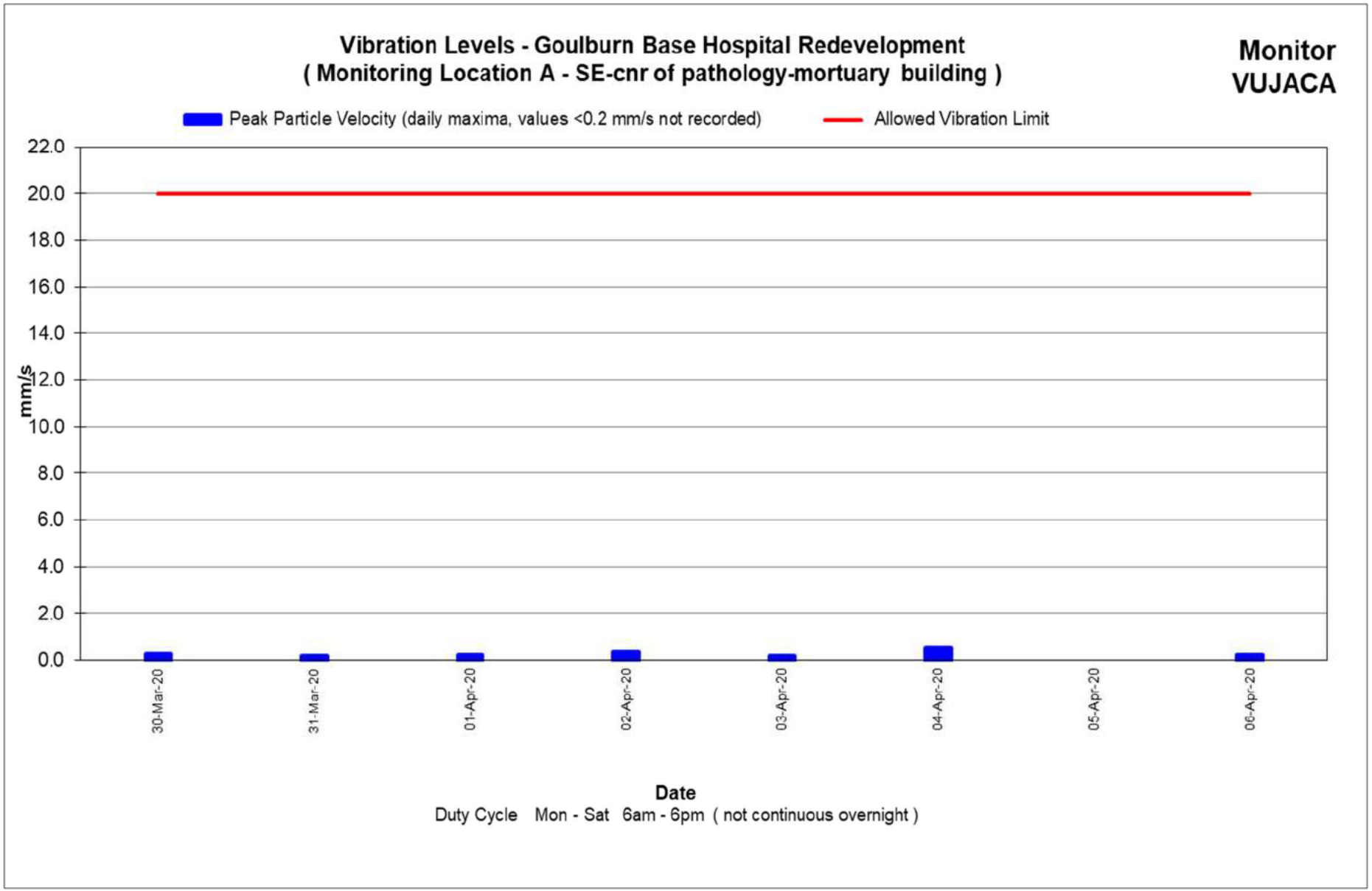
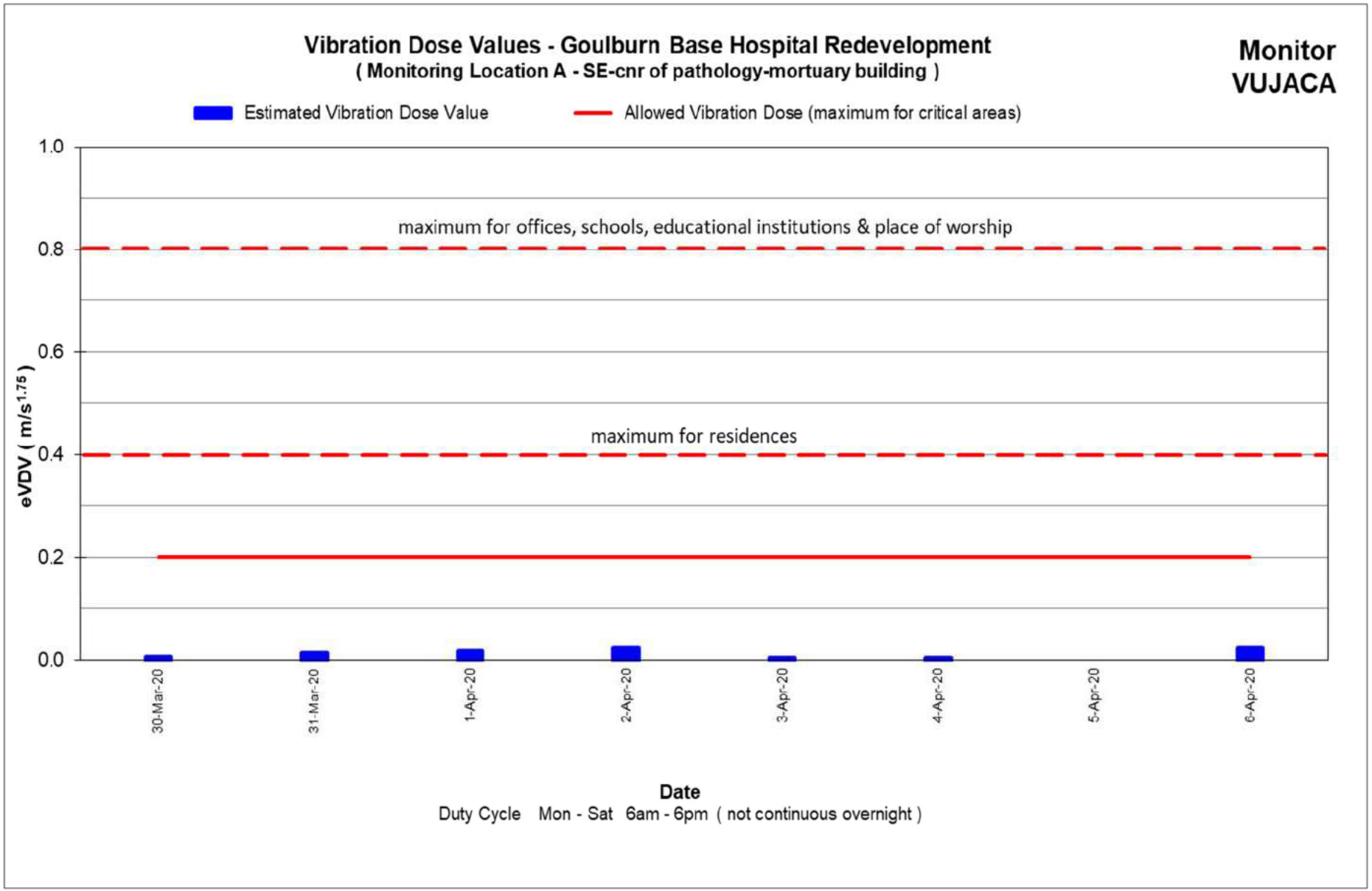
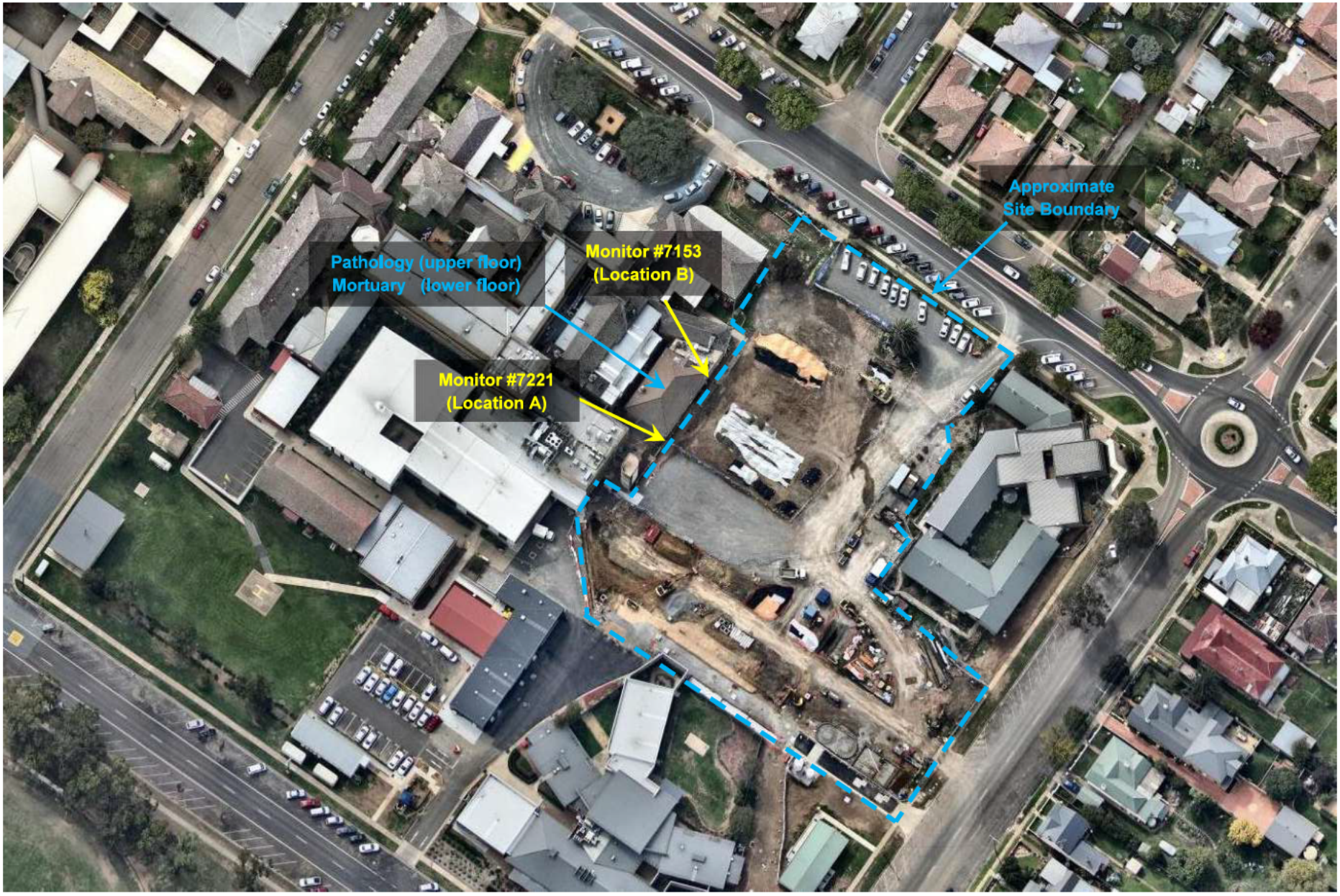
12:00
14:00
16:00
04-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
06-Apr-20 06:05
08:00
10:00
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
(for display purposes, time axis is stretched where triggered events occur)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location A - NE-cnr of pathology-mortuary building)
Monitor
7153
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
eVDV (m/s1.75)
1.0
0.8
0.6
0.4
0.2
0.0
30-Mar-20
31-Mar-20
01-Apr-20
02-Apr-20
03-Apr-20
04-Apr-20
06-Apr-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
VUJACA
Peak Particle Velocity (daily maxima, values <0.2 mm/s not recorded)
Allowed Vibration Limit
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
mm/s
30-Mar-20
31-Mar-20
01-Apr-20
02-Apr-20
03-Apr-20
04-Apr-20
05-Apr-20
06-Apr-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
VUJACA
Estimated Vibration Dose Value
Allowed Vibration Dose (maximum for critical areas)
1.0
0.8
0.6
0.4
0.2
0.0
eVDV (m/s1.75)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
30-Mar-20
31-Mar-20
1-Apr-20
2-Apr-20
3-Apr-20
4-Apr-20
5-Apr-20
6-Apr-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Approximate
Site Boundary
Pathology (upper floor)
Mortuary (lower floor)
Monitor #7153
(Location B)
Monitor #7221
(Location A)

About this Report

Douglas Partners

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Geotechnics / Environment / Groundwater

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ABN 75 053 980 117
www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

Memorandum

To	[redacted] Hansen Yuncken Pty Ltd	[redacted]	
From	[redacted]	**Date**	16 Apr 2020
Subject	Vibration Monitoring Report 13 Goulburn Base Hospital Redevelopment	**Project No.** **Doc. No.**	94054.07 94054.07.R.013.Rev0

Installation and Monitoring

On 21 January 2020 Texcel Construction Vibration Monitors #7221, #7153 were relocated to the positions shown in the attached Monitoring Location Plan, before the start of augered piling. Both monitors were coupled to the ground with a surcharge, close to and at ground level of the adjacent building, which includes Pathology (upper floor) and the Mortuary (lower floor). The monitors were installed to manage vibrations generated during piling works. On 26 February 2020, Monitor #7221 was replaced with Omnidot Vibration Monitor "Vujaca". On 8 April 2020, Omnidot Vibration Monitor "Vujaca"was replaced with Monitor #7113.

With reference to the CNVMP (the Monitoring Plan), an "Allowed Vibration Limit" of 25 mm/s vector sum peak particle velocity (VSPPV) was assigned by DP based on the potential for damage to the adjacent structures and a Vibration Dose Value (VDV) of 0.20 $m/s^{1.75}$ for comfort of the occupants (whole body vibration). The monitors were configured for continuous monitoring Mon - Sat, 6 am - 6 pm, with SMS (text message) alarms to be sent automatically to Eugene Godfrey and DP in the event of vibration exceedances (vibration levels exceeding 7 mm/s VSPPV, as a contingency for impulsive events).

The eVDV shown in the attached graphs is a calculated estimate of VDV from velocity data rather than acquired acceleration data. The Dose Rate and Maximum Values refer to accumulated vibration activity per day during daytime hours and includes summations of RMS velocities, wavelength durations and amplitudes (as detailed in NSW EPA Assessing Vibration: A Technical Guideline, February 2006). "Critical Areas" includes hospital operating theatres and precision laboratories where sensitive operations are occurring, and these criteria are indicative only, therefore consideration of continuous and impulsive vibrations is included (as recommended), see attached graphs. The table of acceptable daily Dose Values, Table 2.4, includes a "Preferred Value", being half of the "Maximum Value".

Outcome this period: 6 April to 13 April 2020

Location	Monitor	Exceedances		Time of maximum exceedance
		No.	Max (VSPPV)	
Monitoring Location A	Vujaca/7113	0	n/a	n/a
Monitoring Location B	7153	12*	>55 mm/s	7-Apr, 1:56 pm

*Site manager reports that all exceedances were due to staff bumping and relocating monitor.

Douglas Partners Pty Ltd

[redacted]

Senior Geophysicist

Reviewed by

[redacted]

Principal

Attachments: Graphs of Vibration Levels, Monitor Location Plan, About This Report

Limitations

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DP's advice may be based on observations, measurements, tests, or derived interpretations. The accuracy of the advice provided by DP in this report may be affected by unobserved features and variations in ground conditions and conditions affecting vibration across the site, between and beyond the testing locations or by variations with time. Vibration monitoring and advice may also be limited by budget constraints imposed by others or by site accessibility.

The results provided in the report are indicative of the vibration levels at the sensor location(s) only and only during the specified period of monitoring. Vibration levels in other locations may therefore differ from those reported herein.

As neither estimations of safe operating distances for vibrations (if provided) nor the presence of an unattended vibration monitor can prevent exceedances, the real-time management of vibration remains the responsibility of Hansen Yuncken Pty Ltd and its plant operators. Interference with (e.g. movement or damage to) the monitoring equipment may influence readings and the Client is

responsible for advising DP immediately to assess whether readings are affected, re-installation and/or repair is required.

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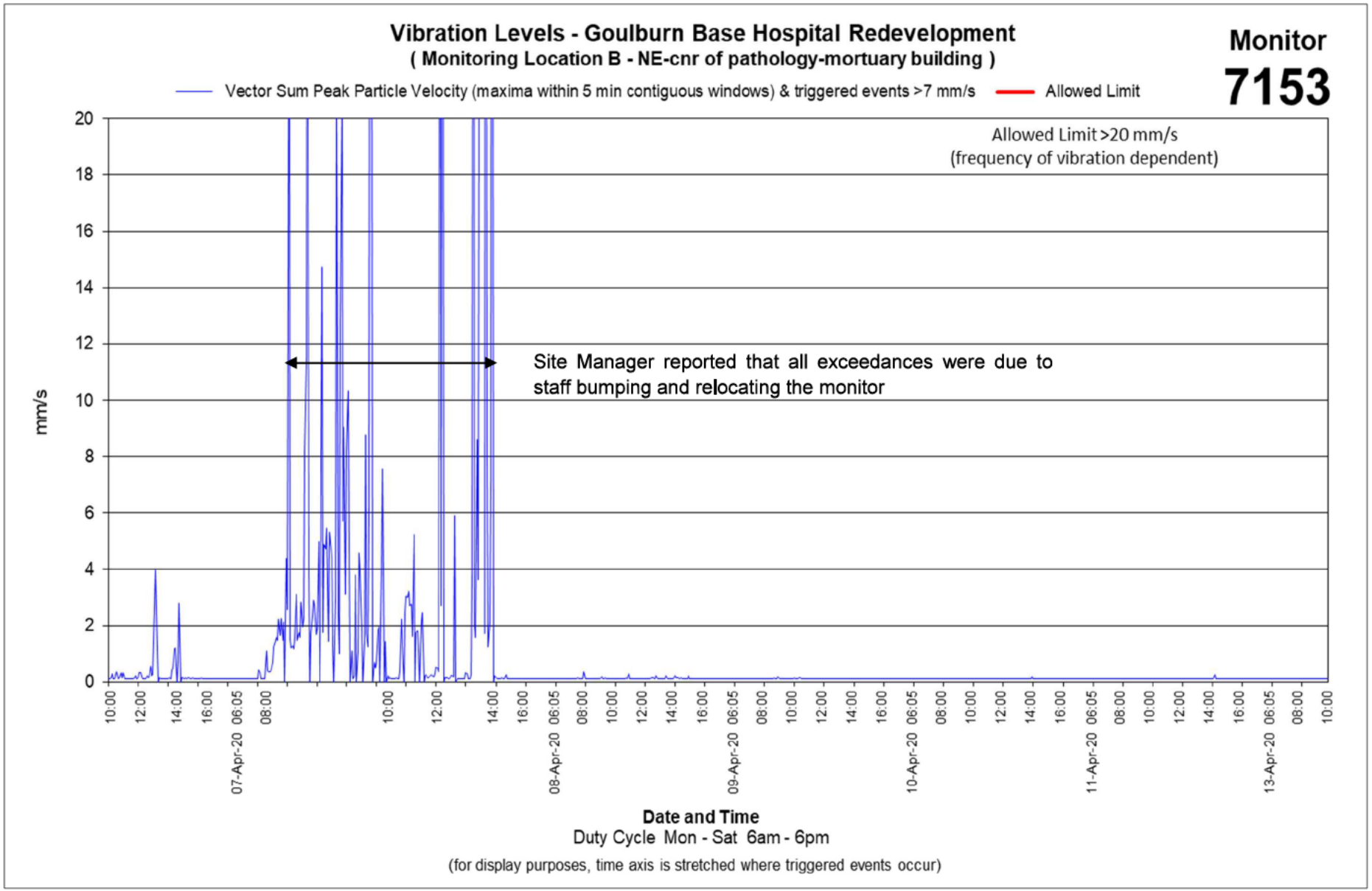
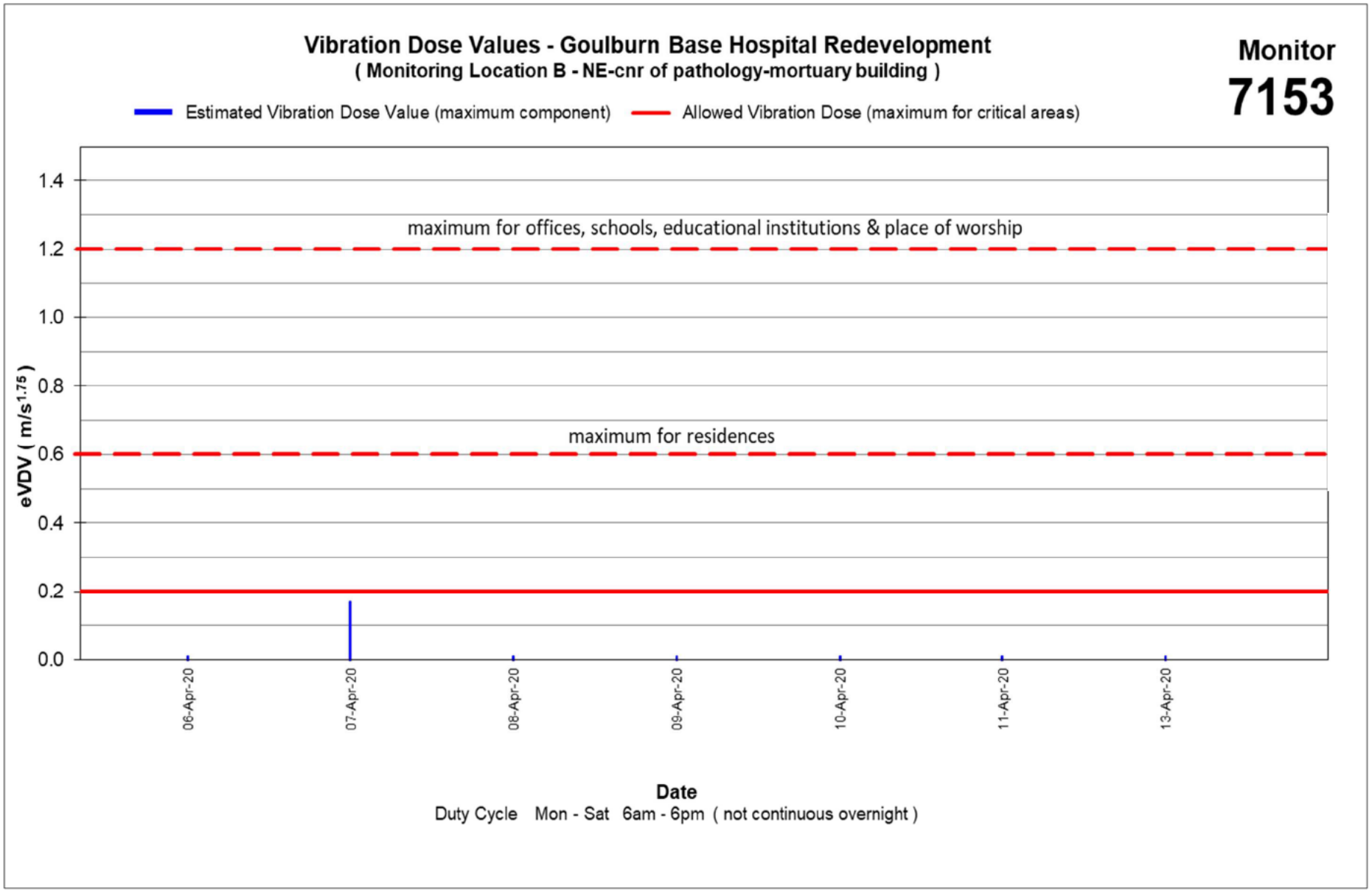
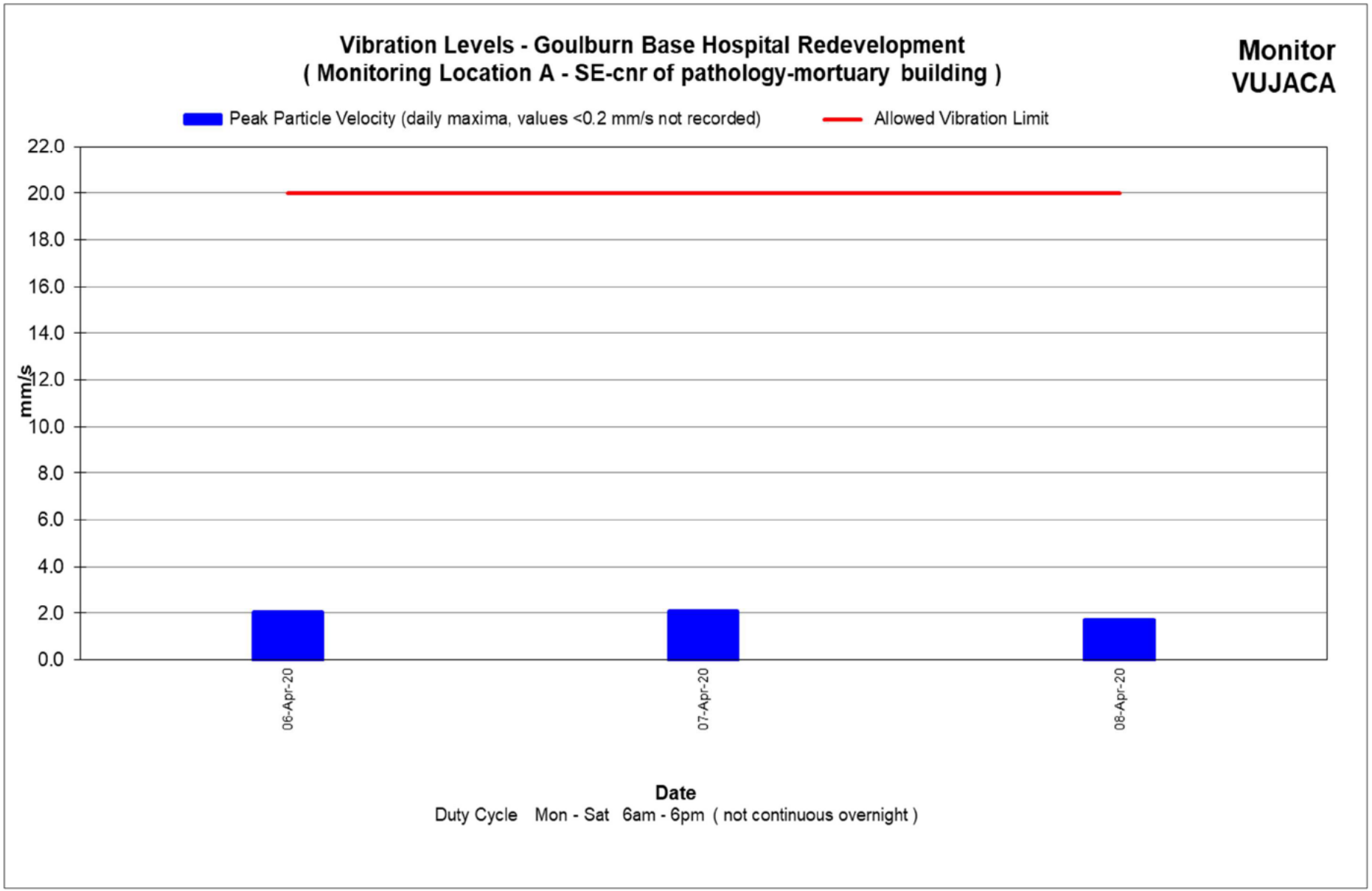
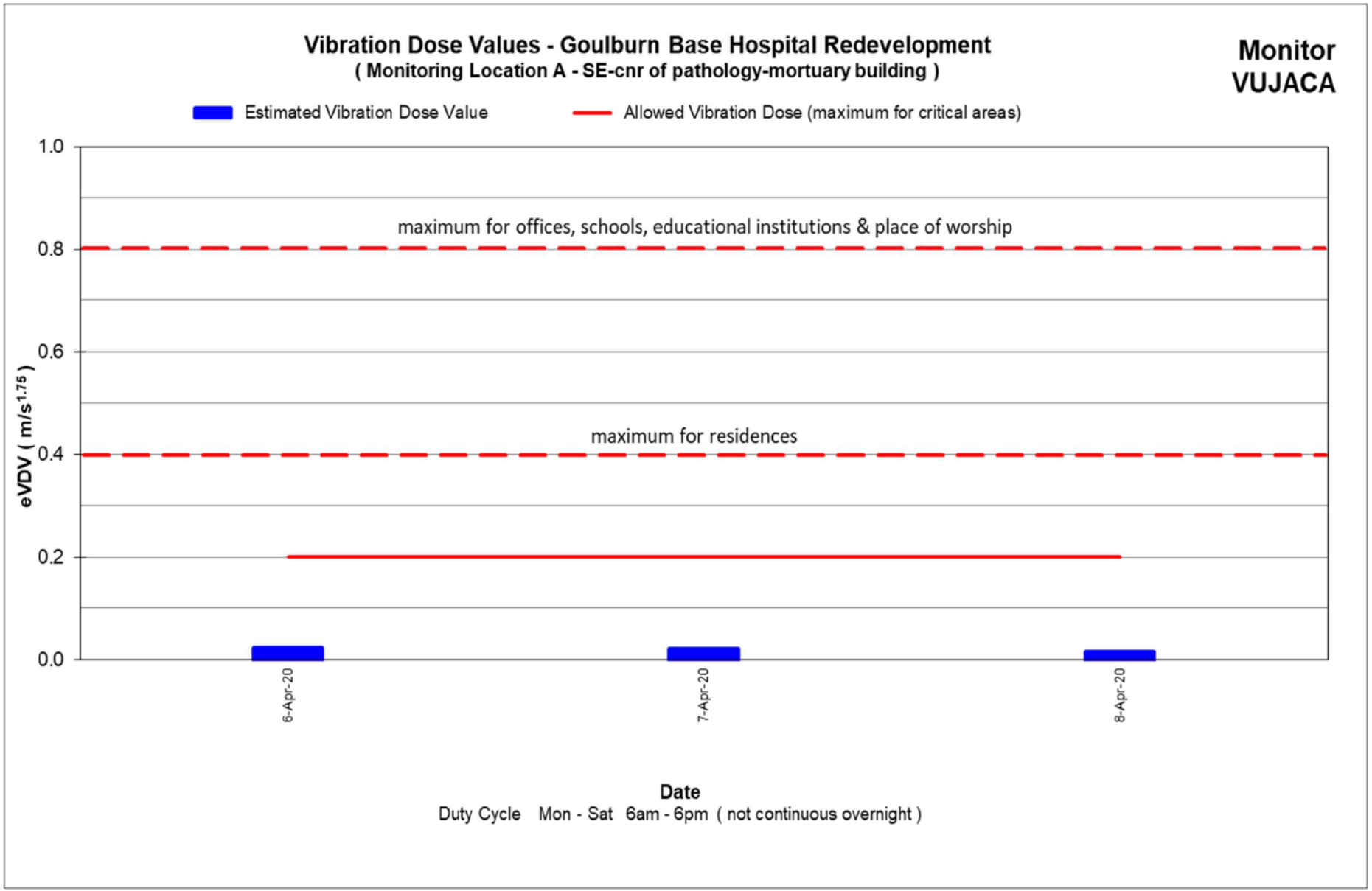
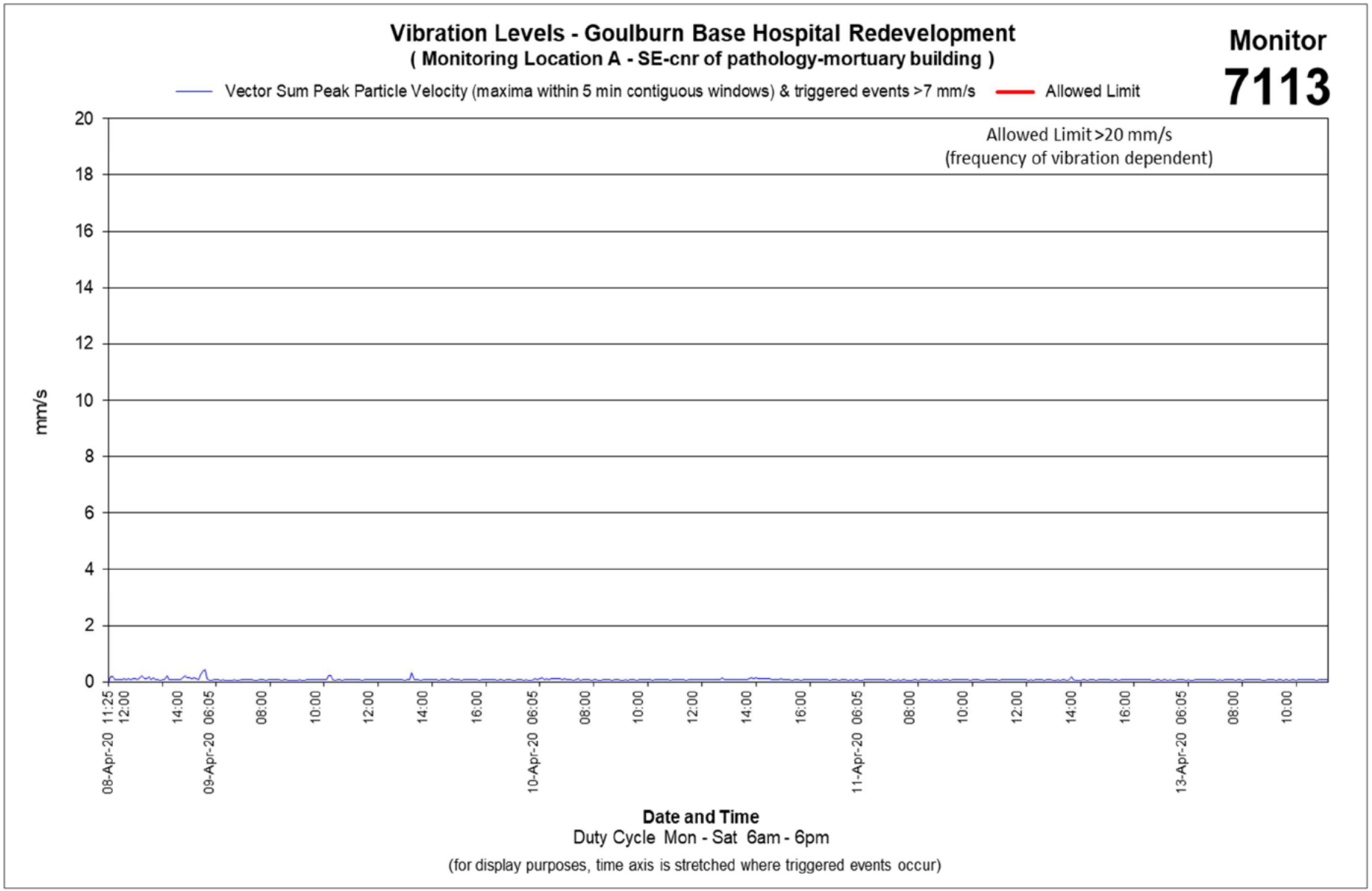

Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
Site Manager reported that all exceedances were due to staff bumping and relocating the monitor
mm/s
0
2
4
6
8
10
12
14
16
18
20
07-Apr-20
08-Apr-20
09-Apr-20
10-Apr-20
11-Apr-20
13-Apr-20
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
(for display purposes, time axis is stretched where triggered events occur)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
eVDV (m/s1.75)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
06-Apr-20
07-Apr-20
08-Apr-20
09-Apr-20
10-Apr-20
11-Apr-20
13-Apr-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
VUJACA
Peak Particle Velocity (daily maxima, values <0.2 mm/s not recorded)
Allowed Vibration Limit
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
mm/s
06-Apr-20
07-Apr-20
08-Apr-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
VUJACA
Estimated Vibration Dose Value
Allowed Vibration Dose (maximum for critical areas)
1.0
0.8
0.6
0.4
0.2
0.0
eVDV (m/s1.75)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
6-Apr-20
7-Apr-20
8-Apr-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
7113
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
10
8
6
4
2
0
08-Apr-20 11:25
12:00
14:00
09-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
10-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
11-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
13-Apr-20 06:05
08:00
10:00
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
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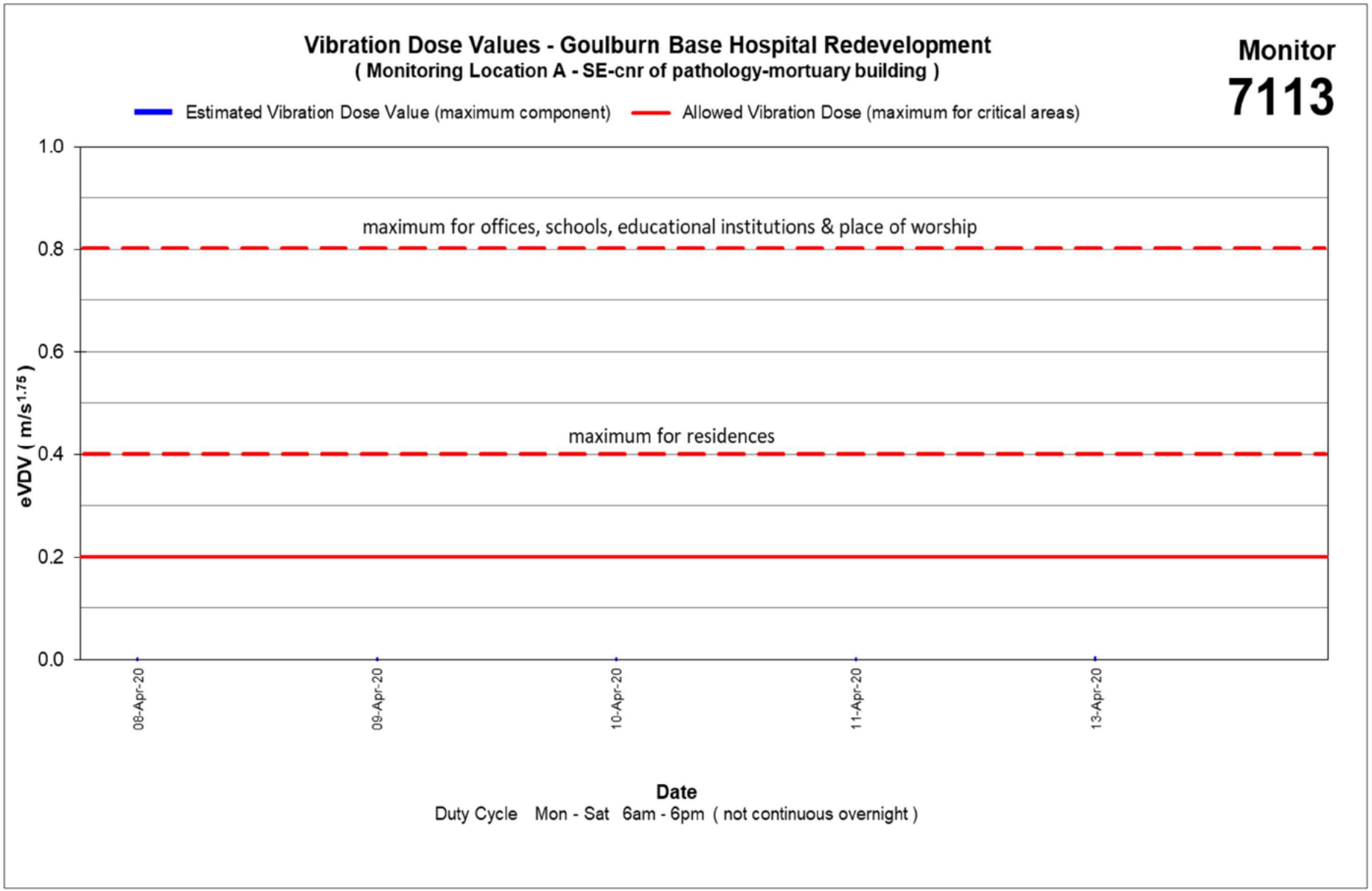
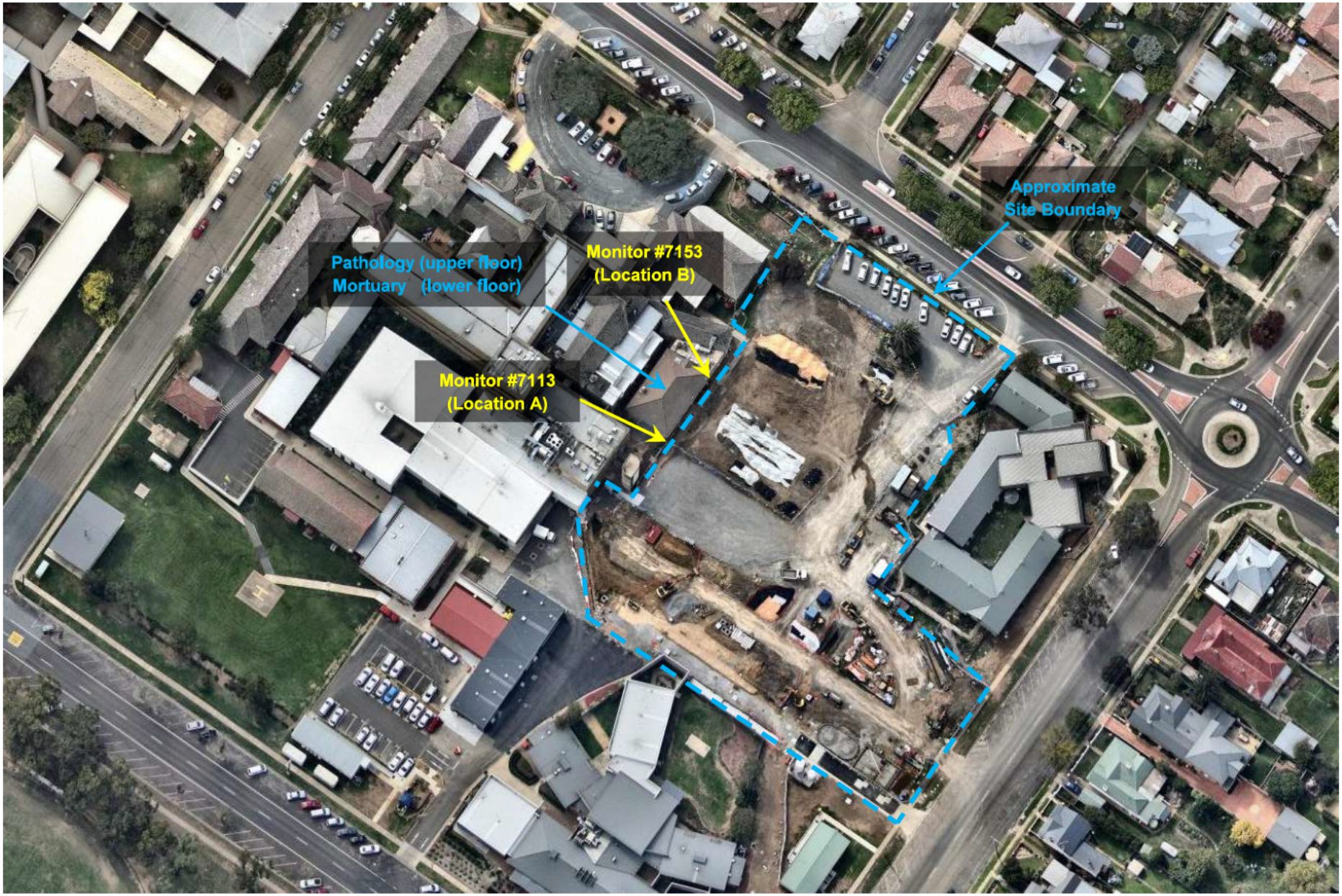

Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
7113
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
1.0
0.8
0.6
0.4
0.2
0.0
eVDV (m/s1.75)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
08-Apr-20
09-Apr-20
10-Apr-20
11-Apr-20
13-Apr-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Approximate
Site Boundary
Pathology (upper floor)
Mortuary (lower floor)
Monitor #7153
(Location B)
Monitor #7113
(Location A)

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

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- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Douglas Partners
Geotechnics / Environment / Groundwater

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

Memorandum

To	[redacted] Hansen Yuncken Pty Ltd	[redacted]	
From	[redacted]	**Date**	23 Apr 2020
Subject	Vibration Monitoring Report 14 Goulburn Base Hospital Redevelopment	**Project No.** **Doc. No.**	94054.07 94054.07.R.014.Rev0

Installation and Monitoring

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Outcome this period: 13 April to 20 April 2020

Location	Monitor	Exceedances		Time of maximum exceedance
		No.	Max (VSPPV)	
Monitoring Location A	7113	1*	40.8 mm/s	16-Apr, 1:54 pm
Monitoring Location B	7153	0	n/a	n/a

*Likely direct bump to sensor.

Douglas Partners Pty Ltd

[redacted]

Senior Geophysicist

Reviewed by

[redacted]

Principal

Attachments: Graphs of Vibration Levels, Monitor Location Plan, About This Report

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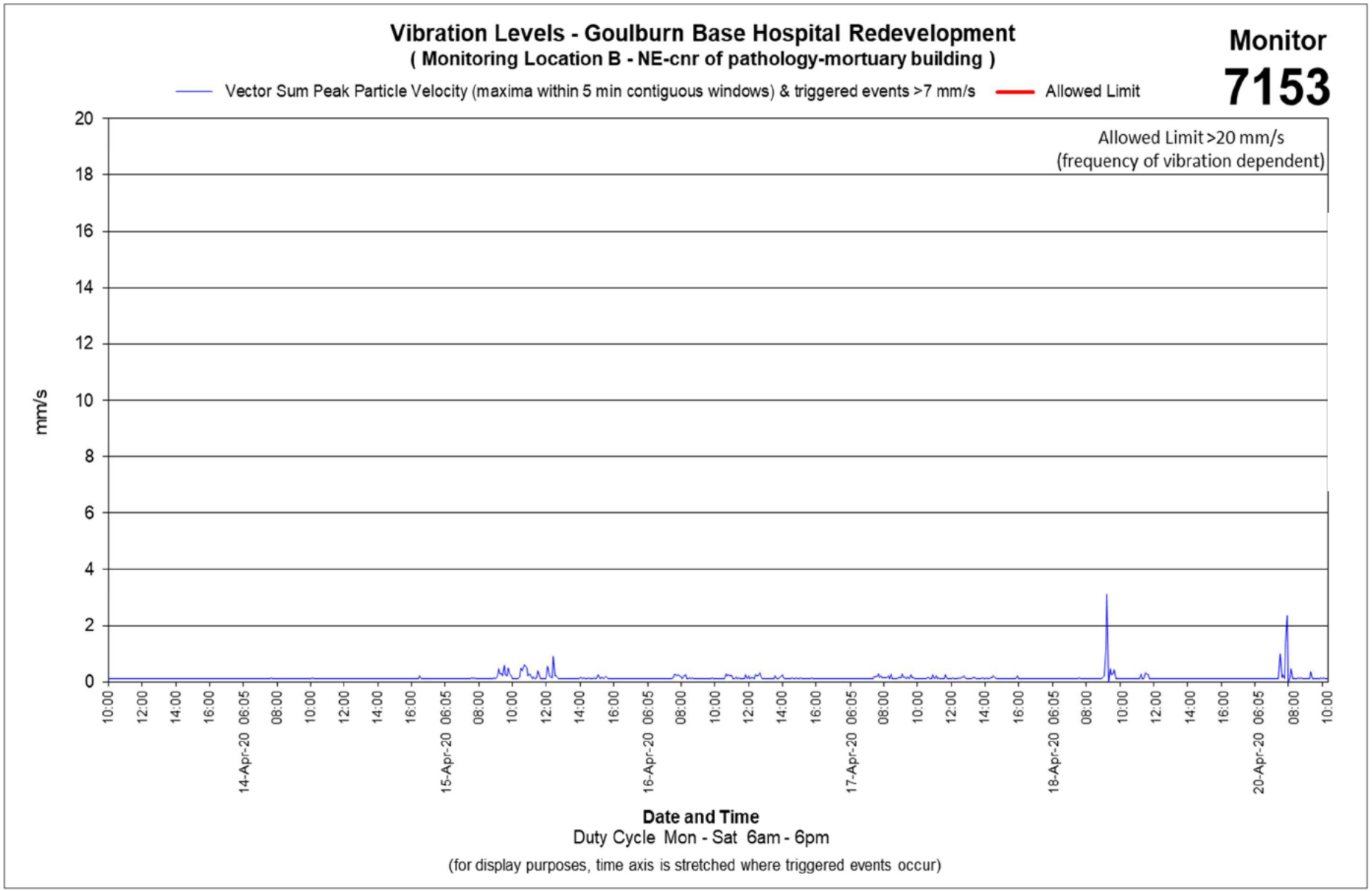
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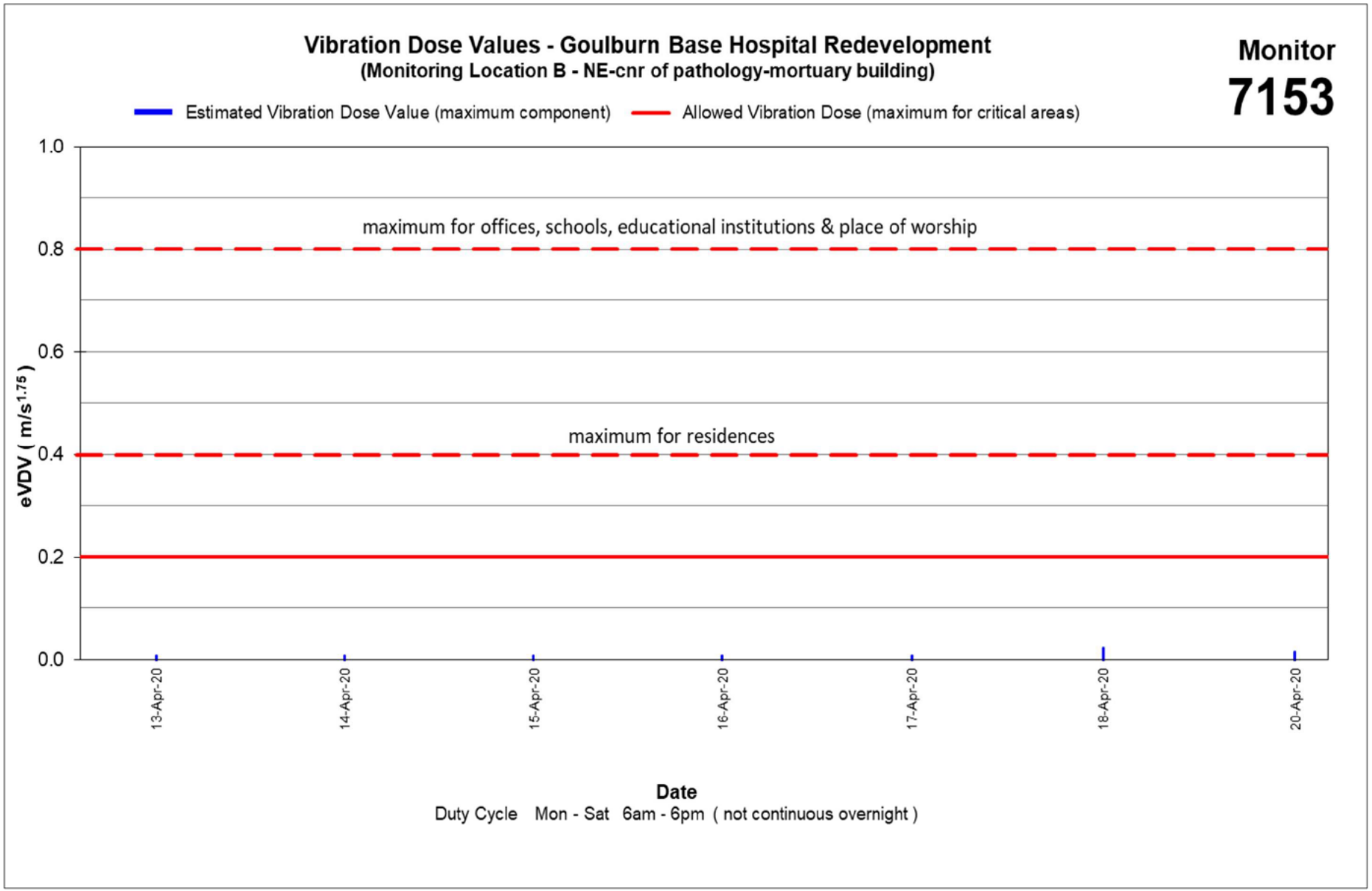
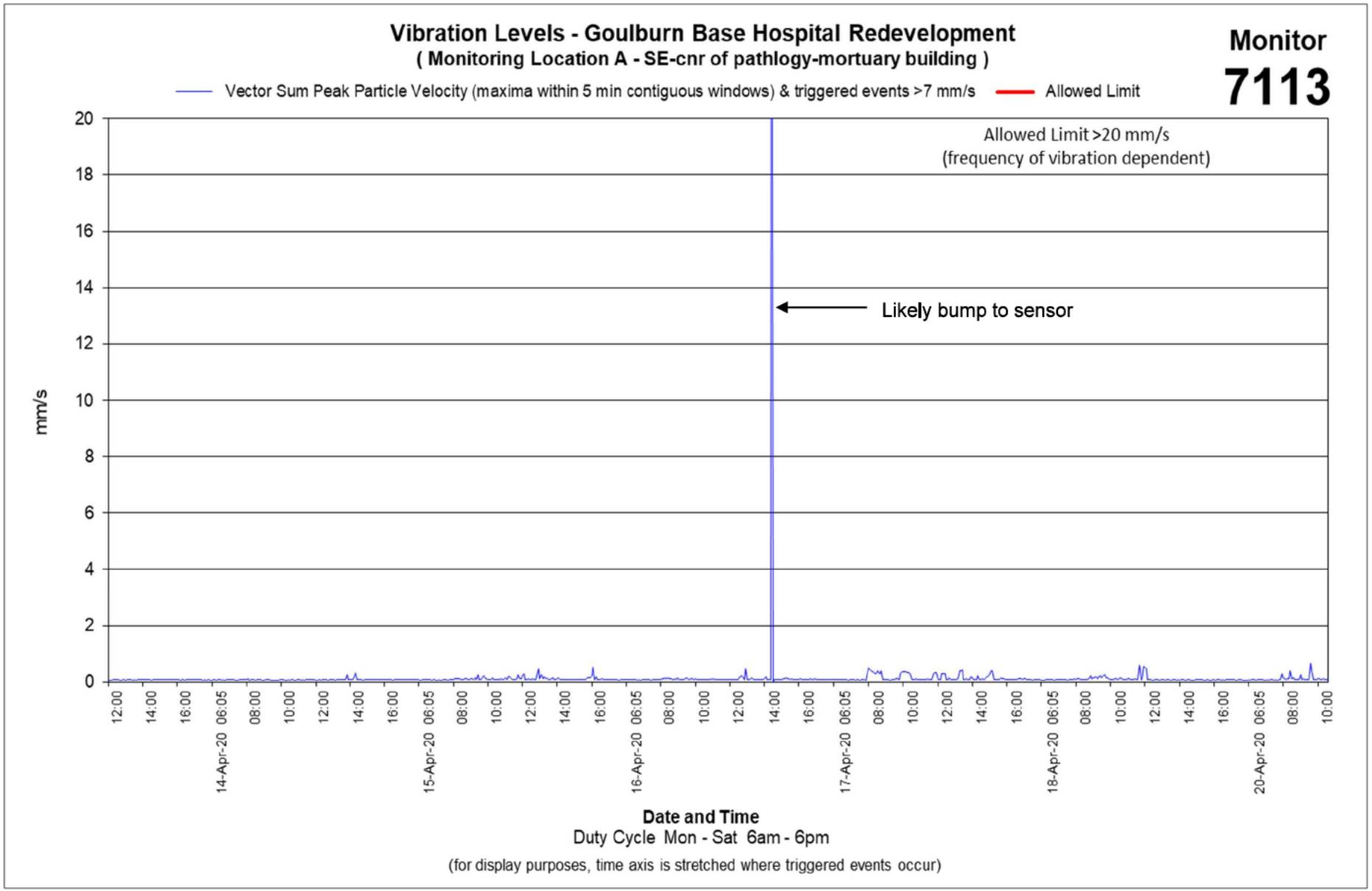
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
10
8
6
4
2
0
10:00
12:00
14:00
16:00
14-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
15-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
16-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
17-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
18-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
20-Apr-20 06:05
08:00
10:00
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
(for display purposes, time axis is stretched where triggered events occur)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
eVDV (m/s1.75)
1.0
0.8
0.6
0.4
0.2
0.0
13-Apr-20
14-Apr-20
15-Apr-20
16-Apr-20
17-Apr-20
18-Apr-20
20-Apr-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathlogy-mortuary building)
Monitor
7113
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
Likely bump to sensor
mm/s
20
18
16
14
12
10
8
6
4
2
0
12:00
14:00
16:00
14-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
15-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
16-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
17-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
18-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
20-Apr-20 06:05
08:00
10:00
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
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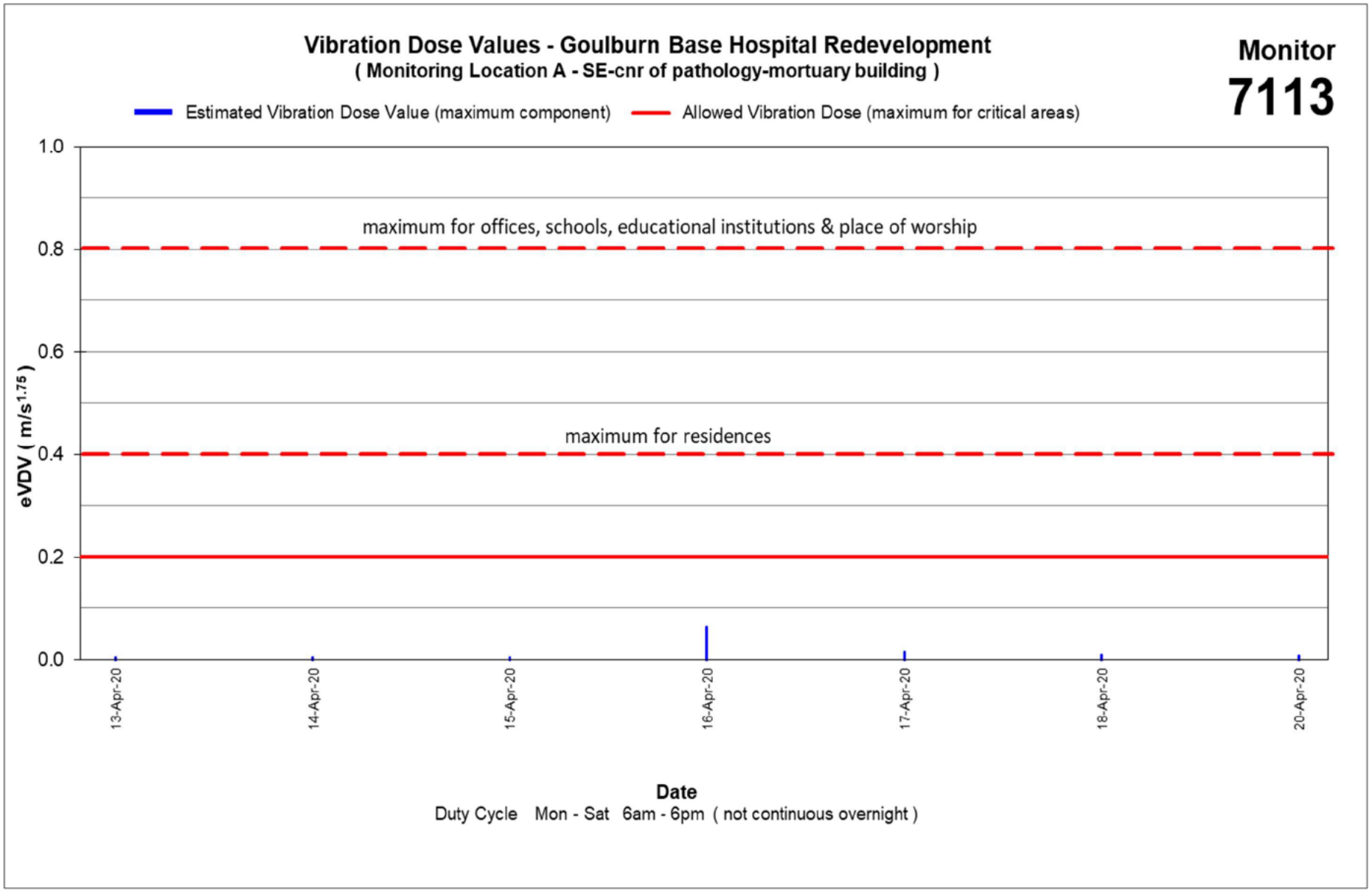
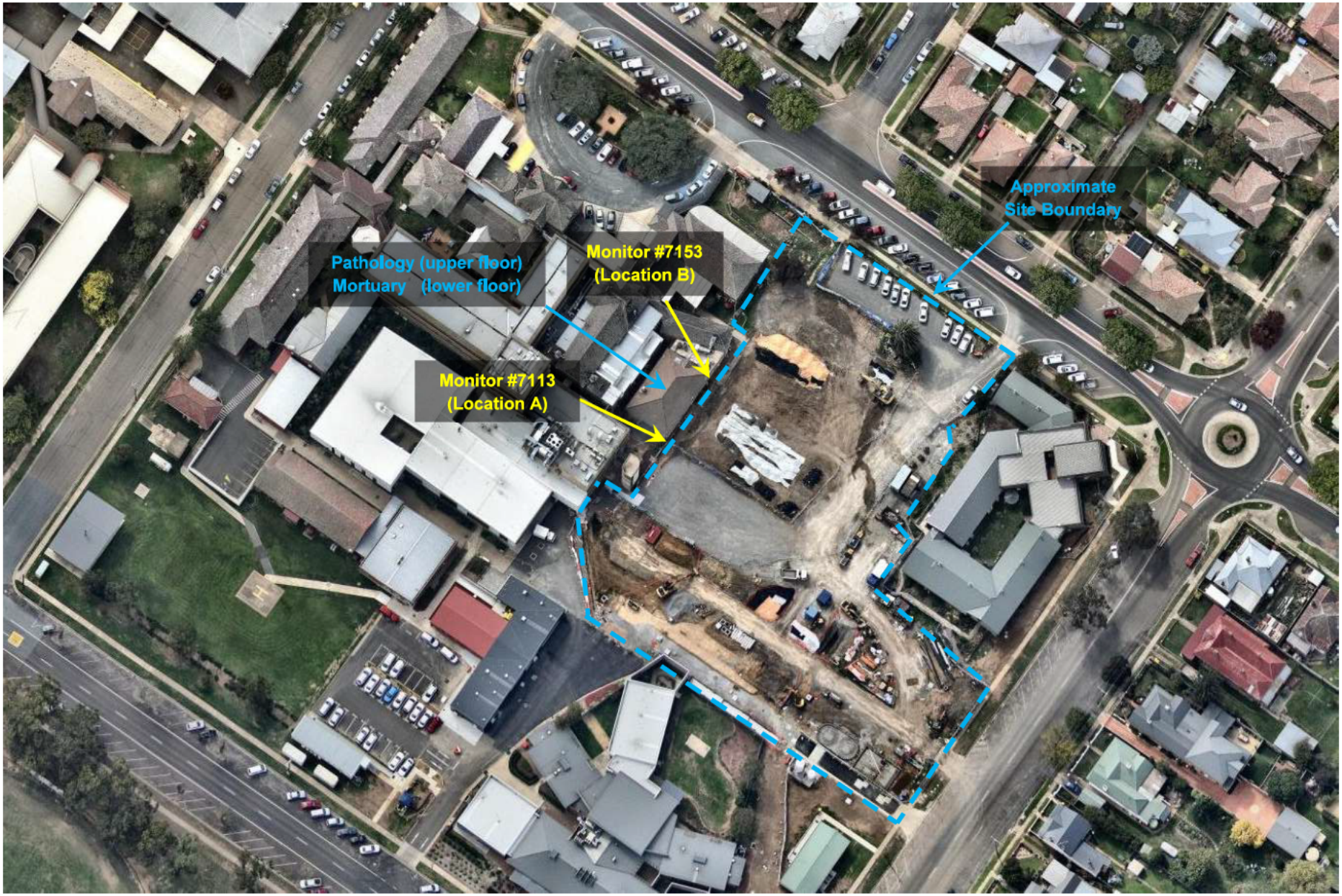

Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
7113
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
1.0
0.8
0.6
0.4
0.2
0.0
eVDV (m/s1.75)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
13-Apr-20
14-Apr-20
15-Apr-20
16-Apr-20
17-Apr-20
18-Apr-20
20-Apr-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Approximate
Site Boundary
Pathology (upper floor)
Mortuary (lower floor)
Monitor #7153
(Location B)
Monitor #7113
(Location A)

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Douglas Partners

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Geotechnics / Environment / Groundwater

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www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

Memorandum

To	[redacted] Hansen Yuncken Pty Ltd	[redacted]	
From	[redacted]	**Date**	30 Apr 2020
Subject	Vibration Monitoring Report 15 Goulburn Base Hospital Redevelopment	**Project No.** **Doc. No.**	94054.07 94054.07.R.015.Rev0

Installation and Monitoring

On 21 January 2020 Texcel Construction Vibration Monitors #7221, #7153 were relocated to the positions shown in the attached Monitoring Location Plan, before the start of augered piling. Both monitors were coupled to the ground with a surcharge, close to and at ground level of the adjacent building, which includes Pathology (upper floor) and the Mortuary (lower floor). The monitors were installed to manage vibrations generated during piling works. On 26 February 2020, Monitor #7221 was replaced with Omnidot Vibration Monitor "Vujaca". On 8 April 2020, Omnidot Vibration Monitor "Vujaca"was replaced with Monitor #7113.

With reference to the CNVMP (the Monitoring Plan), an "Allowed Vibration Limit" of 25 mm/s vector sum peak particle velocity (VSPPV) was assigned by DP based on the potential for damage to the adjacent structures and a Vibration Dose Value (VDV) of 0.20 $m/s^{1.75}$ for comfort of the occupants (whole body vibration). The monitors were configured for continuous monitoring Mon - Sat, 6 am - 6 pm, with SMS (text message) alarms to be sent automatically to Eugene Godfrey and DP in the event of vibration exceedances (vibration levels exceeding 7 mm/s VSPPV, as a contingency for impulsive events).

The eVDV shown in the attached graphs is a calculated estimate of VDV from velocity data rather than acquired acceleration data. The Dose Rate and Maximum Values refer to accumulated vibration activity per day during daytime hours and includes summations of RMS velocities, wavelength durations and amplitudes (as detailed in NSW EPA Assessing Vibration: A Technical Guideline, February 2006). "Critical Areas" includes hospital operating theatres and precision laboratories where sensitive operations are occurring, and these criteria are indicative only, therefore consideration of continuous and impulsive vibrations is included (as recommended), see attached graphs. The table of acceptable daily Dose Values, Table 2.4, includes a "Preferred Value", being half of the "Maximum Value".

Outcome this period: 20 April to 27 April 2020

Location	Monitor	Exceedances		Time of maximum exceedance
		No.	Max (VSPPV)	
Monitoring Location A	7113	0	n/a	n/a
Monitoring Location B	7153	0	n/a	n/a

Douglas Partners Pty Ltd

[redacted]

Senior Geophysicist

Reviewed by

[redacted]

Principal

Attachments: Graphs of Vibration Levels, Monitor Location Plan, About This Report

Limitations

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The results provided in the report are indicative of the vibration levels at the sensor location(s) only and only during the specified period of monitoring. Vibration levels in other locations may therefore differ from those reported herein.

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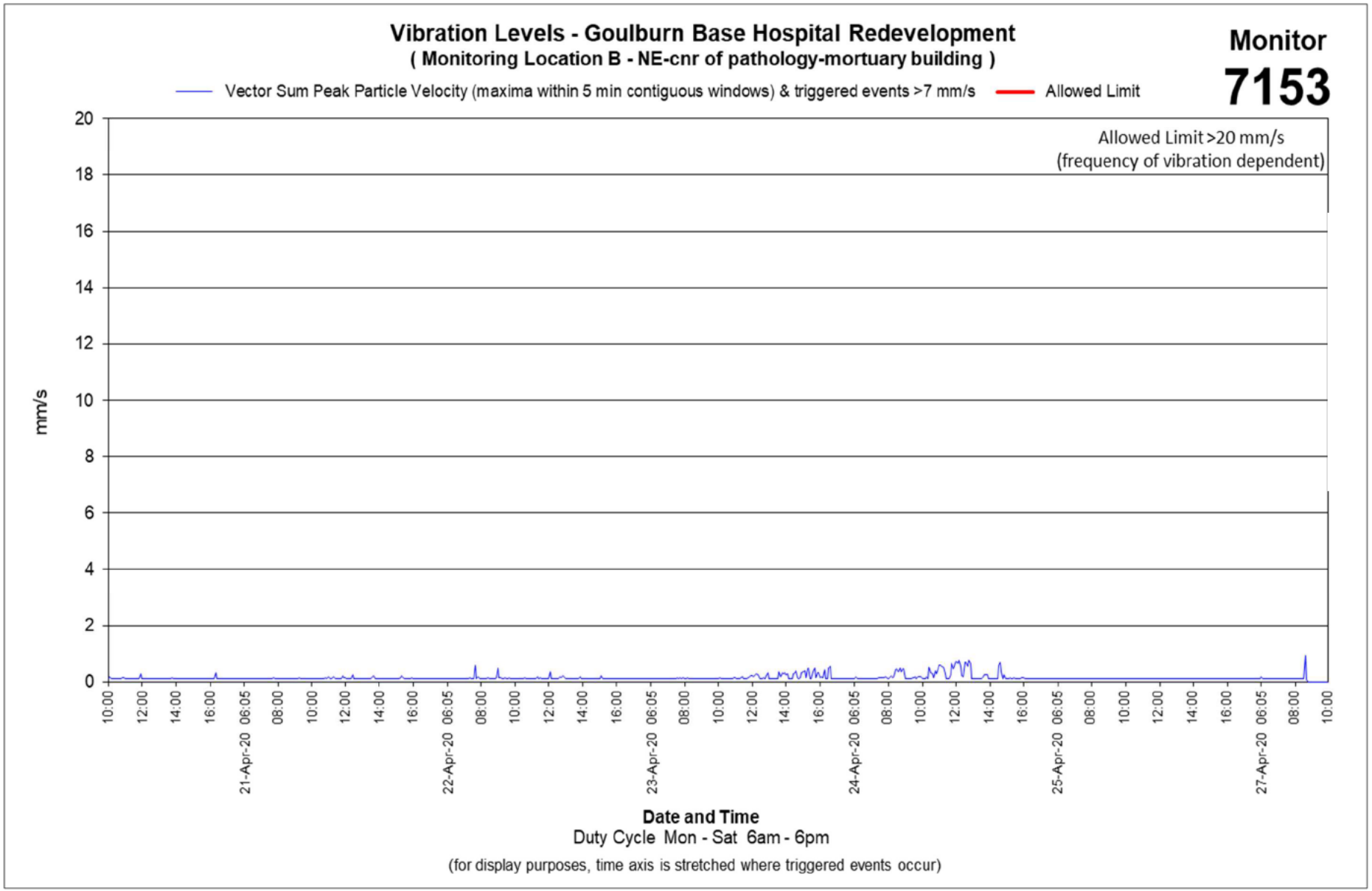
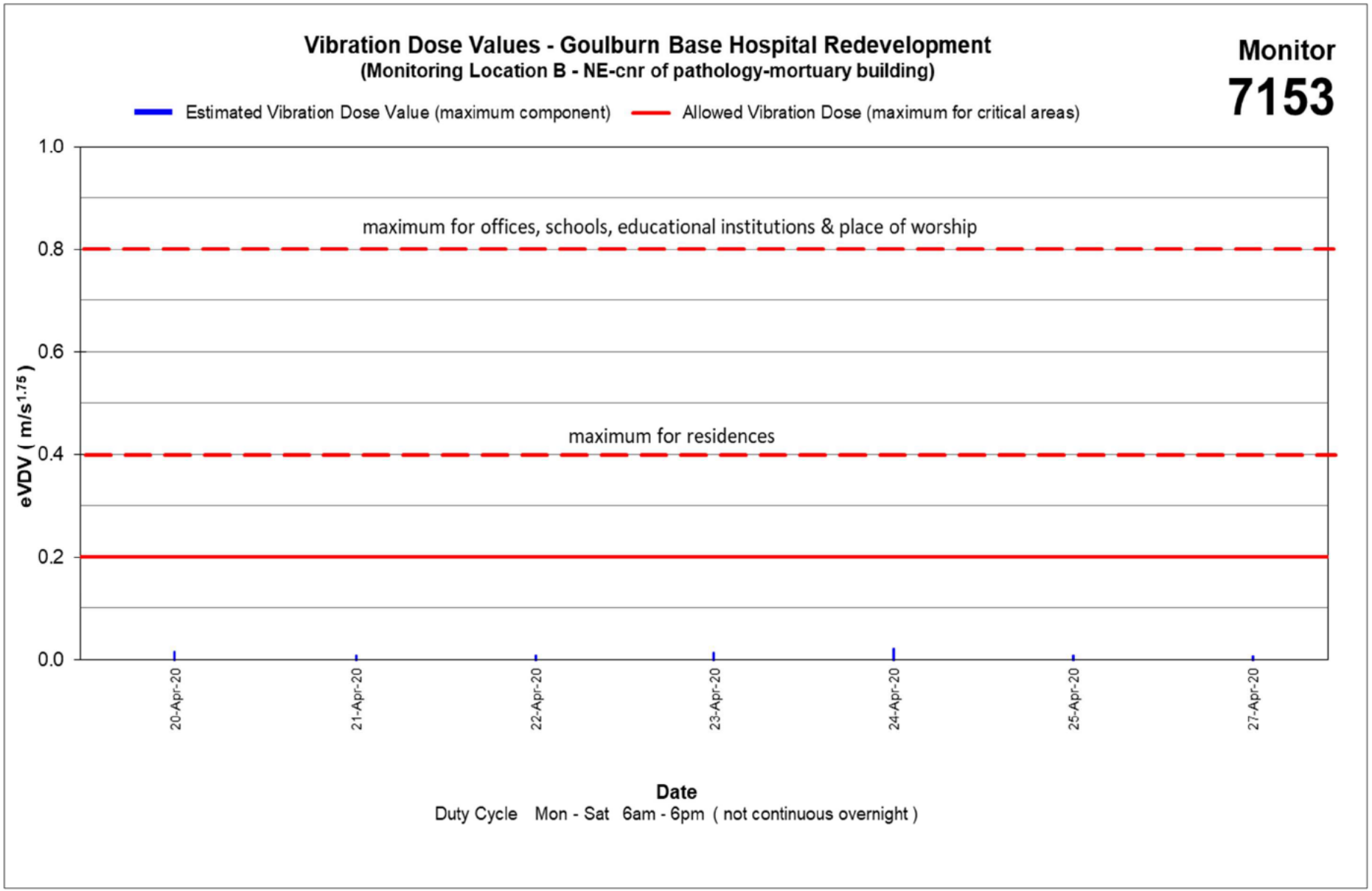
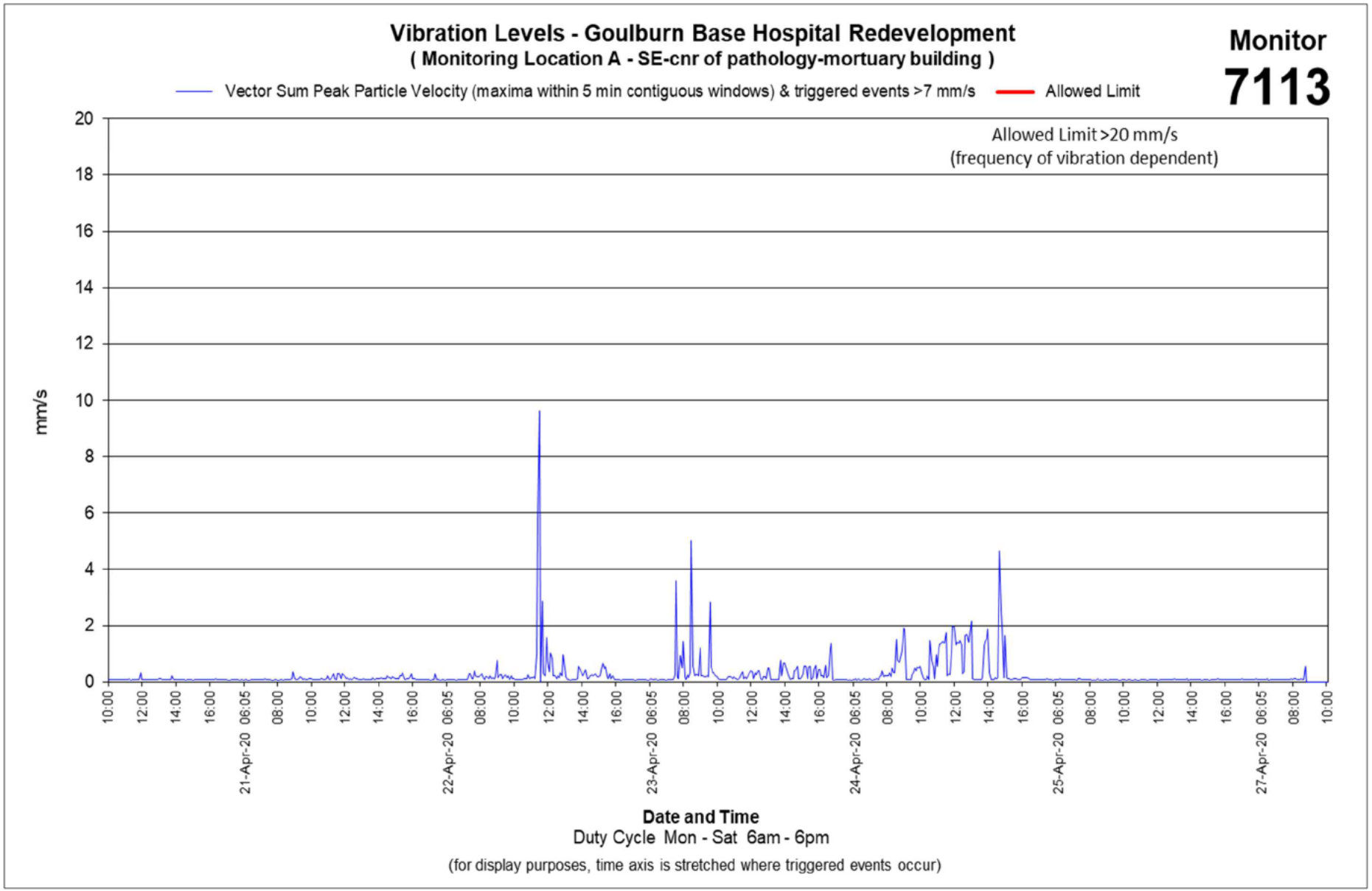

Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
10
8
6
4
2
0
10:00
12:00
14:00
16:00
21-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
22-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
23-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
24-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
25-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
27-Apr-20 06:05
08:00
10:00
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
(for display purposes, time axis is stretched where triggered events occur)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
eVDV (m/s1.75)
1.0
0.8
0.6
0.4
0.2
0.0
20-Apr-20
21-Apr-20
22-Apr-20
23-Apr-20
24-Apr-20
25-Apr-20
27-Apr-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
7113
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
10
8
6
4
2
0
10:00
12:00
14:00
16:00
21-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
22-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
23-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
24-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
25-Apr-20 06:05
08:00
10:00
12:00
14:00
16:00
27-Apr-20 06:05
08:00
10:00
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
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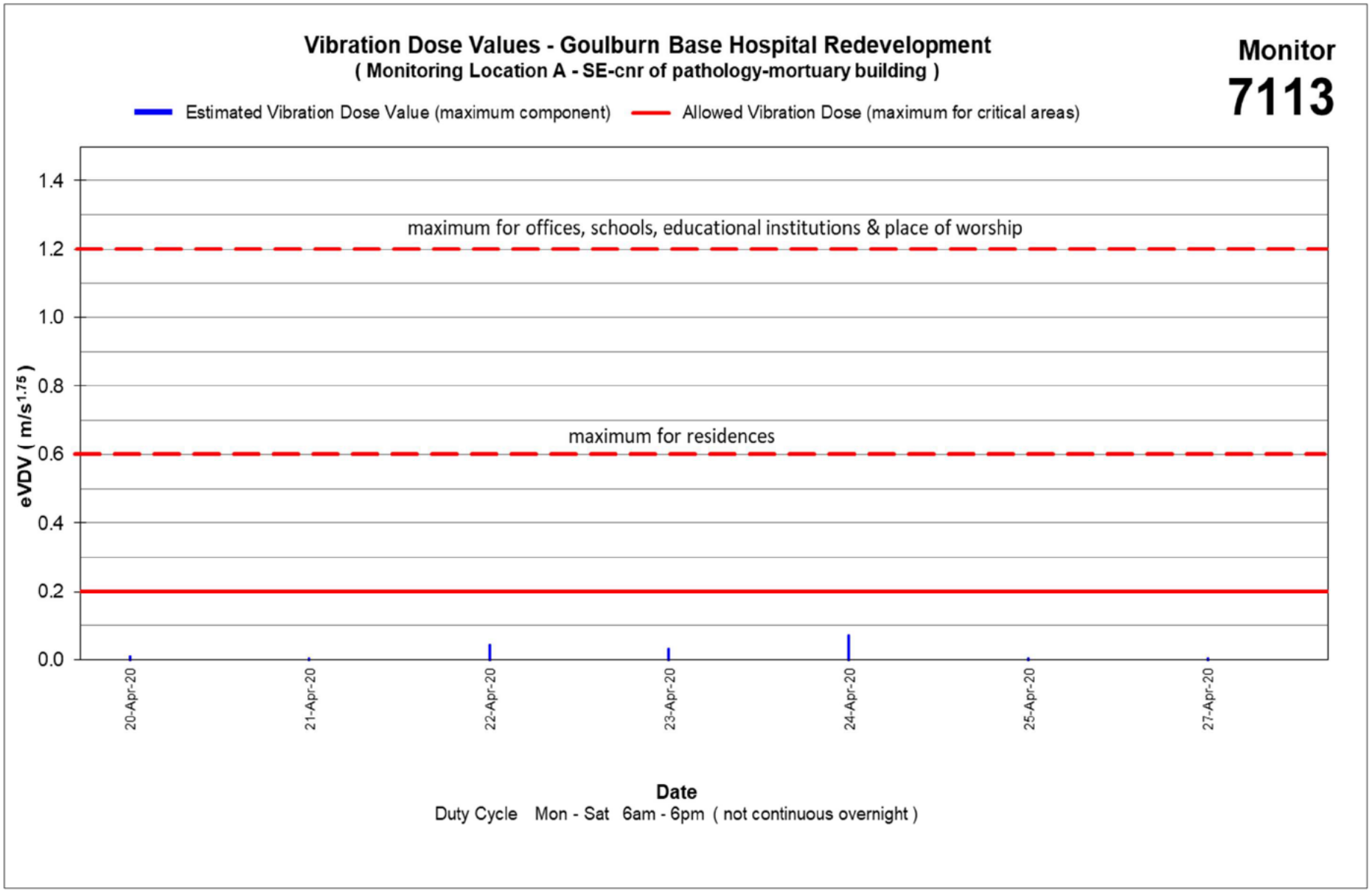
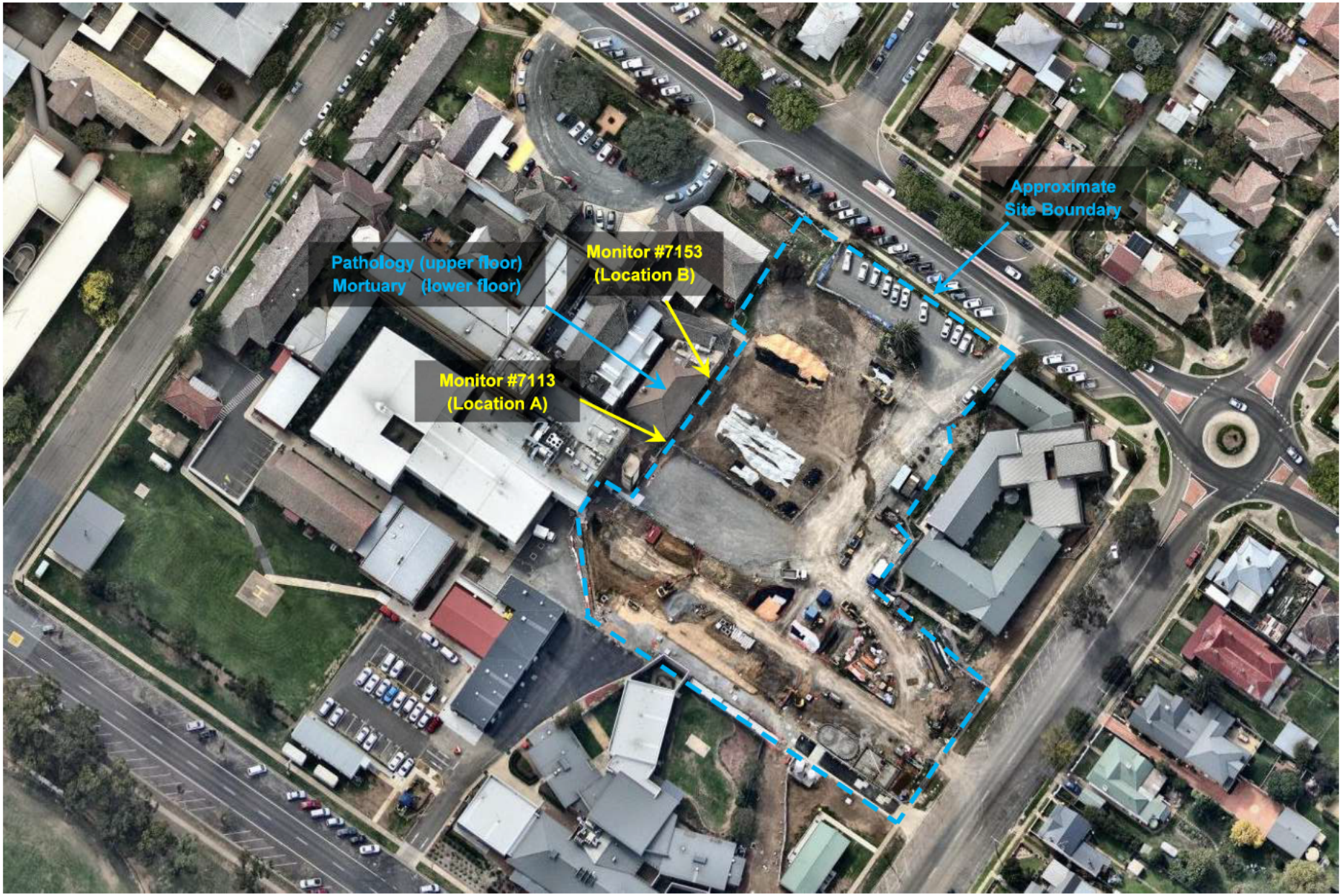

Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
7113
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
eVDV (m/s1.75)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
20-Apr-20
21-Apr-20
22-Apr-20
23-Apr-20
24-Apr-20
25-Apr-20
27-Apr-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Approximate
Site Boundary
Pathology (upper floor)
Mortuary (lower floor)
Monitor #7153
(Location B)
Monitor #7113
(Location A)

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

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Phone (02) 9809 0666

Memorandum

To	[redacted] Hansen Yuncken Pty Ltd	[redacted]	
From	[redacted]	**Date**	05 May 2020
Subject	Vibration Monitoring Report 16 Goulburn Base Hospital Redevelopment	**Project No.** **Doc. No.**	94054.07 94054.07.R.016.Rev0

Installation and Monitoring

On 21 January 2020 Texcel Construction Vibration Monitors #7221, #7153 were relocated to the positions shown in the attached Monitoring Location Plan, before the start of augered piling. Both monitors were coupled to the ground with a surcharge, close to and at ground level of the adjacent building, which includes Pathology (upper floor) and the Mortuary (lower floor). The monitors were installed to manage vibrations generated during piling works. On 26 February 2020, Monitor #7221 was replaced with Omnidot Vibration Monitor "Vujaca". On 8 April 2020, Omnidot Vibration Monitor "Vujaca"was replaced with Monitor #7113.

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Outcome this period: 27 April to 4 May 2020

Location	Monitor	Exceedances		Time of maximum exceedance
		No.	Max (VSPPV)	
Monitoring Location A	7113	0	n/a	n/a
Monitoring Location B	7153	0	n/a	n/a

Douglas Partners Pty Ltd

[redacted]

Senior Geophysicist

Reviewed by

[redacted]

Principal

Attachments: Graphs of Vibration Levels, Monitor Location Plan, About This Report

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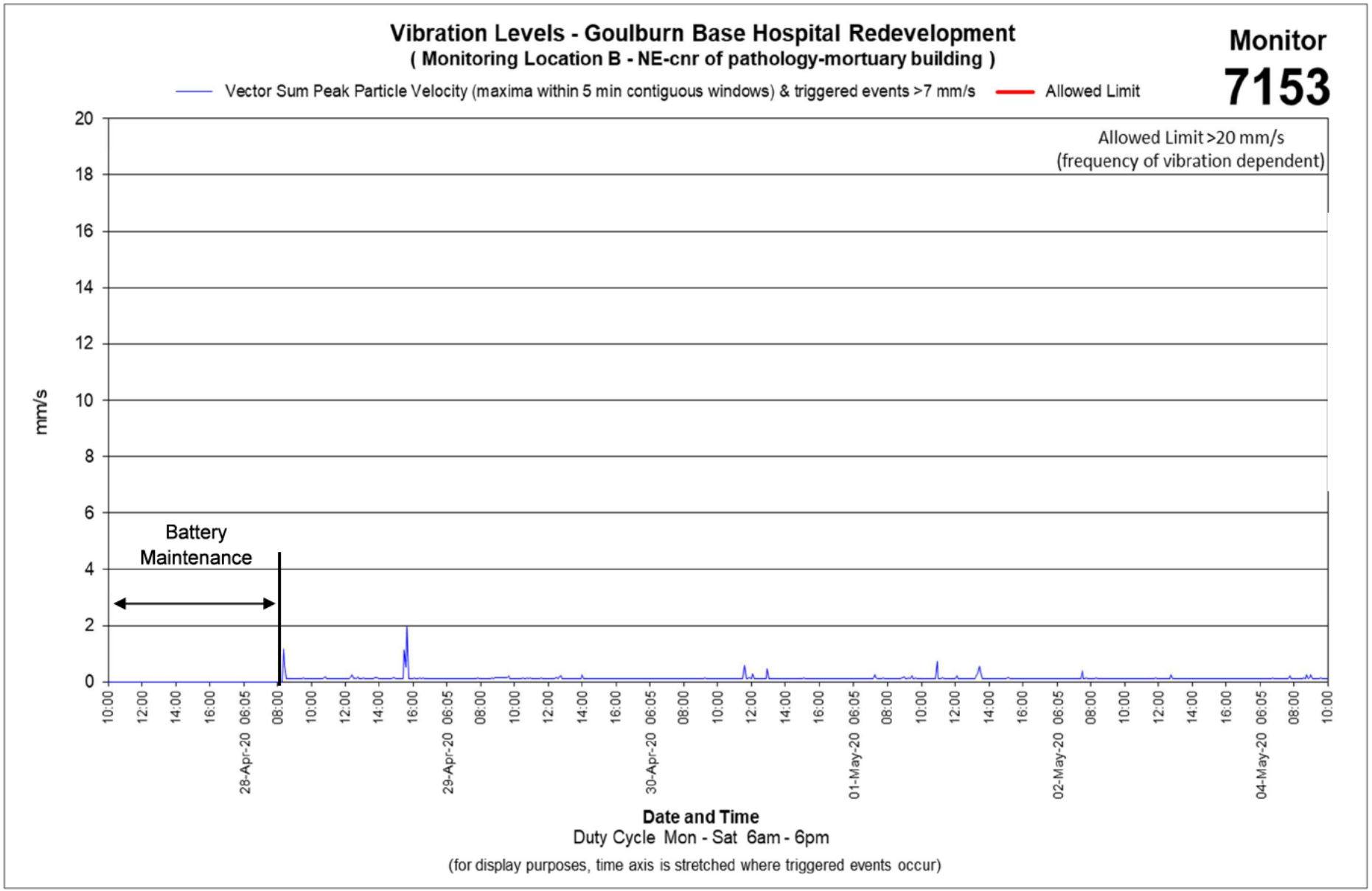
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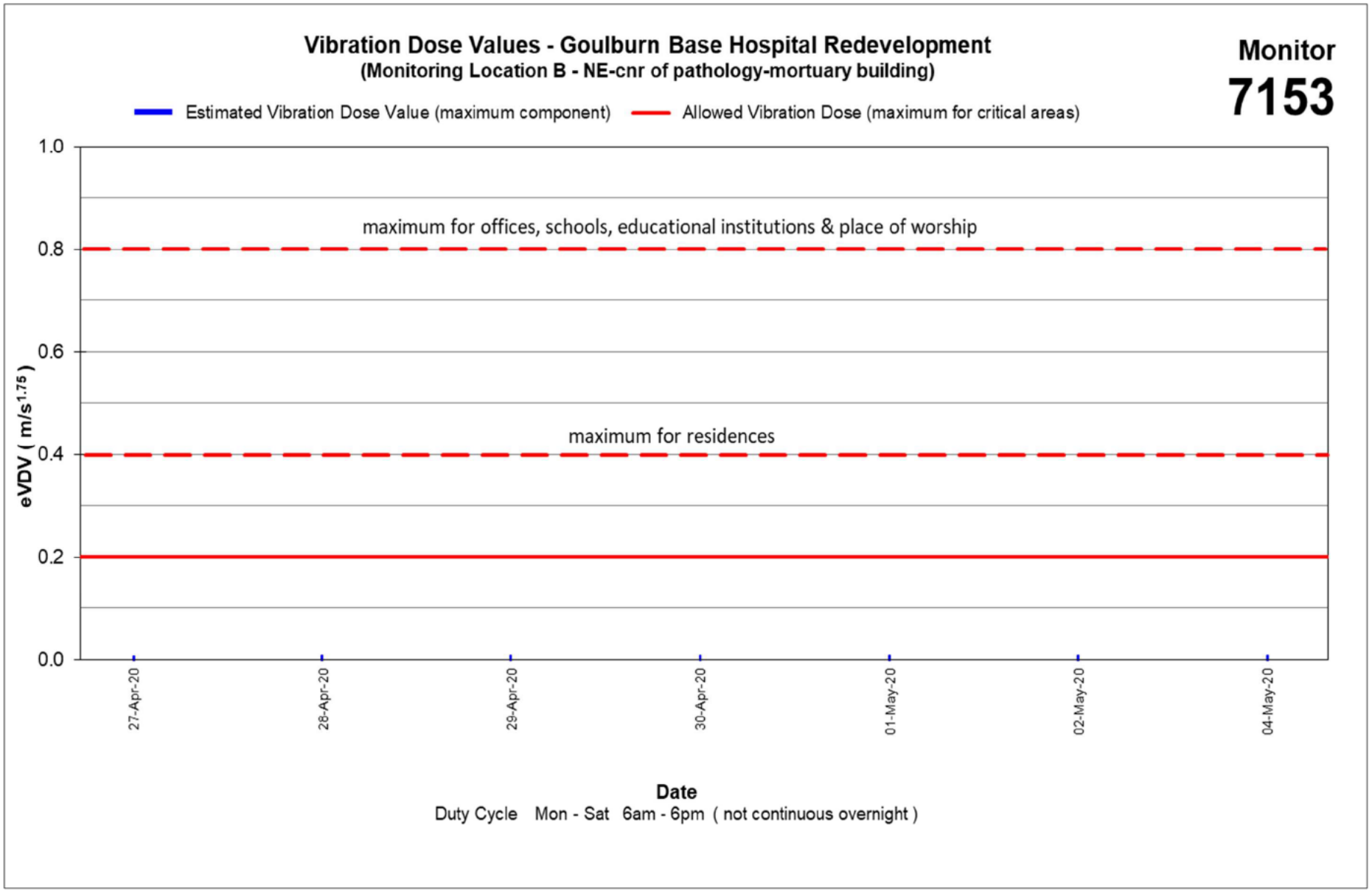
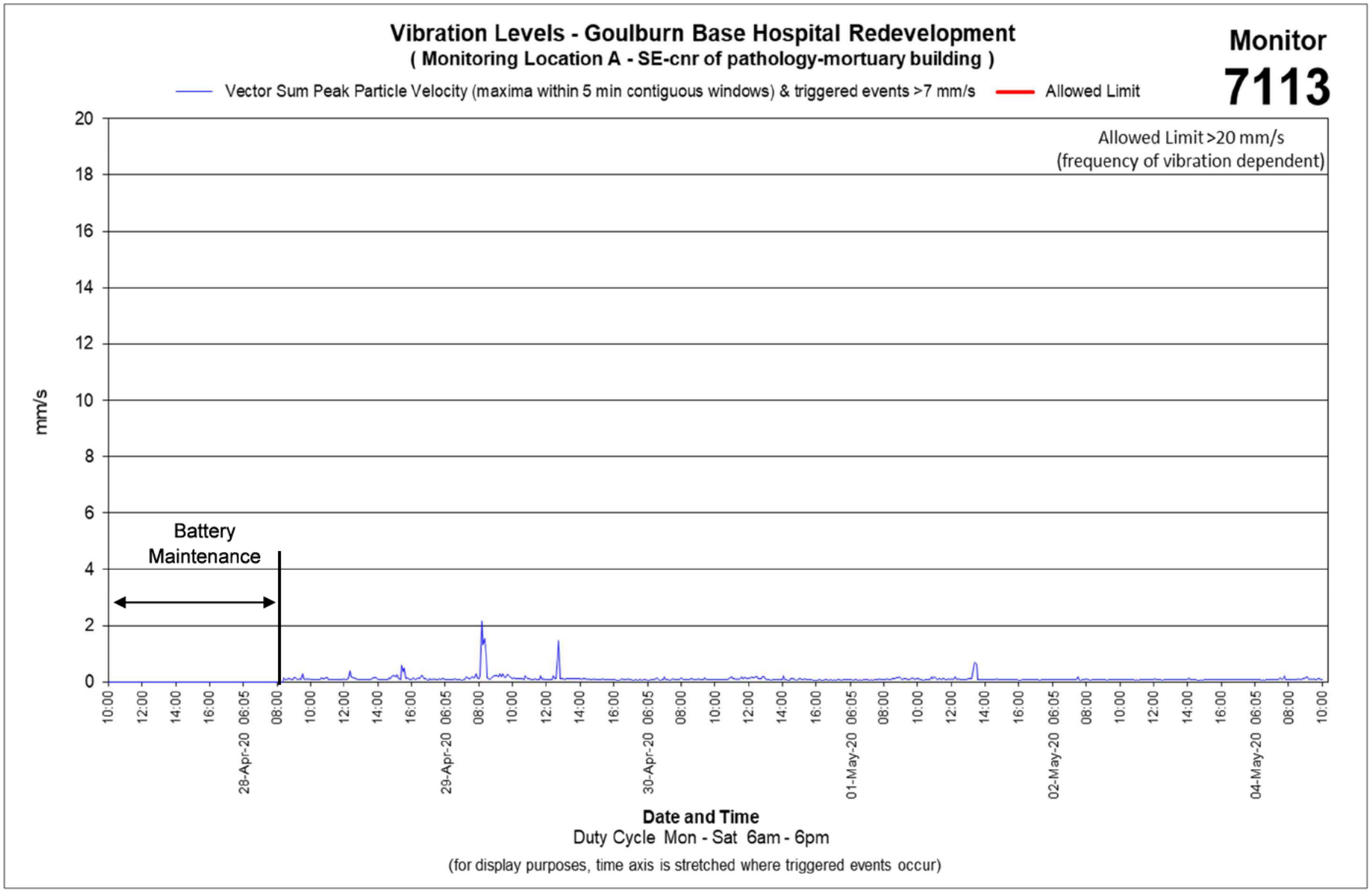
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
10
8
6
4
2
0
Battery
Maintenance
10:00
12:00
14:00
16:00
06:05
08:00
28-Apr-20
29-Apr-20
30-Apr-20
01-May-20
02-May-20
04-May-20
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
(for display purposes, time axis is stretched where triggered events occur)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
eVDV (m/s1.75)
1.0
0.8
0.6
0.4
0.2
0.0
27-Apr-20
28-Apr-20
29-Apr-20
30-Apr-20
01-May-20
02-May-20
04-May-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
7113
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
10
8
6
4
2
0
Battery
Maintenance
10:00
12:00
14:00
16:00
06:05
08:00
28-Apr-20
29-Apr-20
30-Apr-20
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02-May-20
04-May-20
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
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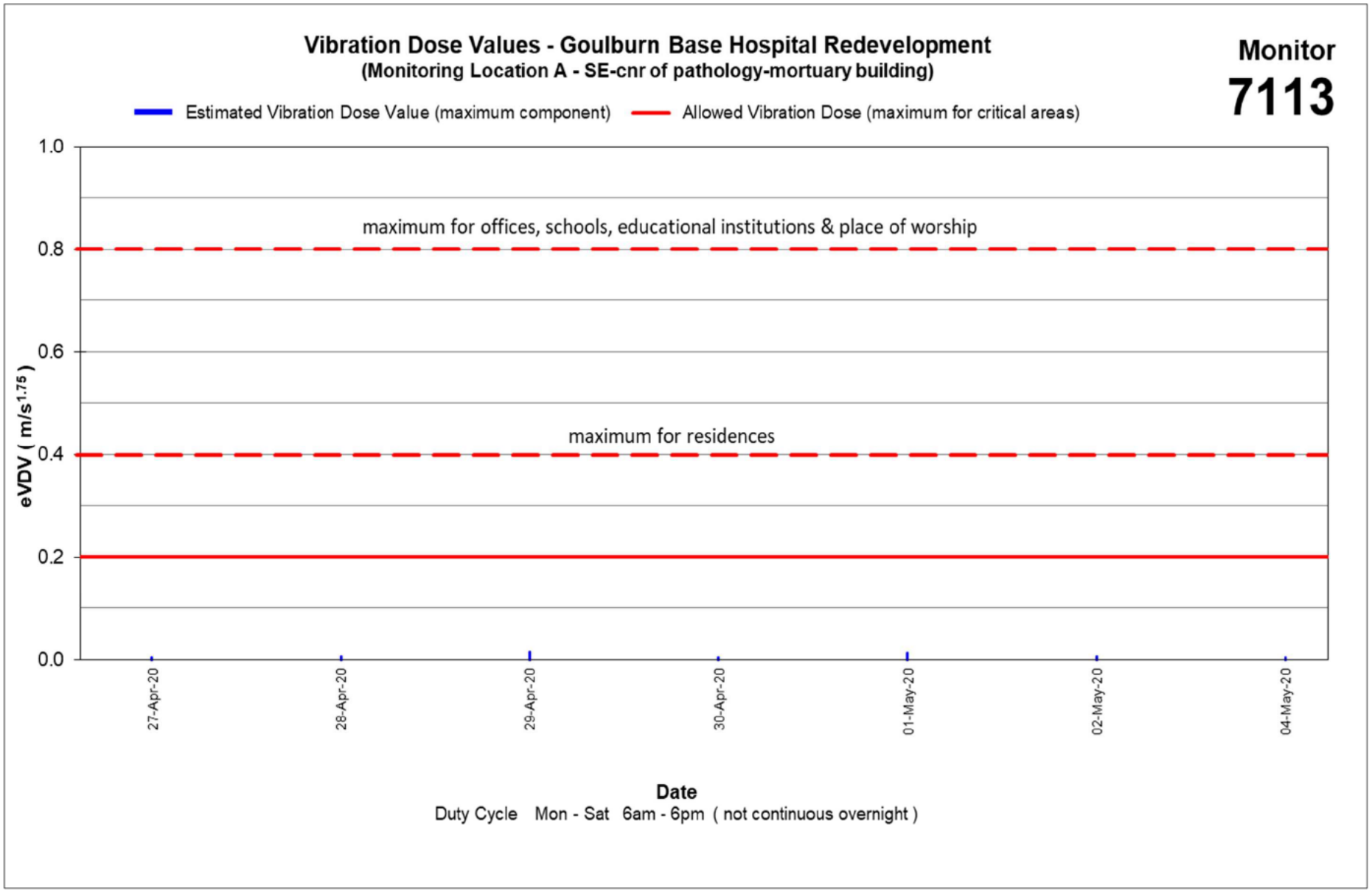
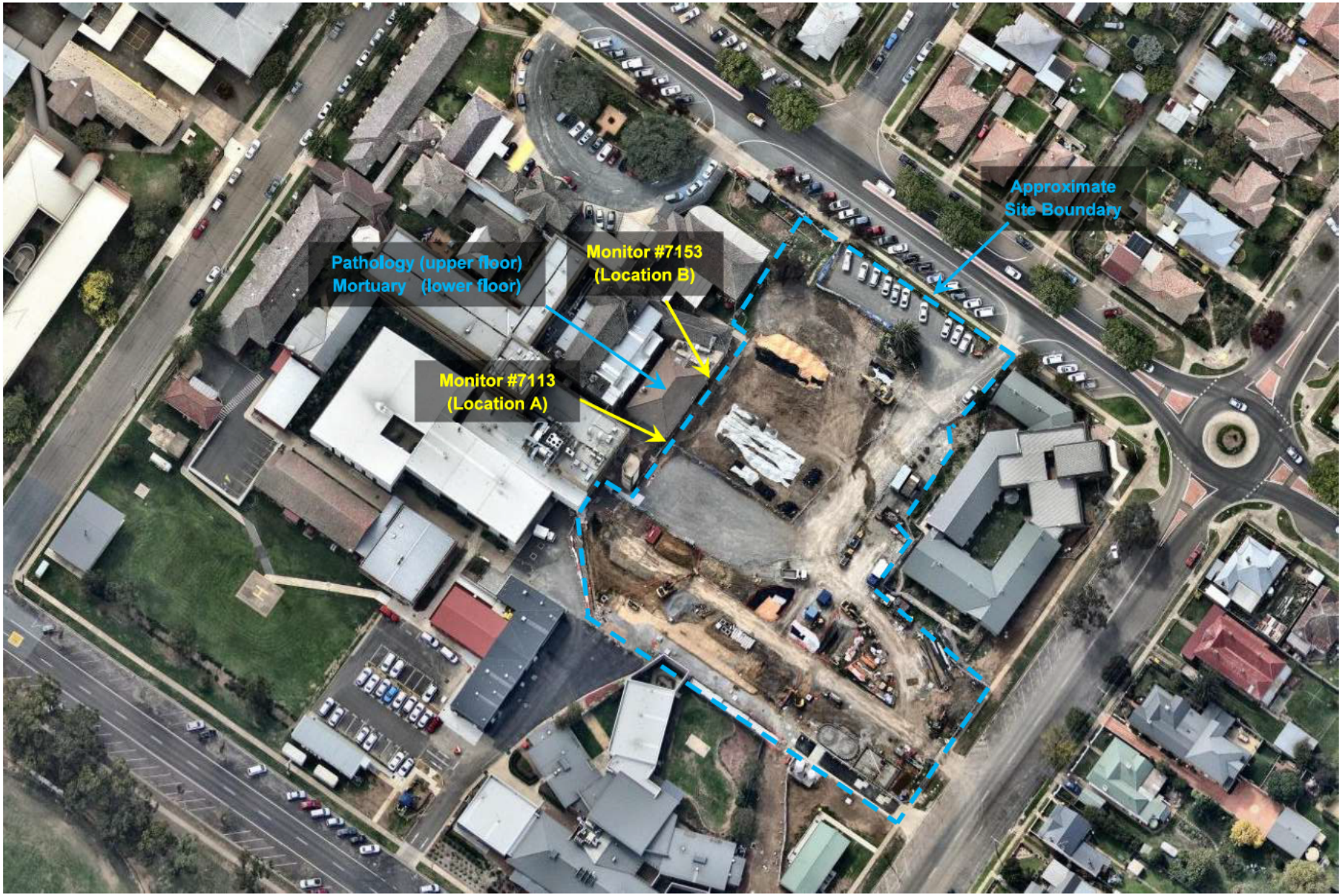

Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
7113
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
1.0
0.8
0.6
0.4
0.2
0.0
eVDV (m/s1.75)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
27-Apr-20
28-Apr-20
29-Apr-20
30-Apr-20
01-May-20
02-May-20
04-May-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Approximate
Site Boundary
Pathology (upper floor)
Mortuary (lower floor)
Monitor #7153
(Location B)
Monitor #7113
(Location A)

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Douglas Partners

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Phone (02) 9809 0666

Memorandum

To	[redacted] Hansen Yuncken Pty Ltd	[redacted]	
From	[redacted]	**Date**	12 May 2020
Subject	Vibration Monitoring Report 17 Goulburn Base Hospital Redevelopment	**Project No.** **Doc. No.**	94054.07 94054.07.R.017.Rev0

Installation and Monitoring

On 21 January 2020 Texcel Construction Vibration Monitors #7221, #7153 were relocated to the positions shown in the attached Monitoring Location Plan, before the start of augered piling. Both monitors were coupled to the ground with a surcharge, close to and at ground level of the adjacent building, which includes Pathology (upper floor) and the Mortuary (lower floor). The monitors were installed to manage vibrations generated during piling works. On 26 February 2020, Monitor #7221 was replaced with Omnidot Vibration Monitor "Vujaca". On 8 April 2020, Omnidot Vibration Monitor "Vujaca"was replaced with Monitor #7113.

With reference to the CNVMP (the Monitoring Plan), an "Allowed Vibration Limit" of 25 mm/s vector sum peak particle velocity (VSPPV) was assigned by DP based on the potential for damage to the adjacent structures and a Vibration Dose Value (VDV) of 0.20 $m/s^{1.75}$ for comfort of the occupants (whole body vibration). The monitors were configured for continuous monitoring Mon - Sat, 6 am - 6 pm, with SMS (text message) alarms to be sent automatically to Eugene Godfrey and DP in the event of vibration exceedances (vibration levels exceeding 7 mm/s VSPPV, as a contingency for impulsive events).

The eVDV shown in the attached graphs is a calculated estimate of VDV from velocity data rather than acquired acceleration data. The Dose Rate and Maximum Values refer to accumulated vibration activity per day during daytime hours and includes summations of RMS velocities, wavelength durations and amplitudes (as detailed in NSW EPA Assessing Vibration: A Technical Guideline, February 2006). "Critical Areas" includes hospital operating theatres and precision laboratories where sensitive operations are occurring, and these criteria are indicative only, therefore consideration of continuous and impulsive vibrations is included (as recommended), see attached graphs. The table of acceptable daily Dose Values, Table 2.4, includes a "Preferred Value", being half of the "Maximum Value".

Outcome this period: 4 May to 11 May 2020

Location	Monitor	Exceedances		Time of maximum exceedance
		No.	Max (VSPPV)	
Monitoring Location A	7113	0	n/a	n/a
Monitoring Location B	7153	0	n/a	n/a

Douglas Partners Pty Ltd

[redacted]

Senior Geophysicist

Reviewed by

[redacted]

Principal

Attachments: Graphs of Vibration Levels, Monitor Location Plan, About This Report

Limitations

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DP's advice may be based on observations, measurements, tests, or derived interpretations. The accuracy of the advice provided by DP in this report may be affected by unobserved features and variations in ground conditions and conditions affecting vibration across the site, between and beyond the testing locations or by variations with time. Vibration monitoring and advice may also be limited by budget constraints imposed by others or by site accessibility.

The results provided in the report are indicative of the vibration levels at the sensor location(s) only and only during the specified period of monitoring. Vibration levels in other locations may therefore differ from those reported herein.

As neither estimations of safe operating distances for vibrations (if provided) nor the presence of an unattended vibration monitor can prevent exceedances, the real-time management of vibration remains the responsibility of Hansen Yuncken Pty Ltd and its plant operators. Interference with (e.g. movement or damage to) the monitoring equipment may influence readings and the Client is responsible for advising DP immediately to assess whether readings are affected, re-installation and/or repair is required.

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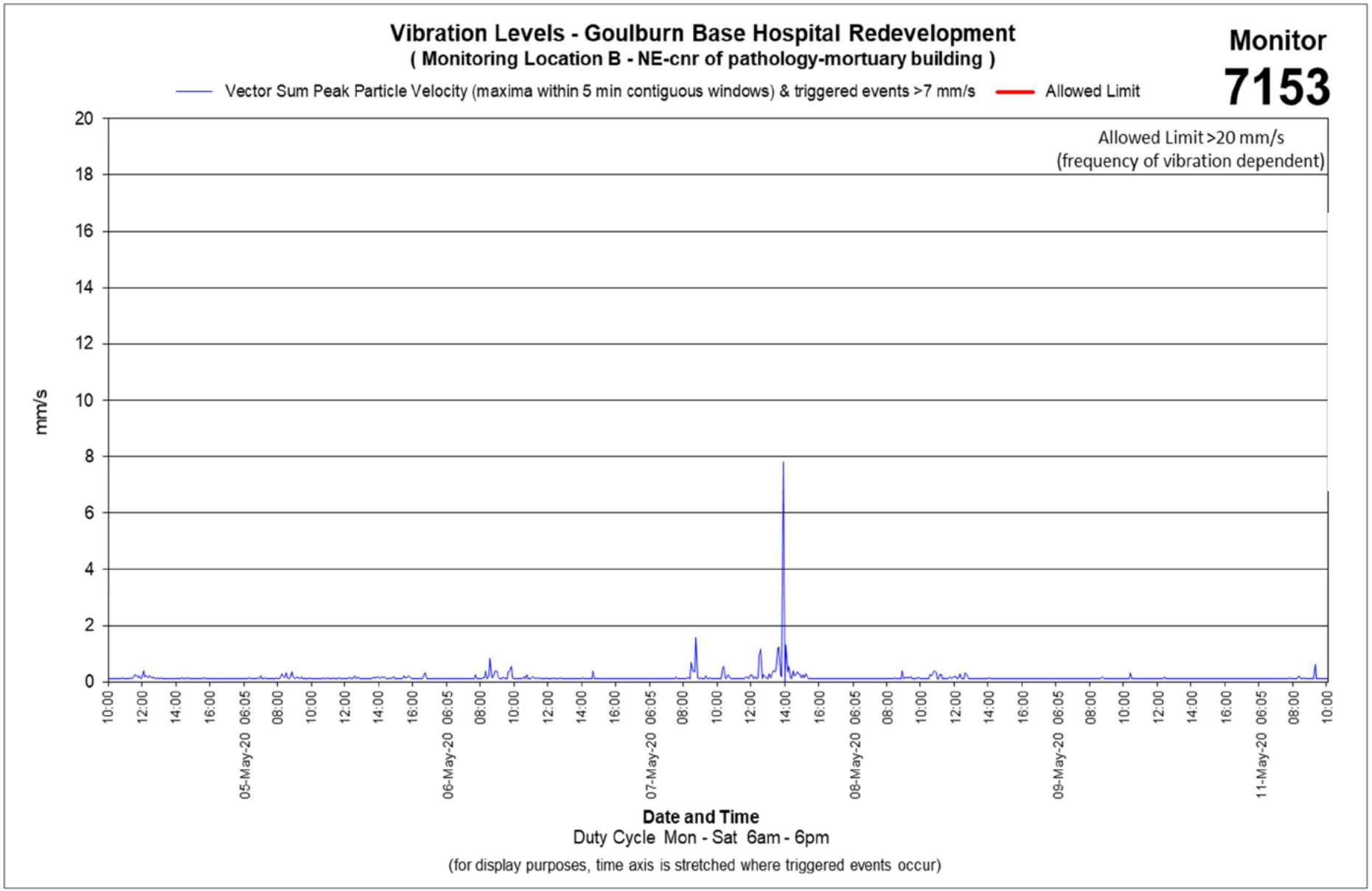
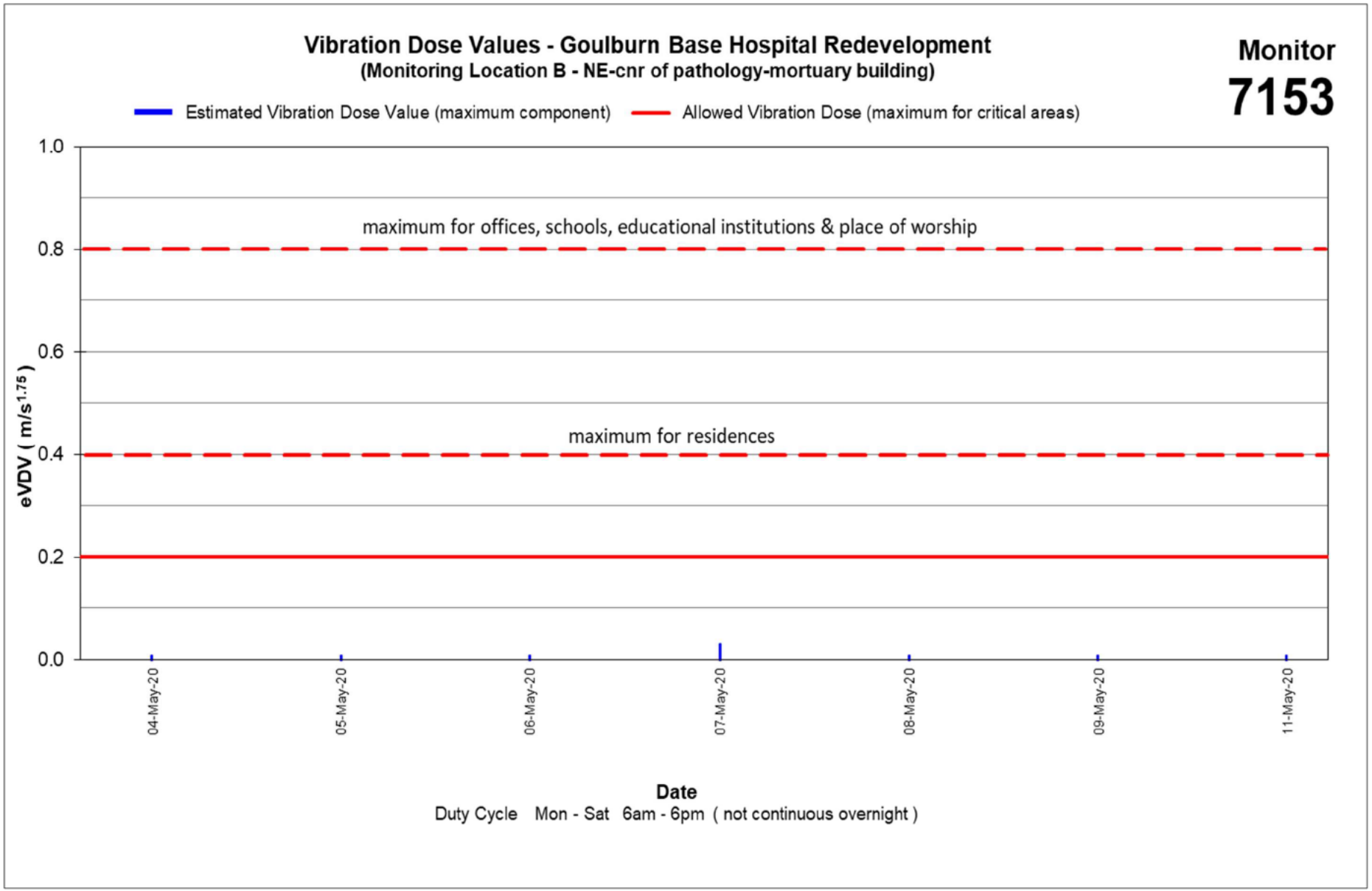
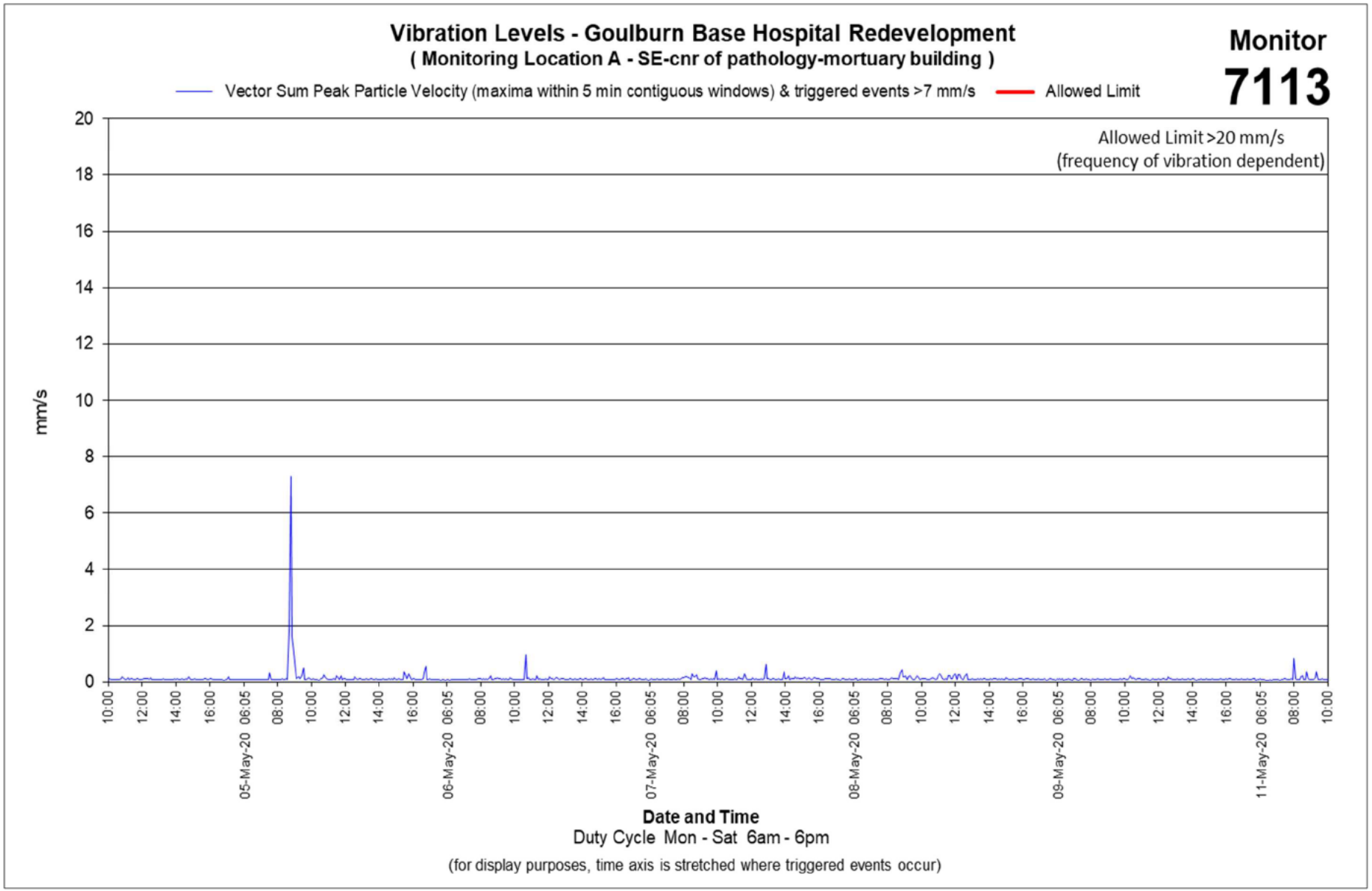

Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
10
8
6
4
2
0
10:00
12:00
14:00
16:00
06:05
08:00
10:00
05-May-20
06-May-20
07-May-20
08-May-20
09-May-20
11-May-20
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
(for display purposes, time axis is stretched where triggered events occur)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
eVDV (m/s1.75)
1.0
0.8
0.6
0.4
0.2
0.0
04-May-20
05-May-20
06-May-20
07-May-20
08-May-20
09-May-20
11-May-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
7113
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
10
8
6
4
2
0
10:00
12:00
14:00
16:00
06:05
08:00
10:00
05-May-20
06-May-20
07-May-20
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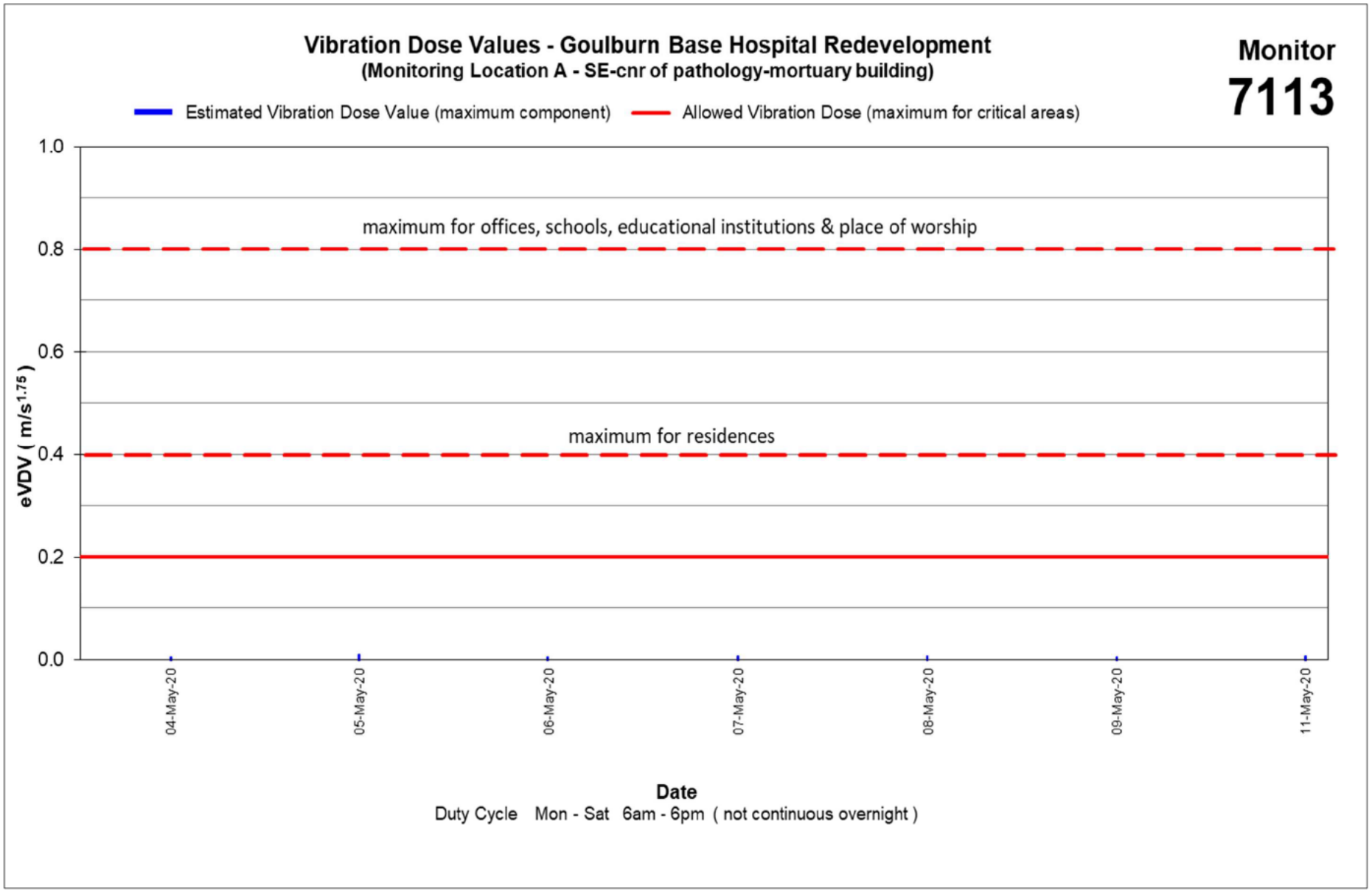
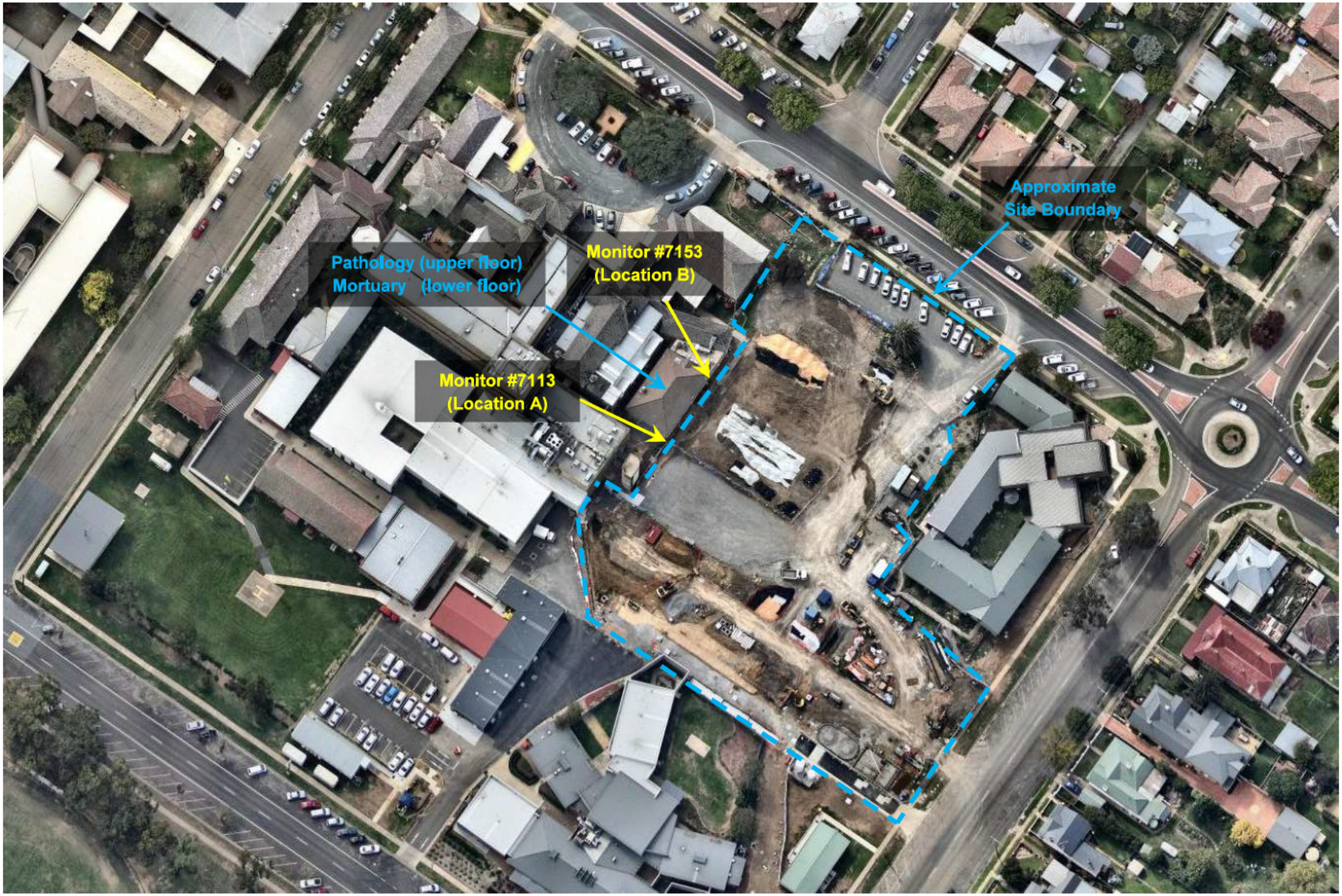
11-May-20
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
(for display purposes, time axis is stretched where triggered events occur)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
7113
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
eVDV (m/s1.75)
1.0
0.8
0.6
0.4
0.2
0.0
04-May-20
05-May-20
06-May-20
07-May-20
08-May-20
09-May-20
11-May-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Approximate
Site Boundary
Pathology (upper floor)
Mortuary (lower floor)
Monitor #7153
(Location B)
Monitor #7113
(Location A)

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

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About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Douglas Partners
Geotechnics / Environment / Groundwater

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

Memorandum

To	[redacted] Hansen Yuncken Pty Ltd	[redacted]	
From	[redacted]	**Date**	19 May 2020
Subject	Vibration Monitoring Report 18 Goulburn Base Hospital Redevelopment	**Project No.** **Doc. No.**	94054.07 94054.07.R.018.Rev0

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Outcome this period: 11 May to 18 May 2020

Location	Monitor	Exceedances		Time of maximum exceedance
		No.	Max (VSPPV)	
Monitoring Location A	7113	0	n/a	n/a
Monitoring Location B	7153	0	n/a	n/a

Douglas Partners Pty Ltd

[redacted]

[redacted]
Senior Geophysicist

Reviewed by

[redacted]
Principal

Attachments: Graphs of Vibration Levels, Monitor Location Plan, About This Report

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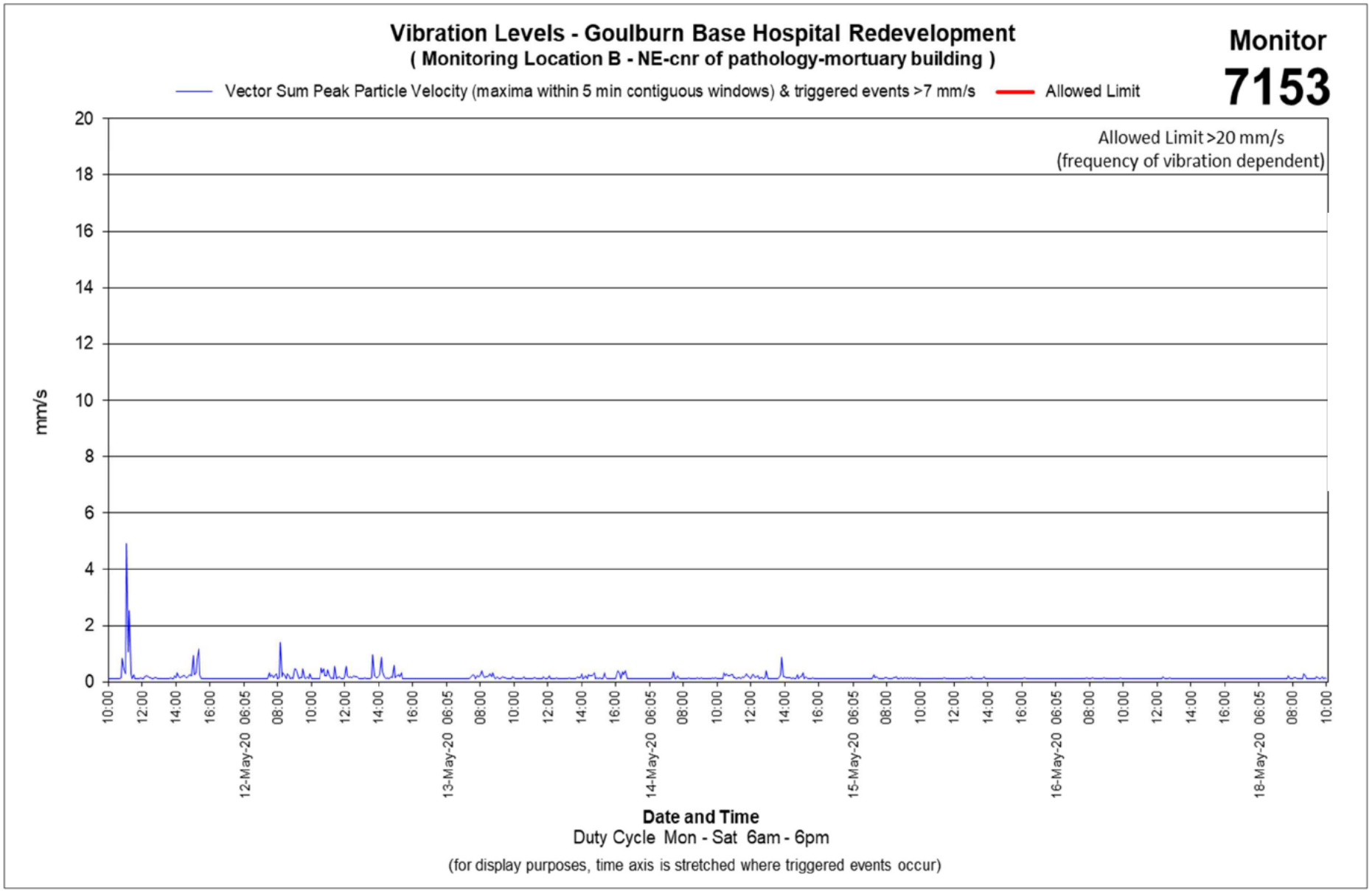
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(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
10
8
6
4
2
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10:00
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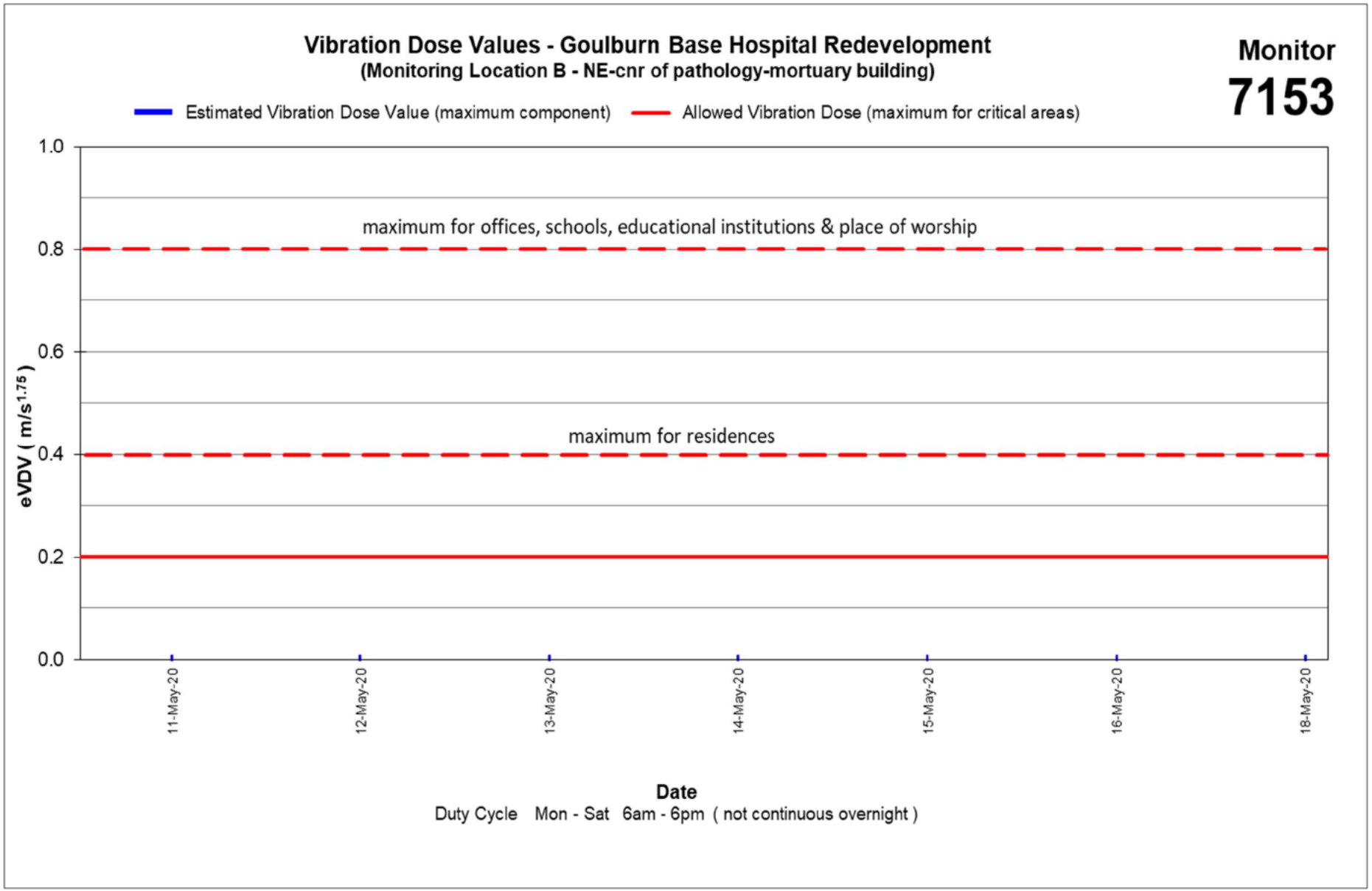
16:00
06:05
08:00
10:00
12:00
14:00
16:00
12-May-20
13-May-20
14-May-20
15-May-20
16-May-20
18-May-20
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
(for display purposes, time axis is stretched where triggered events occur)


Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location B - NE-cnr of pathology-mortuary building)
Monitor
7153
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
1.0
0.8
0.6
0.4
0.2
0.0
eVDV (m/s1.75)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
11-May-20
12-May-20
13-May-20
14-May-20
15-May-20
16-May-20
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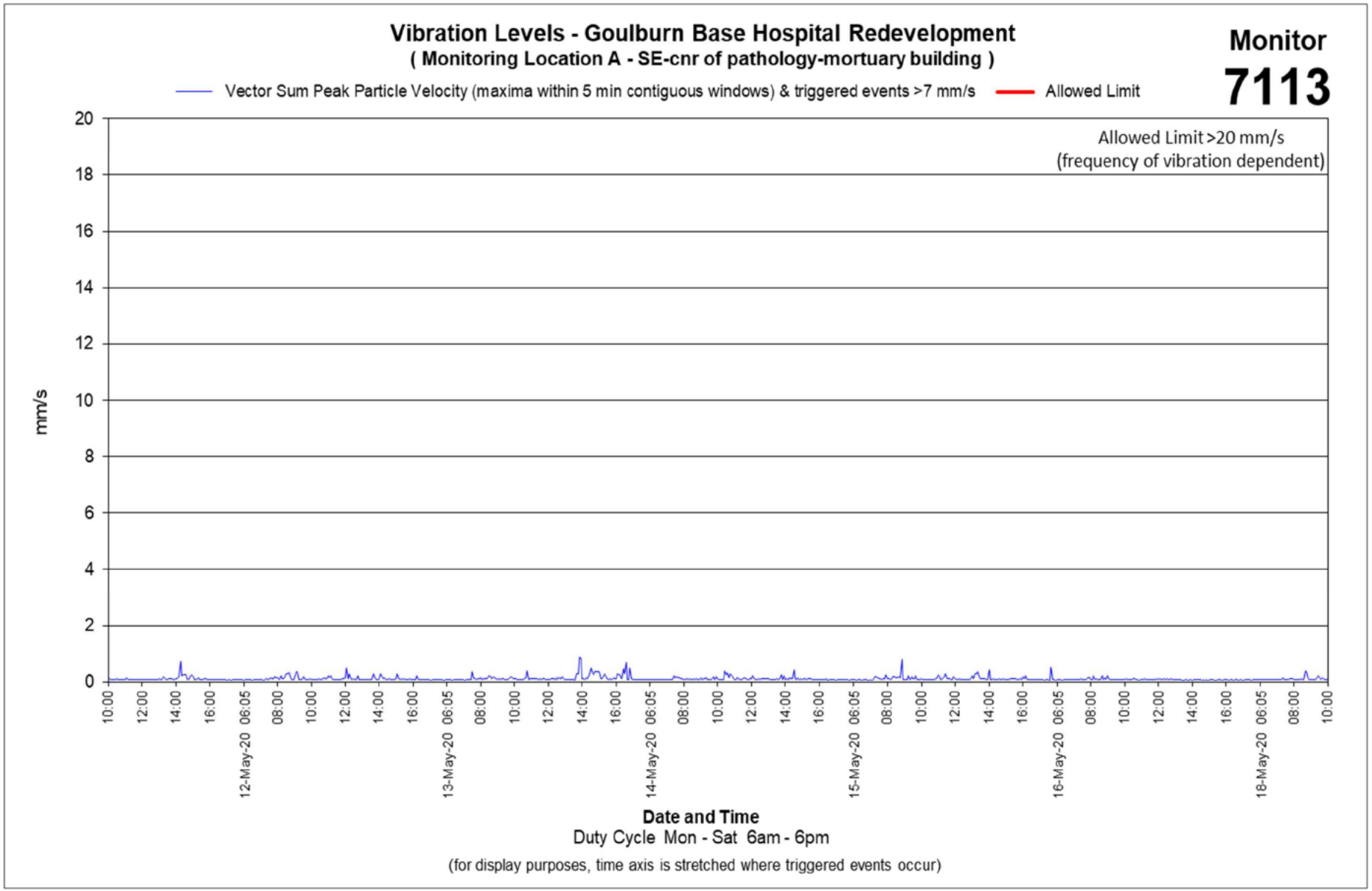
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Vibration Levels - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
7113
Vector Sum Peak Particle Velocity (maxima within 5 min contiguous windows) & triggered events >7 mm/s
Allowed Limit
Allowed Limit >20 mm/s
(frequency of vibration dependent)
mm/s
20
18
16
14
12
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10:00
12:00
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16:00
06:05
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12-May-20
13-May-20
14-May-20
15-May-20
16-May-20
18-May-20
Date and Time
Duty Cycle Mon - Sat 6am - 6pm
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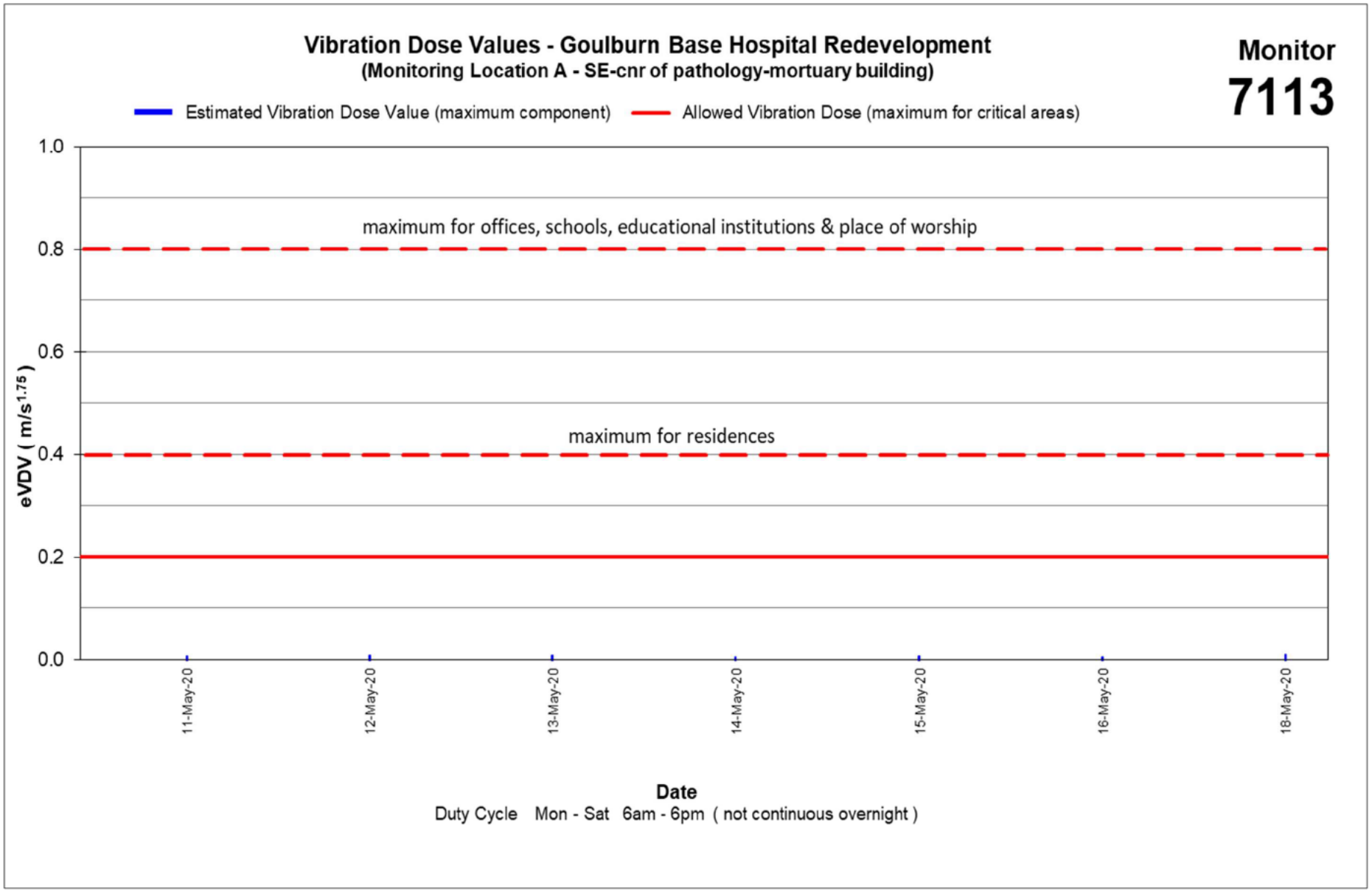
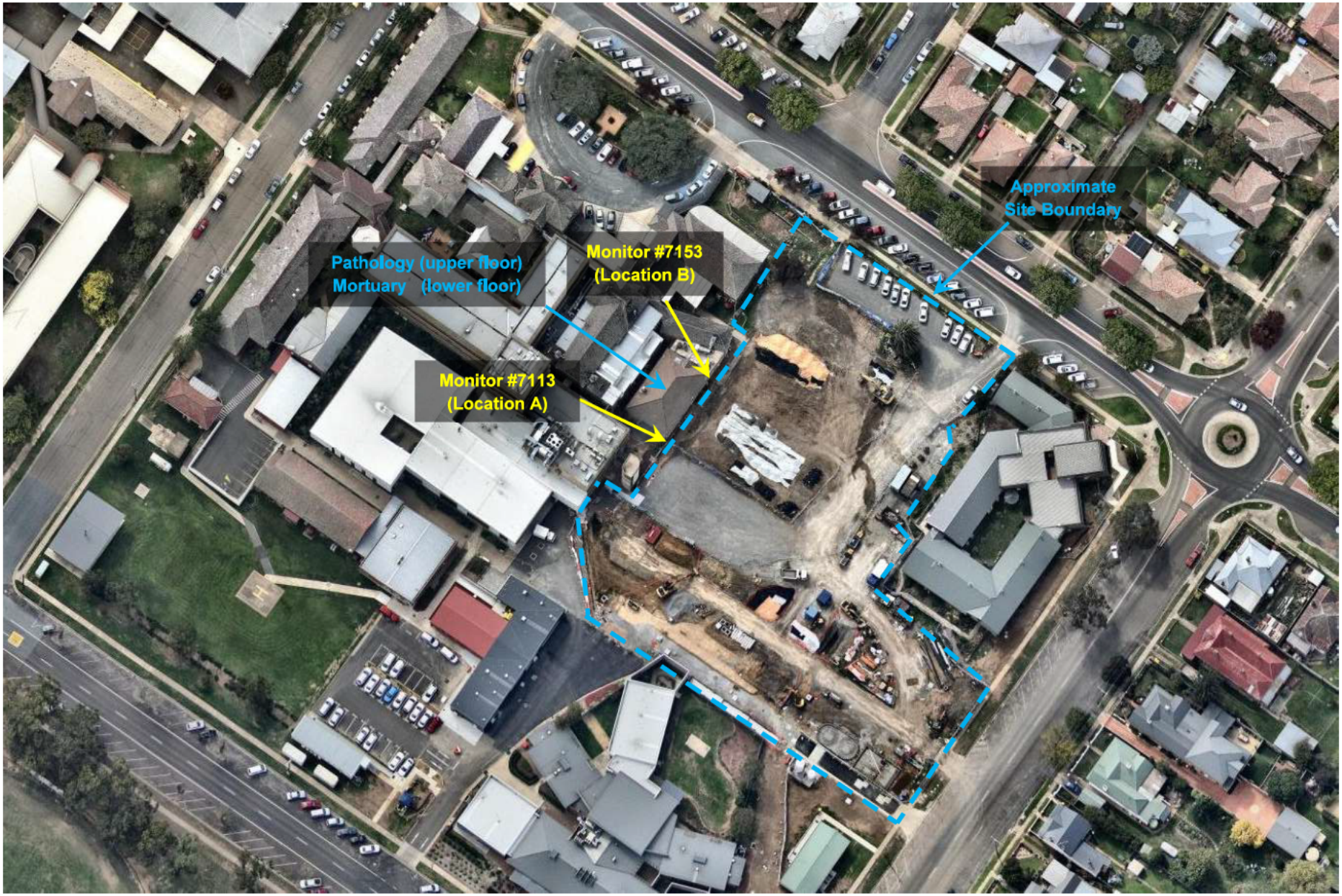

Vibration Dose Values - Goulburn Base Hospital Redevelopment
(Monitoring Location A - SE-cnr of pathology-mortuary building)
Monitor
7113
Estimated Vibration Dose Value (maximum component)
Allowed Vibration Dose (maximum for critical areas)
maximum for offices, schools, educational institutions & place of worship
maximum for residences
eVDV (m/s1.75)
1.0
0.8
0.6
0.4
0.2
0.0
11-May-20
12-May-20
13-May-20
14-May-20
15-May-20
16-May-20
18-May-20
Date
Duty Cycle Mon - Sat 6am - 6pm (not continuous overnight)


Approximate
Site Boundary
Pathology (upper floor)
Mortuary (lower floor)
Monitor #7153
(Location B)
Monitor #7113
(Location A)

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