QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Surrogate p-Terphenyl-d_{14}	%	50196-11	106 || 104 || RPD: 2	50196-2	98%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	50196-11	04/01/2011 || 04/01/2011	50196-2	04/01/2011
Date analysed	-	50196-11	04/01/2011 || 04/01/2011	50196-2	04/01/2011
HCB	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	50196-11	<0.1 || <0.1	50196-2	82%
gamma-BHC	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	50196-11	<0.1 || <0.1	50196-2	70%
Heptachlor	mg/kg	50196-11	<0.1 || <0.1	50196-2	84%
delta-BHC	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	50196-11	<0.1 || <0.1	50196-2	77%
Heptachlor Epoxide	mg/kg	50196-11	<0.1 || <0.1	50196-2	86%
gamma-Chlordane	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	50196-11	<0.1 || <0.1	50196-2	66%
Dieldrin	mg/kg	50196-11	0.1 || 0.1 || RPD: 0	50196-2	104%
Endrin	mg/kg	50196-11	<0.1 || <0.1	50196-2	88%
pp-DDD	mg/kg	50196-11	<0.1 || <0.1	50196-2	70%
Endosulfan II	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	50196-11	<0.1 || <0.1	50196-2	99%
Methoxychlor	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	50196-11	107 || 111 || RPD: 4	50196-2	113%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	50196-11	04/01/2011 || 04/01/2011	50196-2	04/01/2011
Date analysed	-	50196-11	04/01/2011 || 04/01/2011	50196-2	04/01/2011
Diazinon	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	50196-11	<0.1 || <0.1	50196-2	105%
Fenitrothion	mg/kg	50196-11	<0.1 || <0.1	50196-2	112%
Bromophos-ethyl	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	50196-11	<0.1 || <0.1	50196-2	92%
Surrogate TCLMX	%	50196-11	107 || 111 || RPD: 4	50196-2	115%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	50196-11	04/01/2011 || 04/01/2011	50196-2	04/01/2011
Date analysed	-	50196-11	04/01/2011 || 04/01/2011	50196-2	04/01/2011
Arochlor 1016	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221*	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	50196-11	<0.1 || <0.1	50196-2	108%
Arochlor 1260	mg/kg	50196-11	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	50196-11	107 || 111 || RPD: 4	50196-2	97%
QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	50196-2	5/1/2011
Date analysed	-	[NT]	[NT]	50196-2	5/1/2011
Total Phenolics (as Phenol)	mg/kg	[NT]	[NT]	50196-2	85%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	50196-11	04/01/2011 || 04/01/2011	50196-2	04/01/2011
Date analysed	-	50196-11	04/01/2011 || 04/01/2011	50196-2	04/01/2011
Arsenic	mg/kg	50196-11	18 || 19 || RPD: 5	50196-2	94%
Cadmium	mg/kg	50196-11	<0.5 || <0.5	50196-2	82%
Chromium	mg/kg	50196-11	24 || 22 || RPD: 9	50196-2	85%
Copper	mg/kg	50196-11	36 || 43 || RPD: 18	50196-2	110%
Lead	mg/kg	50196-11	210 || 280 || RPD: 29	50196-2	79%
Mercury	mg/kg	50196-11	0.1 || 0.1 || RPD: 0	50196-2	107%
Nickel	mg/kg	50196-11	7 || 7 || RPD: 0	50196-2	95%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Zinc	mg/kg	50196-11	230 || 240 || RPD: 4	50196-2	86%

Report Comments:

Asbestos: A portion of the supplied sample was sub-sampled for asbestos according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample.
Envirolab recommends supplying 30-40g of sample in it's own container.

Asbestos ID was analysed by Approved Identifier: Paul Ching
Asbestos ID was authorised by Approved Signatory: Matt Mansfield

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

Envirolab Services Pty Ltd
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CERTIFICATE OF ANALYSIS 50196-A

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Gavin Boyd

Sample log in details:

Your Reference:	**72138, Macquarie Village**
No. of samples:	Additional Testing on 7 Soils
Date samples received:	24/12/2010
Date completed instructions received:	12/01/11

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:	14/01/11
Date of Preliminary Report:	Not issued
Issue Date:	14/01/11

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This document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025.
Tests not covered by NATA are denoted with *.

Results Approved By:

Giovanni Agosti
Technical Manager

Jacinta Hurst
Laboratory Manager

PAHs in TCLP (USEPA 1311) Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ---------- 	50196-A-17 116/0.3-0.4 17/12/2010 Soil
Date extracted	-	13/01/2011
Date analysed	-	13/01/2011
Naphthalene in TCLP	mg/L	<0.001
Acenaphthylene in TCLP	mg/L	<0.001
Acenaphthene in TCLP	mg/L	<0.001
Fluorene in TCLP	mg/L	<0.001
Phenanthrene in TCLP	mg/L	<0.001
Anthracene in TCLP	mg/L	<0.001
Fluoranthene in TCLP	mg/L	<0.001
Pyrene in TCLP	mg/L	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001
Chrysene in TCLP	mg/L	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001
Surrogate p-Terphenyl-d_{14}	%	114

Metals in TCLP USEPA1311 Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	50196-A-2 102/0.1-0.2 20/12/2010 Soil	50196-A-5 103/0.1-0.2 20/12/2010 Soil	50196-A-6 104/0.1-0.2 20/12/2010 Soil	50196-A-7 107/0.1-0.2 20/12/2010 Soil	50196-A-9 109/0.1-0.2 20/12/2010 Soil
Date extracted	-	13/01/2010	13/01/2010	13/01/2010	13/01/2010	13/01/2010
Date analysed	-	13/01/2011	13/01/2011	13/01/2011	13/01/2011	13/01/2011
pH of soil for fluid# determ.	pH units	9.60	9.80	9.90	9.70	8.80
pH of soil for fluid # determ. (acid)	pH units	1.50	1.60	1.60	1.50	1.50
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.40	5.50	5.20	5.50	5.20
Nickel in TCLP	mg/L	0.1	0.05	0.09	0.1	0.04

Metals in TCLP USEPA1311 Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	50196-A-11 110/0.1-0.2 20/12/2010 Soil	50196-A-17 116/0.3-0.4 17/12/2010 Soil
Date extracted	-	13/01/2010	13/01/2010
Date analysed	-	13/01/2011	13/01/2011
pH of soil for fluid# determ.	pH units	9.80	9.90
pH of soil for fluid # determ. (acid)	pH units	1.70	1.70
Extraction fluid used	-	1	1
pH of final Leachate	pH units	5.10	6.70
Lead in TCLP	mg/L	0.1	[NA]

Method ID	Methodology Summary
GC.12 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
GC.12 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
GC.12	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
LAB.4	Toxicity Characteristic Leaching Procedure (TCLP).
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
LAB.1	pH - Measured using pH meter and electrode in accordance with APHA 20th ED, 4500-H+.
Metals.20 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			13/01/2011	[NT]	[NT]	LCS-W1	13/01/2011
Date analysed	-			13/01/2011	[NT]	[NT]	LCS-W1	13/01/2011
Naphthalene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	78%
Acenaphthylene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	93%
Phenanthrene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	95%
Anthracene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	94%
Pyrene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	99%
Benzo(a)anthracene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	98%
Benzo(b+k)fluoranthene in TCLP	mg/L	0.002	GC.12 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	95%
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		GC.12	89	[NT]	[NT]	LCS-W1	117%

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			13/01/2010	50196-A-2	13/01/2010 || 13/01/2010	LCS-W1	13/01/2011
Date analysed	-			13/01/2011	50196-A-2	13/01/2011 || 13/01/2011	LCS-W1	13/01/2011
Lead in TCLP	mg/L	0.03	Metals.20 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	103%
Nickel in TCLP	mg/L	0.02	Metals.20 ICP-AES	<0.02	50196-A-2	0.1 || 0.1 || RPD: 0	LCS-W1	105%

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	50196-A-5	13/01/2011
Date analysed	-	[NT]	[NT]	50196-A-5	13/01/2011
Lead in TCLP	mg/L	[NT]	[NT]	[NR]	[NR]
Nickel in TCLP	mg/L	[NT]	[NT]	50196-A-5	101%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

Appendix E

Ground Vibration Notes

APPENDIX E - GROUND VIBRATIONS

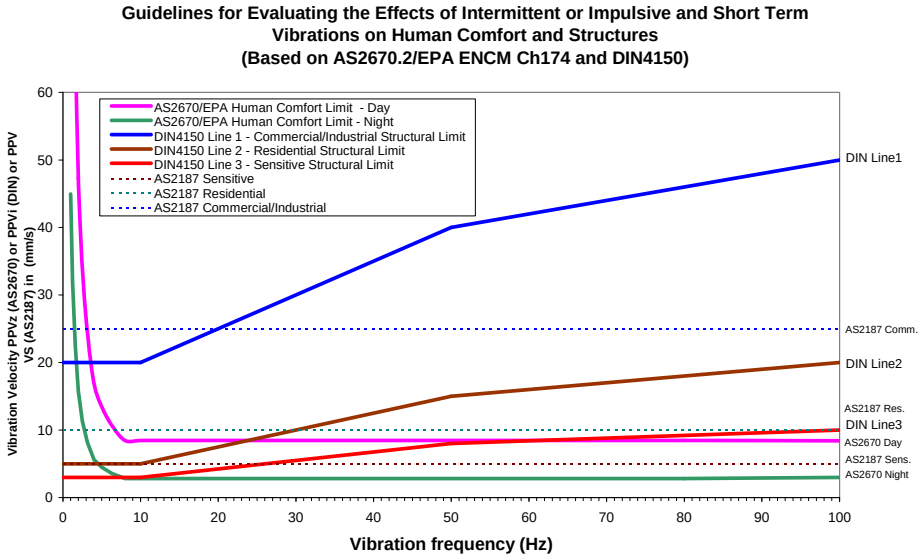
Ground vibrations can be described by measurement of the acceleration, velocity or displacement of the ground particles at one or more locations. Triaxial geophone sensors for example can measure the peak velocities of radial, transverse or vertical particle motion (designated PPVr, PPVt and PPVz respectively and PPVi for any directional component) within selected sample periods and peak velocities can also be determined in the resultant direction of particle motion, from calculations of instantaneous vector sums throughout the sample period. Vector sum velocities are designated VSPPV, or in many cases simply PPV.

There are three aspects of vibrations which need to be assessed:

1. Effects on structures
2. Effects on architectural finishes
3. Effects on humans

Numerous standards and guidelines exist worldwide which provide a basis for these assessments. Their focus varies from structural damage to human comfort and from transient to intermittent to continuous vibrations. Most provide guideline vibration limits for protection against damage or human discomfort, however these limits are not always consistent and application of a particular standard or guideline should be based on the expected types of vibrations, the types and conditions of the potentially affected buildings and the potential for discomfort of their occupants.

Both the guideline and the vibration limits should be determined on a case by case basis and the adopted limits (damage and human comfort or the lower of the two) may vary from guideline values, according to the experience of the vibration consultant, due to the sensitivity of the building or the activities of its occupants. Some applicable guidelines are summarised in the graph below.



Depending on site conditions, proposed works, results of building condition surveys and on-site vibration trials (indicating vibration attenuation rates and dominant vibration frequencies of excavation plant), the standards, guidelines and limits discussed below are considered appropriate for management of ground vibrations generated during rock excavation.

Effects on Structures

The German Standard DIN4150-3 (1999) "Structural vibration – effects of vibrations on structures", recommends that ground vibrations at foundation level of residential buildings, in good condition bearing on sound rock foundations, be limited to 5 - 15 - 20 mm/s PPVi (at vibration frequencies of 10 - 50 - 100 Hz typical of excavation plant), in order to reduce the potential for structural damage. Higher limits (20 - 40 - 50 mm/s PPVi) and lower limits (3 - 8 -10 mm/s PPVi) are recommended for commercial/industrial and sensitive buildings respectively. From DP experience where buildings are bearing on loose sand, maximum vibration levels should be significantly reduced to the order of 5 to 7 mm/s VSPPV to reduce the risk of vibration-induced sand densification and settlement.

Effects on Architectural Finishes

It has been found from experience that even with buildings bearing on rock, vibration levels as low as 10 mm/s VSPPV may cause minor defects such as cracks through rendering, cornices and skirtings. Management of vibrations may require a lowering of structural damage criteria to this architectural damage criterion, or negotiations with owners of affected buildings.

Effects on Humans

Ground vibration can be strongly perceptible to humans at levels above 2.5 mm/s VSPPV and can be disturbing at levels above 5 mm/s VSPPV. Complaints from residents and building occupants are sometimes received when levels are as low as 1 mm/s VSPPV. The Australian Standard AS2670.2-1990 "Evaluation of human exposure to whole-body vibrations – continuous and shock induced vibrations in buildings (1-80 Hz)" indicates an acceptable day time limit of 8 mm/s PPVz for human comfort. Management of vibrations may require a lowering of damage criteria to this human comfort criterion, or negotiations with occupants of affected buildings.

Vibration Dosage

A vibration limit based on a particle velocity allows real time control of excavation using warning systems (e.g. flashing lights) attached to vibration monitors. Occasional exceedances (vibration levels exceeding the allowed limit) are not damaging or disturbing and can be allowed but frequent exceedances should be avoided by changes in excavation methods. The difference between occasional and frequent is difficult to gauge on site but can be assessed using recorded vibration data, on the basis of experience or by application of a vibration dosage criterion.

A vibration dosage value (VDV) can be used to assess the affect of intermittent vibrations (e.g. from bursts of rock hammering) on humans over a defined period. Acceptable dosages (generally VDVz for vertical vibrations found most disturbing by humans) have been defined for occupants of residential, commercial and industrial buildings ("Assessing Vibration: a technical guideline", Department of Environment and Conservation, 2006). Estimates of VDV (eVDV) can be calculated from recorded vibration data and can be compared with recommended maxima of 0.4, 0.8 and 1.6 $m/s^{1.75}$ for residential, commercial and industrial locations respectively, to assess the need to change excavation methods to restore human comfort.

The vibration dosage guideline does not relate VDV to structural damage however it is considered that if the VDV is acceptable from a human comfort viewpoint, vibrations leading to that VDV would be unlikely to cause damage to the corresponding residential, commercial or industrial structure.

Management of vibrations may require addition of these vibration dosage criteria to other human comfort or damage criteria, if the frequency of vibration exceedances becomes difficult to assess on site or by experienced-based data review.