



**APECX**  
planning and environmental

**Wellington Inner City Improvements  
National War Memorial Park (Pukeahu)  
Noise and Vibration (CNVMP2 U)**

Certification Review

15 January 2013

Prepared in association with:



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# CERTIFICATION OF DOCUMENT

In accordance with section 19(2)(b) of the National War Memorial Park (Pukeahu) Empowering Act 2102 ("the Act"), the following document is certified as being consistent with, and will give effect to, the condition(s) of Schedule 3 of the Act to which it relates:

## Construction Noise and Vibration Management Plan 2 – Undergrounding [CNVMP2 U]

prepared by URS for the WICI Alliance, being  
Rev 1.1 dated 21 December 2012

This certification is given for the reasons set out in the review titled:

*Wellington Inner City Improvements,  
National War Memorial Park (Pukeahu),  
Noise and Vibration (CNVMP2 U)  
Certification Review*

prepared by Apecx in association with  
Acousafe and Marshall Day Acoustics, and  
dated 15 January 2013.

### **Certifier**



Mark Ashby  
Member, New Zealand Planning Institute

Dated: 15 January 2013

## 1. Introduction

### 1.1 Review authors

This review has been prepared under commission to the Interim Alliance engaged by the New Zealand transport Agency (NZTA) to implement the undergrounding of Buckle Street. The review's authors are Apecx, Acousafe and Marshall Day Acoustics. The purpose of this review is "certification", as defined by sections 4 and 19(2)(b) of the National War Memorial Park (Pukeahu) Empowering Act 2012 ("the Act").

Section 20 of the Act, and condition NZTA 22 of Schedule 3 to the Act, requires the certifier to be a qualified planner, supported by a suitably qualified acoustician. To meet these requirements, the certifier is Mark Ashby (Apecx), who specialises in resource consent acquisition and the development of planning policy. The supporting acousticians are Nigel Lloyd (Acousafe), who brings technical expertise in prediction and management of construction noise, and James Whitlock (Marshall Day Acoustics), who brings technical expertise in prediction and management of construction related vibration.

The qualifications and affiliations of the reviewers are:

#### **Mark Ashby**

Role: Planner / Certifier  
Qualifications: Bachelor Regional Planning (Hons), Massey, 1984  
Affiliations: 

- Member New Zealand Planning Institute (MNZPI)
- Member Resource Management Law Association

#### **Nigel Lloyd**

Role: Supporting acoustician (noise)  
Qualifications: Bachelor Mechanical Engineering, University of Wales, 1976  
Affiliations: 

- Affiliate Member of the Acoustical Society of New Zealand

#### **James Whitlock**

Role: Supporting acoustician (vibration)  
Qualifications: Bachelor of Science – Physics, 2000  
Master of Architectural Studies (Honours) – Acoustics, 2002  
Affiliations: 

- President, Acoustical Society of New Zealand (ASNZ)
- Council Member, National Foundation for the Deaf (NFD)
- Member, Resource Management Law Association (RMLA)

### 1.2 Wellington inner city improvements

The Wellington inner city improvement projects are aimed at making State Highway 1 the preferred and most efficient route for vehicles travelling between Wellington's central business district and the eastern suburbs. The undergrounding of a section of Buckle Street (and construction of the National War Memorial Park overhead), is one of a suite of projects being implemented by NZTA.

On 7 August 2012, the Government announced a project to underground Buckle Street in front of the National War Memorial. Government also allocated funds to create a new, unified National Memorial precinct. This project is a key part of the Ministry of Culture and Heritage's commemoration of the centenary of the First World War, and the completed New Zealand Memorial Park will be in place by ANZAC Day 2015.

### **1.3 Empowering Act and schedules**

To expedite the project, the Government chose to pass empowering legislation. That legislation, the National War Memorial Park (Pukeahu) Empowering Act 2012, grants all necessary statutory authorisations to NZTA and the Ministry of Culture and Heritage. In effect, the authorisations have provided a project-specific alternative to the Resource Management Act, Historic Places Act, and Building Act processes that would otherwise be required.

Schedules to the Act specify, among other things, resource consents granted to NZTA and the conditions attached to them, and the designation provided to NZTA, and the conditions attached to it.

### **1.4 Environmental management plans and certification**

As specified by the schedules to the Act, particular environmental management plans (EMP) are required to be prepared. The Act also requires that those plans be certified by suitably qualified persons. The purpose of certification is to ensure that any EMP is consistent with the conditions set out in schedules to the Act, and that the plan provides an appropriate means to ensure that the conditions are able to be met.

An overall Construction Environmental Management Plan is required to be formulated for the project, under which sit the following other management plans:

- Construction noise and vibration management plan (temporary road)
- Construction noise and vibration management plan (undergrounding)
- Construction air quality (dust) management plan (temporary road)
- Construction air quality (dust) management plan (undergrounding)
- Heritage management plan
- Construction traffic management plan
- Local roads traffic improvement plan
- Network utility management plan

The EMP that is the subject of this review is the noise and vibration management plan for the underground road.

### **1.5 Nature of environment management plans**

The content of the required management plans is set out in the conditions of Schedule 3 to the Act. The conditions note a specific range of matters to be addressed by each of the EMPs.

Notwithstanding the matters spelled out by the scheduled conditions, EMPs as a general class of plan have the following typical characteristics. They:

- Are a 'living' document that focusses on continual improvement and should be updated as necessary;
- Help ensure the application of best practice environmental management to a project;
- Implement conditions of approval or consent;
- Ensure compliance with environmental legislation; and
- Ensure that environmental risks associated with a project are properly managed.

## 2. Applicable conditions

The National War Memorial Park (Pukeahu) Empowering Act 2012 includes conditions applicable to the Construction Noise and Vibration management plan.

Those conditions, taken from Schedule 3 of the Act, are set out below followed by the reviewers' notes on how the management plan is consistent with and gives effect to the conditions.

### 2.1 NZTA 22

Specific to the CNVMP2–U, condition NZTA 22 of Schedule 3 specifies that:

The Agency shall, at least 5 working days prior to submitting the Construction Noise and Vibration Management Plan – Undergrounding (CNVMP2–U) to a qualified planner (supported by a suitably qualified acoustician) for certification ... submit a draft of the relevant plan to the Manager for comment. Any comments received shall be supplied to the certifier when the CNVMP2–U ... is submitted for certification against the requirements set out in condition NZTA 23, along with clear explanation of where any comments have not been incorporated and the reasons why.

As noted at the beginning of Schedule 3, “Manager” in the context of this condition means the Wellington City Council’s Manager, Development, Planning and Compliance or their nominee.

#### **Reviewer notes**

- The document has been submitted for review to a planner and acousticians who are suitably qualified, as noted in section 1.1 of this review.
- WCC comments were provided separately to the review team, and also incorporated into the final CNVMP2–U document.
- The document provides explanations of how the WCC comments have been addressed. These explanations are accepted by the review team.

#### **Finding 22**

Based on the matters referred to above under Reviewer Notes, condition NZTA 22 has been met.

### 2.2 NZTA 23(a)

Specific to the CNVMP2–U, condition NZTA 23(a) of Schedule 3 specifies that:

The CNVMP2–U ... shall —

- (a) be prepared by a suitably qualified acoustics specialist;

**Reviewer notes**

- The document has been prepared by a qualified acoustic specialist, as noted in section 1.2 of the document.

**Finding 23(a)**

Based on the matters referred to above under Reviewer Notes, condition NZTA 23(a) has been met.

**2.3 NZTA 23(b)**

Specific to the CNVMP2–U, condition NZTA 23(b) of Schedule 3 specifies that:

The CNVMP2–U ... shall —

- (b) include specific details relating to methods for the control of noise associated with —
  - (ii) all other relevant Project works in the case of CNVMP2–U; and

which shall be formulated to, as far as practicable, comply with the following criteria when assessed in accordance with NZS 6803:1999:

Time	Noise limits (dB)	
	L <sub>Aeq</sub>	L <sub>Amax</sub>
<i>Occupied residential and educational buildings</i>		
6:00 am through to 7:00 am	70	85
7:00 am through to 8:00 pm	75	90
8:00 pm through to 11:00 pm	70	85
11:00 pm through to 6:00 am	District Plan construction noise limits	
<i>Other occupied buildings</i>		
6:00 am through to 7.30 am	80	
7.30 am through to 6:00 pm	75	
6:00 pm through to 11:00 pm	80	
11:00 pm through to 6:00 am	District Plan construction noise limits	

**Reviewer notes**

- The document provides specific details relating to methods for the control of noise associated with all relevant construction works.
- Relevant construction works are adequately identified in the document, including in section 6 (Noise Sources).
- Methods for the control of noise have been formulated to, as far as practicable, comply with the criteria listed by the Act.
- The document (section 3.2) notes differences between the criteria set by the Act and the district plan, with regard to the use of L<sub>10</sub> versus L<sub>eq</sub>. The reviewers agree with the approach taken by the document.

**Finding 23(b)**

Based on the matters referred to above under Reviewer Notes, condition NZTA 23(b) has been met.



## 2.4 NZTA 23(c)

Specific to the CNVMP2–U, condition NZTA 23(c) of Schedule 3 specifies that:

The CNVMP2–U ... shall —

- (c) address the following aspects with regard to managing the adverse effects of construction noise:
- (i) noise sources, including machinery, equipment and construction techniques to be used; and
  - (ii) predicted construction noise levels; and
  - (iii) hours of operation, including times and days when noisy construction work would occur; and
  - (iv) the identification of activities and locations where structural noise mitigation measures such as temporary barriers or enclosures may be used; and
  - (v) the measures that will be undertaken by the NZTA to communicate noise management measures to affected stakeholders; and
  - (vi) mitigation options, including alternative strategies where full compliance with the noise criteria set out in the table above cannot practicably be achieved; and
  - (vii) schedules containing information specific to each area of the site where this is relevant to managing construction noise and vibration effects; and
  - (viii) methods for monitoring and reporting on construction noise.

### **Reviewer notes**

- The document addresses the aspects listed by the Act, with regard to managing the adverse effects of construction noise.
- The sources and nature of noise, as required by 23(c)(i) – (iii), have been adequately identified, including in sections 2.1, 6, and 8 of the document. The reviewers note that exact noise levels from all activities cannot be established ahead of time, but conclude that the management plan provides a framework within which responses to noise sources can be addressed as they arise.
- Mitigation matters, as required by 23(c)(iv) and (vi), have been adequately addressed, including in sections 9, 12, and 13 of the document. The reviewers agree that the approach to mitigation is appropriate, as it provides a reactive framework within which the need for future mitigation can be identified and actioned.
- Communication with stakeholders, as required by 23(c)(v), has been adequately addressed, including in sections 12 and 13 of the document.
- Schedules relevant to construction noise management, as required by 23(c)(vii), have been appropriately referred to, including in section 10 of the document.
- Methods for monitoring and reporting on construction noise, as required by 23(c)(viii), have been adequately identified, including in section 11 and 13 of the document.
- Sample calculations of noise levels have been independently reviewed, and are found to be reasonable and accurate.

### **Finding 23(c)**

Based on the matters referred to above under Reviewer Notes, condition NZTA 23(c) has been met.

## 2.5 NZTA 23(d)

Specific to the CNVMP2–U, condition NZTA 23(d) of Schedule 3 specifies that:

The CNVMP2–U ... shall —

- (d) include specific details relating to methods for the control of vibration associated with all relevant Project construction works, which shall be formulated to, as far as practicable, comply with the Category A criteria in the following table when measured in accordance with ISO 4866:2010 and AS 2187-2:2006:

Receiver	Details	Category A	Category B
Occupied dwellings	Night-time 2000h–0630h	0.3 mm/s ppv	1 mm/s ppv
	Daytime 0630h–2000h	1 mm/s ppv	5 mm/s ppv
Other occupied buildings All buildings	Daytime 0630h–2000h Vibration—transient	2 mm/s ppv	10 mm/s ppv BS 5228–2 <sup>*1</sup> Table B.2
	Vibration—continuous	5 mm/s ppv	BS 5228–2 <sup>*1</sup> 50% of Table B.2 values

\*1 BS 5228–2–2009 “Code of practice for noise and vibration control on construction and open sites—Part 2: Vibration”.

### Reviewer notes

- The document includes specific details relating to methods for the control of vibration associated with all relevant project construction works.
- Relevant construction works are adequately identified in the document, including in section 7 (Vibration Sources).
- Methods for the control of vibration have, as far practicable, been formulated to comply with the criteria listed by the Act.

### Finding 23(d)

Based on the matters referred to above under Reviewer Notes, condition NZTA 23(d) has been met.

## 2.6 NZTA 23(e)

Specific to the CNVMP2–U, condition NZTA 23(e) of Schedule 3 specifies that:

The CNVMP2–U ... shall —

- (e) describe the measures to be adopted in relation to managing construction vibration including—
  - (i) identification of vibration sources, including machinery, equipment and construction techniques to be used; and
  - (ii) procedures for building condition surveys at locations close to activities generating significant vibration, prior to and after completion of the works (including all buildings predicted to experience vibration which exceeds the Category A vibration criteria); and
  - (iii) procedures for management of vibration, if measured or predicted vibration levels exceed the Category A criteria; and
  - (iv) procedures for monitoring of vibration levels and effects by suitably qualified experts if measured or predicted vibration levels exceed the Category B criteria; and
  - (v) the measures that will be undertaken by the Agency to communicate vibration management measures to affected stakeholders.

### **Reviewer notes**

- The document describes the measures to be adopted in relation to managing construction vibration.
- The sources and nature of vibration, as required by 23(e)(i), have been adequately identified, including in sections 2.1, 7, and 8 of the document. The reviewers note that exact vibration levels from all activities cannot be established ahead of time, but conclude that the management plan provides a framework within which responses to vibration sources can be addressed as they arise.
- Building condition surveys, as required by 24<sup>†</sup>, 25<sup>†</sup>, and 23(e)(ii), have been largely completed, and locations have been identified where there is a risk of vibration exceeding Category A criteria. The reviewers note that two surveys are yet to be completed, but are satisfied that the framework exists for this to occur.
- Vibration monitoring and management, as required by 23(c)(iii) and (iv), has been adequately addressed, including in sections 9, 10, 11, 12 and 13 of the document. The reviewers agree that the approach to management is appropriate, as it provides a reactive framework within which the need for responses to vibration issues can be identified and actioned.
- Although schedules relevant to vibration management are not required by the Act, the document adopts this approach as part of the management framework. The reviewers commend this approach.
- Communication with stakeholders, as required by 23(e)(v), has been adequately addressed, including in sections 12 and 13 of the document.

### **Finding 23(e)**

Based on the matters referred to above under Reviewer Notes, condition NZTA 23(e) has been met.

<sup>†</sup> The completion of conditions NZTA 24 and 25 are not required to be certified by external reviewers.

## 2.7 NZTA 27

Specific to the CNVMP2–U, condition NZTA 27 of Schedule 3 specifies that:

Methods to be adopted within the ... CNVMP2–U to manage construction noise and vibration shall be formulated following the Agency having first consulted with Mt Cook School, the Ministry of Defence (with regards to HMNZS Olphert and the former Army Headquarters Building), Te Papa Archives, 176–178 Tory Street, and the owners and occupiers of 13 Buckle Street, and Tasman Garden Apartments/Townhouses, 1 Tasman Street.

The ... CNVMP2–U shall set out how any issues raised in consultation with the listed entities have been incorporated, and where they have not, the reasons why.

### **Reviewer notes**

- The document formulates methods for managing construction noise and vibration.
- Initial consultation has occurred with the parties listed by the Act.
- The document provides a framework for incorporating matters raised by the listed entities, in response to any construction noise and vibration issues that might arise during construction.
- The document notes the inclusion of a receiver site (Grandstand Apartments) which is not mentioned by the Act, but which is in proximity to the stormwater drilling in Cambridge Terrace. The reviewers commend the inclusion of this site in the assessment.
- The document appropriately responds to various matters raised by the Wellington City Council, including in relation to working days near the Mt Cook School.

### **Finding 27**

Based on the matters referred to above under Reviewer Notes, condition NZTA 27 has been met.

## 2.8 NZTA 28

Specific to the CNVMP2–U, condition NZTA 28 of Schedule 3 specifies that:

At least 5 working days prior to commencement of any works which are planned to occur within 200m [of] the properties identified in Condition NZTA 27 the Agency shall take reasonable steps to ensure that the owners and occupiers of those properties:

- (a) are each provided with a copy of the schedule of construction activities required by Condition NZTA 3; and
- (b) clear information setting out when works are proposed to occur at night (that is, between the hours of 2000h and 0630h) and the nature and reason for the proposed night works.

**Reviewer notes**

- Section 5 of the document correctly notes the owners and occupiers of the properties identified in NZTA 27. The document notes these properties will be provided with a copy of the schedule of construction activities as required by NZTA 28.
- The reviewers assume that the information provided to the properties will satisfy 28(a) and 28(b).
- The overall communication framework is considered adequate, including the matters referred to in sections 5, 12 and 13 of the document.

**Finding 23(d)**

Based on the matters referred to above under Reviewer Notes, condition NZTA 28 has been met.

### 3. Summary of findings

The document *Construction Noise and Vibration Management Plan (CNVMP2-U)* dated 21 December 2012, has been reviewed by a qualified Planner and qualified Noise and Vibration engineers. The document has been found to be consistent with the applicable conditions of Schedule 3 of the Act, being conditions NZTA 22, 23, 27 and 28.

Provided that the measures and procedures identified in the document are consistently adhered to, the noise and vibration management framework will give effect to the conditions of the Act. The reviewers note that the management plan provides a suitable framework for addressing issues as (or if) they arise. This 'reactive framework' approach is consistent with the typical nature of an environmental management plan.

The noise and vibration management plan logically falls under, or is closely related to, the Construction Environmental Management Plan (CEMP) required by NZTA condition 11. The reviewers note that the CEMP is still being prepared, and that NZTA condition 11 specifically prohibits commencement of the undergrounding works prior to the CEMP being certified.

The reviewers recommend that CNVMP2-U be reviewed for consistency with the CEMP, once that plan is finalised, to allow the undergrounding works to commence.



9 January 2013

Apex Planning and Environmental  
PO Box 5425  
**WELLINGTON 6145**

For the attention of Mark Ashby

Dear Mark

**MEMORIAL PARK PROJECT  
PEER REVIEW – CONSTRUCTION NOISE MANAGEMENT PLAN  
CNVMP2-U UNDERGROUNDING**

I have now received Rev 1.1 Final of the Construction Noise and Vibration Management Plan 2 – Undergrounding (CNVMP2-U) dated 21<sup>st</sup> December 2012. This version of the CNVMP resulted from amendments made to version V1.0 following comments to James Block on 18<sup>th</sup> December 2012 and other comments from Council and the vibration reviewer. The main area of our concern was that Table 11 did not predict construction noise for all of the receivers and this has been corrected in Version 1.1.

I believe that CNVMP2-U V1.1 appropriately identifies the noise sources and predictions set out in conditions 23(c)(i) & (ii) and identifies the times, days and circumstances when noisy construction work will occur as set out in subsection (iii). It is my opinion that the mitigation measures as required by 23(c)(iv) and (v) have been appropriately addressed. Section 10 of the document establishes the methodology for dealing with construction noise management in Schedules for the construction works and these have yet to be written. Noise monitoring and reporting are required by 23(c)(viii) and these are appropriately dealt with in sections 11 and 13 of the document.

I have reviewed sample calculations of the noise levels in Table 11 and the calculations I have reviewed are reasonable and accurate.

With respect to technical noise matters I believe that you can provide certification that the requirements of 23(c) are met by the document.

Yours faithfully

**ACOUSAPE CONSULTING & ENGINEERING LTD**

A handwritten signature in black ink, appearing to read "Nigel Lloyd", is written over a light blue horizontal line.

Nigel Lloyd  
Director of Acoustic Services