



MODIFICATION REQUEST:
Pacific Highway Upgrade - Banora Point
(07_0059 MOD4)

***Modification of condition 2.14 to permit an
increase to approved blasting criteria***

Director General's
Environmental Assessment Report
Section 75W of the
Environmental Planning and Assessment Act 1979

March 2011

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EXECUTIVE SUMMARY

The Pacific Highway Upgrade – Banora Point Project (07_0059) was approved by the Minister on 26 February 2009 under Part 3A of the *Environmental Planning and Assessment Act, 1979*. The approved project involves the upgrade of a 2.5 kilometre section of the Pacific Highway to a six lane divided carriageway highway from the northern end of Barneys Point Bridge through to the southern end of the Tweed Heads bypass in the Tweed local government area.

Construction of the project commenced in May 2010.

The NSW Roads and Traffic Authority has submitted a request (07_0059 MOD4) under section 75W of the *Environmental Planning and Assessment Act, 1979* to modify the project to increase the blasting criteria for ground vibration levels.

The Department publicly exhibited the modification request for 14 days between 14 February and 28 February 2011 and received submissions from the Department of Environment, Climate Change and Water and Tweed Shire Council. The proposal was supported by the public authorities. No public submissions were received.

The Department has undertaken a detailed assessment of the modification request, considered the views of the public authorities and is satisfied that the proposal to increase the blasting criteria for ground vibration levels would not significantly reduce the human comfort level of nearby sensitive receivers or increase the risk of potential damage to structures and buildings. The residual impacts of blasting would be addressed through the implementation of appropriate blast management and mitigation measures.

The Department considers the proposal would have overall benefits to the local community, and minimal long term residual impacts to the wider community and environment. Therefore it is recommended that the Director General approve the NSW Roads and Traffic Authority's modification request to increase blasting criteria for the Banora Point Project.

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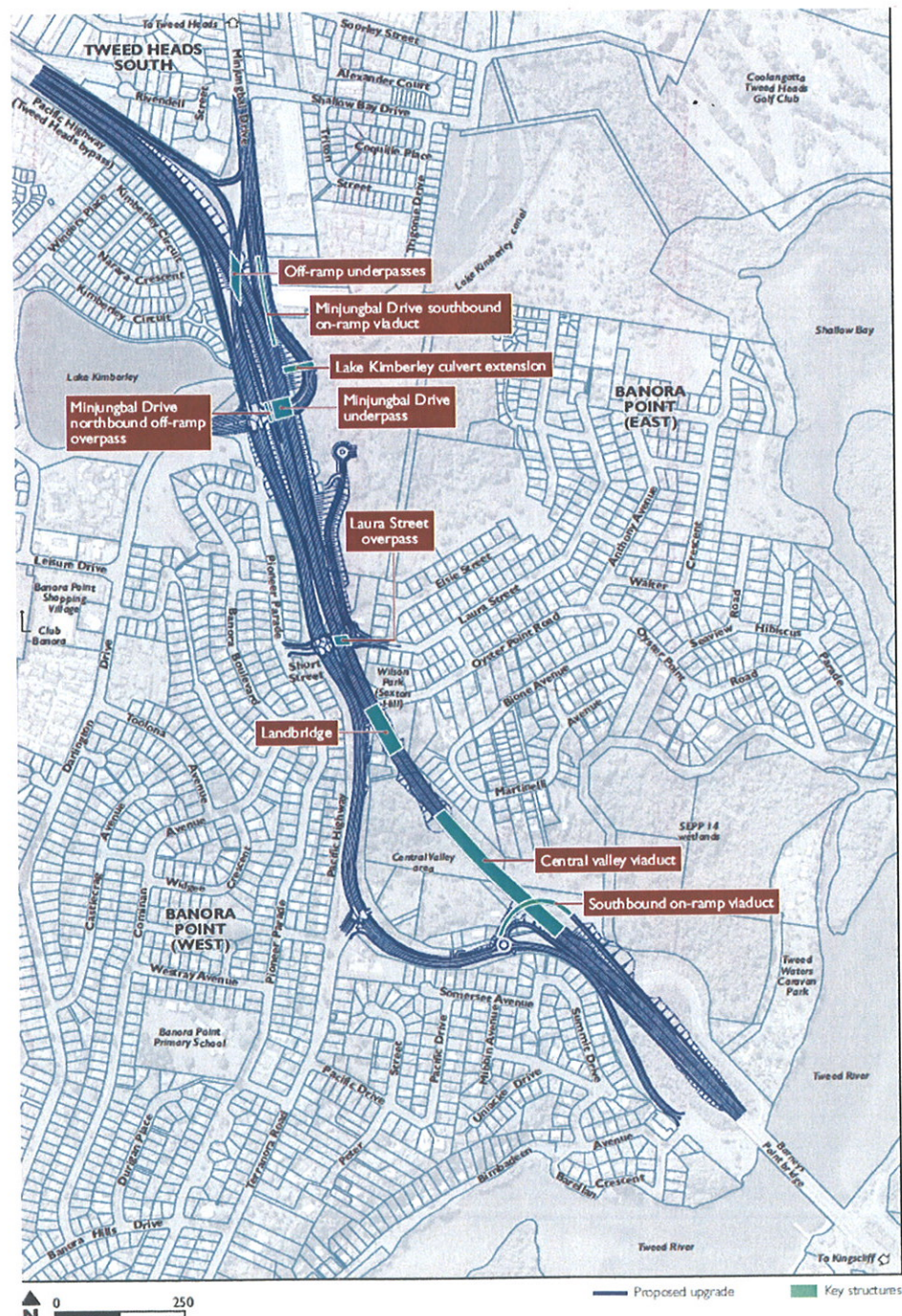
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1. BACKGROUND

The Pacific Highway Upgrade – Banora Point Project (07_0059) was approved by the Minister on 26 February 2009 under Part 3A of the *Environmental Planning and Assessment Act, 1979* (the EP&A Act). The approved project involves the upgrade of a 2.5 kilometre section of the Pacific Highway to a six lane divided carriageway highway from the northern end of Barneys Point Bridge through to the southern end of the Tweed Heads bypass in the Tweed local government area. Refer to Figure 1 for the approved project layout.

Construction of the project commenced in May 2010.

Figure 1 Approved Project Layout



The project was modified in October 2009 (MOD1) to provide flexibility in how community engagement was achieved, and in November 2009 (MOD2) for the timing of submission of staging reports. The modification request lodged in January 2010 (MOD3) to stage the Urban Design and Landscaping Management Plan was subsequently withdrawn.

The project traverses a highly urbanised area dominated by low to medium density residential development. Commercial, retail, special uses and some vacant land are also present.

The main cutting through Sexton Hill has a significant basalt lens located from 3 to 13 metres below ground level. An estimated 35,000 m³ of basalt rock will need to be removed from the cutting. As the basalt rock is extremely hard, blasting is the most effective means of fracturing the rock to enable its excavation. Blasting would therefore be conducted in close proximity to residential uses.

2. PROPOSED MODIFICATION

2.1 Modification Description

The NSW Roads and Traffic Authority (the Proponent) has submitted a request (07_0059 MOD4) under section 75W of the EP&A Act to modify condition 2.14 to increase the blasting criteria for ground vibration levels from 5 mm/s peak particle velocity (PPV) for 95% of blasts and a maximum PPV of 10 mm/s to 10 mm/s for 100% of blasts, or where an agreement has been made with a property owner, 10 mm/s PPV for 95% of blasts and a maximum PPV of 15 mm/s (see Appendix A).

The Proponent considers the current blasting criteria of 5 mm/s (to be met by 95% of blasts) is conservative by industry standards and relates to human comfort levels for blasting operations rather than levels to prevent damage to structures. The request seeks to modify the human comfort criteria while remaining below that of the structural damage limits.

The Proponent commissioned an independent blasting expert, Terrock Pty Ltd, to review the blasting limits and determine the potential effects on structures and residents. The independent review supported the blasting documentation and blasting proposal.

The Proponent states approval of the request would enable a more efficient blasting and construction program and thereby result in an improvement to the amenity of residents in the Sexton Hill area, particularly from reductions in the duration and impact of noise and vibration generated by associated rock breaking and drilling activities.

3. STATUTORY CONTEXT

3.1 Modification of the Minister's Approval

Consideration of the modification request under section 75W of the EP&A Act is appropriate as the proposed modification is not consistent with the project approval, but is not a radical transformation of the approved project. The proposal increases the existing limits for ground vibration levels generated by blasting.

3.2 Delegated Authority

On 25 January 2010, the Minister delegated his powers and functions under section 75W of the EP&A Act to Directors in the Major Projects Assessment Division in cases where there are less than 10 public submissions (not including submissions from public authorities) in the nature of objections in respect of the modification request.

As no public submissions were received, the modification request meets the above criteria, consequently the Director Infrastructure Projects may determine the modification request under delegated authority.

4. CONSULTATION AND SUBMISSIONS

4.1 Exhibition

Under Section 75X(2)(f) of the EP&A Act, the Director General is required to make the modification request publicly available. Accordingly, the Department:

- publicly exhibited the modification request from 14 February 2011 until 28 February 2011 (14 days):
 - on the Department's website; and
 - at the following exhibition locations: the Department's Head Office, the Tweed Heads Branch Office of the Tweed Shire Council and the Banora Point Upgrade Alliance Site Office at Banora Point;
- advertised the public exhibition in the *Tweed Daily News* newspaper on 14 February 2011 and *Tweed Border Mail* newspaper on 17 February 2011; and
- notified the Department of Environment, Climate Change and Water (DECCW) and Tweed Shire Council of the modification request in writing.

The Department received two submissions from public authorities (DECCW and Tweed Shire Council) during the exhibition of the modification request (see Appendix B). No public submissions were received.

4.2 Public Authority Submissions

The DECCW supported the proposed modification and noted that in the event of unresolved complaints the limit of 10 mm/s (100%) would apply. The DECCW also recommended that monitoring of each blast should be carried out at the most affected receiver and the results reported to the Department and DECCW.

Tweed Shire Council noted there were benefits from increasing the efficiency of blasting with minimal risk for damage and that the community consultation process undertaken to date by the Proponent had not identified any major community concerns. Council requested that the consultation process continue throughout the blasting program.

5. ASSESSMENT

Blasting Criteria

Condition 2.14 specifies the maximum ground vibration levels for the project, 5 mm/s for 95% of blasts and no blasts to exceed 10 mm/s (see Table 1). These criteria are based on guidelines prepared by the Australian and New Zealand Environment and

Conservation Council (ANZECC) *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* and are the recommended levels to protect the human comfort of nearby receivers. The ANZECC guidelines are adopted by the DECCW for the assessment of blast impacts.

Table 1: Condition 2.14 Blasting Criteria

Peak Particle Velocity (mm/s)	Allowable Exceedance
5	5% of the total number of blasts over a period of 12 months
10	None

The Proponent proposes to increase the ground vibration limit to 10 mm/s for 100% of blasts or for properties with an agreement to increase blasting criteria, 10 mm/s for 95% of blasts and a maximum of 15 mm/s.

The Proponent states the current limits are based on human comfort levels and not on the structural integrity of houses and other infrastructure. Houses are damaged at much higher levels than those specified in condition 2.14. The vibration from construction blasting has a duration of only 2-3 seconds for each blast and is perceptible only for this time.

The proposal would result in a net benefit gain to the community through improvements in the quality of life, primarily by:

- reduced noise and vibration from fewer drilling hours;
- less blasts;
- less impulsive noise and vibration from fewer rock breaking hours resulting from more efficient blast fragmentation of rock;
- less traffic stoppages and disruption; and
- faster project completion time.

These net benefit gains would be achieved by:

- higher vibration limits permitting expanded drill patterns which reduces the number of blasts; and
- more efficient blasting which would improve fragmentation and require less rock breaking.

The trade off to the community is increased blast vibration from a reduced blasting program of 25 blasts lasting about 2-3 seconds each, compared to 35 blasts at a lower vibration level but with many more hours of almost continuous and annoying noise and vibration from hydraulic or airtrack drills and rock breakers.

The accepted limits for the assessment of damage to structures are contained in British Standard BS7385-1:1900. The British Standard guidelines are referenced in Australian Standard AS2187.2-2006 *Explosives - Storage and use - Use of explosives* (AS2187) and summarised in Table 2. The ground vibration level at which cosmetic damage to a structure could occur is 15 mm/s for a low frequency blast of 4Hz, increasing to 20 mm/s for a 15Hz blast. For blasts with frequencies of more than 40Hz, cosmetic damage to structures begins to occur with levels of 50 mm/s.

The trial blast at the Sexton Hill cutting has indicated that a minimum blast frequency of 40Hz would be required and that this blast frequency is likely to be constant throughout the blasting program. As shown in Table 2, the relevant guideline for

control of cosmetic damage to structures with a blast frequency of 40Hz and above is 50 mm/s, which is significantly above the proposed 10 mm/s maximum limit (15 mm/s for properties with an agreement to increase blast limits).

Table 2: AS2187 Structural Damage Criteria

MEASURE	CONDITION	RECOMMENDED AS2187 BLAST LIMIT		PROPOSED CHANGES TO BLASTING CRITERIA
Ground vibration limits for human comfort	Operations lasting less than 12 months or less than 20 blasts	10 mm/s unless agreement is reached with occupier that a higher limit may apply		10mm/s for 100% of blasts 10 mm/s for 95% of blasts and maximum of 15 mm/s with the agreement of the landowner.
Ground vibration limits for control of damage to structures	British Standard BS 7385 - guide for cosmetic damage to structures	4 Hz to 15 Hz blast frequency	15 Hz and above blast frequency	40 Hz blast frequency
		15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above	10mm/s for 100% of blasts 10 mm/s for 95% of blasts and maximum of 15 mm/s with the agreement of the landowner.

The Department notes that the current ground vibration levels have been set based on ANZECC criteria for protecting human comfort levels at nearby sensitive receivers. Whilst increasing the general applicable limit at sensitive receivers from 5 mm/s to 10 mm/s is likely to marginally increase the risk of human annoyance and comfort, the Department considers that this limit would remain a conservative criterion which is consistent with the ANZECC human comfort goals. In this regard, the Department notes that the general applicable limit proposed by the RTA of 10 mm/s would remain the same as the upper limit for human comfort recommended in the ANZECC guideline and AS2187 (as per the current approved limit) and would only go above this (up to an absolute limit of 15 mm/s) where the Proponent has obtained the informed consent and agreement of a relevant receptor agreeing to higher levels.

The Proponent has identified 14 properties with which agreements would potentially be negotiated to increase the blasting criteria above 10 mm/s up to an absolute limit of 15 mm/s (with an exceedance allowance above 10 mm/s of no more than 5% of the time). The agreement would allow a landowner to terminate the agreement if there are unresolved blasting matters. In that situation, the criteria of 10 mm/s for 100% of blasts would apply and the Proponent would need to adjust future blast sizes to ensure compliance with the blast criteria. Based on the above, the Department considers that the proposed increase of the general applicable blast limit at sensitive receivers (where no agreements apply) up to 10 mm/s, to be reasonable and would not result in a material decrease to human comfort outcomes. In contrast, there are likely to be net beneficial amenity outcomes at receptors from reductions in noise and other impacts as a result of a reduced blasting program (enabled by the increase in blast criteria).

In relation to the proposed increase of blast levels above the general applicable criteria of 10 mm/s to an absolute limit of 15 mm/s where an agreement is in place with receptors, the Department is satisfied that this limit would not materially increase the risk of cosmetic or structural damage to residences, given that the proposed upper limit of 15 mm/s would remain significantly below the building damage vibration levels recommended under AS2187. The Department further notes that exceedences above 10 mm/s up to a maximum of 15 mm/s (under agreement) are only expected to occur infrequency (i.e. a maximum of 5% of time in a given year). In consideration of the above, the Department considers that an increase of the upper limit for blasting to 15 mm/s (under agreement) to be reasonable and can be supported.

Consultation and Mitigation Measures

The Proponent has commenced a staged consultation process with the community on the proposed Sexton Hill blasting program. Initial community consultation occurred in August and September 2010. This involved presentations on the results of the trial blast, the proposed blasting program and modification request to increase blasting criteria, to community information sessions, focus group meetings and meetings with individual landowners. The Proponent advised that in the presentations to date, there was no outright objection to the modification request. Further consultation would occur with individual affected residents during the blasting program. In addition, the Proponent would undertake consultation and notification of the proposed blast program to the wider community and follow up in the case of complaints and complaint close out. The Department supports these consultation commitments and considers that these address Council's comment on the need for the continuation of the community consultation process.

The Proponent would implement a number of management measures, including the preparation of a detailed Blast Management Plan, which would outline measures to ensure compliance with relevant approvals and licences, manage potential vibration, noise, airblast and air quality impacts and reduce adverse impacts to the local community and environment. The Proponent has undertaken building condition inspections of all buildings within 200 metres off the proposed Sexton Hill cutting (in accordance with Statement of Commitment L4) and would implement a blasting complaints handling procedure and repair all damage attributed to blasting activities.

Vibration levels would be monitored at the closest receiver to ensure compliance with the blasting limits. Monitoring would also be carried out at other locations to ensure adequate records are collected for other properties and to increase the data for modelling of vibration levels for sizing of blasts. This commitment addresses the DECCW's comments on the monitoring and reporting of blast performance data.

The Proponent's independent blasting expert has reviewed the community consultation process, complaints handling procedure and the Blast Management Plan, and considered the consultation and complaints procedures were adequate and the Blast Management Plan was based on model documents and addressed the requirements of AS2187. The independent expert recommended that specific details should be added as the project progresses, including the blast design for blasts at specific locations.

The Department is satisfied with the Proponent's commitments on community consultation and considers the Blast Management Plan would adequately manage, mitigate and monitor the proposed blasting program.

6. CONCLUSION AND RECOMMENDATIONS

The Department accepts that the proposal to increase ground vibration levels from 5 mm/s (95% of blasts) to 10 mm/s for 100% of blasts, and for properties with an agreement to increase blast sizes (10 mm/s with an allowable exceedance of 5% to a maximum of 15 mm/s) would have net benefits for the local and broader community and road users. The ability to increase blast sizes would result in a shortened blasting program and consequent reductions in noise generated by associated activities such as blast hole drilling and rock breaking. This would have a positive amenity impact for the Sexton Hill community.

The proposal is consistent with AS2187 which sets recommended guidelines for human comfort levels and damage to buildings. The proposed limits would not significantly affect the human comfort level likely to be experienced at sensitive receivers and are well below the levels that would cause cosmetic and structural damage to buildings.

Further, the proposal to negotiate agreements with landowners for higher blast vibration levels (above 10 mm/s) is consistent with AS2187 and the Environmental Protection Licence for the project.

The modification request has been reviewed by an independent blasting expert on behalf of the Proponent. The expert considered the increase in blasting limits was consistent with accepted standards for control of damage to structures and protection of human comfort levels, the proposed increase in limits represented a minimal risk of damage to properties, the consultation and complaints procedures were adequate and the Blast Management Plan addressed the requirements of AS2187.

The Proponent has committed to a range of management, mitigation and monitoring measures to manage the proposed blasting program. Blasting would be carried out in accordance with a Blast Management Plan which sets out the measures to reduce adverse impacts on the community and manage impacts such as vibration, noise and air quality.

The Department considers the proposal has positive benefits for the community and that commitments made by the Proponent in relation to community consultation, complaints handling and blast management would ensure that potential impacts from larger blasts are managed and monitored. Therefore the Department recommends that the Director Infrastructure Projects approve the modification request under section 75W of the EP&A Act, by signing the attached Instrument of Modification (Appendix C).



Dinuka McKenzie
A/Team Leader Roads
Infrastructure Projects

5/4/11



Daniel Keary
Director
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APPENDIX A MODIFICATION REQUEST

See the Department's website at:

http://majorprojects.planning.nsw.gov.au/page/project-sectors/transport--communications--energy---water/roads/?action=view_job&job_id=4493

APPENDIX B SUBMISSIONS

APPENDIX C RECOMMENDED MODIFYING INSTRUMENT

Modification of Minister's Approval

Section 75W of the *Environmental Planning & Assessment Act 1979*

As delegate of the Minister for Planning under delegation executed on 25 January 2010, I approve the modification of the project application referred to in Schedule 1, subject to the conditions in Schedule 2.


Daniel Keary
Director Infrastructure Projects

Sydney 12 APRIL 2011

SCHEDULE 1

Project Approval:

07_0059 granted by the Minister for Planning on 26 February 2009.

For the following:

The construction and operation of an approximately 2.5 kilometre six lane divided carriageway, comprising a land bridge, viaduct and two interchanges, referred to as the Pacific Highway Upgrade – 'Banora Point' Project.

Modification:

Modification of condition 2.14 in relation to the approved blasting criteria.

SCHEDULE 2

The approval is modified by:

1. Deleting condition 1.1 and replacing with the following:
 - 1.1 The Proponent shall carry out the project generally in accordance with the:
 - a) Major Projects Application 07_0059;
 - b) *Banora Point – Upgrading the Pacific Highway – Environmental Assessment* (volumes 1, 2 and 3), prepared by Parsons Brinckerhoff Australia Pty Ltd and dated February 2008;
 - c) *Banora Point – Upgrading the Pacific Highway – Environmental Assessment Submissions Report*, prepared by Parsons Brinckerhoff Australia Pty Ltd and dated July 2008, including the revised Statement of Commitments contained therein;
 - d) the RTA's modification request dated 3 September 2009 (07_0059 MOD 1);
 - e) the RTA's modification request dated 26 October 2009 (07_0059 MOD 2);
 - f) the RTA's modification request dated 17 January 2011 (00_0059 MOD 4); and
 - g) the conditions of this approval.
2. Deleting condition 1.2 and replacing with the following:
 - 1.2 In the event of an inconsistency between:
 - a) the conditions of this approval and any document listed from condition 1.1a) to 1.1f) inclusive, the conditions of this approval shall prevail to the extent of the inconsistency; and
 - b) any document listed from condition 1.1a) to 1.1f) inclusive, and any other document listed from condition 1.1a) to 1.1f) inclusive, the most recent document shall prevail to the extent of the inconsistency.
3. Deleting condition 2.14 and replacing with the following:
 - 2.14 The Proponent shall ensure that ground vibration generated by blasting associated with the project does not exceed the criteria specified in Table 1 when measured at the most affected residence or other sensitive receiver.

Table 1 – Peak Particle Velocity Criteria

Criteria	Peak Particle Velocity (mm/s)	Allowable Exceedance
Criterion 1 – if no written agreement with the affected receiver	10	Never
Criterion 2 – if a written agreement has been entered into with the affected receiver and the Director General has approved the terms of the written agreement prior to the commencement of any blasting at the higher limits	10	5% of total number of blasts over a 12 month period
	15	Never

The following exclusions apply to the application of this condition:

- a) any agreements reached may be terminated by the landowner at any time should concerns about the increased blasting limits be unresolved;
- b) the blasting limit agreed to under any agreement can at no time exceed a maximum Peak Particle Velocity vibration level of 15 mm/s; and
- c) the provision to increase applicable blast criteria in agreement with the relevant landowner do not apply where the property is a heritage property.

A copy of the written agreement shall be provided to the Department prior to the commencement of any blasting at the higher limits.