Australian Government

New South Wales Government

RTA

Coffs Harbour Highway Planning

Sapphire to Woolgoolga section

ENVIRONMENTAL ASSESSMENT SUBMISSIONS REPORT
JULY 2008

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SUBMISSIONS REPORT

JULY 2008

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AUSLINK
Building our National Transport Future

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1 Introduction and background

The Roads and Traffic Authority of NSW (RTA) proposes to upgrade the Pacific Highway from approximately eight kilometres north of Coffs Harbour at Sapphire, extending for approximately 25 kilometres to the vicinity of Arrawarra Beach Road north of Woolgoolga. The Proposal has a southern "upgrade" section from Sapphire to south Woolgoolga and a northern "bypass" section around Woolgoolga and is described in detail in Chapter 7 of the Environmental Assessment (EA).

Currently 263 kilometres of a total of 677 kilometres of the Pacific Highway are double lane divided road. A further 91 kilometres of the Pacific Highway are under construction or have had a construction contract awarded. The remaining kilometres are either approved for construction or have had a preferred route identified. The Pacific Highway is part of the AusLink National Network. By mid-2009 the New South Wales Government will have spent $2.3 billion and the Australian Government $1.3 billion towards the upgrade of the Pacific Highway.

The RTA has prepared a Project Application Report for the Proposal (October 2006) in accordance with the process and requirements of Part 3A of the *Environmental Planning and Assessment* (EP&A) *Act 1979*. In addition, the RTA has prepared an EA for the Proposal (November 2007), which addresses the key environmental issues identified in the Director General's requirements issued in December 2006 and includes mitigation measures to address potential impacts.

This report has been prepared pursuant to Section 75H (6) of the EP&A Act following the exhibition of the EA. It includes responses to the submissions made to the exhibition of the EA (Chapter 2), design refinements as a result of submissions (Chapter 4) and a revised Statement of Commitments (Chapter 5).

1.1 Community Consultation

1.1.1 EA exhibition period

The EA was on public exhibition between Thursday 29 November 2007 and Friday 15 February 2008 at the locations detailed in Table 1.1.

TABLE 1.1 LOCATIONS WHERE THE EA WAS DISPLAYED

LOCATION	ADDRESS
RTA Motor Registry	34 Gordon Street, Coffs Harbour
Coffs Harbour City Council	Corner of Coff and Castle Streets, Coffs Harbour
Woolgoolga Public Library	Ganderton Street, Woolgoolga
Shop 16, Moonee Beach Shopping Centre	Moonee Beach Road, Moonee Beach
Yarrawarra Cultural Centre	170 Red Rock Road, Corindi Beach
RTA Pacific Highway Office	21 Prince Street, Grafton
RTA Head Office	Ground floor Centennial Plaza, 260 Elizabeth Street, Surry Hills
NSW Department of Planning Information Centre	23-33 Bridge Street, Sydney
Nature Conservation Council of NSW	Level 2, 301 Kent Street, Sydney NSW 2000

All necessary reference material was made available for review at the nominated locations and the EA was also available on the Department of Planning's website in addition to the RTA's website. The RTA's website was accessed almost 2,000 times during the exhibition period. Submissions were invited from anyone with an interest in the upgrade and submissions were received until 15 February 2008.

The Department of Planning provided the RTA with copies of the 93 submissions received during this period.

1.1.2 Further community consultation

The Sapphire to Woolgoolga Pacific Highway upgrade toll-free project information line (1800 63 63 63) will remain open throughout the duration of the approval, detailed design and construction phases of the project. The RTA project staff will be available to respond to ongoing queries with regard to the project.

The EA display period and the Department of Planning's formal submissions period have both closed. However, the RTA will continue to respond to other correspondence with regard to any ongoing project issues.

1.2 Structure of the document

This document has been prepared pursuant to Section 75H(6) of the EP&A Act following the exhibition of the environmental assessment for the Sapphire to Woolgoolga Pacific Highway upgrade. It includes the RTA's responses to the public submissions (Chapter 2), and a revised Statement of Commitments (Chapter 5). The document also includes detail on additional environmental investigations (Chapter 3) and minor design modifications (Chapter 4) that were undertaken since the exhibition of the EA.

2 Consideration of submissions

2.1 Approach

A total of 93 submissions were received during the exhibition period. Each submission was reviewed individually and issues extracted. Table 2.1 provides a reference, tracking where each issue is addressed and responded to in the report.

TABLE 2.1 MATRIX OF RESPONSES TO SUBMISSIONS

SUBMISSION NO.	RESPONDENT	SECTION(S) WHERE ISSUES ARE ADDRESSED
042	Angry Grannies (Margaret Murphy)	2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.8, 2.2.9, 2.2.10, 2.2.11, 2.2.14, 2.2.15, 2.2.15, 2.2.16, 2.2.17, 2.2.18, 2.2.20, 2.2.21, 2.2.22
037	Atwal, David	2.2.2, 2.2.15
059	AWP Holdings Pty Ltd	2.2.4
003	Bagawa Birra Murri Aboriginal Women's Council Inc (Arlene Hope)	2.2.5, 2.2.6
021	Bartha, Andrew	2.2.2, 2.2.7, 2.2.8, 2.2.10, 2.2.17
080	Bartlett, Leonard W	2.2.4, 2.2.7, 2.2.10, 2.2.15, 2.2.22
015	Blessing, Keith and Diane	2.2.1, 2.2.3, 2.2.5, 2.2.7, 2.2.10, 2.2.22
058	Bower, B	2.2.8
032	Boyd, Lorraine	2.2.5, 2.2.12
019	Breaden, Audrey	2.2.3, 2.2.4, 2.2.23
049	Brown, B A	2.2.3, 2.2.4, 2.2.7, 2.2.10, 2.2.11, 2.2.13, 2.2.15, 2.2.17, 2.2.18, 2.2.22
030	Carter, Barry and Lesley	2.2.3, 2.2.4, 2.2.5
086	Chiswell, E	2.2.4, 2.2.5, 2.2.9

SUBMISSION NO.	RESPONDENT	SECTION(S) WHERE ISSUES ARE ADDRESSED
038	Chouhan, Tajinder Singh; Chouhan, Randhir Singh; Khaira, Harnam; Nerwal, Gurtaj; Singh Kanwal	2.2.1, 2.2.3, 2.2.4, 2.2.7, 2.2.9, 2.2.11, 2.2.15
044	Clemesha, Steve	2.2.5, 2.2.23
092	Clouten, C A and W P	2.2.2, 2.2.3, 2.2.4, 2.2.8, 2.2.10, 2.2.11, 2.2.17, 2.2.20
077	Coffs Harbour City Council	2.2.3, 2.2.4, 2.2.10, 2.2.15, 2.2.17, 2.2.18
013	Connolly, Brett	2.2.4
055	Crestani, E and R	2.2.1, 2.2.3, 2.2.4, 2.2.11
070	Crystal Waters Estate – residents (T C Watkins)	2.2.8, 2.2.10, 2.2.20
052	Davey, Gary D	2.2.4
007	Dengate, Barry	2.2.10, 2.2.22, 2.2.23
057	Department of Environment and Climate Change NSW	2.2.4, 2.2.5, 2.2.8, 2.2.12, 2.2.13, 2.2.14, 2.2.15, 2.2.17, 2.2.20, 2.2.24
022	Devi, Kamala	2.2.5, 2.2.7, 2.2.10, 2.2.15, 2.2.22
082	Dillon, Lindy	2.2.1, 2.2.3, 2.2.4, 2.2.8, 2.2.15, 2.2.17
028	Elliott, Judith	2.2.4, 2.2.7
087	Ensbey, Scott and McPherson, Fiona	2.2.3, 2.2.4, 2.2.5, 2.2.8, 2.2.10, 2.2.12
039	Evans, Wayne	2.2.14
002	Fairhall, Vicki	2.2.3, 2.2.4
035	Farag, E J	2.2.3, 2.2.4
026	Findlay, Michael	2.2.5, 2.2.17
011	Flanagan, Kathy	2.2.3, 2.2.18, 2.2.22
081	Forests NSW	2.2.5, 2.2.17
056	Gaggin, P and J	2.2.3, 2.2.4, 2.2.5, 2.2.8, 2.2.11, 2.2.15, 2.2.20
060	Gall, Phillip	2.2.3, 2.2.4, 2.2.7, 2.2.10, 2.2.11, 2.2.14, 2.2.20, 2.2.22
029	Geyson, Graeme	2.2.3, 2.2.5, 2.2.7, 2.2.16, 2.2.21
083	Gill, Kashmir Singh and Sansar Kaur	2.2.1, 2.2.2, 2.2.3
017	Hill of Fire Sanctuary (Kamala Devi)	2.2.10

SUBMISSION NO.	RESPONDENT	SECTION(S) WHERE ISSUES ARE ADDRESSED
084	Huchendorf, K L	2.2.3, 2.2.4, 2.2.7, 2.2.8, 2.2.13, 2.2.15, 2.2.17, 2.2.18, 2.2.22
075	Jones, Julie	2.2.1, 2.2.4, 2.2.5, 2.2.7, 2.2.8, 2.2.17, 2.2.22
050	Kelley, Steven and Sabine	2.2.3, 2.2.4, 2.2.7, 2.2.8, 2.2.11
071	Klinkby, Alfred and Jeanette	2.2.2, 2.2.3, 2.2.4, 2.2.7, 2.2.8, 2.2.10, 2.2.11, 2.2.13, 2.2.15, 2.2.16, 2.2.17, 2.2.18, 2.2.22
025	Klum, Ian	2.2.2, 2.2.3, 2.2.4, 2.2.8, 2.2.9, 2.2.10, 2.2.22
048	Köster, Wolfgang	2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.8, 2.2.10, 2.2.11, 2.2.15, 2.2.17, 2.2.22
043	Laird, Dr Philip	2.2.3, 2.2.15, 2.2.16, 2.2.18, 2.2.19
068	Laird, Dr Philip	2.2.3, 2.2.17
040	Lalli, Parvinder	2.2.1, 2.2.2, 2.2.8, 2.2.15
031	Lange, Henry	2.2.4, 2.2.7, 2.2.23
027	Marr, J E	2.2.12
079	Martyn, Richard and Rae	2.2.1, 2..2.2, 2.2.4, 2.2.22
065	McKelvey, Cr Rod	2.2.3, 2.24, 2.2.5, 2.2.6, 2.2.12, 2.2.23
063	McKelvey, Pat	2.2.3, 2.2.4, 2.2.5, 2.2.12, 2.2.23
006	Ministry of Transport NSW	2.2.3, 2.2.10, 2.2.16
024	Mitchell, K M and Turner, A W	2.2.4
018	Mossuto, Laurie	2.2.12
020	Murdock , Ross	2.2.4
069	Mushalik, Matt	2.2.16
023	Nature Conservation Council of NSW (Cate Faehrmann)	2.2.5, 2.2.8, 2.2.12, 2.2.16, 2.2.17, 2.2.19
061	Northern Beaches Action Group (NAG), (Vicky Fisher)	2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.7, 2.2.8, 2.2.10, 2.2.11, 2.2.13, 2.2.15, 2.2.16, 2.2.17, 2.2.18, 2.2.22
045	NSW Department of Primary Industries	2.2.2, 2.2.5, 2.2.8
093	NSW Marine Parks Authority	2.2.8, 2.2.10, 2.2.13
012	NSW Rural Fire Service	2.2.24

SUBMISSION NO.	RESPONDENT	SECTION(S) WHERE ISSUES ARE ADDRESSED
016	Nurcombe, D	2.2.3, 2.2.4, 2.2.15
010	O'Connor, Richard	2.2.3, 2.2.4, 2.2.10, 2.2.15
041	Parry, Jacqui	2.2.3, 2.2.10
072	Perram, Jan	2.2.2., 2.2.3, 2.2.4, 2.2.10, 2.2.11, 2.2.18
090	Price, P J and S F	2.2.3, 2.2.4, 2.2.5, 2.2.9, 2.2.10, 2.2.23
004	Prince, G and B	2.2.10
078	Quinlan, Brian and Pauline	2.2.1, 2.2.3, 2.2.4, 2.2.22, 2.2.24
008	Robertson, Ann	2.2.4, 2.2.7, 2.2.22
009	Rose, R A	2.2.2, 2.2.22
091	Rothacker, Antonin and Karina	2.2.3, 2.2.18
088	Rothacker, Karina and Tony	2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.7, 2.2.8, 2.2.10, 2.2.11, 2.2.13, 2.2.15, 2.2.17, 2.2.18, 2.2.22
062	Sandy Hearnes Action Group (SHAG), (Wayne Evans)	2.2.1, 2.2.3, 2.2.6, 2.2.7, 2.2.8, 2.2.10, 2.2.11, 2.2.12, 2.2.13, 2.2.14, 2.2.15, 2.2.16, 2.2.19, 2.2.21, 2.2.22
047	Sangha, Kulwinder and Balbiro Kaur	2.2.1
033	Skinner, P G	2.2.1, 2.2.7, 2.2.10
051	Slotter, R E and A P	2.2.1, 2.2.3, 2.2.9, 2.2.11, 2.2.16, 2.2.18, 2.2.22
036	South, C J	2.2.4, 2.2.23
053	Sperring, Rob and Ida	2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.6, 2.2.8, 2.2.9, 2.2.10, 2.2.11, 2.2.14, 2.2.15, 2.2.16, 2.2.17, 2.2.20, 2.2.22
089	Stump, Frank	2.2.1, 2.2.2, 2.2.4, 2.2.7, 2.2.9, 2.2.10
014	Taylor, Frank and Beverleigh	2.2.23
001	Tedman, Janelle	2.2.5, 2.2.20
005	TransGrid NSW	2.2.24
073	United Residents' Group of Emerald Inc (URGE), (Phil Miller)	2.2.1, 2.2.3, 2.2.4, 2.2.5, 2.2.7, 2.2.9, 2.2.12.15, 2.2.17, 2.2.18, 2.2.20, 2.2.22

SUBMISSION NO.	RESPONDENT	SECTION(S) WHERE ISSUES ARE ADDRESSED
076	Wackett, John	2.2.2, 2.2.3, 2.2.4, 2.2.7, 2.2.10, 2.2.11, 2.2.13, 2.2.15, 2.2.17, 2.2.18, 2.2.22
074	Wallace, D F	2.2.4, 2.2.5, 2.2.8, 2.2.20, 2.2.22
034	Walter, Enid	2.2.4, 2.2.12
085	Watkins, T C and J A	2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.7, 2.2.8, 2.2.10, 2.2.11, 2.2.13, 2.2.22
064	Webeck, Margaret	2.2.1, 2.2.3, 2.2.4, 2.2.7, 2.2.8, 2.2.22
054	Webeck, Russell	2.2.2, 2.2.3, 2.2.4, 2.2.7, 2.2.8, 2.2.10, 2.2.11, 2.2.13, 2.2.15, 2.2.17, 2.2.18, 2.2.22
066	Wilson, R J and J L	2.2.1, 2.2.4, 2.2.7, 2.2.10, 2.2.15, 2.2.17, 2.2.22
046	WIRES (Dianne Ward)	2.2.5
067	Woolgoolga Chamber of Commerce, Industry and Tourism Inc (Steve Moody)	2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.8, 2.2.9, 2.2.12, 2.2.15, 2.2.17, 2.2.18, 2.2.20, 2.2.22

2.2 Responses to submissions

2.2.1 Planning and land use

Planning and land use

The following submissions were received with regards to planning and land use:

- Additional land would need to be purchased for the Proposal. This land would be better allocated to local recreational areas or further infrastructure for the Northern Beaches.
- The Proposal yields the largest acquisition of land which conflicts with the EA's statement in 22-1-1 of "minimising property acquisition". Valuable residential land should not be acquired to build roads.

Submission No. *015, 051, 053, 079*

Property acquisition is addressed within section 7.6 and Chapter 14 of the EA. The Proposal utilises as much of the existing road corridor as possible (approximately 46% of the Proposal is within the existing road reserve), which, in the context of the Proposal complies with the statement of "minimising property acquisition".

Only land required for the Proposal would be retained by the RTA. Should there be any excess acquired land, it would be disposed of following completion of construction of the Proposal.

Section 14.2 of the EA addresses the issue of potential urban growth / development areas identified within the *Draft Mid North Coast Regional Strategy* and Coffs Harbour City Council's *Our Living City Strategy*. The Proposal has been designed to facilitate growth within the identified areas through the placement of interchanges in strategic (future development) locations (Sapphire, Moonee Beach, Emerald Beach, south Woolgoolga and Arrawarra). The *Hearnes Lake/ Sandy Beach Development Control Plan* area and the *Moonee Beach Development Control Plan* area would be affected by the Proposal through strip acquisitions only, which affect perimeter sections of those properties such that there would be minimal impacts on the development potential of these areas.

The allocation of land for recreation or other infrastructure on the Northern Beaches is not a matter for the RTA and is not within the scope of this EA.

- The EA has identified the respondent's property as agricultural land with minor impact. It has ignored issues of planning and land use for future urban residential development for the property. The property has been identified in both "future" land release strategies of Coffs Harbour City Council and the *Mid-North Coast Regional Strategy* by NSW Department of Planning. The EA has ignored major environment issues related to proximity of the bypass and future urban development on the property – which is against the Director-General's requirements specifications.

Submission No. *038*

The property was identified as an agricultural property due to the size and current zoning of the site as 1A rural zoning.

The property was also identified within the *Land Use Planning and Socio-economic Assessment* (Appendix F, Working Paper 4) as a property identified within the Coffs Harbour potential future residential areas. However, the Coffs Harbour City Council's *Our Living City Settlement Strategy* and the Department of Planning's draft *Mid-North Coast Regional Strategy* only identified an 80ha portion of the 100ha property as being a future urban development area, with 53.9ha of land on this portion potentially becoming residential sites (540 dwellings) from 2031.

Three hectares of this property would require strip acquisition as part of the Proposal. This acquisition would occur along the western boundary and would not affect the portion of the site identified for future urban development.

In order to minimise the overall property impacts (such as severance and access issues) on properties along the bypass, the Proposal has been located as much as feasible along property boundaries.

- The planning for a freight route should incorporate the issue of the predicted population increase and keep heavy vehicles away from residents. The proposed road freight corridor would limit land available for the expected increase in population.
- The total width of the proposed upgrade (850 metres) would destroy much needed building sites.

Submission No. *042, 048*

Alternative routes were assessed in the route selection process, outlined in Chapter 6 of the EA. The value management workshop held in April 2003 concluded that of the five route options, Options C and D should be considered further. The RTA then developed two revised options in response to a request from Council: Option C1 and Option E. The second value management workshop held in August 2004 considered Options C, C1 and E using the same evaluation process as the first value management workshop (a triple bottom line of functionality, environmental and socio-economic factors). The majority of the participants recommended that Option E be considered further.

Option E was selected as the preferred route as it was considered to:

- Deliver the best overall socio-economic outcome
- Better provide for future urban growth and provide greater flexibility for future land use planning decisions.
- Result in less severance of existing and future communities.
- Provide safety and noise improvements for Mullaway and Safety Beach
- Be likely to have a higher degree of community acceptance.

The Proposal has been designed as a Class M upgrade inclusive of interchanges in specific locations to accommodate the predicted increase in population along the northern beaches. A Class M upgrade would also enable a local access road along the entire length of the Proposal that would separate local traffic from through traffic.

The Proposal has also been designed to have minimal impacts on future urban sites (see working paper 4 *Land Use, Planning and Socio-Economic assessment*). The *Draft Mid North Coast Regional Strategy* and Coffs Harbour City Council's *Our Living City Strategy* identified potential urban growth/ development areas. Only strip acquisitions would be required at properties within the development areas of the *Hearnes Lake/ Sandy Beach Development Control Plan* area and the *Moonee Beach Development Control Plan* area. The identified acquisitions would have minimal impacts on the development potential of these areas.

The quoted width of 850m for the highway corridor is not correct. The width of the Proposal is typically between 80-100m along most of the alignment, increasing to a width of approximately 200-360m at the proposed interchanges. The Proposal has been designed to have minimal impacts on future urban sites and to minimise, to the extent possible, the extent of property acquisition required.

- There is an insufficient planning horizon for Pacific Highway upgrades. The Coffs Harbour upgrades would have a possible completion date of 2024 and have a use by date of 30 years which is not sufficient given that planning and construction take 25 years.

Submission No. *062*

The Department of Planning has released a draft Strategy for the Mid North Coast to 2031 (Draft Mid North Coast Regional Strategy) and Coffs Harbour City Council is preparing a Settlement Strategy for the City to 2031. The planning horizon for the Proposal is consistent with these planning documents, both of which include consideration of the Proposal.

The Coffs Harbour Highway Planning Strategy (the "Strategy") was developed to address the need to upgrade the Pacific Highway between Sapphire and Woolgoolga while planning for future traffic needs within the Coffs Harbour urban area. The strategy is divided into two sections:

- The southern section from south Coffs Harbour to Sapphire (Coffs Harbour section).
- The northern section from Sapphire to Woolgoolga (this Proposal).

The preferred route for the strategy was announced in December 2004. The concept design for both the southern and northern sections of the preferred route incorporates local access road arrangements to facilitate the separation of local and through traffic and provides for a future additional lane in both directions to cater for further increases in traffic volumes.

Predictions of future traffic volumes undertaken for the development of the strategy indicated that the most heavily trafficked section of the preferred route (the Sapphire to south Woolgoolga section) would not need to be upgraded from four lanes to six lanes within the next 25 years. Longer term extrapolations of the traffic predictions suggest that, when upgraded to six lanes, the Sapphire to south Woolgoolga section of the preferred route would cater for anticipated traffic volumes well into the second half of this century.

The Sapphire to Woolgoolga upgrade has been identified as a high priority project in the Pacific Highway Upgrade program.

Property acquisition

The following submissions were received with regards to property acquisition:

- Respondent strongly objects to the compulsory acquisition of their property. The design shows the proposed new road reserve boundary in close proximity to the respondent's front door and there are plans to take land at the back of the property which will cut the access between the respondent's property and the adjacent property which belongs to a relative.

Submission No. *033*

Re-alignment of the property boundary to minimise the impact of the Proposal on this property has been considered, however, due to road design requirements, the boundary line could not be shifted.

The Proposal has been designed to minimise, to the extent possible, property acquisition. However, the RTA acknowledges that acquisition of private property is a sensitive issue for affected residents. As described in section 12.2.3 of this EA, and important Aboriginal site known as a potential archaeological deposit (PAD) was identified on an adjoining property. If the extent of the PAD is confirmed following the sub-surface investigations (refer SoC AH7), there may be further opportunity to minimise the impacts of the access track on the respondents property. The access track would be required to provide the adjoining landowner access to the Proposal at the Fiddaman Road interchange.

To ensure retention of access, the RTA has committed (refer SoC T4), that where any legal property access is temporarily or permanently affected by the Proposal, alternative access to an equivalent standard would be provided where feasible and reasonable or other alternative arrangements agreed in consultation with the property owner.

- RTA must consider the economic devaluation and several other costs due to proximity of the highway to the property. RTA should also acquire the land in close proximity to the highway as it would be unsuitable for urban residential development.
- According to the RTA's land acquisition policy, properties cannot be compulsorily acquired until the project is approved by the Minister, yet according to the valuation report for a property being acquired under "hardship" provisions "although we note the transactions over the neighbouring …. and …. show a slightly more bullish value range, we have discarded this evidence as it isn't considered a "willing buyer willing seller" scenario being acquired by the RTA.

Submission No. *038, 042, 089*

Acquisition of land would be undertaken in accordance with the RTA's *Land Acquisition Policy* and the *Land Acquisition (Just Terms) Compensation Act 1991* (refer SoC P1).

One objective of the *Land Acquisition (Just Terms Compensation) Act 1991* is to encourage the acquisition of land by negotiated purchase in preference to the compulsory process. The RTA fully supports this objective.

The *Land Acquisition (Just Terms) Compensation Act 1991* outlines relevant matters to be considered in determining the amount of compensation to which a person is entitled. The *Land Acquisition (Just Terms) Compensation Act 1991* also ensures that appropriate market value, including any special values of a property are considered when determining the level of compensation a person would receive, including for agricultural properties. The special value is the financial value of any advantage, in addition to market value, to the person entitled to compensation which is incidental to the person's use of the land.

It is unclear which property (being acquired under the hardship provisions) the respondent is referring to. The RTA cannot, therefore specifically comment on the respondent's claim. At this time, no properties have been compulsorily acquired for this Proposal.

- Some of the properties indicated in Table 14-5 have already been acquired by the RTA and are listed as publicly owned. The EA did not disclose that the Coffs Harbour Zoo closed due to the Proposal.

Submission No. *042, 053, 067*

There is no substantive evidence to support the respondent's view that the Coffs Harbour Zoo closed down due to the highway Proposal. Under the Proposal, the Coffs Harbour Zoo site would have had access to the local access road which runs along the eastern side of the highway, linking the Killara Avenue overbridge and the Emerald interchange.

- Respondent is opposed to the partial acquisition of their land and concerned about the consequent impacts on residual land, such as devaluation. Future access to the highway from residual land would be affected and trips to Coffs Harbour and other local destinations extended.

Submission No. *047, 078*

The Proposal has been designed to minimise, to the extent possible, the extent of property acquisition. The RTA acknowledges that acquisition of private property is a sensitive issue for affected residents. As part of the Statement of Commitments, where a property's access is affected, the RTA would re-instate access (refer SoC T4).

Access to this property has been reviewed; it will now link permanently with Hunter Close, rather than having a temporary access to the highway.

- Respondent would like the RTA to minimise land acquisition by reducing the buffer zone between 49 Hunter Close and the new Hunter Close.

Submission No. *055*

The Proposal design at this location has been reviewed and revised. It is proposed to shift the boundary to the east, closer to the existing property boundary. This would reduce the area of acquisition for this property by approximately 770m^2.

- Respondents wish to continue with farming activities on their land and wish to retain any land not acquired by the RTA.

Submission No. *040, 083*

The RTA is aware of the respondent's wish to retain any land not acquired by the Proposal. Ongoing consultation in regards to property access arrangements would occur with the landowners (refer SoC T4).

The RTA has also committed to implementing measures in order to minimise the impacts on agricultural properties (refer SoCs AG1-AG7). Acquisition would be negotiated with the individual property owners and their wishes would be accommodated where reasonable and feasible as part of the negotiation process undertaken to acquire the land. Only that land essential for the Proposal would be acquired.

Property values

The following submissions were received with regards to property values:

- The Proposal would devalue the respondent's property.

Submission No. *064, 079, 082*

Of these respondents:

- one respondent's property is outside the study area (Proposal beginning approximately 450m north of the property).
- another would be subject to property acquisition (value will be determined in accordance with *Land Acquisition (Just Terms) Compensation Act 1991*),
- the remaining property will not be subject to property acquisition.

The possible effect of value on individual properties which are not impacted on by the Proposal have not been considered, however impacts on land use and planning, and social and economic effects generally have been considered in chapters 14 and 16 of this EA.

- Photographic evidence suggests that many landowners have allowed their properties to deteriorate given the threat of the upgrade which has artificially devalued these properties.

Submission No. *067*

There is no evidence to suggest that owners who allow their properties to deteriorate have done so because of the Proposal.

Property impact

The following submissions were received with regards to property impact:

- Should the Proposal be approved on its current alignment, the respondents would not be developing their property and propose that the RTA purchase the allotment from the four owners at cost.

Submission No. *066*

The property to which this issue relates would not be directly affected by the Proposal and partial or total acquisition of the property is not proposed. The RTA would therefore not purchase the property.

- The impact of construction of the Proposal would destroy their lifestyle and home. What legal rights would property owners have in regards to property impacts as a result of construction, such as cracking walls and foundations?

Submission No. *073, 075, 082*

Construction impacts would be temporary and transient along the length of the Proposal. The RTA has committed to identifying and inspecting structures or properties potentially affected by construction (refer SoCs P1-P5). The RTA would prepare a construction environmental management plan to manage any potential environmental impacts as a result of construction of the Proposal. Direct (physical) property impacts as a result of construction would be managed through a process of pre-construction building inspections such that any direct property impacts as a result of the Proposal could be verified in a "before and after" property inspection process. Where liable, any property damage considered to be caused directly or indirectly by the construction or operation of the Proposal would be rectified at no cost to the property owner/s. Alternatively, the RTA may negotiate compensation for the property damage with the property owner.

Amenity for residents during construction would be managed through the implementation of various management plans that aim to manage environmental aspects (such as air quality and noise).

During the construction phase, the RTA would continue to consult with the community and proposes to implement a community consultation system for the responsive and pro-active management of complaints (refer SoCs C1-C5).

2.2.2 Agriculture

Access to water supply

The following submissions were received with regards to access to water supply:

- The Proposal affects access to a water source owned by or from which the properties have legal access to pump water.
- The Proposal affects access to an old gold mine shaft with permanent spring used for irrigation purposes. Losing access to this water source would affect the respondent's ability to farm the property.

Submission No. *021, 083, 089*

It is confirmed that the Proposal would affect water sources (creeks or dams) located at the following locations:

- Approximately 200m north of the proposed Unwins Road underpass.

- Approximately 150m north of the proposed Bark Hut Road overpass.

The potential impact on water supply for agricultural properties is discussed in Section 15.2.6 of the EA.

The Proposal would affect a permanent spring (part of a mine shaft) located on a property immediately to the north of Maccues Road; however the impact on a large dam on that same property (as indicated by the respondent) cannot be confirmed. Further geotechnical investigations undertaken during the detailed design phase would further identify water sources affected by the Proposal (including potential groundwater sources). The EA recognises the need to retain water supply to agricultural properties and it is the RTA's objective to maintain water supply to properties (refer SoC P6). The RTA would take every reasonable step to minimise impacts on water sources.

Agricultural land

The following submissions were received with regards to access to agricultural land:

- Hectares of banana and blueberry growing land cannot be shifted to new sites if the bypass goes ahead, resulting in further economic losses.

Submission No. *009*

While the Proposal would affect agricultural land, there are a number of measures that the RTA has committed to in order to reduce the impact on agricultural land (refer SoCs AG1-AG7).

- The Proposal would result in loss of agricultural land to the Sikh community and that this loss is culturally significant.

Submission No. *025*

Potential impacts of the Proposal on agricultural land are discussed in Chapter 15 of the EA. A Sikh Cultural Impact Assessment was also undertaken as part of the EA (Appendix F, working paper 6) that identified farming (particularly banana farming) as important to the Sikh culture. Of the 19 seriously to critically affected agricultural properties, ten are owned by Sikhs. The EA identifies a number of mitigation measures that have been developed to minimise potential impacts on agricultural properties (refer SoCs AG1-AG3).

- The respondent is concerned that the design Proposal cuts through his property where there is a blueberry plantation. If the Proposal goes through the respondent believes he would lose income annually. Moving such a plantation would be difficult.

Submission No. *037*

It is confirmed that the Proposal would have a direct impact on the respondent's property and blueberry plantation. Potential impacts of the Proposal on agricultural land are discussed in Chapter 15 of the EA and Table 14.5 of the EA indicates that the Proposal would require the acquisition of approximately 1.27 ha of this property. The EA also identifies a number of mitigation measures that have been developed to minimise potential impacts on blueberry farms (refer SoCs AG1-AG3 and AG5).

The RTA has undertaken additional investigations to determine if it is possible to reduce the extent of acquisition for this property. The Proposal includes provision for water quality control treatments at this location and consideration must also be given to access to these facilities for maintenance purposes. These issues contribute to the extent of acquisition required generally along the highway alignment, including at this particular location. Notwithstanding, as a result of

further investigation, it is proposed that the road reserve boundary at this location be refined such that only 0.77 ha of land would be affected by the Proposal. This is a reduction of 0.46 ha compared with that identified in the EA.

Section 14.3.2 of the EA identifies the extent of property acquisition required by the Proposal and indicates that property acquisition would be undertaken in accordance with the RTA's *Land Acquisition Policy and the Land Acquisition (Just Terms) Compensation Act 1991*.

The Land Acquisition (Just Terms) Compensation Act 1991 outlines relevant matters to be considered in determining the amount of compensation to which a person is entitled. The *Land Acquisition (Just Terms) Compensation Act 1991* also ensures that appropriate market value, including any special values of a property are considered when determining the level of compensation a person would receive, including for agricultural properties (refer SoC P1).

- The EA ignores the impact on organic farmers affected by the Proposal. The impact assessed is only the direct impact, not indirect impacts on farming properties, such as water supply.
- Concerned about potential impacts on their organic mango plantation but are not aware of any investigations at their farm.

Submission No. *042, 048, 053, 054, 061, 067, 071, 076, 085, 088, 092*

Potential impacts on organic farms are discussed in Section 15.2.5 of the EA and the Agricultural Assessment (Appendix F, working paper 5). Discussions with peak organic grower bodies was undertaken to identify agricultural properties that are certified organic producers and those agricultural enterprises who have started their organic certification. Six properties within the study area were identified as certified organic producers. None of these properties were identified as being directly affected by the Proposal.

The Agricultural Assessment outlined organic certification requirements (section 6.1 of the report). There are a number of organic grower organisations and the major ones each produce a set of standards for certification. Freedom of synthetic chemicals is a prominent feature of organic produce, however, the organic farming systems encompasses a commitment to biological improvement leading to a self generating biologically secure and sustainable farming base. There is no tolerance for organophosphates or other synthetic pesticides including synthetic pyrethroids. The certification standards contain no references to air quality. Certification also requires a three year conversion period, maintaining certification entails annual audits, random additional audits and tissue tests, maintenance of records and compliance with standards.

The organic mango plantation was identified as an agricultural property within the Agricultural Assessment. Management measures relating to water quality are outlined in Chapter 18 of the EA and include details of water quality control structures that would be constructed as a priority in the early phase of construction to minimise any impacts that erosion and road runoff may have on surrounding watercourses.

Highway drainage design has been developed to divert road runoff away from farm dams to minimise potential impacts on watercourses.

- The EA states that banana properties which would be seriously or critically affected by the Proposal comprise 3.7% of area of land under banana production. Woolgoolga produces 95% of the bananas in this region, therefore corresponds to 3.52% of the banana production in the region.

Submission No. *042*

The figure of 3.7% of banana land seriously or critically affected in the region was the area (in hectares) of seriously or critically affected banana land (35 ha) divided by the number of hectares within the Coffs Harbour and Woolgoolga areas (950 ha). The figure is 3.68%.

- According to the EA, the potential spray drift from blueberry farms to affect motorists on the highway would be an issue for blueberry farms. But it ignores the impact that dust and vehicle emissions have on the quality of blueberries.

Submission No. *042, 048, 053, 054, 061, 071, 072, 076, 085, 088*

Specialist agricultural advice regarding the potential impact of dust and vehicle emissions on blueberries has indicated that it is unlikely to be an issue for the Proposal. Literature reviews show that on the outskirts of Lismore at Wollongbar there is a very large blueberry farm immediately alongside the Bruxner Highway (which had an average of 14,207 vehicles per day (including 625 heavy vehicles per day) in 2004). As a commercial operation the blueberry farm is required to submit product samples each year for Maximum Residue Level (MRL) determination on a wide range of potential contaminants in order to maintain market access(currently for fruit it is about 95 compounds).

The fact that the operation has not only continued to exist but has expanded greatly suggests that the steadily increasing heavy traffic flow along the Lismore-Alstonville corridor has not affected the productivity of the blueberry farm. In comparison, Table 10.4 of the EA indicates that the 2011 predicted traffic volumes on the bypass section of the Proposal would be 12,809 vehicles per day (including 548 heavy vehicles per day).

Notwithstanding, the EA included provision of a fast growing vegetation screen to assist blueberry farmers meet their statutory requirements to control spray drift (or irrigation drift) onto non-target areas (ie the highway) (refer SoC AG5).

It should be noted that from a review of available literature, no records have been located where existing blueberry crops along existing highways have had MRL results affected by highway (vehicle) emissions or dust.

- The Proposal would affect agriculture. The development would pass through semi built up areas and affect 40 agricultural properties. Existing farmland should not be impacted to construct the Proposal.

Submission No. *067, 079*

It is confirmed that the Proposal would affect agricultural properties. Potential impacts of the Proposal on agricultural land are discussed in Chapter 15 of the EA. A specialist Agricultural Assessment was also undertaken as part of the EA (Appendix F, working paper 5). Section 15.1.3 indicates that 40 agricultural properties would be directly affected by the Proposal.

The EA also identifies a number of mitigation measures that have been developed to minimise potential impacts on agricultural practices (refer SoCs AG1- AG7, P1 and P6).

- The Proposal would affect a water body (dam) close to the respondent's property that provides habitat for a bee population that essential to pollination of the respondent's Mango tree buds.

Submission No. *092*

It is confirmed that the Proposal would affect a dam located approximately 150m north of the proposed Bark Hut Road overpass. It is accepted that the dam could provide a habitat resource for a bee population that assists with the pollination of Mango tree buds on the respondent's property.

This dam in question has been identified as critical to the supply of water for agricultural properties and the RTA has identified management measures that would allow for the reinstatement of this water source (refer SoC P6).

Microclimate

The following submissions were received with regards to microclimate:

- The EA demonstrates no local ground knowledge of the microclimate. Only temperature change impacts on banana plantations were considered in the EA. The EA does not assess all microclimate impacts (westerly winds) that the deep cuttings would have on banana plantations. Mango and banana plantations are susceptible to northerly and north easterly winds which can destroy fruit blossoms and increase spray drift.
- Banana plantations need to be protected from the wind as they are likely to fall over.
- Removal of the natural tree line to facilitate the upgrade would result in the channelling of northerly winds onto the plantation which would adversely affect both mango and banana plantations.

Submission No. *042, 061, 076, 092*

The EA addresses microclimate, including impacts from deep cuttings in Section 15.2.7 as well as within the Agricultural Assessment prepared as part of the EA (Appendix F, working paper 5). The potential changes to microclimate were considered and included both the potential for a change in temperature and wind gusts as a result of the Proposal. These were issues that the community thought could occur if the Proposal cut through the ridge that separates western Woolgoolga rural land from other adjoining airsheds, particularly to the west.

The EA concludes that the potential impacts of the Proposal on farming activities as a result of changes to microclimate are low risk. This conclusion was confirmed through subsequent consultation with the Department of Primary Industries (Agriculture).

The bypass section of the highway does not traverse the highest terrain that separates the air shed of rural Woolgoolga and that of the southern air shed. While there may be some localised impacts as a result of the introduction of cuttings along the bypass section of the Proposal (as identified in Section 15.2.7 of the EA), these would be considered of a minor nature only.

Agricultural mitigation

The following submissions were received in regards to agricultural mitigation:

- Preference for the vegetated spray drift buffer for blueberries to be placed within the road reserve rather than exclusively on an adjoining blueberry farm property.

Submission No. *045*

The Proposal, including the extent of the proposed road reserve, has been designed to minimise the impact of the Proposal on private property. The landscaping within the road reserve would consist of more generalised planting and would not, in all locations, be able to fulfil the function of a spray drift buffer. However, at some locations within the road reserve there may be an opportunity to incorporate "spray drift plant species" into the landscape design of the Proposal.

Due to various constraints including areas of the road reserve available for landscaping and road sight line requirements, a comprehensive barrier within the road reserve may not be possible for all locations. As such the vegetative buffer would need to be located within the blueberry farm property. Further, the effectiveness of the barrier increases the closer it is to the blueberry crops

and the property owner would also have the opportunity to maintain the vegetative buffer as they consider necessary.

- A vegetative style buffer similar to that identified for blueberries should be implemented for the banana growers where spray drift is a potential issue.

Submission No. *045*

Farmers within the area have relied on aerial spraying for disease control of bananas due to the steepness of the banana lands, lack of internal access for machines and health issues associated with backpack overhead spraying. With aerial spraying, a buffer would not provide any protection from oil drifting onto the highway; due to the height that the spray is released from the aircraft (see the Agricultural Assessment, Appendix F of the EA, working paper 5).

As a rule, helicopters would not fly within 200m of the highway, 300m if there are strong winds which could push misting oil onto windscreens. However, for the 2005-2006 season, only one aerial spraying was undertaken and the contract had lapsed due to an insufficient number of farmers entering into an aerial spraying agreement (which requires a minimum of 40 hectares of crop).

- Compensation should be provided if farm infrastructure such as sheds, water supply and access roads are affected by the Proposal. If partial acquisition is proposed for an agricultural property and the remaining land is likely to be unprofitable, total acquisition should be an option to the landowner.

Submission No. *040, 045*

Compensation for farm infrastructure and profitability of farmland would be included in any acquisition process undertaken for the Proposal. Section 15.2.2 of the EA discusses the potential impacts of the Proposal on agricultural properties, including direct (acquisition) impacts and indirect impacts such as effects on access to and within agricultural properties (which were seen as potentially affecting farm profitability). The RTA has identified a number of measures that would be implemented prior to and during the construction phase of the Proposal to minimise the impacts on agricultural properties.

Some commitments (refer SoCs AG1- AG3) relate specifically to managing impacts on agricultural properties, while SoC T4 commits to retention of property access and SoC P6 commits to maintaining water supply to properties. Acquisition of land would be undertaken in accordance with the RTA's Land Acquisition Policy and the *Land Acquisition (Just Terms) Compensation Act 1991* (refer SoC P1).

2.2.3 Traffic and access

Access to private property

The following submissions were received with regards to access to private property:

- Due to road safety concerns, the respondent would like to know if it is possible to get an alternative entrance to the property (39 Hoys Road).

Submission No. *010*

Access into 39 Hoys Road would be further assessed in consultation with the property owners, during the detailed design phase. Possible strategies to mitigate safety concerns when turning into the property include a recessed gate or the formalised widening of the road shoulder in front of the property to enable through vehicles to safely pass another vehicle(s) that is waiting for a gap in the traffic to turn into the property.

- The EA does not adequately address property and dam access. Respondent requires access roads suitable for machinery and semi-trailers and currently uses Newman's Road for this purpose but access to Newman's Road would be restricted in the future. Restricted access roads would also affect the respondent's ability to draw water from the dam adjacent to the swimming school on Newman's Rd.

Submission No. *025, 040*

Where access to a property is affected, the RTA has committed to re-instating appropriate access to those properties (refer SoC T4). Access from any property would also be maintained through the construction period, (refer SoC P6).

Both of these activities would be undertaken in consultation with the property owner.

- Properties, particularly businesses, which front the highway and whose access would be affected by the works are not clearly identified, nor is there information in the EA as to how long they will have restricted access.
- Roads adjacent to banana plantations would need to be repaired for normal business operation.

Submission No. *040, 060*

Access to properties and businesses would be maintained throughout the construction and operation phases (refer SoC T4). Construction phase traffic impacts on local roads would be managed through a Construction Traffic Management Plan, which would be prepared in consultation with affected residents and Coffs Harbour City Council. This plan would be implemented by the construction contractor to ensure the safe and efficient movement of local traffic and also reduce inconvenience to local residents. Any temporary diversions or changes to existing access routes would only be implemented after consultation with affected residents and Coffs Harbour City Council, and would be publicised in local media prior to the changes being made and identified on site by the use of clear sign posting.

- The respondents are concerned about the entry and exit points for Campbell Close as cars and trucks would be travelling at 100kph or faster.

Submission No. *078*

Campbell Close would become a cul-de-sac, with access onto the highway only from the southern entry point. The northern entry/exit of Campbell Close would be closed to the highway. Entry to Campbell Close from the south would be a left in/ left out arrangement at grade intersection. Access to Campbell Close from the northbound highway carriageway would be via a deceleration lane, which would remove turning vehicles from the faster flowing highway traffic. This is a temporary connection until the Korora to Sapphire section of highway is upgraded as part of the Coffs Harbour Bypass proposal.

During the detailed design phase of the project, additional investigations would be undertaken at this intersection.

- The proposed access road at the bottom of the land is not practical for the respondent's farming activities. They would like the RTA to consider constructing an underpass at the bottom of their property to create access to Unwins Road.

Submission No. *083*

The RTA has committed to a retention of property access (refer SoC T4). The RTA has reviewed the access road for this property and has been able to reduce the grade on the access road for passage by crop trucks and machinery. The grade has been reduced from 20% to 15%.

- The EA does not address how the respondents will gain access to and from their driveway (42 Greys Road).

Submission No. *092*

Property access arrangements are discussed within section 7.4.3 of the EA. The Proposal incorporates an overpass for Greys Road to maintain access to properties (refer Chapter 7 of the EA).

The RTA has committed to a retention of property access (refer SoC T4), with access being maintained during the construction period (refer SoC P6). An overpass would be constructed to ensure continued access to properties along Greys Road and access off Greys Road would be maintained.

Public transport, cycling and pedestrians

The following submissions were received with regards to public transport, cycling and pedestrians:

- Potential disruptions to existing school bus services should be identified and managed by way of a construction management plan.

Submission No. *006*

Disruptions to existing road users including school bus services would be minimised during the construction phase. The EA includes a draft Statement of Commitments as Appendix A. The RTA seeks to maintain traffic movements on the existing road network through all phases of construction and limit impacts on road users (refer SoC T3). Details relating to construction traffic and temporary access arrangements are discussed in section 8.2.3 of the EA. Construction vehicle movement arrangements would be developed with specific regard to local traffic movement requirements and peak traffic volumes (including at weekends and during holiday periods).

- There is no indication in documents whether bus services will cease or if alterations will be made to the stops.
- Coffs Harbour City Council would like to see a plan that shows the location of proposed bus bays to be constructed along with an assessment of the need for provision of bus shelters at these locations.

Submission No. *060, 077*

Bus stop arrangements are discussed within section 7.5.8 of the EA. It is not the RTA's intention to stop existing bus services. Rather, it anticipates that bus services would use the local access road network, where bus bays would be located. The RTA would consult with Council on the location and design of the bus bays during the detailed design phase of the project.

There is no provision for bus shelters within the Proposal.

- The local road system provides an opportunity to develop a cycleway/walkway but there seems to be confusion as to whether this is happening or not. Respondent is in favour of cycleway/walkways. Respondents question why a 2.5 metre shoulder for cyclists is being planned when cyclists are considered local traffic and as such would use the local roads.

Submission No. *063, 065, 067*

Pedestrians and cyclists would be able to use the shoulder of the local access roads and the upgraded highway. Provision for pedestrian and cyclists are also included in the proposal at the bridge locations as identified in section 7.5.7 of the EA. This would be refined during the detailed design phase of the project. Dedicated cycleways do not form part of the Proposal.

The proposed 2.5m shoulder on each carriageway of the Proposal is primarily for road safety requirements and would be available for breakdowns and RTA maintenance vehicles. While it could be used by cyclists, it is anticipated that most cyclists would use the shoulder on the proposed local access road network.

- One positive effect is the local feeder roads which will provide cyclists with access between Sapphire and Woolgoolga. It will also provide some diversion of traffic when highway accidents occur but not for B doubles that are not permitted on local roads.

Submission No. *073*

Pedestrians and cyclists would be able to use the shoulder of the local access roads. Provision for pedestrian and cyclists are also included in the proposal at the bridge locations as identified in section 7.5.7 of the EA. This would be refined during the detailed design phase of the project.

Compared to the existing highway, the proposed Class M dual carriageway upgrade is expected to significantly improve road safety and reduce accidents. The concept design for the Proposal also includes facilities to minimise the need to divert traffic onto local roads following accidents. Should one carriageway of the upgrade be closed due to an accident, emergency crossover facilities would enable vehicles to be diverted onto the adjacent carriageway. Should both carriageways of the proposal be closed due to an accident, or it not be possible to divert vehicles onto the adjacent carriageway, traffic may need to be diverted from the highway onto an alternate route. B-double vehicles would only be diverted onto designated B-double routes.

Some local roads would need to be designated B-double routes in order to accommodate heavy vehicles that service the local community (eg Bucca Road and access roads to Moonee Shopping Centre, Woolgoolga industrial estate area and other local facilities).

- Council would like to see a plan indicating the cycleway links to be constructed as part of the project and how these links will connect to Council's cycleway network. The environmental assessment does not include consideration of the provision for a grade separated local pedestrian/cycle crossing of the Pacific Highway north of Moonee Beach as indicated in the Moonee Release Area Developer Contributions Plan.

Submission No. *077*

Pedestrian and cyclist facilities are discussed within section 7.5.7 of the EA. Cycleway facilities were developed in consultation with Council and are consistent with both Council's cycleway plans and the provision for a grade separated crossing of the Pacific Highway in the Moonee Release Area Developer Contributions Plan.

In the vicinity of Moonee, the Moonee Beach interchange and the Killara Avenue overpass provide for grade separated pedestrians and cyclist movements across the new highway. If Council wishes to pursue further development of grade separated pedestrian and cyclist facilities across the new highway, the RTA would have no objections provided that the appropriate safety, environmental and design requirements are met and are consistent with the objectives of the Pacific Highway upgrade program.

Details of the pedestrian and cyclist facilities included in the Proposal were confirmed with Council representatives on 30 April 2008.

Road Safety

The following submissions were received with regards to road safety:

- The Proposal will improve road safety. Navigating suburban streets will be much safer when heavy vehicles are not dissecting the town and there is a considerable reduction in local traffic. Provision of local access roads will increase safety, especially for school children

Submission No. *002, 016, 030, 035, 087, 090*

Noted. The Proposal (as a controlled access highway) has been designed to improve road safety. The Proposal also includes a local access road network that provides an alternative route for local residents if they do not wish to travel along the highway for local trips.

- Increase in traffic, particularly heavy vehicles, mixing with local traffic would result in an increase in accidents, especially if the speed increases. There would not be a reduction in accidents as the EA states; instead, the types of accidents would change. Accidents that occur would cause the highway to close, and result in travel delays.

Submission No. *011, 015, 029, 042, 056*

The existing Pacific Highway through the study area is a two lane, two way road with occasional overtaking lanes. The Proposal is for a Class M four lane dual carriageway highway with access via strategically located grade separated interchanges. The Proposal also includes a full length local access road comprising sections of the existing Pacific Highway and new and existing local roads that provides an alternative route for local residents who do not wish to travel along the highway for local trips. The local access road would maintain and improve community access for the length of the Proposal by:

- Facilitating the separation of local and through traffic.
- Linking the local road network to the strategically located grade separated interchanges on the highway.
- Providing an alternative local road link between Sapphire and Arrawarra.
- Providing safer access to properties and facilities which currently have direct highway access – including those which provide community access to estuaries and the coastline.

The RTA's *Road Environment Safety Update No.22* (April 2004) provides data on recorded accident rates for typical major road types. Based on the data provided in the update, the Proposal is anticipated to:

- Decrease total accident rates from approximately 29 crashes per 100mvkt to 20 crashes per 100mvkt (as identified in section 10.2.6 of the EA).
- Decrease injury accident rates from approximately 14 injury crashes per 100mvkt to approximately 6 injury crashes per 100mvkt.
- Decrease fatal accident rates from 1.4 fatal crashes per 100mvkt to 0.3 fatal crashes per 100mvkt.

The Proposal would facilitate a safer mode of travel, essentially removing through (highway) and local traffic conflicts through the introduction of grade separated interchanges. Physically separated carriageways would reduce the occurrence of head-on crashes, while better sight lines and controlled access points would result in fewer accidents as a result of local traffic trying to merge with fast flowing highway traffic.

The concept design for the Proposal includes facilities to minimise the need to divert traffic onto local roads following accidents. Should one carriageway of the upgrade be closed due to an accident, emergency crossover facilities would enable vehicles to be diverted onto the adjacent carriageway. Should both carriageways of the proposal be closed due to an accident, or it not be possible to divert vehicles onto the adjacent carriageway, traffic may need to be diverted from the highway onto an alternate route.

- Concerned about the Fiddaman Road interchange being safe to enter and exit Emerald Beach, particularly school buses. There will be traffic build-up in the mornings across the local road.

Submission No. *019, 073*

The Fiddaman Road interchange has been designed to accommodate the increased traffic predicted for the area. Working paper 1: *Traffic and Transport Assessment* has indicated that the proposed Fiddaman Road interchange would have a good intersection performance (Level of Service A) in 2011 and 2031 for both the AM and PM peak periods.

- Respondents believe the bypass is long overdue because it would address urgent road incidents, freight cost, service to road users and economic development issues.

Submission No. *038*

Noted. Chapter 10 of the EA addresses these issues.

- Respondents indicated that the NRMA is asking that motorists be shielded from heavy vehicles on the freeway.

Submission No. *042, 049, 054, 061, 071, 084, 088*

The Proposal incorporates a local access road network, which could be used by local traffic instead of travelling along the highway. Access onto the highway is limited to the five grade-separated interchanges, which removes the number of conflict points for slower local and faster through (highway). These substantive safety features are not required as part of a Class A upgrade design scheme.

- Sapphire to Woolgoolga is being upgraded to a motorway and as such, heavy vehicles containing hazardous materials will be able to pass through populated areas.

Submission No. *051*

Class 1 dangerous goods (explosives) are not permitted on the Pacific Highway, and there is no current proposal to change this as a result of the Sapphire to Woolgoolga upgrade.

Vehicles that do travel along the Pacific Highway with permissible dangerous goods currently travel on a highway that is of a lower standard than that proposed. As such, the Proposal would provide a safer route for these vehicles. The bypass around Woolgoolga would also remove the requirement for these vehicles to travel through the township of Woolgoolga.

- The speed limit should be lowered immediately to 60-80 kph between Moonee and Coffs Harbour as the current highway has increased traffic from a variety of developments and a number of black spots which are dangerous. The speed limit should be reduced for safety reasons until the new motorway is completed. Lower speed would also reduce current noise levels.

Submission No. *055, 082*

The Proposal is for an upgrade to a Class M dual carriageway highway.

The RTA continuously monitors and reviews speed limits as necessary along the highway. In the past five years, speed reductions along the Pacific Highway have occurred within the study area at south Woolgoolga (80km/hr), north Woolgoolga (50km/hr) and at Moonee Beach (80km/hr).

- The EA says the proposal will provide safe overtaking opportunities. This is not the case for the local service roads which the local community are being directed to use. Questions the emphasis on local traffic to use service roads given that improving road safety on the highway for local traffic was used as a justification for the upgrade.

Submission No. *067*

Section 2.1 of the EA outlines the agreed benefits of upgrading the Pacific Highway as outlined in the Memorandum of Understanding signed by the NSW and Federal governments. One of these benefits is to provide "increased safe overtaking opportunities".

The Proposal would provide safer overtaking opportunities. Along the local access road network, the traffic would mostly comprise of local traffic for short local trips. Due to the nature of the traffic predicted to use the local access road, advantages of overtaking would be limited. If there is traffic that wishes to get to a location faster, access and overtaking opportunities are provided on the highway.

- The respondents are in favour of the upgrade as it will improve connectivity on the east/west corridors separating local and through traffic. It will also provide improvements in safety, particularly for school children who won't have to access buses from the side of the highway.

Submission No. *090*

Noted. The local access road was designed to provide an alternative route for school buses and local traffic to improve safety. It also allows the separation of through and local traffic.

Traffic assessment

The following submissions were received with regards to traffic assessment:

- Safety along the Mountain Way (a private road). There is already increased traffic along the road, with approval being granted for subdivided lots which will increase traffic and safety risks in the future. Respondent would like to see the RTA and/ or Council develop a traffic and road management plan.

Submission No. *041*

The RTA considers that the Proposal would not generate any additional traffic along the Mountain Way. The generation of additional traffic along the Mountain Way as a result of adjacent developments is outside the scope of the EA.

- According to the AusLink 2 document, heavy freight is expected to triple (not double as indicated in the EA) between Brisbane and Sydney.

Submission No. *042, 048, 049, 051, 053, 054, 061, 062, 067, 071, 072, 076, 085, 088, 091*

The "At a Glance" section of the AusLink 'Sydney – Brisbane Corridor Strategy' (2007) (the AusLink 2 document) states that:

> *"Interstate freight between Sydney and Brisbane corridor is expected to almost triple over the next 20 years. This compares to an expected doubling of freight on most other*

AusLink corridors. Both road and rail freight will play important roles in meeting this future freight demand, and although rail is expected to increase its market share, the majority of freight is expected to continue to be carried by road. "

This statement refers to all freight in the Sydney to Brisbane corridor, not only freight carried by road.

In relation to road freight, Chapter 3 of the AusLink *'Sydney – Brisbane Corridor Strategy'* (2007) forecasts an increase of 3.4% in heavy vehicles along the coastal route each year to 2025. Based on 3.4% per annum growth rate (compound), the percentage increase in heavy vehicle traffic volumes between 2006 and 2021 would be 65%.

Based on the AusLink *'Sydney – Brisbane Corridor Strategy'* (2007) document, heavy vehicle volumes at Sapphire are estimated to increase from 2,353 veh/day in 2006 to 3,885 veh/day in 2021 (number of heavy vehicle movements in 2006 (2,353) multiplied by the percentage increase in heavy vehicle numbers (65%)).

In the EA, the future daily heavy vehicles traffic volumes were estimated based on the assumption that the current heavy vehicles composition in through and local daily traffic volumes would be maintained in the future. Based on the results of the origin destination and mid block classification surveys, the current percentages of heavy vehicles for through and local traffic volumes were estimated at different locations within the study area. These heavy vehicle percentages were applied for the future total traffic volumes to estimate the future heavy traffic volumes in 2021 and 2031.

The estimated heavy traffic volumes along the highway based on the traffic modelling for the EA are provided below:

- 2,353 heavy vehicles movements per day in 2006.
- 3,988 heavy vehicle movements per day in 2021.

In summary, the predicted 2021 heavy vehicle movements in the EA (3,988 veh/day) are higher than those predicted based on the AusLink *'Sydney – Brisbane Corridor Strategy'* (2007) document (3,885 veh/day). Consequently, the EA predictions provide a "worst case" scenario for traffic and noise assessments.

- The EA needs more attention in regards to the cumulative impacts of Pacific Highway upgrades and road freight. Notes a 2006 Bureau of Transport and Regional Economics report which showed that in 1996 road had a 76% modal share of freight and an 84% share in 2001. The trend is predicted to continue and road freight is estimated to reach 95% in 2015.
- Such increases in freight are due to the opening of the Yelgun to Chinderah highway upgrade, RTA approval for unrestricted B double access, transfer of trucks from the New England Highway, growing economy and loss of some freight from rail to road.

Submission No. *042, 062, 068*

One of the objectives of the Pacific Highway Upgrade Program is to reduce freight transport costs, which would thus encourage its use by heavy vehicles. The increase in the number of heavy vehicles using the Pacific Highway is, therefore, an outcome of the achieving one of the program's objectives.

In particular, the AusLink *'Sydney – Brisbane Corridor Strategy'* (2007) considers the transport and freight efficiencies of not only the Pacific Highway, but also the North Coast rail line and the New England Highway, all of which are integral parts of the Sydney – Brisbane transport corridor. This study identifies that the Pacific Highway is the key transport mode in this region. It also

highlights the fact that the Main Northern railway is unlikely to meet the future inter-regional transport task even if major rail infrastructure upgrades were to occur.

Further to this, the upgrade of rail networks is the responsibility of the relevant rail transport/ infrastructure authorities rather than the RTA, which is responsible for the development and maintenance of the road network in NSW. Any decision on the upgrading of the rail network, as well as the timing and availability of funding for such works would rest with the State and/or Commonwealth authorities responsible for the rail network and is, therefore, outside the scope of the Sapphire to Woolgoolga Pacific Highway upgrade project.

The following information is provided in relation to existing modal share based on BTRE (Bureau of Transport and Regional Economics) estimates and future modal share prediction in the AusLink *'Sydney – Brisbane Corridor Strategy'* (2007):

> *"In 2004, road transport carried an estimated 76 percent of the corridor's inter-capital freight task, while rail carrying 11 per cent, sea 12 per cent and air one per cent".*
>
> *"ARTC's current investment program is scheduled to be completed by 2009 and... is a significant improvement but still leaving road as the dominant mode with around 70 per cent modal share.*
>
> *In the long term, NSRCS (North South Rail Corridor Study) analysis found that capacity constraints on the Sydney-Brisbane corridor will affect rail's performance and mode share in the absence of further investment."*

Based on the above information, the quoted (in submissions) modal shares (2001 – 84%, 2015 – 95%) for road are too high.

- The EA states that "as the Pacific Highway program progresses, the improved road conditions on the highway could potentially attract through traffic from other routes and particularly the New England Highway." This potential has not been incorporated into the noise impact assessment. The impact of B-triples has also not been assessed.

Submission No. *042, 053, 067*

The projections of heavy vehicles used within the traffic assessment cater for overall industry trends, and the impacts of any single industry relocation would have a negligible impact on heavy vehicles using the highway.

The traffic counts that form the basis of the traffic assessment were obtained subsequent to the opening of the Pacific Highway to B-doubles and therefore incorporate any shift in freight.

Anticipated future development along the corridor was incorporated into traffic volumes and has been reflected into the noise modelling. No assessment was undertaken to incorporate impacts of B-triples as there is no current proposal for the designation of the Pacific Highway for use by B-triples.

- The EA does not adequately address the issue of increased traffic, particularly heavy traffic such as a result of the opening of Yelgun to Chinderah in 2002-2003. The statistics adopted in the EA are for 193 vehicles / day / year which respondent says are flawed given that Dr Phillip Laird said the development actually led to an increase of 340 heavy vehicles, an increase of 38%.The Pacific Highway has increased the amount of freight travelling by road, while rail freight has decreased. The EA doesn't incorporate potential increase in heavy vehicles movements from other sources, such as the relocation of Carlton Breweries to Queensland and a Port Macquarie freight company.

Submission No. *042, 043, 048, 049, 051, 053, 054, 060, 061, 064, 067, 068, 071, 072, 076, 085, 088, 091*

The traffic volumes along the highway used for the EA were estimated from the May 2005 traffic counts by applying historical traffic growth which was estimated based on the *RTA Traffic Volume Data for Hunter and Northern Region* (2004) publication. The traffic volumes from the May 2005 traffic surveys include the increase in heavy vehicle traffic volumes as a result of the opening Yelgun to Chinderah opening. The historical traffic growth of 193 vehicles/day/year and traffic generation from the proposed developments along the highway was added to the 2005 traffic volumes which already include the increase in heavy vehicle traffic volumes as a result of the opening of the Yelgun to Chinderah project.

The increase of 340 heavy vehicles per day quoted in submissions was identified in the May 2006 final report of *Pacific Highway Upgrades of General Purpose Standing Committee (GPSC) No 4* of the NSW Legislative Council. This traffic count was based on a heavy vehicle count near Port Macquarie outside the study area as a one-off increase in the traffic volume as a result of the Yelgun to Chinderah opening. The results of the traffic survey that was undertaken in 2005 include this one-off increase. The increase of 193vehicles/day/year was applied for through traffic from 2005 in addition to the local traffic increase as a result of the proposed land use developments within the Coffs Harbour area.

Anticipated future development along the corridor was also incorporated into traffic volumes and has been reflected into the noise modelling (refer Working Paper 1 *Traffic and Transportation Assessment*).

- A far western bypass would not create traffic havoc between Sapphire and Woolgoolga. It could be staged without interruption to current traffic with a seamless transition for the freight industry to use it.
- Believes the increase in traffic will occur before the Coffs bypass so wonders why an existing road would be upgraded, when there is the option to move west.

Submission No. *042, 056*

Various route options were assessed during the route selection phase of the project (refer Chapter 6 of the EA). A Far Western Bypass was assessed during the route selection process, but was discounted due to:

- Poor functional performance (attract less traffic off the existing highway, result in longer travel times and higher operating costs).
- Moderate adverse socio-economic impacts.
- Moderate to very high environmental impacts (flora/fauna and Aboriginal heritage).
- High investment with little opportunity for staging.
- Significant investment into upgrading of the existing highway until the Far Western bypass becomes viable in 20+ years.
- Poor economic performance.
- Likely to have poor community acceptance.

The value management workshop held in April 2003 concluded that of the five route options, Options C and D should be considered further. The RTA then developed two revised options in response to a request from Council: Option C1 and Option E. The second value management workshop held in August 2004 considered Options C, C1 and E using the same evaluation process as the first value management workshop (a triple bottom line of functionality, environmental and socio-economic issues). The majority of the participants recommended that Option E be considered further.

Option E was selected as the preferred route as it was considered to:

- Deliver the best overall socio-economic outcome.
- Better provide for future urban growth and provide greater flexibility for future land use planning decisions.
- Result in less severance of existing and future communities.
- Provide safety and noise improvements for Mullaway and Safety Beach.
- Be likely to have a higher degree of community acceptance.

An update of the economic analysis (November 2007), showed that a Far Western Bypass had a poor benefit cost ratio.

Chapter 10 of the EA indicates that the existing highway would still need to be duplicated in addition to a Far Western Bypass due to the predicted increase in population expected on the Northern Beaches.

Staging refers to the ability of a project to be built in smaller sections and then opened to traffic prior to completing the construction of the whole project. For example, the northern (Woolgoolga Bypass) section of the Proposal could be constructed and then opened to traffic prior to completion of the construction of the southern section of the Proposal. Staging can allow the road user to obtain early benefits from sections of the new highway.

There are limited opportunities to stage a far western bypass. It would need to be built as a whole project due to its distance from the existing Pacific Highway and the lack of suitable roads in its vicinity which sections of the bypass could be temporarily connected to and then opened to traffic. There is no current proposal for a Far Western Bypass, nor was it considered as part of this EA.

- Believes that the RTA has not conducted a proper count of motor and heavy vehicles. They have relied on old data which conflicts with the Angry Grannies traffic study in 2006 that counted approximately 10 000 more vehicles. Angry Grannies counted all vehicles not just the white cars. University students who conducted the RTA count, were not told to record the number plates to determine who was local or through traffic.

Submission No. *048, 050, 053, 054, 061, 067, 071, 084, 085, 088, 091, 092*

During the week commencing 9 October 2006, a series of articles and letters to the editor appeared in the Coffs Coast Advocate newspaper stating that some sections of the community were concerned with the accuracy of traffic volumes previously reported by the RTA for the Pacific Highway through Coffs Harbour. One group, known as the Angry Grannies, was reported to have undertaken its own 24-hour traffic count between 5pm Monday, 9 October and 5pm Tuesday, 10 October. The article, "Grans count every car" (Coffs Coast Advocate, 11 October) stated that the group counted "26,825 cars and cars with caravans or cars with trailers and 2734 trucks…" on the highway at the "Big Banana" tourist attraction north of Coffs Harbour.

Traffic surveys undertaken by the RTA on the highway at Coffs Harbour during May 2005 indicate a range of daily volumes from 9,145 total vehicles at a location north of Mullaway Drive to 18,705 total vehicles at a location north of the Opal Cove Resort at Sapphire north of Coffs Harbour. These surveys were conducted over seven consecutive days using calibrated automatic traffic counters and indicate average daily traffic volumes for vehicles classes (including heavy vehicles). These traffic counts were conducted in accordance with the AUSTROADS *Guide to Traffic Engineering Practice – Part 3, Traffic Studies*. This standard is the accepted standard for undertaking traffic counts for Australian road authorities including the RTA.

The ranges of the total and heavy traffic volumes recorded north of the Opal Cove Resort at Sapphire during the survey period are given below:

- Total Traffic volume – 15,033 – 20,603 veh/day.
- Heavy Traffic volume – 1,220 – 2,921 veh/day.

Based on the above, it is evident that the heavy traffic volumes recorded by community are within the range of RTA counts. However, community counts are higher than RTA counts.

The RTA considers that a number of factors are likely to have influenced the difference between the May 2005 volumes recorded by the RTA north of Opal Cove Resort Sapphire (15,033 veh/day to 20,603 veh/day) and the count by the "Angry Grannies" at the "Big Banana" in October 2006 (26,825 veh/day). These factors include:

- The different locations of the traffic counts along the highway. The "Big Banana" is located approximately 3km south of the Opal Cove Resort and closer to the Coffs Harbour CBD. Traffic travelling along the highway between Coffs Harbour and the Diggers Beach, Korora and West Korora residential and rural residential areas would be recorded at the "Big Banana" but not at the RTA's counter north of the Opal Cove Resort.
- The increase in traffic volumes during school holiday periods. As Coffs Harbour and the North Coast are holiday / tourist destinations, traffic volumes on the road network (including the Pacific Highway) are higher during school holiday periods than outside of school holiday periods. The May 2005 volume from the RTA north of Opal Cove Resort was for a non-school holiday period whereas the October 2006 count by the "Angry Grannies" at the "Big Banana" was taken during school holidays.
- Seasonal variations in traffic volumes. Surveys undertaken in the study area indicate that traffic volumes in the non-holiday periods of October are typically higher than in May.
- Variations between "spot" traffic counts and calculated average traffic volumes. The May 2005 volume from the RTA north of Opal Cove Resort is a 7 day average volume which reflects the lower traffic volumes occurring over weekends. However, the October 2006 count by the "Angry Grannies" at the "Big Banana" was a weekday (Monday / Tuesday) count.
- The overall general increase in traffic volumes on the highway during the 17 month period between the May 2005 traffic survey by the RTA north of Opal Cove Resort and the count by the "Angry Grannies" at the "Big Banana" in October 2006.

Data collected by the RTA indicates that in excess of 70% of the traffic counted by the "Angry Grannies" at the "Big Banana" would be local traffic and that increases in local traffic volumes are the main contributors to the evident increases in both light and heavy vehicle traffic at this location.

- Respondent is concerned about the increase in traffic during construction.

Submission No. *056*

During the construction period, as part of the Construction Environmental Management Plan, the RTA would implement a traffic management plan to appropriately manage construction traffic and general access arrangements.

- An article appearing in the 14 September 2006 edition of the Coffs Coast Advocate newspaper talks of the possibility of Coffs Harbour as being as congested as Parramatta Road by 2031, and that new settlers may bypass Coffs Harbour for other less polluted environments.

Submission No. *064*

Travel time predictions are discussed in section 10.2.5 of the EA and were only undertaken for the project section (ie Sapphire to Mullaway). The Coffs Harbour town area is covered by the Coffs Harbour Highway Planning Project which is currently in the planning phase of the project development.

The opportunities for the staging of construction are identified in section 7.3.2 of the EA. Issues relating to smooth transition of traffic to the new highway and minimising impacts on the existing highway traffic would be considered in the development of a staging report (refer SoC EM2).

The RTA, in conjunction with Coffs Harbour City Council, would continue to manage the existing highway through Coffs Harbour until the preferred route for the southern section of the Coffs Harbour Highway Planning Strategy is constructed. The recently completed extension of Hogbin Drive across Coffs Creek forms part of the management of the existing highway. The extension was jointly funded by the NSW and Australian governments and Coffs Harbour City Council.

- There will be increased traffic due to an approval for a 185 dwelling development next to the highway. The additional traffic will be a hazard at the Fiddaman Road intersection.

Submission No. *073*

This proposed 185 dwelling development has been included in the EA traffic counts, as have other proposed local developments within the area (refer Working Paper 1: Traffic and Transport). The performance of the Fiddaman Road intersection is predicted to have a Level of Service A, the highest quality of service (refer working paper 1: Traffic and Transport Assessment).

- Council believes that traffic impacts on local roads and properties adjacent to local roads have not been fully assessed. Further investigation and negotiation need to be undertaken with the RTA on road upgrades, noise and environmental impact mitigation works required along affected local roads.

Submission No. *077*

The traffic volumes along the local access roads are estimated to be less than 4600 veh/day, including predicted traffic from future development within the area (refer Chapter 10 of the EA). Therefore, these local access/service roads would function as typical collector/local roads. Therefore, the traffic impact on local roads and properties is predicted to be minimal as a result of the Proposal. Impacts on the local access roads have been assessed and a two-lane, two-way road is considered adequate to cater for the predicted traffic volumes along these local access roads. The EA includes assessment of the potential impacts on the local access road network as a result of the Proposal.

It should be noted that the increase in traffic volumes on the local roads (eg Moonee Beach Road) would occur as a result of the future developments even without the proposed highway upgrade. The noise assessment not only addressed the noise generated from traffic along the Pacific Highway, but also along the local access roads and the on/off ramps.

Travel times

The following submissions were received with regards to travel times:

- RTA's claim that travel times will reduce is misleading. A motorway at Bonville and from Arrawarra to Sapphire will funnel traffic to the main streets of Coffs Harbour which will become bottlenecked until the Coffs Harbour bypass is constructed.

Submission No. *029, 048, 053, 054, 061, 067, 071, 076, 085, 088, 092*

Travel time predictions within the EA were only undertaken for the project section (ie Sapphire to Mullaway) and have no reference to travel times outside this area. The Coffs Harbour town area is covered by Coffs Harbour Highway Planning Project which is currently in the planning phase of project development. Reference to travel times for Coffs Harbour is outside the Proposal scope.

Within the study area, reduction in travel time would occur due to the increased capacity of the highway and the reduction in braking locations, as access onto the highway would be via five-grade separated interchanges. Without the Proposal, there would be increasing delays on the Pacific Highway between Sapphire and Arrawarra.

Improvements to road infrastructure south of the Proposal include the recently opened Hogbin Drive extension, which, would improve travel times through Coffs Harbour by removing a large proportion of local traffic off the Pacific Highway in that area.

- Travelling along the local access road would increase travel times for residents, resulting in higher fuel costs. Also concerned about emergency response times

Submission No. *060, 067*

Without the Proposal, with the predicted increase in traffic; travel times and congestion would deteriorate; as would the Level of Service for the intersections. With the local access roads in place, and access onto the highway via grade- separated interchanges, the majority of residents would therefore be able to access the highway in a more efficient manner. It is acknowledged that a small number of residents would need to travel for a longer period to access the highway, however the following benefits are provided to local residents as a result of the Proposal:

- High quality access would be provided to the local traffic via interchanges at several locations along the highway.
- Local access roads parallel the new highway for the majority of the section south of Woolgoolga.
- It is expected that most of the local traffic would join the highway via interchanges to travel north or south of the highway and the local traffic would benefit as a result of travel time reduction using the upgraded highway.
- The local access road would also provide improved safety to local residents.

Emergency response access would be via the grade separated interchanges, with emergency crews being able to access both the highway and the local access road, whichever is more convenient. Section 7.5.3 of the EA indicates a range of other emergency accesses along the highway, including:

- Breakdown bays at approximately 2.5 kilometre intervals or between interchanges.
- U-turn bays at approximately 2.5 kilometre intervals or between interchanges.
- Emergency carriageway cross-over points at approximately five kilometre intervals.
- Emergency accessway (for access onto the Woolgoolga bypass) from Newmans Road.

2.2.4 Noise and vibration

Construction noise

The following submissions were received with regards to construction noise:

- Respondent would like noise barriers constructed as early as possible in the construction phase of the Proposal.

Submission No. *055*

Every effort would be made to construct the noise barriers as early in the construction phase as possible, however, this would be subject to staging and how different aspects of the work are constructed. This would be further addressed in the detailed design phase of the project.

- DECC considers that SoC CN10 should include the monitoring of blasting, including wave form traces and video taping.

Submission No. *057*

SoC CN11 has been created to reflect this request.

- A new SoC should be included to 'utilise all reasonable and feasible noise measures to comply with construction noise levels'.

Submission No. *057*

SoC CN 7A has been created to include this request.

- DECC notes that the assessment of construction noise indicates that construction noise levels would not meet the criteria (outlined in the Noise Impact Assessment) at many residences. DECC expects that a construction noise management plan would be implemented and that best practices to minimise construction noise would be adopted.

Submission No. *057*

Practices to minimise construction noise will be developed in accordance with the ten statements of commitment within Appendix A to the EA that relate to construction noise (refer SoCs CN1 to CN10). The objectives of these commitments include minimising the effects of construction noise on surrounding sensitive land uses and the community and the preparation and implementation of a Construction Noise Management Plan.

Existing noise

The following submissions were received with regards to existing noise:

- The respondent looks forward to a reduction in traffic noise when the highway traffic does not travel through Woolgoolga.

Submission No. *002*

Noted. Predicted noise level reductions along the existing Pacific Highway through Woolgoolga are identified in Chapter 11 of the EA and are anticipated to fall by between one and 10 decibels (dBA).

- Existing noise levels are higher than indicated in the EA and are due to an increase in heavy vehicles. Many households have to shut windows, turn up televisions and have made architectural changes to their properties to block the noise from the existing highway. Some respondents have complained of interrupted sleep.

Submission No. *008, 020, 030, 031, 034, 053, 055, 060, 064, 073, 074, 075, 078, 082, 087, 088, 090*

The current noise levels were derived from noise monitoring that was undertaken between 19/20 May 2005, 30/31 May 2005 and 8 June 2005. The predictive modelling to determine the future noise levels was then validated against those recorded levels. Chapter 11 of the EA discusses noise and vibration issues, including assumptions made within the noise model relating to heavy vehicles. Further noise monitoring would be undertaken prior to construction (refer SoC CN1).

Independently of this Proposal, the Pacific Highway Noise Taskforce undertook noise assessments and a program of noise treatment works assessed in the Sapphire/Korora area. These works were undertaken in 2004 and are now complete.

The RTA has also committed to monitoring operational noise between six months and a year post project opening at points along the highway alignment and within Woolgoolga to ensure that noise levels are within the *Environmental Criteria for Road Traffic Noise* (ECTRN) criteria (refer SoC ON5).

- Respondent finds the statement 'background noise levels along the bypass section are low (consistent with the rural environment)' in the EA incorrect. New pavement work undertaken near Sapphire in 03/04 did little to reduce noise impacts.

Submission No. *060*

The text within the EA stating "background noise levels along the bypass section are low (consistent with the predominantly rural environment) as there is currently a negligible noise effect from the existing highway" refers only to the bypass section (ie west of Woolgoolga) and not the entire length of the Proposal.

Ambient noise measurements are undertaken to set criteria for construction noise. The noise descriptor utilised is the L_{A90} from which a rating background level (RBL) is derived. The noise level along the Woolgoolga bypass section of the upgrade (from Unwins Road, Woolgoolga to Arrawarra Beach Road) has been identified as having a night time rating background noise level (RBL) of 32dBA. This RBL level is typical of rural environments and is not a measure of traffic noise, rather ambient background noise.

Noise measurements from loggers that were placed close to the existing highway would, however, give a reliable measure of existing traffic noise levels. These levels are then used to validate the noise model. ECRTN road traffic noise criteria are generally independent of existing ambient noise levels (e.g. 50dBA for new roads at night). The exception to this is where traffic noise levels already exceed ECRTN base criteria, in which case a further allowance is added to the existing traffic noise level. This issue is discussed in Chapter 11 of the EA.

Noise assessment

The following submissions were received with regards to noise assessment:

- The respondents' property has not been identified in the noise report.

Submission No. *025, 060*

The respondents' properties were identified within the Noise and Vibration report (Appendix F, working paper 2). The two properties were identified within the noise report as properties 425 and 389. For property identified as 425, architectural noise treatments are proposed.

For property 389, with the proposed introduction of low noise pavement and noise barriers, this property is anticipated to experience a noise level decrease of 3dBA.

- Further noise assessment should be undertaken for the area between Killara Ave and Smiths Rd, Heritage Park.

Submission No. *035, 036*

Further noise measurements would be undertaken prior to construction. This would include any new areas of approved residential development that are approved prior to the approval of the highway Proposal. These locations would be incorporated in the noise assessment during detail design phase and further noise mitigation measures be identified as and when required. The noise

management measures identified within the EA were developed in accordance with the RTA's *Environmental Noise Management Manual* (ENMM) guidelines.

- RTA has not incorporated the recommendations contained in the 2003 Pacific Highway Noise Taskforce Report.

Submission No. *042, 048, 049, 054, 061, 071, 085, 088*

The recommendations that were accepted by the Minister for Roads, and are relevant to this Proposal have been incorporated as part of the Proposal. For example one recommendation was for the RTA to consider locating new highway segments carrying heavy vehicles at least 5km from any community in preference to widening existing segment where possible, and where not reasonable, a low noise wearing surface be used. The Proposal uses a low noise pavement from the beginning of the Proposal at Sapphire until 700 metres past Bark Hut Road, where the highway enters the state forest (see section 7.5.9 of the EA).

The RTA evaluated a number of options which were in excess of 5km (in locations) west of the existing highway including Option A and the Far Western Bypass, prior to selecting the preferred route. The Proposal, on balance, out performed these options across the triple bottom line of functionality, environmental and socio-economic criteria.

- The EA does not adequately address noise pollution. The estimation of 740 residents being affected by traffic noise is grossly understated as there are properties further north of the Proposal which are currently affected by noise but have not been identified in the EA. Noise would not stop along the contour lines drawn by the RTA and mitigation measures such as noise walls are too low or non existent in places.

Submission No. *042, 048, 049, 050, 053, 054, 061, 071, 072, 076, 084, 085, 088, 092*

The 740 residences identified are those residences whose noise levels were modelled (predicted) along the upgrade section of the highway as well as those along the existing highway through Woolgoolga.

ENMM Practice Note iv outlines the procedure for assessment of "feasible and reasonable" treatment options for new and upgraded roads. The road traffic noise catchment to be assessed is generally defined as the area of land within the 50dBA night noise contour with no mitigation in place. The noise assessment took into account residences up to and beyond this point. Residences located further away from the highway alignment than those assessed would automatically comply with requisite noise criteria. Perception of traffic noise is subjective and the proposed noise management measures have been designed to ensure noise levels at residences comply with DECC criteria and RTA's ENMM.

Noise mitigation measures such as noise walls, low noise pavement and architectural treatments have been introduced as part of the Proposal design in accordance with Practice Note iv of the ENMM to ensure noise levels at residences meet appropriate ECRTN criteria.

- Information in the EA did not disclose that there was noise monitoring equipment installed on properties without owner's consent (and so were removed) and conditions imposed by owners were not adhered to. There are no noise results for ambient noise levels along the bypass.
- Noise logger graphs were not provided in the Noise Impact Assessment. Page 12 of the NIA indicates that these graphs are included in Appendix D, however only the predictions are provided.

Submission No. *042, 053, 057, 067*

Details of residents willing to participate in the ambient noise survey were provided to Wilkinson Murray. An error in these details provided to Wilkinson Murray resulted in a noise logger being mistakenly left at an incorrect address. The logger was removed when the resident complained and none of the data collected over the intervening few days was utilised in the noise assessment in accordance with the property owner's wishes.

Noise logger graphs were not included as Appendix D in the working paper as indicated. This was an oversight and the noise logger graphs can be provided upon request. These graphs have since been provided to respondents 042 and 057 and are available on request. Noise logger graphs show daily "raw" measured data for the duration of the ambient noise measurements at the various residences. This is displayed as different statistical noise parameters including L_{Aeq} and L_{A90} which form the basis of derivation of criteria for the noise assessment itself. The results over the entire measurement period are summarised in Chapter 11 of the EA.

- Disputes the definition of an 'existing' road that has a 55dBA noise level, and notes that 266 of the 737 sites register noise in excess of 55dBA. If the noise level was 50dBA (limit for 'new road') 618 of the 737 sites would register noise above the 50 dBA level.

Submission No. *052, 075, 090*

Under the *Environmental Criteria for Road Traffic Noise* (ECRTN), road developments are classified as either "new road" or "redevelopment of an existing road". Practice note (i) of the ECRTN describes the circumstances under which each of these applies. Applying this practice note to the Proposal, the upgrade section of the Proposal would be classified as "redevelopment of existing freeway / arterial road" and the bypass section of the project would be classified as a "new freeway or arterial road corridor".

For the redevelopment of existing freeway/ arterial road, the daytime noise criterion is 60dBA, while the night time criterion is 55dBA. A new freeway or arterial road corridor has a daytime criterion of 55dBA and night time criterion of 50dBA. Further details regarding the application of the ECRTN and the *Environmental Noise Management Manual* (ENMM) are provided in Section 3.1 of working paper 2 (refer Appendix F to the EA).

The methodology provided in the ECTRN and ENMM was adhered to in preparation of the EA noise assessment and the relevant criteria set for individual residences.

Interpretation of the ENMM can mean that a residence in the upgrade section has "new road" criteria if there is no "existing traffic noise exposure" where the proposed road is outside, or marginally outside, the existing road corridor. This is the case at several residences in the upgrade section, where the criterion for "new roads" has been adopted.

- No firm indication where batch plants, construction compounds and stockpile sites would be located. These sites may be situated 200m from a property and are likely to generate noise. There were many noise complaints from residents of the Bonville highway upgrade over similar operations.

Submission No. *053, 067*

It is noted that the respondent is concerned about construction noise from batch plants, construction compounds and stockpile sites. Chapter 8 of the EA identifies potential sites for these ancillary facilities as well as criteria that any potential sites are required to meet. However, noise monitoring would be undertaken prior to construction to establish a background noise level for construction purposes (refer SoC CN1).

- Respondent would like all subsequent noise monitoring and investigations completed prior to construction.

Submission No. *055*

Noise monitoring has been completed as part of the EA. Additional noise assessment (including further noise monitoring) would be undertaken during the detailed design phase of the Proposal (refer SoC CN1). This would include further validation of the noise model and redesign of noise mitigation measures where appropriate in light of design changes. The RTA would also undertake noise monitoring post construction (refer SoC ON5).

- Some concerns regarding noise assessments. They related to the appropriateness of noise monitoring locations, such as at Sandy Beach and Fiddaman Road. The time period for noise modelling was too spread out and the models were based on moving traffic which did not take into account heavy vehicle braking.

Submission No. *056, 065, 074, 078*

The locations of the noise monitors were selected as they are representative of locations that may experience potential noise impacts due to operational or construction noise (or both) associated with the Proposal. These locations were used to validate the noise model. As such monitoring does not need to be undertaken at each residence to determine future existing noise levels. The noise monitoring captures all traffic noise including heavy vehicle braking.

Noise predictions were undertaken for traffic flows 10 years after opening at night, as levels at night were calculated to be further above ECRTN than during the day. Upgrading of the highway would be expected to reduce the need for heavy vehicle braking.

Additional noise assessment (including further noise monitoring) would be undertaken during the detailed design phase of the Proposal (refer SoC ON5).

- Predicted traffic flows and predicted noise levels for 2011 prior to the opening are provided in the Noise Impact Assessment; however those after the 2011 opening are not provided. DECC notes that the assessment has been based on the 2021 figures as this may present a worst-case scenario.

Submission No. *057*

The assessment of operational noise is for the year 2021 (10 years after opening), which is required by the ECRTN (Technical Note (vi)). Results of the noise modelling for 2021 would represent a worst-case scenario as traffic levels are expected to grow in the intervening years from the anticipated year of opening (2011).

- The Noise Impact Assessment indicates that a MadMax monitoring system was used to measure maximum noise levels on the existing highway and an assessment of the required separation distance was undertaken for maximum noise levels from the Proposal to meet sleep disturbance criteria. DECC notes that three residences south of the bypass section require further assessment of maximum noise level mitigation during the design stage.

Submission No. *057*

Based on the noise assessment undertaken as part of this EA, the three residences on Hunter Close south of Old Coast Road (residences identified in the Noise Impact Assessment as numbers 17, 18, 19) would experience an increase in noise levels of 1 to 2dBA. However, the comment is noted and it is confirmed that these residences would be considered as part of further assessment of noise impacts during the detailed design stage in accordance with the ECTRN and the RTA's ENMM.

- The noise levels presented in Chapter 11 of the EA are misleading as it does not take into account traffic which would be funnelled from Old Coast Rd to the west, across into Headland Road.

Submission No. *060*

Predicted noise levels at this property (see Working Paper 2: Noise and Vibration), are expected to decrease by 3 dBA. Only those local access roads where flows were predicted to increase substantially (from south of Headlands Road to north of Fiddaman Road) were included in the noise model (see Table 4.7 within the Noise Assessment Working Paper 2).

Traffic generation from the catchment of properties that would be likely to utilise the overbridge at Headlands Road were estimated based on the *RTA Guide to Traffic Generating Developments*. It is estimated that there would be approximately 360 vehicles a day traversing the Headlands Road overbridge, with a peak hour traffic generation of 34 vehicles an hour.

- Respondent notes that it is unlikely that future freight rail upgrading will reduce transport numbers in the short to medium term and should not be considered in the noise assessment of the EA.

Submission No. *066, 080*

The traffic volume estimates did not allow for movement of freight to rail and subsequently were not reflected within the noise assessment. The number of heavy vehicle movements identified in the EA are higher than those predicted within the AUSLINK Sydney to Brisbane Corridor Strategy paper, providing a "worst case" scenario for the traffic and noise assessments.

Within the noise assessment, in addition to conservative heavy vehicle numbers, a sensitivity analysis was undertaken in the noise assessment with a 15-20% increase (450-600 heavy vehicles per day) in heavy vehicles in 2021.

- The rationale with respect to assessment of maximum noise levels and impacts on sleep and living environment is erroneous.

Submission No. *066, 080*

There are no specific criteria set in either the ECRTN or ENMM regarding maximum traffic noise levels. The policy outlines the findings of several studies into the effect of traffic noise on sleep disturbance and offers a recommendation on frequency of internal maxima which *"are not likely to significantly affect health and wellbeing"*.

In this context an assessment was undertaken utilising new technology that enables unattended capture of multiple maximum noise events. A distance at which the adopted goal for health and wellbeing would be met was subsequently calculated. The methodology outlined in the EA noise assessment goes beyond the typical approach for other similar projects but is limited by the fact that there are no specific criteria for maximum noise in NSW. Any such assessment would only be general in nature until such time that specific maximum noise criteria are incorporated in the policy.

- Believe that the 'allowance criteria' for noise utilised by the RTA is questionable and think that the 'base criteria' should be used when assessing highway noise mitigation. Respondents also believe that the Department of Environment and Climate Change and the Department of Planning need to review their position on this issue so noise mitigation options are not compromised for future Pacific Highway upgrades.

Submission No. *087*

The noise assessment has been undertaken in accordance with the ENMM to meet the NSW Government *Environmental Criteria Traffic Road Noise* criteria.

Operation noise

The following submissions were received with regards to operation noise:

- The respondent looks forward to a reduction in traffic noise when the highway traffic does not travel through Woolgoolga.

Submission No. *002*

Noted. Predicted noise level reductions along the existing Pacific Highway through Woolgoolga are identified in Chapter 11 of the EA and are anticipated to fall by between one and 10 decibels (dBA).

- Many respondents are concerned that there would be increased noise in residential areas due to increased traffic and a higher speed limit that would occur as a result of the Proposal. Respondents would like to see noise barriers installed and/or heightened, or other noise mitigation implemented at various locations along the alignment in addition to those already identified in the EA.
- Mitigation is only provided to residents where the development has been classed as new road, rather than providing all residents subject to noise, with mitigation options.

Submission No. *008, 010, 013, 016, 019, 020, 024, 028, 030, 031, 034, 035, 036, 038, 042, 053, 055, 059, 061, 063, 065, 066, 067, 073, 074, 077, 078, 079, 080, 082, 087, 088, 089*

Under the *Environmental Criteria for Road Traffic Noise*, road developments are classified as either "new road" or "redevelopment of an existing road". Practice note (i) of the *Environmental Criteria for Road Traffic Noise* describes the circumstances under which each of these applies. Applying this practice note to the Proposal, the upgrade section of the Proposal would be classified as "redevelopment of existing freeway/ arterial road" and the bypass section of the project would be classified as a "new freeway or arterial road corridor.

In accordance with the ENMM Practice Note 1, the noise assessment for the EA was undertaken and the relevant criteria was set for each individual residence assessed. Several residences in the upgrade section where there is no "existing traffic noise exposure", the criteria adopted was for "new roads" rather than the "redevelopment of an existing road" (refer to Appendix E of the Noise and Vibration Assessment working paper, where the relevant criteria has been identified for all residences assessed).

The locations of all noise walls and other noise mitigation measures are detailed in Chapters 7 and 11 of the EA. The Proposal includes a number of noise mitigation measures (refer SoCs ON1-ON5). These measures include: low noise pavement, introduction of noise barriers and architectural treatments where receivers are expected to experience noise levels above criteria levels inclusive of other noise management measures. Additional noise assessment (including further noise monitoring) would be undertaken during the detailed design phase of the Proposal to confirm the final noise barrier design.

The procedure for selection and design of noise mitigation is outlined in detail in Practice Note iv of the ENMM. There are two situations put forward where the RTA believes it is generally not "reasonable and feasible" to reduce noise levels for "new" and "redeveloped" roads respectively. These scenarios were adopted in the noise assessment (section 3.1) where applicable.

The EA noise assessment incorporated an allowance of 1dBA to predicted design noise levels for 2021 to account for possible variations in noise levels at residences as a result of increased speeds or traffic flows. This resulted in a more conservative interpretation of the ENMM and subsequent noise mitigation design.

For those residences where exceedances of criteria were predicted, and it was considered "reasonable and feasible" to mitigate noise, appropriate barrier heights were selected using methodology outlined in ENMM Practice Note iv, including barrier cost benefit analysis where appropriate. At those residences where barriers are not an appropriate noise mitigation solution, individual residences have been identified to be considered for architectural treatments.

Noise mitigation measures were provided for "redeveloped" areas as well as for "new" areas.

Respondents are referred to Appendix C and D of the Noise Impact Assessment (Appendix F, working paper 2 for the EA) for specific information regarding noise at their property.

- What quantitative levels of noise are permitted before residents have a lawful avenue of complaint?

Submission No. *013*

Traffic noise levels are outlined in the NSW government document ECRTN. At the respondent's location, the highway is considered as a redevelopment of an existing road and the night time noise level criterion is 55dBA. With the introduction of noise management measures identified in Chapter 7 of the EA, this criterion is expected to be met at this location.

- The highway should be surfaced with a noise reducing pavement between Emerald Beach and Graham Drive north. A noise abatement wall should be erected between Emerald Beach and Graham Drive north. Revegetate the road verge and along property boundaries with consent of landowners. Phase out truck exhaust braking.
- The respondent believes that noise arising from the Proposal should be further mitigated with the exclusion of compression braking in the area between Woolgoolga and Coffs Harbour, limiting the traffic to 80 kph and the construction of more sound barriers compared to what is currently proposed.

Submission No. *031, 086*

Noise mitigation measures (including sound barriers and a low noise pavement) that have been committed to by the RTA as a result of this Proposal are based on noise levels 10 years after opening, in accordance with the ECTRN and RTA's ENMM. Further consideration of noise management would be assessed during the detailed design phase.

A noise wall between Emerald Beach and Graham Drive north is not required to meet the criteria as set out in the ECRTN and the RTA's ENMM for this section of the Proposal. However, in this area, the surface of the highway would be paved in a low-noise pavement (which would extend along the entire length of the highway from Sapphire until 700m north of Bark Hut Road, Woolgoolga). Mitigation measures have been developed as part of the Proposal, including the use of noise walls and where necessary, architectural treatments, in order to comply with the ECTRN and the RTA's ENMM. The Proposal also includes a landscape plan that would see the planting of woodland vegetation along the Heritage Park length of the highway.

It is outside the scope of this Proposal to limit heavy vehicle use of compression braking between Coffs Harbour and Woolgoolga, or to attempt a phasing out of truck exhaust braking systems. The request to limit traffic to 80km/hr does not comply with one of the project objectives, which is to allow the highway to be posted at a speed of 100km/h in rural area. Nevertheless the RTA has been working closely with the National Transport Commission (NTC) to develop an effective response to excessive noise from heavy vehicle engine compression brakes. Recently the Federal government published model rules to apply a new noise limit to engine compression brake noise.

The RTA is actively developing the measurement methodology to support implementing the new noise limit in NSW. Trialling of a measurement system is underway at Mt Ousley. This has identified a number of issues that need to be resolved to establish a robust system suitable for statutory application. In the longer term this is seen as an effective response to excessive engine compression brake noise.

- The respondent is concerned that the proposed bypass will have high noise and vibration impacts on the property. It will severely affect quality of life for future communities in the region. The EA study has not provided any noise mitigation measures.

Submission No. *038*

Operational noise mitigation measures (refer SoCs ON1- ON5) have been outlined within the EA. At this respondent's location, there would be low-noise pavement introduced along the alignment from Sapphire to a point 700m north of Bark Hut Road. This would mean that the road would be paved with a low-noise pavement for the length of the highway that runs past this area of land that has been identified as potential future urban development.

Further noise measurements would be undertaken prior to construction. This would include consideration of any new areas of approved residential development (this would include any new areas of approved residential development that are approved prior to the approval of the highway Proposal). These locations would be incorporated in the noise assessment during detail design phase and further noise mitigation measures would be introduced as necessary.

The noise management measures identified in the EA were developed in accordance with the ENMM guidelines.

- SoC ON5 should confirm the adequacy of noise mitigation measures against predictions of noise levels 10 years after opening. The prediction model needs to be re-calibrated against noise monitoring undertaken in conjunction with classified vehicle counts.

Submission No. *057*

Agreed.

- DECC recommends that a commitment be included that the pavement have a noise performance equal to or better, but not less than, that used in the EA.

Submission No. *057*

Commitment ON2 in the SoC identifies that low-noise pavement is included in the Proposal from the southern limit of the works at Sapphire to approximately 700 meters north of Bark Hut Road, Woolgoolga.

The Proposal includes a number of noise mitigation measures (refer SoCs ON1-ON5). These measures include: low noise pavement, introduction of noise barriers and architectural treatments where receivers are expected to experience noise levels above criteria levels inclusive of other noise management measures. Noise mitigation measures as described in the EA have been developed in accordance with the ECTRN and RTA's ENMM.

Regardless of the operational performance of the low noise pavement included in the Proposal, Commitment ON1 confirms that a reasonable and feasible approach will be adopted to limit operational noise impacts in accordance with the ECRTN and the RTA's ENMM. The approach to operational noise impacts will be developed further during detailed design and in consultation with relevant property owners.

SoC ON5 identifies that monitoring of operational noise would be undertaken between six months and one year after opening and that, should the monitoring indicate traffic noise levels exceeding the relevant noise criteria in the NSW Government's *Environmental Criteria for Road Traffic Noise*; the RTA would investigate and implement further "reasonable and feasible" mitigation measures.

- Respondents want appropriate noise walls installed adjacent to the coastal villages along the upgrade that begin and extend beyond the settlements. The respondents have their ideas on suitable barriers and wants to consult the RTA ASAP.

Submission No. *061*

Noise mitigation measures (including sound barriers and a low noise pavement) that have been committed to by the RTA as a result of this Proposal are based on noise levels 10 years after opening, in accordance with the ECTRN and RTA's ENMM. Further consideration of noise management would be assessed during the detailed design phase.

The noise walls would be designed in compliance with the ENMM and the RTA's urban design guidelines. The RTA would also consult Council on the design of the noise walls.

- Even with proposed noise mitigation measures noise levels would exceed ECTRN guidelines, but because the respondent's allotment is yet to be developed (approval granted by CHCC), the RTA does not intend to pay for noise mitigation which the respondent believes is inequitable.

Submission No. *066*

While the Proposal cannot assess specific noise impacts on potential future residences, the Proposal incorporates low- noise pavement and noise walls which would benefit future housing along the Proposal length.

- Properties on the eastern side are set to receive better noise mitigation that those on the western side who would not receive noise walls with vegetation screens or any other types of noise barriers. Suggests lowering the highway where possible below existing land and service roads which could help to reduce noise.

Submission No. *075, 082*

All potentially noise affected residences have been assessed and the requisite methodology for noise mitigation adopted for each residence following guidelines in Practice Note iv of the ENMM. Both sides of the highway are designed to the same criteria however, the techniques employed to meet those criteria vary (and include noise barriers and architectural treatment).

In the Sapphire area, the areas to the west of the highway and north of Gaudrons Road are predicted to have a decrease in noise levels and meet the criteria as the Proposal has been designed to "sit" low in the topography of the area in addition to the use of low noise pavement. To the area south of Gaudrons Road, architectural treatments would be required at a number of individual houses to meet the criteria.

Vibration

The following submissions were received with regards to vibration:

- Existing residences at Sandy Beach would be affected by earth vibrations when trucks pass along Diamond Head Drive. Concerned that the properties built on fill over sand would be more susceptible to vibrations.

Submission No. *056*

Construction vibration levels are considered in Section 11.4.3 of the EA. Vibration criteria (maximum peak velocity (mm/s)) for construction of the Proposal relate to maximum continuous vibration and are defined in terms of human comfort and building damage.

For residential buildings, the building damage criterion is 10 mm/s. The EA indicates that a 30 tonne hydraulic hammer for example, is considered to typically induce a peak particle velocity vibration level of 3 mm/s, 1.5 mm/s and 1.0 mm/s at 10 metres, 20 metres and 30 metres respectively. As such, it is highly unlikely that vibration from passing trucks would cause damage to buildings.

Property inspections would be undertaken for properties close to highway construction prior to commencement of construction (refer SoCs P3 and P4).

- DECC expects that when blasting is required, the Maximum Instantaneous Charges would be designed so that the criteria for blasting are met. It is noted that in the Noise Impact Assessment where this is not possible, alternative methods of removing rock would be considered/ arrangements would be made with residents.

Submission No. *057*

The Maximum Instantaneous Charges (MICs) would be designed so that, where feasible, the criteria for blasting are met (refer section 11.4.4 of the EA). Consideration would be given to alternative methods of removing rock in any locations where the criteria for blasting cannot be met. Any decision regarding the use of alternative methods of removing rock would be undertaken in consultation with affected residents and the DECC.

- DECC notes that the Noise Impact Assessment indicates that vibration levels during construction may exceed the human comfort criteria.

Submission No. *057*

Vibration levels are addressed in section 11.4.3 of the EA and within Appendix F, working paper 2 of the EA. Criteria for human comfort levels, which are taken from *Assessing Vibration: A Technical Guideline*, are considered to be the limiting factor when determining maximum vibration levels and are different for night time (0.20 mm/s), day time (0.28 mm/s) and at industrial buildings (1.1 mm/s). The EA notes that vibration levels exceeding the criteria for human comfort would occur at some residences close to the proposed alignment and that vibratory impacts during construction are expected to be temporary as the vibration source moves away from residential area.

Mitigation measures outlined in Appendix A of the EA are proposed to mitigate potential construction vibration impacts (refer SoCs CN8-CN10).

2.2.5 Biodiversity

Adequacy of EA biodiversity studies

The following submissions were received with regards to the adequacy of EA biodiversity studies:

- The Flora and Fauna report is based on a four-day study which is not enough time for a representative study. The study area did not take into account land adjacent to the proposed interchange. Independent surveys undertaken at the Arrawarra caravan park (Feb 2007 – Eco Logical consultants) revealed presence of species of micro bats and squirrel glider.

Submission No. *032, 065*

The survey effort employed over the four day study undertaken at the Arrawarra interchange is in accordance with the *Threatened Species Survey and Assessment Guidelines* (DEC 2004). The results of the surveys and habitat assessments undertaken at Arrawarra were interpreted in light of studies undertaken over a longer time period and in varying seasons over the length of the Proposal.

The survey techniques employed at the Arrawarra interchange were suitable for the detection of micro bats and gliders as indicated by the presence of several of these species during the survey period.

- DECC feel that the cumulative impact assessment in regards to biodiversity in the EA (Section 21.6.3) is not adequate. It should include consideration of threatened species and EEC's within the NSW North Coast Bioregion when considering route refinement and in accurately determining offsets with the aim of maintaining and improving biodiversity.
- It is understood from discussions with Department of Planning staff and RTA biodiversity staff that the most appropriate means for developing this assessment would be via a strategic study, using accurate spatial data and threatened species records.

Submission No. *057*

Following discussions with DECC representatives on 23 April 2008, the RTA has undertaken an additional assessment of the potential cumulative impacts of the Pacific Highway upgrade program on EECs.

The assessment is shown in section 3.3.1 of this report.

As indicated in section 17.4.9 of the EA and SoC F25, the RTA would develop and agree on a biodiversity offset package to address residual impacts of the Sapphire to Woolgoolga project in consultation with the Department of Environment and Climate Change. This package would be developed and agreed following the decision on the approval of the project. The RTA proposes to adopt a sectional approach to developing this package such that a larger and more effectively manageable area of suitable compensatory habitat can be achieved, suitable for use as an offset for both the Sapphire to Woolgoolga project and other Pacific Highway upgrade projects to the north and south.

This would enable a robust and comprehensive biodiversity offset package to be developed on a regional basis rather than for each individual project. The RTA believes that this approach would give a better outcome for all parties, as there are likely to be larger properties available under a sectional approach that would be better linked to land that is already protected by the Department of Environment and Climate Change or other agencies.

While it is envisaged that agreement on the package would be negotiated with the relevant government agencies as early as possible after the decision on the approval of this project, the timeframe for agreement would necessarily be subject to consultation with DECC, considering land options and the finalisation of the details of the impacts on key habitat of the adjacent projects. As a result, it may not be possible to finalise the package prior to the commencement of construction of this project. This approach has successfully been used on a number of RTA Pacific Highway projects in the past.

It should be noted that the RTA has already commenced preliminary discussions with DECC about this issue at both an officer and manager level during January and February 2008. During these discussions general agreement was reached between DECC and the RTA with regard to the process outlined above.

Fauna movement

The following submissions were received with regards to fauna movement:

- Respondents are concerned about fauna movement across the upgraded highway. Particular areas for concern are at Bark Hut Road, Moonee, Wedding Bells State Forest and all waterways/riparian zones that are intersected by the highway.
- Underpasses should be constructed every 500 metres for the length of the Proposal.

Submission No. *001, 042, 046, 067, 087*

The Proposal has considered potential impacts on fauna movement and has identified fauna movement corridors in Chapter 17 of the EA. The design of the Proposal seeks to minimise the impact on fauna movement through the introduction of fauna movement structures, which are identified in Figures 17.1a to 17.1d of the EA. Along the length of the Proposal, there would be 18 locations that could provide for fauna movement under the highway (refer SoC F14). Within the Wedding Bells State Forest there are four fauna movement structures at indicative chainages 29 000 (56 m in length), 29380 (42 m in length), 29930 (50 m in length), 30400 (54 m in length) (refer Table 7.5 of the EA).

- New structures at the Solitary Islands Marine Park should incorporate measures to facilitate fish and frog migration.

Submission No. *023*

The RTA commits to designing waterway crossings to facilitate fish passage in consultation with relevant government agencies (refer SoC F1). Fauna passage including frog passage would also be accommodated at these locations.

- The respondents note that there would be no barrier to stop local animals from attempting to cross the highway to the centre tree planting area.

Submission No. *030*

At this stage it is considered that fauna fencing will be required at the locations identified in section 17.3.3 of the EA (including along the length from Bucca Road to Emerald Beach interchange on either side of the highway), however, the location of fauna fencing will be further refined at the detailed design stage (refer SoC F17).

- Bark Hut Road and Moonee Creek floodplain have high kangaroo migration. Pipe culverts up to 1800mm are not high enough for kangaroos. Request underpass at Darkum Creek.

Submission No. *042, 053, 067*

The highway is currently a barrier to east-west fauna movement. The location of fauna movement structures along the Proposal was undertaken with reference to the National Parks and Wildlife Service study, *Key Habitats and Corridors for Forest Fauna: a Landscape for Conservation in North-east New South Wales* (NPWS 2003). Fauna movement structures are provided at the corridors identified by NPWS with additional structures providing for fauna movement at other locations along the Proposal (refer Table 7.5 of the EA and SoC F14). The design of culverts underneath the highway is consistent with what is currently present in order to maintain the existing hydrological regime.

As well as providing fauna friendly culverts, fauna movement underneath the highway would also be via bridge structures. Bridges are located at Cunninghams Creek, Skinners Creek, Double

Crossing Creek, Woolgoolga Creek, Poundyard Creek (arch culvert) and Arrawarra Creek. This would enable movement of fauna, including kangaroos.

There was insufficient room to locate an underpass larger than 1200mm at Darkum Creek. Fauna investigations undertaken as part of the environmental assessment indicated that it would be appropriate to locate fauna exclusion fencing 150m north of Darkum Creek, through the Wedding Bells State Forest. However, this location may be refined during the detailed design phase of the Proposal.

Table 17.6 of the environmental assessment details the approximate locations where fauna exclusion fencing is proposed. As well as providing a barrier to fauna movement across the highway, the fencing would also direct fauna to locations that provide cross- highway movement under the highway (refer SoC F17). The location of fauna exclusion fencing would be further refined during the detailed design phase.

Where the highway passes through forested areas, the width of vegetation clearance (approximately 60-70m) has been minimised, and the length of culverts reduced.

- The DECC supports further ecological studies into glider populations and identifying possible crossing points. With regard to fauna movement structures, consideration should be given to designing crossing points in the first instance via large over/under passes, retention of median trees and only finally retrofitted structures such as poles and rope bridges. If using box culverts the length should be no greater than one carriageway. (ie broken into two sections by vegetated and fenced media).
- DECC is concerned regarding the effectiveness of glider crossing structures that have been suggested as mitigation for the upgrade. The reduction or complete removal of connectivity would reduce the glider's ability to disperse and recolonise isolated habitat. The DECC would like further information on current RTA studies relating to effectiveness of glider crossing structures and request that the RTA investigate potential alternatives for glider crossings.
- The correct position and number of fauna underpasses needs to be catered for, and should include guide fencing, overpasses and underpasses and tree islands for gliders.

Submission No. *057, 061, 087, 088*

The RTA has developed a preliminary proposal for a widened median through the Wedding Bells State Forest to facilitate fauna movement across the highway carriageways through the provision of a widened median and retention of median trees. This proposal was discussed with DECC officers on 23 April 2008.

As a result of these discussions, the RTA has committed to undertake further investigations into the provision of a wide median within the state forest and has also committed to further consultation with relevant government agencies (including the DECC and DPI (Forests)) regarding this fauna movement facility (refer SoC F15A).

- DECC recommend that consideration be given to establishing a dedicated fauna crossing structure between chainage 19.6km to 20.3km as there is vegetation connectivity which adjoins Moonee Beach Nature Reserve.

Submission No. *057*

Between 19.6km and 20.3km, the highway is very low lying, with the Proposal required to maintain existing hydrological regimes to avoid any flood impacts further upstream. Consequently, a new fauna crossing structure in this area is not feasible.

As the culverts under the existing highway in this area would be extended to pass under the new carriageway, existing fauna movements across the highway would be maintained. Fauna exclusion fencing would be erected to direct fauna to these crossing locations.

- There are four fauna underpasses planned for the Wedding Bells State Forest spaced every 500m. DECC supports the spacing but would prefer the position of structures in the landscape to reflect established fauna movement corridors which would encourage fauna use. The respondents would like to confirm that the four fauna underpasses within Wedding Bells State Forest would be no less than 3050mm x 3050mm as described in Table 7.5. The length of the structures is not described in the EA.

Submission No. *057*

The four underpasses within Wedding Bells State Forest are located adjacent to drainage lines as it is considered that associated riparian zones would be used as fauna for movement corridors. The approximate locations for these underpasses through the State Forest are at chainages 29 000, 29 380, 29 930 and 30 400. The four underpasses would be a minimum of 3050mm x 3050mm as identified in Table 7.5 of the EA.

Subject to road safety and other appropriate considerations, box culverts would be broken into the two sections by a vegetated and fenced median to minimise the length of the structures. The feasibility of providing the break in the box culverts would be considered during detailed design.

- DECC suggests that highway bridge structures be designed to encourage fauna movement by providing sufficient light, moisture and landscaping initiatives to promote vegetation growth. As much native vegetation as possible should be retained adjacent to bridge structures to promote use by fauna.

Submission No. *057*

It is agreed that bridge design, landscaping and preservation of vegetation adjacent to bridge structures should aim to maximise the suitability of these areas for fauna movement.

Individual bridges have been proposed for the carriageways to enable light to filter down between the carriageways to encourage fauna movement. Section 7.5.6 of the EA outlines the features that could be incorporated into fauna movement corridors – including tree planting to favour fauna species likely to use the underpasses and providing rocks/ logs and tree branches to provide cover for small animals. The Proposal would minimise the amount of native vegetation clearing, and where disturbed, the area would be revegetated (refer revised SoC UD3).

- DECC considers the proposed 1m to 1.5 m width dedicated for fauna passage beneath bridge crossings is insufficient. The designs should be modified to allow for wider fauna passage without affecting watercourse width.

Submission No. *057*

The stated minimum width for fauna crossings came from a DECC presentation, *Design Approaches for Fauna Structures in Road Development and Construction* (circa 2004), which identified that paths for fauna passage under bridges should be a minimum of 1m wide.

For bridge structures along the Proposal, there would be a minimum dedicated fauna passage of 1m to 1.5 m (refer SoC F16). During normal flows, the actual width underneath the bridges that could be utilised for fauna movement would be greater than 1m to 1.5m and would vary from bridge to bridge with up to 10m of unobstructed land (between piers) present at some locations.

- The location of the fauna movement structures and glider crossing locations through the Wedding Bells State Forest should consider forest management zoning and the management intent of the adjacent state forest.

Submission No. *081*

The four underpasses within Wedding Bells State Forest are indicatively located at chainages 29 000, 29 380, 29 930 and 30 400. The adjacent forest management zones to the indicative locations of the fauna movement corridors are predominantly Zones 4 (General Management) and 8 (Areas for further Assessment), with other directly adjacent zonings being 3A (Harvesting Exclusions) and 3B (Special Prescriptions).

The management guidelines for the identified zonings are:

- Zone 4: Management of native forests for timber production utilising the full range of silvicultural options as appropriate; and conservation of broad area habitat and environmental values which are not dependent on the structure of the forest.
- Zone 8: An interim zoning of areas where field investigation is required to determine final Forest Management Zone classification. Field investigations would be undertaken as part of pre-harvest planning.
- Zone 3: Management for conservation of identified values and / or forest ecosystems and their natural processes, in either Zone 3A or Zone 3B.

During the detailed design phase, consultation would be undertaken with DPI (Forests) to ensure that the locations of fauna movement structures are consistent with forest management zoning and the management intent of the adjacent state forest (refer new SoC F14A in the revised Statement of Commitments).

- The respondent believes that the highway upgrade would enhance the survival of the native fauna in the area given the plan to include exclusion fencing and fauna crossings.

Submission No. *090*

Noted.

Impacts on biodiversity

The following submissions were received with regards to the impacts on biodiversity:

- The Proposal would affect 25 threatened fauna, 9 threatened flora and 4 EEC's and would intersect a number of wildlife corridors. The Nature Conservation Council of NSW prefers the alternative routes C1 and D.

Submission No. *023*

The potential impacts on threatened species, communities and wildlife corridors have been described in Chapter 17 of the EA. The route selection process is outlined in Chapter 6 of the EA. The value management workshop held in April 2003 concluded that of the five route options, options C and D should be considered further. The RTA then developed two revised options in response to a request from Council: Option C1 and Option E. The second value management workshop held in August 2004 considered options C, C1 and E using the same evaluation process as the first value management workshop (a triple bottom line of functionality, environmental and socio-economic issues). The majority of the participants recommended that Option E be considered further.

Option E was selected as the preferred route as it was considered to:

- Deliver the best overall socio-economic outcome.
- Better provide for future urban growth and provide greater flexibility for future land use planning decisions.
- Result in less severance of existing and future communities.
- Provide safety and noise improvements for Mullaway and Safety Beach.
- Be likely to have a higher degree of community acceptance.

On balance, the preferred route performed best across the triple bottom line of functionality, environmental and socio-economic criteria.

- Local ecosystems are already depleting and the local ecology is going to be affected no matter which highway route is constructed and is concerned about availability of future habitat.
- The Proposal would affect biodiversity. A list of 56 bird species that they have recently identified on their property is provided.
- Concern regarding loss of wildlife corridors, vegetation fragmentation and the possibility of wildlife injury or mortality as a result of vegetation clearance and construction of the Proposal.

Submission No. *026, 029, 067, 086*

It is acknowledged that the Proposal would have an impact on the local ecology (see Chapter 17 of the EA).

The selection of the preferred route is outlined in chapter 6 of the EA. Specialist studies were undertaken for all highway options considered. Option E was selected as the preferred route as it was considered to:

- Deliver the best overall socio-economic outcome.
- Better provide for future urban growth and provide greater flexibility for future land use planning decisions.
- Result in less severance of existing and future communities.
- Provide safety and noise improvements for Mullaway and Safety Beach.
- Be likely to have a higher degree of community acceptance.

Throughout the development of the Proposal, the RTA has endeavoured to minimise the impacts of the Proposal by the adoption of a policy of avoid, minimise and mitigate. Further to this, the RTA has already included an extensive range of management measures in the EA (Appendix A) for this project to help offset the impacts of the Proposal (see section 17.4 of the EA), to facilitate fauna movement and the preservation of threatened species and vegetation communities.

These management measures include fauna crossings at numerous points along the route including the wildlife corridors identified by the NPWS, fauna exclusion fencing and fauna underpasses / glider crossings are incorporated into Proposal design to facilitate fauna movement across the highway and minimise wildlife injury and mortality (refer SoCs F14-F17).

As indicated in section 17.4.9 of the EA, the RTA would develop and agree on a biodiversity offset package to address residual impacts of the Sapphire to Woolgoolga Proposal in consultation with DECC.

Impact on fauna species and habitat

The following submissions were received with regards to impact on fauna species and habitat:

- The respondent's property is mapped as comprising koala habitat and at present the highway at their property boundary has a high wildlife death toll that would increase as a result of the Proposal.

Submission No. *001*

In addition to fauna movement structures, the Proposal also provides for the introduction of fauna exclusion fencing at locations along the alignment where the proposed highway bisects relatively large areas of native vegetation where fauna are more likely to cross the proposed highway and at locations where fauna movement corridors are known to exist (refer SoC F17). Fauna exclusion fencing is provided at this location and Table 17.6 of the EA identifies indicative locations along the length of the project where fauna exclusion fencing is proposed. The fauna exclusion fencing would assist in protecting a range of native fauna including koalas.

- The possible presence of koalas should be further investigated.

Submission No. *023*

While koalas were not identified during the survey periods, it is acknowledged in Chapter 17 of the EA that they are potentially present within areas of suitable habitat along the Proposal study area. Mitigation measures also reflect the potential presence of koala within the area (refer SoC F6).

- The Oxleyan Pygmy Perch has been recorded and registered in Corindi Creek to the north of the study area which is similar in habitat to Arrawarra Creek. Future consideration of this species would be required and management plans and protective measures identified for works in areas identified as key habitat areas for this species.

Submission No. *045*

Oxleyan Pygmy Perch are found almost exclusively in swamps, streams and lakes in coastal lowland 'wallum' (banksia dominated heath) ecosystems, characterised by waterbodies with low salinity and conductivity, and high organic content and acidity. The creeks and watercourses crossed by the proposed route do not include any areas of this habitat type, and as such the Oxleyan Pygmy Perch and its habitat would not be affected by the project. While the field surveys did not identify any Oxleyan Pygmy Perch in Arrawarra Creek, if the species is present, the RTA has committed (refer SoC F1) to developing waterway crossings to facilitate fish passage where appropriate, as well as implementing sedimentation and erosion controls (refer SoC SW4) to minimise impacts on watercourses.

- The respondents believe that wildlife on the section of Wedding Bells State Forest and Flora Reserve at the end of Woolgoolga Creek Road are at a high risk of injury or fatality. Fencing needs to be erected to provide a barrier for wildlife.

Submission No. *046*

Fauna exclusion fencing is incorporated into the Proposal along both sides of the highway through Wedding Bells State Forest. This fencing would guide fauna to the four combined fauna and drainage structures on this section of the highway.

- The remnant 'lowland rainforest on floodplain' endangered ecological community that traverses Poundyard Creek where it crosses Newmans Road would be removed and disturbed by the Proposal to such an extent that the long term viability of the remaining rainforest on either side of the road would be threatened. The creek should be bridged and passage provided for fauna and possibly a raised span over the EEC enabling protection of these remnants. The route of the upgrade could also be reconsidered to avoid the EEC, preferably downstream.

Submission No. *057*

The Proposal has been designed in order to minimise and provide a balance of impacts including socio economic and biodiversity impacts. The crossing of Poundyard Creek would provide for fauna movement.

It is acknowledged that, at the location where the Proposal crosses Poundyard Creek, there would be impacts on the EEC. However, the options of realigning the Proposal or spanning the EEC are not feasible options. Realignment of the route both upstream and downstream was assessed as part of the refinement of the preferred route, but due to steep and hilly terrain and impacts on adjacent residences neither was feasible nor acceptable.

Construction of a bridge to span over the EEC would not reduce the impact on the EEC significantly, as construction of the bridge would require removal of part or all of the EEC. As a result, the additional cost of the structure would not be warranted.

The adjustments to Newmans Road to pass under the Proposal have been designed to minimise impacts on the adjacent EEC.

Impacts on the EEC would be minimised during construction of the Proposal by limiting clearing and installing temporary fencing (refer SoC F21).

- Respondents are concerned about the loss of koala habitat at the site of the former Zoo to Tiki Road.

Submission No. *073*

At this location, within the existing road reserve, there is 1.3 ha of vegetation which is classed as secondary koala habitat. Within the zoo site, approximately 1.5 ha of vegetation would fall within the proposed road reserve. Therefore there could be an estimated 2.8 ha of secondary koala vegetation at this location that could be removed.

However, the RTA has committed to developing a biodiversity offset package (refer SoC F25) to offset residual habitat impacts associated with this Proposal.

- The Wallum Froglet inhabits low lying heathland on the northern beaches (Hearnes Lake, Sandy and North Emerald Beach and Bucca Road) that would be affected by highway construction, air and water pollution.

Submission No. *074*

A detailed frog survey was undertaken for the Proposal (see Appendix F, working paper 7d) with the Wallum Froglet being one of the species addressed within this survey. Potential habitat for the Wallum Froglet was identified at two locations: heathland north of Emerald Beach and west of Arrawarra on the western verge of the Pacific Highway.

The RTA has committed to a range of mitigation measures to minimise impacts on fauna, and specifically frog species (refer SoC F6-F8). Measures to reduce impact on the habitat of the Wallum Froglet would be developed as part of the Construction and Operation Environmental

Management Plans which would identify specific measures to prevent erosion, sedimentation and water pollution.

- EA indicates overall that there would be no significant environmental impacts, respondent believes that there would be impacts at a more specific level, such as at 18 Mountain Way.

Submission No. *086*

The location mentioned within this submission is zoned as 7a environmental protection habitat and catchment and has been identified as secondary koala habitat (vegetation consisting of Blackbutt-Coastal hills moist open forest). Impacts are assessed across the whole project in accordance with DoP D-G requirements. It is acknowledged there will be impacts on biodiversity values and mitigation measures have been developed to address these impacts (refer section 5 of this report for the revised Statement of Commitments).

Impact on flora species and vegetation communities

The following submissions were received with regards to impact on flora communities and vegetation communities:

- Concerned about removal of vegetation especially at the Wedding Bells State Forest, Moonee and Arrawarra.

Submission No. *023, 063, 065, 067, 075*

The preferred route was selected based on a number of criteria, including the potential impacts on State Forests and vegetation. The concept design has also taken into consideration the need to minimise vegetation clearance where possible.

- Biodiversity would be irreversibly and negatively altered as a result of the 83 hectares of vegetation that would be removed which includes 18 hectares of endangered ecological communities.

Submission No. *032, 065, 067, 073, 074*

The preferred route was selected based on a number of criteria, including the potential impacts on biodiversity. The concept design has also taken into consideration the need to minimise impacts on biodiversity where possible. It is acknowledged that the Proposal would require the removal of 83 hectares of vegetation; however the RTA would develop a biodiversity offset package to offset this impact, in consultation with appropriate other agencies (refer SoC F25). Any opportunities to reduce the impact on vegetation communities and habitat would be further investigated in the detailed design stage.

- Concern regarding the impact on Rusty Plum at Bark Hut Creek.

Submission No. *053*

Rusty Plums were identified at Bark Hut Creek during the route options development phase, but not close to the alignment. The Proposal was designed in order to minimise impacts on the identified Rusty Plum species. In the vicinity of the Proposal, Rusty Plums were only identified at mid-Sapphire and Woolgoolga Creek. The RTA has committed to translocating affected plants where possible (refer SoC F3).

- Respondent would like the RTA to limit the vegetation clearing in the vicinity of their property and consult with the respondent about re-vegetation.

Submission No. *086*

Opportunities to reduce the impact on vegetation communities and habitat would be further investigated in the detailed design stage. The flora species and density of plantings to be used in revegetation and landscaping works would be determined as part of the detailed design of the Proposal. The RTA will contact the respondent with regards to their suggestions for landscaping in proximity to their property. If appropriate, the landowners' suggestion would be incorporated into the landscaping plan undertaken as part of the detailed design.

Biodiversity offset package and biodiversity management issues

The following submissions were received with regards to offset strategy and biodiversity management issues:

- Any rusty plums trees and individuals of the species *Typhonium brownii* and *Typhonium sp aff brownii* likely to be destroyed by the upgrade should be relocated.

Submission No. *044*

The feasibility of translocating individuals of Rusty Plum that are likely to be destroyed by the Proposal to nearby land in secure tenure would be investigated and determined on the basis of expert advice (see refer SoC F3). Direct impacts on the *Typhonium brownii* and *Typhonium sp aff brownii* have been avoided through the design process. However, should any identified species become potentially affected, the RTA has committed to assessing the feasibility of translocating individual plants (refer SoC F3) and in order to protect them from construction impacts, the site of the species would be fenced during construction (refer SoC F2).

Additional information on surveys undertaken to determine which species of typhonium was within the study area can be found in section 3.3.3 of this report.

- Will the fauna exclusion fencing be erected pre-construction as suggested in the SoC (F17)?

Submission No. *057*

The fauna exclusion fencing cannot be erected pre-construction. SoC F17 incorrectly stated that this activity would be undertaken "pre-construction". The timing in the Statement of Commitments has been altered to "Construction" to reflect this.

- Temporary fencing mentioned in SoC F21 is not discussed in the EA. Where does the RTA propose to temporarily fence?

Submission No. *057*

The RTA has no current proposals to erect temporary fauna fencing. The term "temporary fencing" in SoC F21 refers to delineation type fencing. For clarity the Commitment has been revised to state "The limits of clearing and other native vegetation disturbance would be clearly marked on relevant work plans and delineated on site prior to clearing" (refer revised SoC 21).

The RTA would explore the opportunity for provision of fauna fencing at an early stage for key areas of the Proposal as part of the CEMP. During construction, measures will be put in place with construction teams to ensure that fauna movement patterns are considered prior to and during construction.

- DECC wishes to negotiate a biodiversity offset package with similar principles and utilising the biometric and threatened species tools within the *Environmental Outcomes Assessment Methodology* under the *Native Vegetation Act 2003*.

Submission No. *057*

Throughout the development of this Proposal, the RTA has endeavoured to minimise the impacts of the Proposal by the adoption of a policy of avoid, minimise and mitigate. The reduction of impacts on species such as the Slender Marsdenia, Rusty Plum and endangered ecological communities is an example of the implementation of the policy (see section 17.3.2 of the EA).

Further to this, the RTA has already included an extensive range of management measures in the EA for this Proposal to help offset the impacts of the Proposal. In relation to biodiversity, these measures include a large revegetation program, fauna crossings, fauna fencing and the installation of fish friendly crossings.

As outlined in SoC F25, the RTA would develop a biodiversity offset package. This package would take into account the extent and type of habitat/vegetation communities that would be impacted on by the Proposal, and the biodiversity management measures as identified in the environmental assessment. The biodiversity offset package may include non land and land base management measures/actions to develop a beneficial outcome for the region.

The RTA has already commenced preliminary discussions with DECC about this issue at both an officer and manager level during January and February 2008. During these discussions general agreement was reached between DECC and the RTA with regard to the process outlined above (refer SoC F25).

- DECC requests that all harvestable timber should be removed from the site and timbers selected for habitat usage before clearing commences.

Submission No. *057*

The RTA has committed to a two stage clearing process that would see harvestable timber being removed prior to habitat trees (refer revised SoC F6A and SoC WR6).

The Construction Environmental Management Plan (CEMP) would incorporate a hierarchy of use for the timber resource obtained from the site. The hierarchy of use would include, but not be limited to, consideration of use of the timber resource for harvestable timber, habitat usage and mulch. Procedures for vegetation clearance would be developed as part of the CEMP and would incorporate the selection of timber for habitat usage prior to clearing and the removal of all harvestable timber from the site prior to the removal of habitat trees.

- DECC supports the use of endemic native vegetation for use in landscaping, primarily to conserve local genetic stock. Respondent also suggests following a general principle whereby landscaping is consistent with natural vegetation communities present. Monitoring should continue for ten years and include an evaluation of the effectiveness of mitigation measures.

Submission No. *057*

To provide the greatest benefit to flora and fauna, revegetation and landscaping would be consistent with the natural vegetation communities present as far as practicable. SoC F26 in the Statement of Commitment identifies that the monitoring program would be implemented for a minimum of 12 months after construction completion. Monitoring for ten years is considered neither appropriate nor feasible.

- DECC support the distribution of salvaged habitat resources and request where possible reinstatement of such resources be extended beyond the project boundary. Use of mature logs and other tree features should also be considered.

Submission No. *057*

The reinstatement of habitat resources would occur within the project boundary, including the use of mature logs and other tree features where possible (refer SoC F12). The feasibility of extending the reinstatement of habitat resources beyond the project boundary, including the use of mature logs and other tree features, would be investigated during the detailed design phase in consultation with adjacent landowners, and considered as part of the biodiversity offset package.

- DECC considers that the nest box plan, which is aimed at replacing tree hollow resources lost in clearing, should be developed in a strategic manner addressing the loss with a clearly defined objective and with a commitment to monitor and maintain nest boxes for at least ten years. The plan needs to be developed in two stages, pre and post clearing in consultation with the respondent. Both plans require negotiation with adjacent landholders so boxes can be established no greater than 500m from the alignment. The project ecologist needs to develop a strategy so the placement of next boxes provides artificial hollows in an area of sufficient food resources and natural hollow recruitment.

Submission No. *057*

The nest box plan would be developed in consultation with DECC and participating adjacent landowners (refer revised SoC F13), and considered as part of the biodiversity offset package.

- The demolition of existing bridges requires the relocation of roosting bats. DECC recommends that consideration be given to incorporating artificial roosting structures into the design of future bridges. If possible demolition of the old bridges should take place after the bats have been given an opportunity to investigate and move to the new roosting sites.

Submission No. *057*

The feasibility of incorporating artificial roosting structures into the design of new bridges would be investigated during detailed design, and considered as part of the biodiversity offset package. If possible, given other constraints, demolition of any bridges would take place after construction of adjacent new bridges so that bats have the opportunity to investigate and move to the new roost sites. In some sites, at least one of the new bridges would be located where the existing bridge is located. It would not be possible to construct these new bridges in advance of the existing structures.

Procedures for the demolition of bridges known to accommodate roosting bats would be developed in consultation with DECC prior to the demolition of the bridges (refer SoC F10).

- The DECC requests that weed maintenance extend for ten years after opening of the Proposal, allowing revegetation sites to successfully rehabilitate.

Submission No. *057*

SoC F22 in the Statement of Commitment identifies that weeds in areas disturbed by construction activities would be actively managed for a minimum of two years after construction completion to allow revegetation works to establish and help minimise weed invasion. The RTA will continue to manage and control noxious weeds to meet legislative requirements under the *Noxious Weeds Act 1993*.

- Respondents support the inclusion of two stage clearing process and requests consultation in the further refinement of this management tool.

Submission No. *057*

The RTA would consult with DECC regarding clearing procedures (refer SoC WR6).

- A bushland buffer of 50m or more should be introduced along waterways and wildlife corridors. Compensatory habitat areas should also be established.

Submission No. *061, 088*

There are likely to be significant limitations to establishing a 50m bushland buffer along waterways as this has the potential to substantially affect bridge design. Protection of waterways and wildlife corridors within the road reserve can be achieved but protection to areas outside the road reserve would be at the discretion of the relevant landowner. Measures that could be undertaken within the road reserve would include the minimisation of riparian vegetation disturbance during construction and revegetating with suitable species within the road reserve. The landscaping plan developed during the detailed design phase would provide greater detail on species.

The RTA will develop a biodiversity offset package to offset the biodiversity impacts of the Proposal in consultation with the DECC (refer SoC F25).

- Suggests purchase of Lot 66 DP 551005 Pacific Highway, Moonee Beach as part of offset package for loss of vegetation as a result of the Proposal.

Submission No. *065*

The RTA will develop a comprehensive biodiversity offset package to offset the biodiversity impacts of the Proposal in consultation with the DECC (refer SoC F25).

2.2.6 Heritage

Aboriginal heritage

The following submissions were received with regards to Aboriginal heritage:

- The EA provides incorrect information relating to their clan name and quoting from incorrect material. Requests to meet with the RTA's Aboriginal Liaison Officer to discuss their position.

Submission No. *003*

Section 4 of the Aboriginal Heritage Assessment (Appendix F, Working Paper 3 of the EA) provides background cultural information in the context of the Proposal. In doing so, it refers to readily-accessible publications and other documents that relate as specifically as possible to the area under investigation. Although a reference is made to the 'Jita Jita' group (as reported by England in unpublished documentation held by the Coffs Harbour Regional Museum), there is no reference as to the name of the Clan of which the Jita Jita may or may not have been part. The RTA recognises that this is an important issue, however the conclusive reconstruction of traditional group and Clan names and their respective territories would require comprehensive anthropological research which is outside the scope of this EA.

The background information is not, nor is it meant to be, an exhaustive account of Aboriginal occupation and use of Gumbaingirr country, a critique of the reviewed documentation, or an anthropological investigation of traditional ownership. Rather, the primary purpose of the background information is to highlight the fact that the Sapphire-Woolgoolga area was occupied and used by traditional Aboriginal people and that attachments to this landscape continued through the historical period to contemporary times.

As requested, the project team Aboriginal consultant contacted the Bagawa Birra Murri Aboriginal Corporation.

The RTA Aboriginal liaison officer would be involved in further Aboriginal consultation, including the sub-surface investigations of identified sites.

- Respondent indicates that the traditional sovereign owners of Bagawa Country of the Gumbayngirr Nation are descendants of the Birra Murri Clan and that the Bagawa Birra Murri Aboriginal Corporation was formed in September 2007 because of misrepresentations of Bagawa cultural lore and sites.

Submission No. *003*

The formation of the Bagawa Birra Murri Aboriginal Corporation is acknowledged and the RTA would provide the opportunity for it to be included in any future Aboriginal heritage consultations for the Proposal.

- On 3 October 2007 the RTA advertised for Aboriginal stakeholder groups. The Bagawa Birra Murri Aboriginal Corporation contacted the RTA and consultant and is still waiting for a meeting to take place. They have not been identified in the report, nor their cultural values and concerns considered. Mention of the Jita Jita group within the EA is offensive to the Bagawa tribe and some sacred sites, such as Hearnes Lake and Flat Rock (in the Solitary Islands Marine Park).
- The Aboriginal heritage significance of Hearnes Lake has not been seriously investigated and consultation has been lacking. There is no mention of Hearnes Lake or Oomderi as being culturally significant to the local indigenous people.
- Advice on matters relating to Aboriginal heritage has not been addressed by direct descendants of the traditional country, as is specified under Aboriginal lore.
- The *Aboriginal and Torres Strait Islander Heritage Protection Act* (Cth) may apply to Aboriginal areas and objects to the Proposal.

Submission No. *042, 053, 062, 065*

An Aboriginal Heritage Assessment (Appendix F, working paper 3) has been undertaken as part of the EA. Section 5.4 of the assessment provides an outline of Aboriginal consultation/ involvement over the five-year period spanning the initial route selection study and the EA process. A chronological record of this consultation/involvement is detailed in Appendix A of the assessment, which is based on logbook notes taken by the consultant during this period. Written correspondence with the Aboriginal groups involved in the assessment process is available, and confirmation of the extent of consultation/ involvement can be obtained from these groups if required.

The draft Aboriginal Heritage Assessment report was provided to Aboriginal groups in the Sapphire-Woolgoolga area for further input and comment in July 2005. The report was then updated and finalised as part of the EA in July 2007, incorporating comments received from these groups. Given that the Bagawa Birra Murri Aboriginal Women's Council Inc (now Bagawa Birra Murri Aboriginal Corporation) was not formed until September 2007, this organisation is not identified in the EA. However, it is understood that many of the members of the Bagawa Birra Murri Aboriginal Corporation were, and are still, members of the Coffs Harbour and District Local Aboriginal Land Council and/or the Gumbula Julipi Elders group, both of which were consulted (via nominated representatives) throughout the route selection and subsequent EA process. As such, the cultural values and concerns of these particular people are considered to have been appropriately included and reported.

It is acknowledged that the 'Jita Jita' group is mentioned in Section 4 of the Aboriginal Heritage Assessment (on the basis of references in England (undated manuscript, *Coffs Harbour Historical Society Archives*) and North (1964, *Aboriginal factory sites at Moonee Beach, NSW*)). Records of the Australian Museum (14[4]: 633-642) indicate that this group is most likely the same group

that camped at Bagawa (on the western side of the coastal range at least 17km west of the Proposal) during the summer months (Holder 1984), and that the 'Bagawa' group could have thus been used as an alternative name for this group. 'Jita Jita' was nevertheless referred to in Section 4 of the Aboriginal Heritage Assessment due to the more localised (and thus immediately relevant) references available.

The RTA, Connell Wagner and the consultant are aware of and acknowledge the recently formed Bagawa Birra Murri Aboriginal Corporation and its interest in the Proposal. Along with other Aboriginal organisations, the Bagawa Birra Murri Aboriginal Corporation has registered as a stakeholder in the proposed subsurface investigations (refer SoC AH5). In line with RTA guidelines, the Aboriginal representatives that would be present during these investigations would be determined by the Aboriginal Focus Group itself (consisting of these Aboriginal stakeholders and the RTA's Aboriginal Heritage consultant).

The presence of sacred sites in the Hearnes Lake/Flat Top Rock locality were investigated and the identified sites recorded and registered with the DECC by the Aboriginal heritage consultant (with permission from the relevant Aboriginal informants) prior to completion of the Sapphire to Woolgoolga EA Aboriginal heritage assessment (cf Collins 2004, Development Control Plan. *Hearnes Lake, NSW mid-north coast Aboriginal Heritage Assessment*). These sites/places of Aboriginal socio-cultural significance within the Sapphire-Woolgoolga locality were determined to be not affected by the Proposal. As such the Hearnes Lake/Flat Top Rock sites are not mentioned in the report to protect cultural sensitivities and prevent the unwarranted dissemination of Aboriginal cultural heritage information in the public arena.

Section 9.3 of the Aboriginal Heritage Assessment identified that there were a number of waterways (including Hearnes Lake) that were culturally significant to Aboriginal communities. The Proposal would include substantive management measures to protect against construction and operation phase water quality impacts on these waterways, including Hearnes Lake. Section 18.3.2 of the EA outlines the various water quality management measures to which the RTA has committed. A number of measures have been identified within the Statement of Commitments (refer SoCs SW1 and SW4 to SW7).

The *Aboriginal and Torres Strait Islander Heritage Protection Act, 1984* applies to any Aboriginal areas or objects Australia wide, irrespective of land ownership or private/public tenure. It is based on the principle that Aboriginal areas and objects should be protected because of their significance to Aboriginal people rather than because of their scientific or archaeological significance.

The Act provides for the protection of areas and objects that are of significance to Aboriginal people in accordance with Aboriginal tradition, and is intended for use as a 'last resort' to protect Aboriginal heritage in instances where State and Territory laws do not offer effective protection to an area/object which is under threat. Protection under the Act is not ordinarily given where State or Territory laws are considered effective.

Throughout the route development and environmental assessment phases of the project, Aboriginal groups have been consulted and reported significant place/ objects have been considered and accommodated in the assessment process. The RTA will continue to consult with the local Aboriginal community in accordance with the relevant state legislation and guidelines.

Non Aboriginal heritage

The following submissions were received with regards to Non Aboriginal heritage:

- There is no mention of the Orara wreck in Hearnes Lake.

Submission No. *042, 053, 067*

The Non-Aboriginal Heritage chapter of the EA (Chapter 13) addressed the potential impacts of the Proposal on Non- Aboriginal heritage items. There would not be any direct impact on Hearnes Lake and subsequently no direct impact on the shipwreck. As such, the "Orara" wreck was not assessed within the EA.

- There has been reliance on databases for the acquisition of information related to non-Aboriginal heritage and that the local knowledge of the area has been ignored. An old gold mine near Woolgoolga Creek, 300m west of the proposed alignment was overlooked.

Submission No. *067*

In developing the Non-Aboriginal Heritage chapter of the EA (Chapter 13), all relevant databases were interrogated, all available related literature was reviewed and Coffs Harbour City Council and historical societies were consulted. The gold mine near Woolgoolga Creek, 300m west of the proposed alignment was identified during this process, however, as it was determined that the Proposal would not directly affect the site, no further assessment was considered necessary.

2.2.7 Economic and social impacts

Amenity

The following submissions were received with regards to amenity:

- A wider highway will divide the village at Sandy Beach and limit road access. It will affect the ambience of the area with more traffic noise and increased air pollution.

Submission No. *015*

At Sandy Beach, the highway reserve would not be widened and the Proposal would be fully contained within the existing road reserve. Road access would remain the same for Sandy Beach, with a new overbridge being constructed, which would result in the acquisition of two properties. Access onto the new highway would also remain the same with Sandy Beach residents having to access the new highway via Graham Drive.

The Proposal includes a number of strategies to minimise the impact of traffic noise on nearby residences (refer SoCs ON1-ON5). Along Sandy Beach, there would be noise barriers erected and the road pavement would be a low- noise pavement. Where residences exceed the permissible noise criteria, architectural treatments would be investigated. With these noise mitigation measures in place, most residences within Sandy Beach are predicted to experience a predicted decrease of 1-6.5dBA in noise levels.

The EA has detailed results of air quality monitoring that was undertaken at Korora. The station was located on the northern side of the Korora Rural Fire Service shed, immediately to the west of the Pacific Highway, approximately 500 metres from the southern end of the Proposal. The monitoring station was set up to monitor a likely "worst case" operational air quality situation. This testing showed that the levels expected would all be within the National Environment Protection Council guidelines.

- The Proposal favours the convenience of truck drivers and through travellers rather than local commuters and will result in a downgrade of and the amenity of the residential areas over which noise and air pollution will prevail.

Submission No. *022, 042, 054, 084, 085*

The Proposal incorporates a local access road for the entire length of the project to benefit local commuters, so that local trips need not be undertaken on the highway. The Proposal is designed

to remove local and through traffic conflict points along the highway, with five interchanges being located at strategic locations over the 25km length of the Proposal. Rather than downgrading the coastal beaches, the Proposal would provide improved access for residents into the northern beaches and Coffs Harbour and onto the new highway. Issues of noise and air pollution have been discussed within Chapters 11 and 20 of the EA and mitigation measures have been included to minimise any negative impacts.

In some areas along the upgrade, there would be negative noise impacts. However, the RTA has committed to a range of mitigation measures to minimise any negative impacts (refer SoCs ON1-ON5). These measures include the use of low- noise pavement along the upgrade, installation of noise barriers and where residences exceed the permissible noise criteria, architectural treatments would be investigated.

The EA has detailed results of air quality monitoring that was undertaken at Korora. The station was located on the northern side of the Korora Rural Fire Service shed, immediately to the west of the Pacific Highway, approximately 500 metres from the southern end of the Proposal. The monitoring station was set up to monitor a likely "worst case" operational air quality situation. This testing showed that the levels expected would all be within the National Environment Protection Council guidelines.

- The respondent indicated that while the urban design principles could be transported to other options, the current Proposal does not take into account the loss of amenity of residents.

Submission No. *042, 067*

Amenity is considered in the socio- economic assessment of the project, under amenity (Chapter 16 of the EA).

- The respondent moved to the area because of the lifestyle, environment, access to education and other facilities, all of which will be affected by the Proposal.

Submission No. *064*

Impacts of the Proposal on amenity and access are assessed in Chapter 16 (Socio-economic analysis) and section 7.4.3 of the EA. The respondent is located outside the project study area. Issues of noise and air pollution have been discussed within Chapters 11 and 20 of the EA and mitigation measures have been identified.

Business / income

The following submissions were received with regards to business/ income:

- Commercial interests suffer from bypasses but people will visit Coffs Harbour regardless. Woolgoolga is already bypassed so the upgrade would have little commercial impact.

Submission No. *029*

Socio economic impacts are assessed within Chapter 16 of the EA.

- Due to the upgrade, the respondent will lose the second dwelling on his property and the corresponding rental income which he has derived from it over the past twenty years and expected to receive it in the future.

Submission No. *089*

This property would require partial acquisition, which would include the rental residence on this property. Property acquisition and negotiations would be undertaken in accordance with the *Land*

Acquisition (Just Terms Compensation) Act 1991 and the RTA Land Acquisition Policy. The aims of the Act include 'to guarantee that, when land affected by a proposal for acquisition by an authority of the State is eventually acquired, the amount of compensation would be not less than the market value of the land (unaffected by the proposal) at the date of acquisition'. Factors such as existing land use, building assets and other improvements are taken into consideration in the valuation process.

- Social and economic impacts of the EA failed to identify the total loss to the Urban Development Industry values at $2.4 billion, with Woolgoolga likely to suffer the largest loss.

Submission No. *042, 067*

It is understood that the $2.4 billion quoted came from an assessment of the loss to the urban development industry in the Coffs Harbour Local Government Area arising from the Coffs Harbour Highway Planning Strategy. As the entire context and background of the $2.4 billion quoted was not provided in the Submission, the RTA could not review the assessment of the $2.4 billion loss to the urban development industry identified in the submissions.

The Proposal has been designed to minimise potential impacts on future urban sites by maximising the utilisation of the existing highway and, subject to consideration of other constraints in the study area, by locating new sections of the preferred route for the Strategy to avoid areas identified for future development where practicable. The *Draft Mid North Coast Regional Strategy* and Coffs Harbour City Council's *Our Living City Strategy* identified potential urban growth/ development areas. Only strip acquisitions along the existing alignment required as part of the Proposal would affect the *Hearnes Lake / Sandy Beach Development Control Plan* area and the *Moonee Beach Development Control Plan* area. The Proposal would have minimal impacts to the development potential of these areas.

Upgrading the Pacific Highway would provide economic growth for the area through increased freight efficiency, travel times and level of service. The flow-on benefits for the growing northern beaches area of Coffs Harbour include decreased transportation costs and times, better access for goods and services to markets as well as opening/ strengthening access to inter regional markets.

As identified in working paper no.1 (Traffic and Transport Assessment) the Proposal, which is the northern section only of the Coffs Harbour Highway Planning Strategy, is estimated to provide a Present Value of Benefits of $752 million (discounted from 2006) over a 30 year period from 2011 based on an annual discount rate of 7%. This is the estimate value of direct benefits arising from reductions in road user costs (vehicle operating costs, travel time costs and accident costs) resulting from the Proposal and does not include any provision for indirect benefits from the Proposal or estimated direct and indirect benefits arising from the southern (or Coffs Harbour) section of the Coffs Harbour Highway Planning Strategy.

- The EA has not addressed the flow-on effect of loss of agricultural jobs to service industries and the Woolgoolga economy.

Submission No. *042, 067*

The EA acknowledges that over 16% of the workforce in Woolgoolga is employed in jobs related to agriculture (section 15.1 of the EA). As such, the RTA has committed to a range of measures to reduce the impact on the agricultural industries (refer SoCs AG1-AG7). By minimising the number of properties that would no longer be viable (through design and mitigation measures) for agricultural production, this would, in turn have a flow-on effect of reducing any impacts on the agricultural service industries.

- The proposed upgrade will isolate through traffic from the respondent's business while local traffic will continue to shop at the larger retail centres.

Submission No. *060*

This property currently does not have direct access from the highway, but off Headland Road. Access arrangements to the Sapphire Beach area would remain unchanged with the exception of an overbridge being installed that would bring additional local traffic passing by this business. However, it is acknowledged that the business would be less accessible to highway through traffic.

- The respondent owns and manages the Sapphire Motel and is concerned about the impacts on business in the future if there is increased traffic and noise. Respondent cannot afford to build more sound walls, and would like to know who will pay to make the necessary structural changes in the future.

Submission No. *064*

This property does not fall within the study area of the Sapphire to Woolgoolga Pacific Highway Upgrade, but falls within the southern (Coffs Harbour) section of the Coffs Harbour Highway Planning Strategy. As such, noise impacts for the Coffs Harbour section of the Coffs Harbour Highway Planning Strategy were not considered as part of this EA.

- The proposed development would not facilitate economic growth for the area. Destruction of natural assets, removal of future urban development land and holidaymakers travelling through the area would affect the local economy negatively.
- The respondents are concerned about the impact on local businesses during construction.

Submission No. *067, 073*

The EA has noted that there would be economic impacts as a result of the Proposal in both the construction and operation phases (refer section 16.2.5 of the EA).

Upgrading the Pacific Highway would provide economic growth for the area through increased freight efficiency, travel times and level of service. The flow-on benefits for the growing northern beaches area of Coffs Harbour include decreased transportation costs and times, better access for goods and services to markets as well as opening/ strengthening access to inter regional markets.

During the construction period, it is expected that there may be some short term impacts on businesses. Impacts include the disruption to access for businesses that have access from the highway. The RTA has committed (refer SoC T4) to providing temporary access for these businesses. Access arrangements would be discussed between the RTA and the property owner. Through the bypass section, access would be maintained to rural properties to the west of the upgrade so that access and transportation of crops are not affected.

It is also anticipated, that there could be some short-term benefits to the local economy through the construction period (refer section 16.2.5 of the EA).This is likely to occur through increased demand for workforce accommodation and goods/ services. The construction may also generate employment opportunities in the local area. There may be additional impacts on community services (eg medical, social and commercial) resulting from labour relocating to the area.

During the operation phase, there may be adverse impacts on businesses in Woolgoolga that would be bypassed. It is acknowledged that there are some businesses that may be heavily reliant on highway traffic. However, in order to mitigate any adverse impacts on Woolgoolga, the RTA would

consult with Coffs Harbour City Council in regards to providing appropriate signage on the highway for Woolgoolga and other towns along the northern beaches. Signposting arrangements would be consistent with the RTA's signposting policy and signposting along the Pacific Highway generally.

- The social and economic impacts have not been accurately described.

Submission No. *073*

Chapter 16 of the EA describes the characteristics of the socio-economic environment of the study area, including a demographic profile, notable cultural and social aspects as well as business and tourism features. The potential impacts along with proposed management measures are also discussed in this chapter.

Further information on potential socio-economic impacts can be found in Working Paper 4 Land Use, Planning and Socio-economic assessment (Appendix F).

Community cohesion

The following submissions were made with regards to community cohesion:

- The highway upgrade will affect human culture and quality of life.

Submission No. *067*

Regardless of the Proposal, the northern beaches and the Coffs Harbour local government area would still experience an increase in traffic volumes due to the predicted population growth of these areas. Through traffic is also expected to increase as the Pacific Highway Upgrade Program continues. The current congestion would continue to increase and affect the quality of life of surrounding residents. The Proposal has been designed to reduce impacts, such as the use of a low-noise pavement (to minimise noise impacts), and incorporating grade-separated interchanges (improving road safety by reducing the number of conflict points along the highway). The RTA has committed to a number of mitigation measures in order to reduce any adverse impacts of the Proposal on the surrounding environment and residents (Appendix A of the EA).

- The construction of the motorway will have significant social, economic and environmental impacts. Respondent indicates that the Proposal is only beneficial to the trucking industry and transient traffic between Sydney and Brisbane.

Submission No. *075*

Social and economic impacts of the Proposal are discussed within Chapter 16 of the EA. The Proposal would have a number of social, economic and environmental benefits. The Proposal has been designed to improve road safety for all users including local residents. This has been undertaken through the introduction of grade-separated interchanges, improved local access arrangements and a separate local access road. The Proposal has been designed to minimise environmental impacts such as those on EEC's and identified threatened species (refer Chapter 17 of the EA).

Traffic counts undertaken as part of the environmental assessment indicate that approximately 20-40% of heavy vehicles passing through the study area service the local area (from Sapphire to north of Mullaway).

A large percentage of the total traffic volumes using the current highway (approximately 46-72%) is local traffic as identified in section 10.1.2 of the environmental assessment.

Proposal would also provide improved access for residents into the northern beaches and Coffs Harbour and onto the new highway.

The RTA has committed to a number of mitigation measures (Appendix A of the EA) in order to reduce any residual adverse impacts of the Proposal on the surrounding environment and residents.

Human health

The following submissions were made with regards to human health:

- Respondent is concerned about human health impacts related to traffic noise (particularly lack of sleep) particularly from heavy vehicles.

Submission No. *008, 031, 066*

Noise management measures would be developed to comply with the ECRTN in accordance with the RTA's ENMM. Sleep disturbance is considered in section 11.3 of the EA.

There are several noise descriptors used in identifying the existing noise environment, including the maximum noise level within a sample period (L_{Amax}). As noted in section 11.3 of the EA, there are no criteria for sleep disturbance, however the NSW Government's ECRTN provides the following guidance in terms of acceptable maximum noise levels:

- Maximum internal noise levels below 50 to 55dBA are unlikely to cause awakening reactions.
- One or two noise events per night with maximum internal noise levels of 65 to 70dBA are not likely to significantly affect health and wellbeing.

Engine brake noise is an issue around the world, although there has been no significant or effective action taken overseas, and research into the exact nature of the noise problem is very limited.

Given this gap in knowledge the National Transport Commission (NTC) has focussed its research on:

- Identifying and defining the factors in engine brake noise that cause annoyance.
- Establishing how to address these factors and reduce engine brake noise.
- Developing a means to test for excessive noise.
- Identifying the most cost effective means of ensuring compliance.

Much of this work has been completed and the RTA has been working closely with the NTC in the development of an appropriate engine brake noise standard. Recently the Australian Transport Council unanimously approved a proposal from the NTC to introduce an in-service standard for engine brake noise. The RTA is currently trialling a noise camera that, with further enhancements, will allow the approved standard and future regulations to be enforced.

In addition to above previous Federal vehicle noise standards were much less demanding than international standards and the RTA has advocated for more stringent noise standards. As a result, the Australian Transport Council has approved a new Australian Design Rule ADR 83/00 bringing the Australian standards into line with current strict European standards. The new ADR has been applied to all new light vehicles from 2005 and new heavy vehicles from 2007.

During the detailed design phase further noise assessment would be undertaken. Noise mitigation measures would be refined as part of this process.

- The respondent refers to studies that show that exposure to fine particle air pollution and diesel exhaust significantly increase health risks and that people living near motorways are more likely to suffer from a number of diseases and conditions. The RTA would be acting in a negligent manner in upgrading the highway which would increase diesel emissions. Have the RTA and Department of Health investigated the long term effects of air pollutants.

Submission No. *028, 062, 066 076, 080*

The National Environmental Protection Council has developed ambient air quality National Environmental Protection Measures (NEPMs). The ambient air quality NEPMs set out maximum levels permissible for CO, NO, SO_2, photochemical oxidants, Lead and $PM^{10.}$ In 2004, these NEPMs were varied to include an advisory $PM^{2.5}$ standard.

The NEPM standards were set at levels to protect human health and are based on the understanding of the health effects of these pollutants at the time of making the NEPM. Health data that fed into the developing of the NEPMs included a variety of studies including epidemiological and toxicological research. For the criteria pollutants, much of the health data arose from broad population based epidemiological studies as well as controlled exposures studies.

Air quality standards are usually set at levels to protect the most sensitive groups within the population. All standards developed by the USEPA, WHO, NEPC and other bodies around the world all take this approach.

In May 2002, the Environmental Protection and Heritage Council (EPHC) established a working party to identify priority research areas into the relationship between air quality and health, and to identify funding options and develop mechanisms for the delivery of priority research projects. The information generated by these studies would support decisions on future air quality standards and management strategies.

Section 20.1.1 of the EA (Table 20.1) identifies NEPM goals and relates them to results from air quality monitoring undertaken for the Proposal adjacent to an existing dual carriageway section of the Pacific Highway at Korora. The results indicate that maximum concentrations of all pollutants measured are well within National Environment Protection Measures (NEPM) guideline limits.

Air quality impacts relate to traffic volumes which are likely to increase whether the Proposal goes ahead or not. With the Proposal, a higher standard road is likely to have a lesser impact than a lower standard of road due to improved traffic flows.

- Traffic headlights at night will degrade the sleep quality of the future residences. There is no provision for headlight screens.

Submission No. *038*

This property is currently undeveloped and the Proposal cannot assess impacts or provide mitigation measures on potential future developments. If the respondent receives approval after approval has been granted for the highway Proposal, then the development would be required to have consideration of the highway. As part of the landscape plan for the Proposal, there would be planting along the side of the highway (refer Chapter 7 and SoCs UD1-UD4).

- The respondent asked where the health and social impact assessment of the project is.

Submission No. *042*

The socio-economic impacts (including amenity effects) are assessed within chapter 16 of the EA.

- The 2006 Productivity Commission Road/ Rail Infrastructure Pricing stated that community impacts must also be taken into account and that the spill over costs that trucks impose on local communities, and on other road users, reduce community wellbeing. Spill over costs include: accident costs, environmental impacts such as noise and air pollution, greenhouse gas emissions and congestion.

Submission No. *042, 062*

The Proposal has been designed to reduce the number of accidents. Chapter 10 of the EA outlines that the accident rate would reduce from 29 crashes / Mvkt to 20 crashes / Mvkt. The local access road provides a local alternative route for local trips, and grade-separated interchanges provide safer access points to the highway.

Assessments of noise and air quality impacts have been undertaken (refer to Chapters 11 and 20 of the EA). While there would be some negative impacts as a result of the Proposal, the RTA has committed to a range of mitigation measures in order to minimise these impacts (refer Appendix A of the EA).

A quantitative assessment of the greenhouse gas emissions as a result of the Proposal was undertaken and showed that by 2031, there would be a decrease in the amount of greenhouse gas emissions compared with the existing highway conditions (refer section 20.2 of the EA).

The Proposal has been designed to cater for the predicted increase in traffic volumes through this section. With fewer locations to access the highway, there would be longer stretches of free-flowing traffic.

- Australian levels for air quality are lacking. The respondent indicated that PM1 are more highly correlated with cardiopulmonary disease and lung cancer mortality. Respondent indicated that there are substantial health costs of air pollution from transport – $1110-$1775 per diesel vehicle per year.

Submission No. *042, 066*

The RTA is complying with the current Australian Government goals (refer section 20.1 of the EA). The assessment indicates that the Proposal would be within the guidelines. Setting air quality goals is outside the scope of this project and is not under the control of the RTA.

Vehicle emission impacts are most effectively managed at source via vehicle fuel standards and vehicle maintenance and emissions testing. The preferred approach to addressing road-based air quality impacts is through state or region wide strategies, such as progressive tightening of vehicle air emission standards, in-service inspections to ensure vehicle muffler/exhaust systems are well maintained, and the integration of transport and land use planning. In addition, it is anticipated that over time the turnover in the vehicle fleet would see progressive removal of less efficient vehicles from the roads, thereby reducing vehicle emissions.

- The EA does not address the health impacts of noise pollution which will result from the upgrade and that will have no curfew. Respondent refers to the World Health Organisation's recognition that traffic noise can lead to a number of different conditions which are listed in the submission.

Submission No. *049, 054, 061, 071, 076, 085, 088*

A comprehensive noise assessment has been undertaken for the Proposal (see Chapter 11 of the EA and working paper 2: Noise and Vibration Assessment). In order for the level of noise at households to be compliant with the ECRTN, where necessary, a number of mitigation measures

have been proposed, such as low noise pavement, noise barriers and architectural treatments (refer SoCs ON1-ON5).

- The respondent believes that the safety and well being of the people in the area will be compromised by the development and puts forward that the social implications and associated costs have not been properly assessed.

Submission No. *050*

One of the key objectives for the project is to provide a dual carriageway road which will improve the overall safety of the highway. The Proposal would see a reduction in accidents along this stretch of highway. The inclusion of a local access road would see that local trips need not be taken on the highway. The grade-separated interchanges would also provide safer access points to the highway.

The Proposal has been designed with a number of mitigation measures in order to minimise the impacts of traffic on the highway on surrounding residents. These include: noise mitigation measures (low noise pavement, noise barriers and where necessary, architectural treatment of residences), and improved local access measures (a full length local access road, grade-separated interchanges).

- Respondent notes that she suffers from sinus problems and high blood pressure which is not helped by the constant noise from the highway.

Submission No. *064*

This property is outside of the study area and has already been architecturally treated under the Northern Pacific Highway Noise Taskforce program of works.

- Respondents are interested to know what benefits the RTA's social impact studies have found for local residents as a result of highway construction. They are inclined to think that residents will be adversely affected.

Submission No. *073*

Socio-economic impacts are assessed in Chapter 16 of the EA. The Proposal would result in better local accessibility through the local access road. The local access road would also provide safer access for cyclists as well as providing facilities for bus routes. Some areas would also experience decrease in noise levels. The EA identifies that there would be short term adverse impacts on the community. However, the RTA has committed to a number of mitigation measures to manage any residual impacts as a result of the Proposal (see Appendix A of the EA).

Culture and heritage

The following submissions were made with regards to culture and heritage:

- The respondent is opposed to the Proposal because it will result in the loss of agricultural land of cultural significance to the Sikh community.

Submission No. *021, 067*

Impacts on the Sikh community are addressed within chapter 16 of the EA. It is acknowledged that for many Sikh families, farming and the relationship to the land is an important aspect of their culture. The RTA would implement a number of mitigation measures to agricultural properties in order to minimise adverse impacts on agricultural land (refer SoCs AG1-AG7). These are detailed in Chapter 15 of the EA.

- Although not formally recognised as culturally significant, the land owned by the respondent has been in the family for generations and the respondent considers it 'family heritage'.

Submission No. *033*

The Proposal has been designed to minimise, to the extent possible, the extent of property acquisition. The RTA acknowledges that acquisition of private property is a sensitive issue for affected residents.

- Impact on the cultural and heritage values of the Sikh community were not assessed during the route option development phase

Submission No. *042*

The RTA has undertaken a comprehensive consultation process since the inception of the project in 2001. At this time a community consultation plan was produced, that identified the Sikh community as key stakeholders and was developed with help from a representative of the Sikh community. To ensure adequate representation, the RTA provided the Sikh community with two places on the northern Community Focus Group Consultation has also included posters translated into Punjabi, invitations to value management workshops and individual land owner meetings with the project team. Chapter 5 of the EA goes into detail on the consultation undertaken with the Sikh community. Consultation with the Sikh community continued through the preferred option and EA phases.

Tourism

The following submissions were made with regards to tourism:

- Tourists staying near the Proposal will now be able to hear heavy vehicles all night. Pedestrians and cyclists including tourists will have to cross over or under the highway to access tourist facilities.

Submission No. *042*

Tourists currently staying near the existing highway are able to hear heavy vehicles. With the bypass of Woolgoolga, tourists staying in nearby accommodation would experience benefits with reduced noise levels. The Proposal incorporates a number of mitigation measures in order to reduce the impact that the Proposal would have on the surrounding environment and residences. These include the use of low-noise pavement and noise barriers. These mitigation measures have been implemented to ensure compliance with the ECRTN.

Safe access across the proposed highway for pedestrians and cyclists would be provided at grade separated interchanges which are located in five key strategic locations, and at the overbridges which are included as part of the local access road network.

- EA does not adequately address the impact on tourism and tourism resorts.

Submission No. *066, 080*

Tourism and tourist resort impacts (positive and negative) are addressed in Chapter 16 of the EA and includes potential construction and operational impacts as well as mitigation measures to reduce impacts on tourist resorts.

- Option E was justified during the route selection process as the beaches were the only main attraction in the area.

Submission No. *067*

During the route selection phase, investigations were undertaken to identify tourist facilities in the area. These investigations indicated that most tourist facilities were situated to the east of the highway, predominantly within the established villages along the coast, but acknowledged that there were some facilities in the hinterland. However it was not assumed that the beaches were the only attraction.

The Proposal would see improved access to the area and promote tourism, while also improving road safety.

- Tourism is one of the region's biggest industries and is under threat. The upgrade will negatively impact on the beaches with highway noise and pollution.

Submission No. *067, 073, 088*

The Proposal could improve access to tourist facilities and attractions through improved road safety and quicker travel times. RTA would consult with Coffs Harbour City Council in regards to providing appropriate signage on the highway for Woolgoolga and other towns along the northern beaches. This would be consistent with the RTA's signposting guidelines and signposting along the Pacific Highway generally.

Bypassing Woolgoolga would also improve the amenity of the township, and could potentially benefit many businesses catering for short and long stay highway travellers. Other amenity measures along the length of the highway such as noise barriers and low-noise pavement would also assist tourist facilities (refer Chapter 7 and 11 of the EA).

2.2.8 Soils and water

Construction impacts

The following submissions were received with regards to construction impacts on soil:

- Respondent requests proper controls be implemented to ensure soil erosion will not be a problem.

Submission No. *040*

The RTA is accountable for water quality and soil erosion management during construction and must comply with pollution control legislation. Sedimentation/ erosion basins and other soil management measures will be developed in consultation with relevant government agencies.

During construction, the site would be inspected by DECC and other regulatory agencies. The RTA has committed to developing a Construction Environmental Management Plan (refer SoC EM1) that would identify management responses related to soil erosion.

- Respondent objects to the large amount of soil and existing slopes to be removed.

Submission No. *056*

Chapter 8 of the EA outlines estimated required quantities of materials for the Proposal. In a road project of this scale, a significant amount of earthworks is required. The Proposal has been designed in order to minimise the amount of earthworks required. The Proposal has been designed to achieve a cut/ fill balance to minimise the quantity of imported fill that is required.

- The DECC notes that the majority of the route passes through highly erodible soils and that sediment and erosions controls will need to be designed in accordance with Managing Urban Stormwater – soil and construction volume 1 and volume 2, book 4. It is anticipated that an opportunity to review the plan will be provided in the application for an Environment Protection Licence.

Submission No. *057*

The RTA would consult with Department of Environment and Climate Change in the design and location of sedimentation control measures during the detailed design of the project.

- The EA identifies the uses of mulch, however the DECC note that there are potential environmental impacts from the use of mulch and mulch stockpiles. The DECC would like the amount of mulch required for the site, the stockpile locations and environmental controls determined prior to clearing. Excess mulch should be kept offsite. The amount of land and environmental impacts from topsoil and mulch stockpile areas is considered in the Construction Environment Management Plan. A new Commitment is proposed to calculate how much mulch will be required for the site prior to clearing commencing. Only mulch required for site activities/ restoration should be stored on site. Impacts from the storage and use of mulch are to be identified and requirements for environmental protection implemented.

Submission No. *057*

The amount of mulch and topsoil required, stockpile locations and environmental controls would be determined in the detailed design of the project.

The Construction Environment Management Plan (CEMP) would incorporate a hierarchy of use for the timber resource obtained from the site. The hierarchy of use would include, but not be limited to, consideration of use of the timber resource for harvestable timber, habitat usage and mulch,

Locations and environmental controls for the stockpiling of mulch and topsoil would be identified in the CEMP (refer new SoC WR5).

- EA suggests that most of the required 'fill' will be obtained from the 'cut', but respondents believe this has been inaccurately assessed. More imported fill would be required for Option E that traverses valleys and watercourses.

Submission No. *067*

The EA has outlined that from the Proposal, there would be 2.44 million m^3 of cut material and 2.35 million m3 of fill. This results in an estimated excess of 90,00m^3. The EA also notes that subject to the actual volumes of topsoil and unsuitable materials encountered, up to 100 000m^3 of material may need to be imported on the site to complete these earthworks operations.

The earthworks balance would be further assessed during the detailed design phase of the project.

Contaminated soils

The following submissions were received with regards to contaminated soils:

- How does the RTA propose to dispose of contaminated soil, such as from old banana farms and service stations?

Submission No. *042, 053, 067*

The RTA has identified that waste would be handled, stored and disposed of in accordance with relevant guidelines (refer SoC WR2). The RTA has also committed (refer SoC AG4) that Panama disease and bunchy top virus would be identified and appropriately managed in consultation with the NSW Department of Primary Industries (Agriculture) on all ex-banana farms acquired as part of the Proposal.

- Acid sulphate soils and other soils contaminated with arsenic and organochlorine residues may be disturbed during construction. The toxins will migrate into Hearnes Lake and the Solitary Islands Marine Park.

Submission No. *062*

Section 18.2.3 of the EA identifies that the majority of the Proposal would pass through areas considered to have negligible or low probability of acid sulfate soils. However, isolated areas such as Arrawarra Creek, localised sections north of Arrawarra Creek, Woolgoolga Creek and the area immediately east of the existing highway at Cunningham Creek exhibit high probability of acid sulfate soils. RTA has committed to identifying, investigating and managing any contaminated soils along the alignment (refer SoCs SW9, CS1 and CS2).

Domestic drinking water tanks

The following submissions were received with regards to domestic drinking water tanks:

- The Environment Assessment has not adequately addressed the impact of emissions and pollution on water quality for water tanks used for human consumption. Some respondents feel that because traffic assessments were underestimated so too have the effects on water quality have been understated.
- Collection of rainwater for human consumption in areas affected by heavy traffic, incinerators, smelters or heavy industry is not recommended.
- Respondent said that one resident was told by the RTA that he could truck water in if he was concerned about water quality. Respondent is angry with the RTA's response. To the respondents' knowledge water testing of water tanks is yet to be done.

Submission No. *021, 025, 042, 048, 050, 053, 054, 061, 064, 067, 071, 084, 085, 088, 092*

Air quality and the impacts on water tanks are addressed in section 20.1.2 of the EA. The study referred to in the document revealed that water quality of rainwater tanks in an area close to the Pacific Highway and close to an industrial area was within Australian guidelines. Traffic numbers of these sites are comparable to the traffic numbers predicted at Sapphire (22, 500 and 32,000 at the two sites in the study compared to 25, 427 vehicles south of Headlands Road, Sapphire in 2011).

- The respondent is concerned about the safety of the water in tanks and is not satisfied that installing a diverter will fix water quality problems. Respondent notes that controlled and quality tested town water is only provided to homes on the eastern side of the motorway.

Submission No. *075, 082*

Air quality and the impacts on water tanks are addressed in section 20.1.2 of the EA. The study referred to in the document revealed that water quality of rainwater tanks in an area close to the Pacific Highway and close to an industrial area was within Australian guidelines.

Water quality controls

The following submissions were received with regards to water quality controls:

- The commitment "best practice water quality controls would be implemented during construction phase" would not result in the RTA being accountable for construction water quality.

Submission No. *042*

The RTA is accountable for water quality during construction and must comply with pollution control legislation. Sedimentation/ erosion basins and other water quality controls will be developed in consultation with DECC.

During construction, the site would be inspected by DECC and other regulatory agencies.

The RTA has committed to developing a Construction Environmental Management Plan (refer SoC EM1).

- Commitment SW1 be amended to include a commitment to monitor water quality both before and during construction. Water monitoring program should occur over a period sufficient to adequately describe water quality in the area and be of at least 12 months duration. Also recommended that the water monitoring program include groundwater and monitoring bores should be installed in locations close to areas of significant cut or fill or other activities likely to impact on groundwater.

Submission No. *057*

At least six months prior to the commencement of construction commencing pre construction water quality monitoring would be undertaken to obtain baseline water quality data. This will supplement existing water quality data that has been undertaken by Coffs Harbour City Council.

During construction, water quality monitoring would be undertaken upstream and downstream of the Proposal. The location and frequency of the monitoring will be determined in consultation with DECC prior to the commencement of construction.

Locations of groundwater monitoring sites and frequency of monitoring would be determined in consultation with DECC prior to the commencement of construction.

- Commitment SW4 should be amended to include an undertaking to maintain hydrological regimes to ensure ecosystem requirements are satisfied.

Submission No. *057*

The Proposal has been designed to maintain existing drainage patterns and hydrological regimes and, thereby, minimise potential impacts on existing aquatic ecosystems.

Solitary Islands Marine Park

The following submissions were received with regards to the Solitary Islands Marine Park:

- The removal and construction of bridges may result in higher levels of silt and pollution entering the Solitary Islands Marine Park and protected coastal wetlands. Focused measures to eliminate siltation and pollution increases for this Proposal should be considered.
- The Solitary Islands Marine Park and watercourses would be adversely affected by runoff and pollution from the highway during both construction and operation due to the Proposal's proximity to the coast. Sedimentation and erosion control are inadequate for the protection of the Solitary Islands Marine Park. Water Quality would be at risk during periods of flood.
- Environmental Monitoring of the Park should be undertaken before and after construction.
- DPI stresses the importance of the Solitary Islands Martine Park and will work with the RTA, DECC and contractors to implement sedimentation control.
- Construction will disturb riparian vegetation and acid sulphate soils which may affect areas such as Hearnes Lake.
- The RTA is seeking to cut a 150m scar for its upgrade which would result in endangering the marine park. Respondent notes that the area experiences high levels of rainfall and that the passage of silt from the works will not be able to be controlled by siltation catchment ponds.

Submission No. *023, 045, 056, 058, 062, 067, 074, 087, 093*

The RTA is aware of the proximity of the Solitary Islands Marine Park and has designed creek crossings and other watercourses to minimise impacts (refer SoC SW6 and SW7). The RTA has already consulted with the Marine Park Authority and would continue to do so through the detailed

design and construction period. The bridges across creeks would be constructed so that where possible, the bridges would clear span the creeks so that there would be little disturbance to the creek and water quality downstream. The RTA has committed to monitoring water quality up and downstream during construction (refer SoC SW1). During construction, environmental mitigation measures would be put in place to minimise impacts on the Solitary Islands Marine Park (erosion and sediment control measures and development of detailed and specific method statements for bridge removal and construction).

In developing a method statement for the removal of bridges (refer section 7.5.2), consultation would be undertaken with the DECC and the Marine Parks Authority (refer SoC SW5).

Water quality control measures to be incorporated into the proposed upgrade are discussed in Sections 7.5.4 and 18.3.2 of the EA. These sections of the EA describe a range of standard, as well as project specific mitigation measures that would be implemented to help manage erosion, sedimentation, run-off from road surfaces and pollution from spills/accidents during both the construction and operational phase of the project.

The sedimentation control basins would be developed in compliance with the *Managing Urban Stormwater: Soils and Construction, Volumes 1 and 2, book 4, Main Road Construction* (DECC 2006). RTA would consult with the DECC, DPI and the Marine Park Authority on the design, sizing and location of sedimentation control initiatives during the detailed design of the project.

Measures to protect riparian vegetation and manage acid sulfate soils are outlined in Chapter 18 of the EA. The RTA has committed to a range of mitigation measures to minimise impacts from acid sulfate soils (refer SoCs F21 and SW9 & SW10). These measures include minimising the amount of vegetation clearance and identification of sites of actual acid sulfate soils and implementing containment strategies to prevent leachate entering downstream watercourses.

The RTA is committed to implementing a range of measures to ensure that there are minimal adverse impacts on the Solitary Islands Marine Park. Water quality control structures would be introduced in accordance with relevant best practice guidelines including *Managing Urban Stormwater: Soils and Construction Volumes 1 and 2* (DECC, 2006). This document outlines the process for sizing sedimentation ponds. Factors utilised in determining the size include the type of soil and climatic data, including rainfall.

Reference is also made to the revised Statement of Commitments in Chapter 5 of this Submissions Report that identifies commitments relating to construction and operation phase water quality control measures (refer SoCs SW1- SW8) to which the RTA has committed.

- The Hearnes Lake and Moonee Creek management plans require buffers of 100m between the creek/lake and development. In the case of the highway, the DECC believes that in addition to best practice sediment and erosion controls, a minimum vegetated riparian buffer of at least 20-40m would be required. In high conservation value areas such as Hearnes lake, Cunningham and Skinners Creek the buffer should meet the requirements of the estuary management plans.

Submission No. *057*

The RTA met with DECC staff on 23 April 2008 and clarified that this comment relates more to developments such as subdivisions, and as such does not relate to linear infrastructure such as the Proposal, which must cross Cunningham's Creek, Skinners Creek and Double Crossing Creek.

- DECC recommends that where works are proposed within creek/drainage lines attention should be given to bank stabilisation as part of the initial construction works.

Submission No. *057*

Bank stabilisation as well as sedimentation and erosion basins would be implemented as part of initial construction work for areas within creeks and drainage lines.

- Given that there are a number of creek crossings proposed and that there is the possibility of flash floods, the DECC and Marine Parks Authority recommend the scheduling of construction activities to avoid peak rainfall periods in the more sensitive areas. The RTA should consider timing of certain construction activities (eg stripping) to dry weather periods to minimise sedimentation and erosion impacts. Such areas that could benefit from this approach are the Hearnes Lake area, Arrawarra Creek, Cunninghams Creek and Skinners Creek.

Submission No. *057, 093*

DECC and the Marine Parks Authority's concerns are noted and where reasonable and feasible, construction activities within creeks would not be undertaken during periods of wet weather.

- There are very high flows at the creek north of Headland Road, especially during times of heavy rain. The RTA should provide safeguards against sedimentation and other pollutants seeping into the creek and along Paperbark Lagoon. Such measures should be in place for all stages of construction. The respondents elaborate on concerns which include the risk of sedimentation in early construction, the lack of sedimentation traps, and no plans to upgrade the existing culvert.

Submission No. *070*

Erosion and sedimentation control measures would be implemented for all creek systems, with their details being progressed in the detailed design of the project (refer SoC SW4).

2.2.9 Urban design and landscaping

Landscape

The following submissions were received with regards to landscape:

- A 30 metre cut at Unwins Roads would affect the scenic value of the area and is not in keeping with the urban design principle of a road sensitively designed to fit into the landscape.

Submission No. *042, 053, 067*

As identified in SoC UD1 (Appendix A of the EA), the urban and landscape design treatments would reflect the urban and landscape design objectives and principles identified in Chapter 19 of the EA. In order to minimise the visual impact of the 30 metre cut at Unwins Road, it would be appropriately landscaped to reduce the visual impact of the cut.

Urban design

The following submission was received with regards to urban design:

- The EA states that "suitable urban design and landscape strategies/plans to be developed and incorporated into the Proposal". The respondent believes this statement is vague and would like advice on what these strategies mean for the area adjacent to the respondent's property.

Submission No. *086*

The cut would be re-vegetated with appropriate species (subject to further geotechnical investigations to determine the conditions of soil at this location). The urban design concept of the Proposal is outlined in Chapters 7 and 19 of the EA.

Refinement of the landscape design would occur as part of the detailed design process.

Views

The following submissions were received with regards to views:

- The respondent is concerned about the interrupted views as a result of the Proposal and how this may negatively affect land values, particularly for the properties situated higher than the proposed corridor.

Submission No. *025*

The RTA acknowledges that the views at this location would be negatively affected as a result of the introduction of the Proposal. As outlined in Section 7.5.10 and in Chapter 19 of the EA, a detailed urban design and landscape / vegetation strategy has been developed in order to minimise to the extent possible the visual impacts of the Proposal (refer SoC UD1). However, as this location is on a hill overlooking the location of the bypass, mitigation measures may have minimal beneficial impacts.

- The bypass would be clearly visible to current and future residents. There are no provisions for a visual barrier.

Submission No. *038*

As identified in SoC UD1 (Appendix A of the EA), the urban and landscape design treatments would reflect the urban and landscape design objectives and principles identified in Chapter 19 of the EA, a detailed urban design and landscape / vegetation strategy has been developed in order to minimise to the extent possible the visual impacts of the Proposal.

As part of the landscape plan for the Proposal, there would be screen planting along the side of the Proposal in this general location to minimise the view of the highway. In some areas, only shrub planting would be planted, and while not totally obstructing the view from residences, it would break up the view of the highway from any current and future residences in this location.

- The picturesque landscape between Woolgoolga and Sapphire would be altered.

Submission No. *073*

As identified in SoC UD1 (Appendix A of the EA), the urban and landscape design treatments would reflect the urban and landscape design objectives and principles identified in Chapter 19 of the EA. As outlined in Section 7.5.10 and in Chapter 19 of the EA, a detailed urban design and landscape / vegetation strategy has been developed in order to minimise to the extent possible the visual impacts of the Proposal.

- The respondent's property is screened from the highway by a buffer zone of trees that the respondent planted. These trees would be removed and the outlook of the property detrimentally changed. A similar buffer zone for the upgraded highway would take years to create.

Submission No. *089*

As identified in SoC UD1 (Appendix A of the EA), the urban and landscape design treatments would reflect the urban and landscape design objectives and principles identified in Chapter 19 of the EA. As outlined in Section 7.5.10 and in Chapter 19 of the EA, a detailed urban design and landscape / vegetation strategy has been developed in order to minimise to the extent possible the visual impacts of the Proposal.

This property would be bordered by the local access road. Between the local access road and the highway, screen planting would be planted in order to minimise the visual impact of the highway on the property.

Between the property boundary and the local access road, there would be additional planting, so that between the property and the highway, there would be two vegetated buffer areas. This landscaping would be planted during the final stages of construction, and may take some time to become established. Until the vegetation becomes established, there would not be an effective visual barrier between the property and the highway.

- The visual aspects of the Proposal would not detract from the area as much as the existing highway already does.

Submission No. *090*

Noted.

Other issues

The following submissions were received with regards to other issues of landscape and urban design:

- The Proposal would transect regionally important hilly coastal topography, native vegetation and watercourses. Care of coastal areas should be the topmost priority for the government as these areas are important to the prosperity of Australia.

Submission No. *051, 067*

Noted. The consideration of impacts on the biophysical environment has been one of a number of key factors to the route selection and project design process. Identified impacts have been avoided and mitigated where possible through the development process.

Overall the environmental management process is discussed within section 20.6 of the EA. Environmental management commitments relate to best practice environmental management and have been developed based on advice from specialist consultants.

2.2.10 Community consultation

General consultation

The following submissions were received with regards to general consultation:

- Information relating to the description of the Proposal in the November 2007 community update is inconsistent with that provided in the advertisement relating to the RTA's application to the Minister for Planning.

Submission No. *004*

The two documents are not inconsistent as "upgrade" is a generic term encompassing all aspects of the Proposal which is detailed in Chapter 7 of the EA. It includes elements of the Proposal including duplication of the highway, local roads becoming part of the highway and parts of the highway becoming part of the local access road.

- The consultation process was not transparent, was inadequate and did not consider individual and / or wider community concerns regarding various project aspects including route options. There is ample evidence of this borne out in the Parliamentary inquiry.

Submission No. *010, 015, 017, 021, 025, 042, 048, 049, 053, 054, 060, 061, 062, 071, 076, 080, 085, 088*

A comprehensive community consultation strategy has been implemented throughout the course of the project involving individuals, the general community and businesses. Consultation activities have included community meetings, shopfront exhibitions, distribution of newsletters to

stakeholders and the wider community, and maintenance of a project website. Avenues to consult with the project team have been available throughout the duration of the project via the project information line (free call). These activities are discussed in Chapter 5 of the EA.

The consultation process has involved a broad cross-section of the community, and as such the RTA considers that it is aware of and has considered the majority of the issues raised during the project development process. Concerns raised during the route options display were considered as part of the route selection process. The community involvement approach for the concept design and EA phase of the project sought to address issues identified during the route selection phase, and to respond to any further issues raised by local community members, and affected or adjacent land owners.

A summary of the key issues raised by the community and stakeholders during the concept design and EA phase of the Proposal are provided in Table 5.1 of the EA. These issues have been considered throughout the EA, including within specialist investigations.

The RTA has sought to provide extensive and rigorous assessment and consideration of environmental impacts, community concerns and technical requirements in determining the optimum route, alignment and design for the Proposal. Since the inception of the project in 2001, the RTA has consulted extensively with the community and stakeholders at all levels, from individual landowners and precinct-based community liaison groups to the wider public, Council and State Government agencies. The EA documents this process and marks the culmination of all technical investigations to determine the biophysical and socio-economic impacts of the Proposal.

All options that have been developed by the community or Council have been rigorously assessed. The coastal corridor which was favoured by the Coffs Harbour City Council was assessed in the *Coffs Harbour City Council Preferred Corridor Feasibility Assessment* which was released in June 2004. Other route options were assessed through a process of value management meetings and were assessed within the *Route Options Development Report* and the *Supplementary Options Report* released in December 2002 and February 2004 respectively.

- The decision making process is fundamentally flawed as a number of areas within the EA are false, misleading or inconsistent (evidence supporting this position was attached to some submissions). The community was given limited time and resources to respond and full information was not available to them.

Submission No. *021, 042 048, 053, 054, 061, 066, 071, 072, 076, 080, 087, 088, 092*

The EA has been prepared by specialist consultants with the best information available. It has also been undertaken in consultation with relevant government agencies. While a number of issues were raised as being "misleading", these have been addressed in the relevant issue section.

The Department of Planning set the public exhibition period, which was based on the statutory timeframe of 30 days as described under Section 75H(3) of the EP&A Act. The formal exhibition period for the Project continued for 73 days (5 December 2007 to 15 February 2008).

This extended EA display period was chosen such that there would be the equivalent of the statutory 30 day period outside the school holiday period (from 5 December to 21 December and from 30 January to 15 February- a total of 32 days).

The EA and information about it has also been readily available to members of the public since the beginning of the display period through the website (both the DoP and RTA project websites) and the project information line (toll-free).

During the exhibition period the RTA also staffed a shopfront location, held community liaison group meetings and invited directly affected landowners to individual meetings at the shopfront to discuss the project and the submissions process, and also explain details of the EA as required.

- Many technical papers referred to in the EA and other design information such as specific design at creek crossings was not on public exhibition.

Submission No. *021, 041, 070*

The EA (including all technical reports comprised in it) was placed on public display at all locations identified in the November 2007 community update and are available on the community information page of the project website. Further design details were supplied upon request.

During the exhibition period the RTA also had three exhibition display days, community liaison group meetings and invited directly affected landowners to individual meetings to discuss the project and the submissions process, and also explain details of the EA as required.

- Respondent has had ongoing contact with the project team but still cannot ascertain the potential impact of the Proposal on their property.

Submission No. *021*

The project team has provided the respondent with the sections of the EA within which their issues are identified and discussed. There would be no direct impact from the Proposal on their property; however this particular property has been identified in the noise assessment report as having an increase in noise level at 2021 (10 years after opening).

Architectural treatments are proposed for this property. The exact nature of those measures would be developed in consultation with the individual property owner.

The RTA has also committed to re-instating water sources, where a licensed water supply is adversely affected (refer SoC P6).

- No amount of community objection seems to convince the RTA that to build the Proposal along this stretch of coast is a big mistake.

Submission No. *022*

The RTA has undertaken a comprehensive consultation process since the inception of the project in 2001. This process, like other consultation programs, do not always satisfy all participants or resolve all differences of opinion or values. Consultation is one of the issues which were addressed to determine a preferred route. Other considerations included technical studies such as heritage, flora and fauna studies and road design guidelines. This process to determine the preferred route and considerations taken into account can be found in Chapter 6 of the EA and the Preferred Option Report (November 2004).

- The respondent is not satisfied with the consultation that has been undertaken in regards to land acquisition.

Submission No. *033, 089*

Section 14.3.2 of the EA identifies property that would be affected by the Proposal and the property acquisition process. All property owners whose property has been identified as being directly affected by the Proposal and requiring acquisition have been sent individual letters regarding the process and potential timing of property acquisitions. Property owners were also invited to meet with project team representatives either at the EA display shopfront or at an alternate location convenient to the property owner to discuss the acquisition process and any concerns they may have.

Should approval be forthcoming from the Department of Planning, another round of consultation with affected property owners would occur at or after project approval.

- The planning for a Class A highway was changed during the planning process to a Class M motorway but the community was not informed.

Submission No. *042*

the Class M highway design was announced at the *Project Application Report* (November 2006) stage and incorporated into the design. As part of this, approximately 12,000 community updates were mailed out and placed at static display locations that provided details of the change to the Proposal and gave contact details for the community to make comments. At this time, community focus groups meetings were also held and the design explained.

- The RTA had not planned to brief council about the EA during the display period- they only did so because they were asked.

Submission No. *042*

This statement is not correct. The RTA had numerous briefings during the refinement of the design prior to the release of the EA. Council has been in attendance at planning focus meetings and has been briefed by RTA on a number of occasions, as well as being invited to attend community focus groups in December 2007.

- The EA states that there has been an increase in support for an upgrade of the existing highway to Sapphire to south Woolgoolga to cater for local traffic. This support was for safety upgrades only not the proposed motorway.

Submission No. *042*

Noted.

- The EA states that one of the ways that the community has influenced the Proposal is the "review of traffic counts taken by community groups". The EA does not explain that the RTA traffic count was flawed and less than the numbers counted by the community group.

Submission No. *042, 048, 054, 061, 071, 085, 088*

The RTA had reviewed the count undertaken by the Angry Grannies and had determined that there were a number of factors that were likely to influence the difference between that count and the RTA's count. These factors included:

- The location – the Angry Grannies count occurred at the Big Banana, south of the project start and closer to Coffs Harbour.
- The Angry Grannies count was conducted during the October school holidays, when traffic levels are traditionally higher.

The RTA data is a 7 day average volume which reflects the lower traffic volumes occurring over the weekend. However, the Angry Grannies count was a weekday count (refer traffic and access section (section 2.2.3 of this report for more information).

- RTA has not incorporated their response to the Parliamentary inquiry recommendations regarding community consultation.

Submission No. *042, 048, 049, 054, 061, 071, 085, 088*

Community Consultation has been detailed within Chapter 5 of the EA.

The RTA engages in extensive community consultation and assessment processes and provides many opportunities along the way for people to comment on Pacific Highway upgrade proposals including the Sapphire to Woolgoolga upgrade.

From the early stages of planning through to construction, the RTA consulted with the community in a variety of ways. For the Sapphire to Woolgoolga upgrade, consultation has included advertisements, community updates and flyers, project website and freecall line, public forums, displays, publications, community focus groups and landowner meetings.

The RTA's response to the Parliamentary Inquiry is publicly available on the RTA's website www.rta.nsw.gov.au. The Parliamentary Inquiry occurred approximately 2 years after the announcement of the preferred route for the Sapphire to Woolgoolga upgrade. However the principles of the RTA's response to the Public Inquiry were considered for the consultation activities undertaken to date for the proposed Sapphire to Woolgoolga upgrade.

- Consultation process with Aboriginal and Sikh communities was with the wrong groups or insufficient. The impact on the Sikh community was not considered prior to the preferred route announcement in December 2004.The respondent does not approve of the amount of money that has been spent on consultation.

Submission No. *053*

The Sikh community has always been involved in the broader consultation process. The Sikh community were identified as stakeholders in the community consultation plan prepared at the start of the project in September 2001. A Sikh representative was consulted and provided input into the plan. Subsequently, consultation has included posters and presentations held at the Gurdwaras, two places reserved on the community focus group for Sikh representatives and invitations to join the value management workshops. An assessment of the impacts of the Proposal on the local Sikh community was undertaken as part of the EA. The process of consultation with the Aboriginal and Sikh communities is outlined in working papers 3 and 5 respectively of Appendix F of the EA.

- Coffs Harbour Council would like further input into the design options of the project which include – urban design, aesthetics, landscaping and consistency of noise wall appearance.

Submission No. *077*

RTA would consult with the Council during the detailed design phase in relation to issues of urban design and consistency of noise walls, aesthetics, landscaping as well as the design of noise walls.

Community meetings

The following submissions were received with regards to community meetings:

- Community meetings have been sensitive and "on the ball" technically, aesthetically, financially, ecologically.

Submission No. *007*

Noted.

- CFG meetings were held too far apart and in some cases concerns tabled at meetings were not addressed for more than 12 months or ignored. RTA did not follow up promises made during CFG meetings.

Submission No. *042*

There were two community focus groups (CFGs) formed as part of the project, a "northern" and "southern" CFG. Thirty four meetings of the CFG have been held since 2001 which have coincided with key milestones of the Proposal's development.

Concerns tabled at meetings were noted in the meeting minutes and all attempts were made to address those concerns at the next CFG meeting, unless specified otherwise. An additional northern CFG meeting was held last year in order to address issues and previous minutes that were not able to be addressed during the scheduled meeting.

- The respondent is a member of the community focus group and believes that the group has had a good working relationship with the RTA and contractor teams.

Submission No. *090*

Noted.

- Respondent recalls that a meeting with the RTA, the RTA 'forgot' that the respondent owned an organic farm.

Submission No. *092*

The respondent's 'organic farm' has not been 'forgotten' or overlooked. The respondent's property has been identified in Working Paper No.5 – Agricultural Assessment as being in the process of seeking certification as an organic producer. Proposed measures to mitigate potential impacts on farming properties (including organic farms) are identified in Chapter 15.3 of the EA and within Chapter 7 of the Agricultural Assessment (Appendix F of the EA).

Construction phase

The following submissions were received with regards to community consultation during the construction phase:

- The Ministry of Transport recommends close liaison with local bus service providers during preparation of the construction management plan.

Submission No. *006*

There would be extensive consultation with various stakeholders during the development of a Traffic Management Plan that would form part of the Construction Environmental Management Plan (refer SoC EM1). This would include liaison with local bus service providers.

- The Marine Parks Authority requests that they be consulted and would like to assist in determining the particular sensitivities of individual receiving waters and identifying appropriate sediment and erosion controls. This would fit well with the SW4 commitment in Appendix A of the EA.

Submission No. *093*

The RTA welcomes the collaborative process identified by the Marine Parks Authority in relation to soil and water management for the Proposal. The RTA recognises the sensitivities of the study area in terms of proximity of the Solitary Islands Marine Park to sections of the Proposal. A revised commitment (refer SoC SW4) has been provided as part of this report (refer Chapter 5), which reflects this request by the Marine Parks Authority.

2.2.11 Air quality

Air quality assessment

The following submissions were received in regards to air quality assessment:

- Confirmation required that air quality was considered in the value management triple bottom line.

Submission No. *042*

Air quality was considered as part of the value management workshop triple bottom line. In order to assess the route options at the April 2003 value management workshop, a triple bottom line approach of functional performance, environmental performance and socio-economic performance were considered. The assessment criteria identified under each of the three triple bottom line categories were accepted by the whole group to evaluate the route options. This assessment technique was also used in the supplementary options value management workshop in August 2004.

Air quality was considered in the triple bottom line category of socio-economic performance under a heading of amenity effects (as outlined in Table 9.1 of the EA).

Chapter 9 of the EA discusses the environmental risk assessment process that was undertaken for the Proposal and includes discussion of the process at the options evaluation, preferred route and EA stages. Air quality was considered at the route options identification stage; Air quality impacts are assessed within the EA in section 20.1.

- The air quality monitoring station was incorrectly located and the EA was misleading in stating the location of the air quality monitoring station. The EA stated "the station was situated approximately 20 metres from a four lane section of the highway that has a gradient of 5.2% with southbound climbing lanes". However, the site was situated on the western side of the highway and traffic was descending.

Submission No. *042, 053*

The EA correctly stated the station was situated approximately 20 metres from a four lane section of the existing Pacific Highway. The air quality monitoring site was located approximately 20 metres from the northbound carriageway of the highway, which equates to a distance between 30 and 40 metres from the southbound carriageway of the highway.

- Has air pollution resulting from heavy vehicle outfall been addressed and correctly analysed.

Submission No. *061*

The EA discusses the potential impact of the Proposal on air quality in Chapter 20. Consideration of operation phase air quality impacts includes discussion relating to heavy vehicles (as a proportion of the predicted traffic volume) and also provides consideration of the potential impacts of vehicle emissions on rainwater tanks.

Construction

The following submissions were received with regards to air quality associated with construction:

- Australian air quality standards are inadequate and RTA monitoring of air pollution is inadequate.
- Dust pollution is not adequately managed on other Pacific Highway Upgrade projects and there would need to be dust control management during construction.

Submission No. *042, 053, 060, 062, 072*

The National Environmental Protection Council has developed an Ambient Air quality National Environmental Protection Measure (NEPM). This sets out maximum levels permissible for CO, NO, SO2, photochemical oxidants, Lead and PM_{10}. In 2004, these NEPMs were varied to include an advisory $PM_{2.5}$ standard. Section 20.1 of the EA identifies the NEPM goals for a variety of air quality parameters and results for those parameters for the air quality monitoring site at Korora, where monitoring was undertaken between October 2005 and January 2006.

The EA includes a comprehensive list of commitments to manage potential impacts of the Proposal, including some relating specifically to air quality (refer SoCs EM1, AQ1 and AQ2). The extent of air quality monitoring undertaken prior to and during construction would comply with relevant guidelines and be developed in consultation with the DECC. Measures to appropriately manage tracking of mud onto roads and to limit exposure of soil material would be included.

- The effect of dust and other airborne pollution on residents near the construction zone has not been addressed in the EA.

Submission No. *092*

This issue has been considered in Section 20.1.2 of the EA.

Operation

The following submissions were received with regards to air quality during operation:

- The close proximity of the highway to properties would degrade air quality for current and future residents. The respondent wants the RTA to take measures to improve air quality in the region.
- The effects of air pollution have not been fully assessed. With the increase in traffic (including more diesel powered vehicles) and higher speeds, air pollution (including toxic fumes emitted by B-doubles and other trucks) would increase at a micro and macro level.

Submission No. *038, 050, 051, 055, 056, 072*

Section 20.1 of the EA identifies the current air quality environment based on monitoring results obtained from the Korora air quality monitoring site and also provides an assessment of the potential construction and operation phase impacts of the Proposal on air quality. The Korora air quality monitoring site is in close proximity to the Proposal location, in a section of highway that currently has a dual carriageway arrangement. Results from this monitoring site show that the air quality close to the highway (which is a worst-case scenario) is well within National Environment Protection Measures (NEPM) guidelines.

The Proposal would introduce an improved vertical and horizontal alignment compared to the existing highway and would also provide for a more consistent speed environment and improved traffic flow which would be expected to result in a decrease in vehicle emissions (including those of heavy vehicles) and associated air quality pollutant levels associated with traffic.

Further, as vehicle emission impacts are most effectively managed at source via vehicle fuel standards and vehicle maintenance and emissions testing, no specific operational management measures are identified in relation to air quality. The preferred approach to addressing road-based air quality impacts is through improved road design (as is the case with this Proposal) and through state or region wide strategies, such as:

- Progressive tightening of vehicle air emission standards.
- In service inspections to ensure vehicle muffler/exhaust systems are well maintained.
- Integration of transport and land use planning.

In addition, it is anticipated that over time the turnover in the vehicle fleet would see progressive removal of less efficient vehicles from the roads, thereby reducing vehicle emissions.

Emissions and associated air quality pollutant levels would also be expected to improve from 2011 to 2021 due to improved fuel composition and associated combustion technologies. With the proposed upgrade, emission rates and associated pollutant levels would generally decrease in comparison to conditions without the Proposal.

- The EA states that air quality improvements would be expected with higher posted travel speeds. The air quality constraints report shows that vehicle emissions increase as speed increases.

Submission No. *042, 048, 049, 051, 053, 054, 061, 071, 072, 076, 085, 088, 092*

The statement in Section 20.1.2 of the EA (p.20-5) that air quality improvements would be expected with higher posted travel speeds was presented in the wrong context. The EA should have read "air quality improvements would be expected with the introduction of a consistent travel speed". The statement within the EA was written in the context that the current posted travel speeds along the existing highway vary from 60 km/h to 100 km/h.

The Proposal seeks to provide a consistent speed environment for its entire length. Where a more consistent posted travel speed occurs there would be less "slow down and speed up" driver behaviour which would result in improved fuel consumption and therefore an overall reduction in vehicle emissions.

- The respondent notes that Table 9.2 of the EA identifies that vehicle emissions through Woolgoolga would be reduced as a result of the introduction of the bypass section of the Proposal and questions what level of vehicle emissions would be expected through the bypass section as a result of the Proposal.

Submission No. *042*

Table 9.2 of the EA also indicates that an adverse impact could be *"additional vehicle emissions with progressive traffic growth along corridor including introduction of near-field emissions to new rural areas along bypass section".*

It should be noted that any new near-field emission levels experienced within rural areas along the bypass section would fall well within National Environment Protection Measures (NEPM) guidelines for air quality.

- If a bypass of Coffs Harbour is constructed atmospheric inversions would trap pollutants in the lower layers of the atmosphere over Coffs Harbour and areas of West Coffs Harbour.

Submission No. *062*

This issue identifies potential air quality conditions for the area of Coffs Harbour and western Coffs Harbour. This falls outside the study area of this Proposal and is outside the scope of the EA.

However, temperature inversions are possible within the study area. Based on air quality modelling undertaken on other Pacific Highway projects in the region, with similar traffic counts to those predicted at Sapphire to Woolgoolga, even under temperature inversion conditions, Australian air quality goals would be met.

- Respondents note California is attempting to reduce fine particle pollution and want to know what the NSW Government is doing to address the issue of particle emissions.
- Further steps should be taken to reduce fine particle emissions from heavy vehicles.

Submission No. *062*

This issue is not specifically relevant to the Sapphire to Woolgoolga Proposal and is not solely within the authority of the RTA. However, there are initiatives being developed by the NSW Government relating to particle emissions. Initiatives include the NSW government *Cleaner Vehicles Action Plan*, *Action for Air Policy* and the Australian Government *Australian Design Rules*. Section 20.1.2 of the EA identifies operation phase air quality issues, including consideration of vehicle emissions.

Clean Cars for NSW is one element of the NSW Government's *Cleaner Vehicles Action Plan*. This guide explains the NSW clean car benchmarks, an environmental rating system that would help new car buyers choose between models.

Action for Air is the NSW Government's 25-year air quality management plan. Objective 3 of *Action for Air* is to reduce exhaust and evaporative emissions from new and in-service cars, trucks and buses. As part of this objective NSW would continue to champion a comprehensive national diesel measure through the *National Environment Protection Council*. The measure would allow governments to tackle diesel exhaust emissions and fuel quality collectively. It would also provide an opportunity to work with industry to gather a better information profile on the national diesel fleet so that an environmentally sound and cost-effective program can be brought forward.

The Australian Government *Australian Design Rules* (ADRs) are national standards for vehicle safety, anti-theft and emissions. The standards apply to vehicles newly manufactured in Australia or imported as new or second hand vehicles, and supplied to the Australian market. Relevant ADRs include:

- *ADR 30 – Smoke Emission Control for Diesel Vehicles:* To specify the smoke emission requirements for diesel fuelled vehicles in order to reduce air pollution.
- *ADR 70 – Exhaust Emission Control for Diesel Engine Vehicles:* To reduce air pollution, by limiting the hydrocarbons, carbon monoxide, oxides of nitrogen, and particulates emitted to the atmosphere from the exhaust system of motor vehicles fitted with a 'Diesel Engine'.
- *ADR 79 – Emission Control for Light Vehicles:* To prescribe exhaust and evaporative emission requirements for light vehicles in order to reduce air pollution.
- *ADR 80 – Emission Control for Heavy Vehicles:* To prescribe exhaust emission requirements for heavy vehicles in order to reduce air pollution.

2.2.12 Arrawarra interchange and rest area

Arrawarra interchange

The following submissions were received with regards to the proposed Arrawarra Interchange:

- Respondents question the location of the Arrawarra Interchange due to the loss of vegetation and because Arrawarra Beach Road only services a small area and contains a fragile estuary.
- The interchange should be located further north which would provide better highway access to the growing Red Rock/ Corindi area. Or the Interchange could be integrated into the Woolgoolga to Wells Crossing project. Other suggested locations are at Halfway Creek where there is already existing infrastructure, Tasman Road or the Coral Street turnoff.

Submission No. *018, 027, 032, 034, 057*

The Arrawarra Interchange would function as the main northern access into Woolgoolga and has been placed at this location to provide good connections to the local road network.

Flora and fauna studies have been undertaken for the proposed interchange (Working Paper 7c

Arrawarra Interchange Flora and Fauna Assessment) and a number of mitigation measures are proposed to minimise impacts on flora and fauna species. The location and layout of the interchange has been refined to minimise impacts on EECs in the area.

The section of the Pacific Highway north of the Proposal is proposed to be upgrade to dual carriageway in the future under the adjoining Woolgoolga to Wells Crossing upgrade project. As part of that project, Eggins Drive is proposed to be extended to provide a local road connection between Red Rock / Corindi and the interchange.

There were a number of suggestions made as to other locations for an interchange in the submissions. The interchange, which would function as the main northern access into Woolgoolga, is located in the best available location as it:

- Has good connections to the existing road network.
- Provides good access to Woolgoolga, Safety Beach, Mullaway and Arrawarra via the existing Pacific Highway.
- Provides good access to Arrawarra Beach and adjacent developments via Arrawarra Beach Road and Eggins Drive.
- Provides the opportunity to provide improved access to Red Rock / Corindi in the future via an extension of Eggins Drive.
- Is in a location which has comparatively few adjacent residences and other noise sensitive receivers.
- Is mostly located within a section of Wedding Bells State Forest which is separated from the remainder of the State Forest by the existing highway.
- Would, by being included in the Proposal, provide earlier road safety and transport efficiency benefits than at the other locations suggested which are proposed to be upgraded under future Pacific Highway upgrade projects.

Locations to the north of the proposed interchange, including the suggested Halfway Creek, Tasman Road and Coral Street locations, are too far north to provide efficient and effective access to the township of Woolgoolga.

- Concern regarding loss of wildlife corridors, vegetation fragmentation and the possibility of wildlife injury or mortality as a result of vegetation clearance and construction of the Arrawarra interchange.

Submission No. *023, 032, 034, 065*

The Proposal incorporates a number of measures to mitigate the negative impact on flora and fauna species within the study area. Fauna crossing is accommodated at numerous points along the route including the wildlife corridors identified by the NPWS. Fauna exclusion fencing and fauna underpasses / glider crossings are incorporated into Proposal design to facilitate fauna movement across the highway and minimise wildlife injury and mortality (refer SoCs F14-F17). The concept design has also taken into consideration the need to minimise vegetation clearance where possible. The location and layout of the Arrawarra interchange has been refined to minimise impacts on EECs in the area.

Vegetation and habitat fragmentation have been minimised through the route investigation phase and subsequently through the refinement of the concept design. Fragmentation of vegetation was avoided where possible and where unavoidable locally indigenous plants would be used in landscaping and revegetation.

- Respondents are concerned about fauna movement across the upgraded highway, particularly at the Arrawarra interchange (and rest area).

Submission No. *032, 065*

The Proposal has considered potential impacts on fauna movement and has identified fauna movement corridors in Chapter 17 of the EA. The design of the Proposal seeks to minimise the impact on fauna movement through the introduction of fauna movement structures, which are identified in Figures 17.1a to d. Along the length of the Proposal, there would be 18 locations that could provide for fauna movement under the highway (refer SoC F14).

- The respondent believes that the Arrawarra interchange requires significantly better sound reduction measures.

Submission No. *065*

Noise mounding (or noise walls, or a combination of both, subject to detailed design) would be constructed to the north of Arrawarra Beach Road and along the east of the rest area to minimise any noise impacts (refer SoC ON3).

There are no specific criteria for addressing noise criteria from rest areas so the most relevant methodologies were reviewed and a conservative approach adopted. As detailed in 11.2.2 of the EA, the interchange ramps were assessed in accordance with the ECRTN. The rest area was considered as an "industrial" operation and noise levels were assessed in accordance with the DECC's *Industrial Noise Policy*. Night-time noise levels from the rest area were assessed in accordance with the sleep arousal guidelines contained in the *Environmental Noise Control Manual*.

- The proposed location of the Arrawarra interchange would affect the village of Arrawarra, a wetland and the local wildlife. Remnant wetlands should be preserved.

Submission No. *065*

The Arrawarra interchange has gone through a number of refinements to minimise ecological impacts. A section of land to the west of the Arrawarra interchange was identified within the submission as being a wetland. This land has been identified within the EA as the EEC Broad leaved Paperbark and is not a SEPP 14 wetland. Refinements to the interchange design have reduced the impact on this EEC through the Arrawarra area. Flora and fauna studies have been undertaken for the interchange location (Working Paper 7c Arrawarra Interchange Flora and Fauna Assessment) and a number of mitigation measures proposed to minimise impacts on flora and fauna species.

The rest area has been designed, like the interchange, to minimise impacts on EECs. The design of the rest area has also minimised the removal of native vegetation. In order to reduce the impact of the rest area on the village of Arrawarra, a noise assessment was undertaken as part of the EA and mitigation measures including noise mounding is provided within the design (refer revised SoC ON3), subject to detailed design. A landscape plan has been developed in order to minimise the visual impact of the rest area on surrounding areas.

- If the Arrawarra Interchange is constructed respondent would like to see the continuation of the local road system to include Corindi. This would also cater to the local cyclists.

Submission No. *065*

Corindi is located within the study area of the adjacent Woolgoolga to Wells Crossing project. As the local road system to Corindi is outside the scope of the environmental assessment, it was not

assessed. The provision of a local access road between Arrawarra and Corindi may be assessed as a possible separate project to the Sapphire to Woolgoolga upgrade.

Arrawarra rest area

The following submissions were received with regards to the Arrawarra rest area:

- Is there a necessity for the Arrawarra rest area? Just 19kms north (a 10 minute drive) there is an established heavy and light vehicle rest. If necessary it should be placed to the west of the highway where there are no residents or if on the east of the highway, what measures are to be implemented for noise mitigation for the residents?
- A number of locations were also identified for where the rest area should be shifted to these included from Woolgoolga up to Red Rock and Corindi Village.

Submission No. *018, 027,032, 063, 065, 087*

In the Pacific Highway Safety Review 2004, a strategic plan for rest areas on the Pacific Highway recognised that additional areas need to be developed in the Coffs Harbour/ Woolgoolga area. Section 7.5.11 of the EA describes the proposed rest area and discusses why the Arrawarra interchange is the most appropriate location for the rest area.

The current Proposal for the rest area to the east of the highway incorporates features to reduce noise impacts of the rest area on the residents in Arrawarra. Where possible, existing vegetation would be retained to create a natural buffer between residents and the rest area. Noise mounding would also be installed to the north and the east of the rest area (or noise walls, or a combination of both, subject to detailed design) to mitigate any noise impacts (refer SoC ON3).

- Concerned about the loss of hollow bearing trees around the proposed Arrawarra rest area. The proportionally high number of hollow bearing trees adds to the ecological significance of the area and the respondents would prefer the interchange is located in a different location where less clearing is required.
- The proposed location of the Arrawarra rest area is identified as habitat for many threatened species including the Yellow-bellied glider and Squirrel glider. The existing highway is small enough to not warrant a glider crossing however the upgrade and interchange area would fragment habitat and separate glider populations.
- The proposed upgrade in the Arrawarra area will create impacts in an area of low relief and high productivity coastal forest. DECC suggests that the proposed rest area is inappropriately situated and consideration should be given to a location that does not require clearing of native vegetation.
- The proposed upgrade in Arrawarra area will create impacts in an area of low relief and high productivity coastal forest. Consideration should be given to designing the Arrawarra interchange to reduce the level of habitat clearing.
- The DECC feel that the location of the Arrawarra rest area is inappropriate because of the land clearing required resulting in increased stormwater runoff that will affect the Solitary Islands Marine Park.

Submission No. *057, 087*

Flora and fauna studies have been undertaken for the rest area location (Working Paper 7c Arrawarra Interchange Flora and Fauna Assessment) and a number of mitigation measures proposed to minimise impacts on flora and fauna species (refer SoCs F1- F26).

The refinement of the rest area location has resulted in no impact on any EECs and has minimised the loss of vegetation in its present location (see figure 7.5m of the EA showing the retention of native vegetation as part of the landscaping plan). However, it is acknowledged that the Arrawarra rest area would result in the loss of hollow bearing tree resources.

Within the footprint of the Arrawarra Interchange and the rest area, there are 12 hollow-bearing trees, with 5-6 of these affected by the rest area. There may be the opportunity to protect and retain some of these trees within this area, which would result in fewer of these having to be re-located (refer SoC F12).

It is also acknowledged that the Arrawarra rest area would fragment habitat for threatened species including gliders. The type and location of glider crossings in the vicinity of this area would be developed in consultation with DECC (refer SoC F15).

Water quality control devices (such as oil separators) would also be implemented in the design of the rest area. Controls to measure water quality runoff developed during the detailed design phase in consultation with DECC (refer SoC SW4).

Possible highway service centre

The following submissions were received with regards to a possible highway service centre:

- Arrawarra service area was not discussed during the route selection process. It will affect the economy of Woolgoolga and adversely affect the environment.
- Woolgoolga businesses will suffer due to the proposed service centre at Arrawarra.

Submission No. *042, 067, 073*

There are currently no plans to construct a highway service centre at Arrawarra.The proposal for which approval is being sought includes only a rest area with toilet and picnic amenities, to cater for both light and heavy vehicles. However, the Project Application Report (October 2006) indicated that while a service centre was outside the scope of the application (and subsequently the EA): 'opportunities to upgrade the rest areas to a highway service centre in the future will be considered during the development of the design of the rest areas'.

The draft *Mid North Coast Regional Strategy* nominates Woolgoolga as one of the identified strategically derived highway service centre locations for the Pacific Highway. Any future service centre would need to be co-located at a rest area / interchange to maintain its commercial viability. The two viable locations for a highway service centre at Woolgoolga would be at the Arrawarra Interchange or the south Woolgoolga interchange. The RTA acknowledges that any future proposals for a service centre to be co-located with the rest area would result in further impacts on the natural environment, in conjunction with the impacts of the rest area as assessed in this EA. Should a proposal for a highway service centre be forthcoming in the future, it is expected that the Proponent would be required to undertake an environmental assessment which would address these further impacts and would involve consultation with key stakeholders and the community. It would also be expected that that assessment would address any potential impacts on Woolgoolga businesses.

The RTA will undertake further consultation with key stakeholders and the community on having the rest area and any future service centre coexisting at the same location and if that location should be Arrawarra or South Woolgoolga.

2.2.13 Assessment process

Approvals, licence and permits

The following submissions were received with regards to approvals, licence and permits:

- DECC notes that the Proposal would be subject to a licence to operate and would need to make a separate application to DECC once development approval is granted.

Submission No. *057*

It is understood that the Proposal would be subject to a license to construct under Chapter 3 of the POEO Act.

- DECC expect to review the Director- General's EA report for the proposal. If the amendments to draft Statement of Commitments are not to DECC's satisfaction, then they would ask for these to be included as conditions of approval
- DECC would like to receive a copy of the submissions received, or a summary to enable DECC to review the Director Generals EA report.

Submission No. *057*

Noted.

- DECC expects to be consulted on the preparation and implementation of the construction environmental management plan
- New Statement of Commitment should be included and read "DECC and relevant government agencies are to be consulted on environmental management measures to be utilised at the site such as Construction and Operational Environmental Management Plans, Construction and Operational Noise Management Plans etc.

Submission No. *057*

SoC EM1 has been modified to include consultation with relevant agencies (including DECC).

- The Sapphire to Woolgoolga Pacific Highway upgrade is a project that the Federal Government should become involved and override the NSW legislation. Does not believe legislative process is fair.

Submission No. *062*

The Proposal was referred to the (Commonwealth) Department of Environment Heritage Water and the Arts (DEHWA) in relation to potential impacts of the Proposal on matters of National Environmental Significance (as outlined in the *Environment Protection and Biodiversity Conservation Act 1999*). As a result of this referral, the Commonwealth Government deemed that the Proposal is not a controlled action and can be solely assessed under the NSW planning system.

The Proposal is being assessed under Part 3A of the *Environmental Planning and Assessment Act 1979*. Under this legislative process, there is a public exhibition period of 30 days which provides the opportunity to stakeholders to comment on the Proposal. The Proposal is also assessed by an independent body (the Department of Planning).

- Permission may be required from the Marine Parks Authority for any development that is conducted within the Solitary Islands Marine Park.

Submission No. *093*

Noted.

Precautionary Principle

The following submissions were received with regards to the Precautionary Principle:

- The precautionary principle should apply and that a lack of scientific certainty should not be an excuse for allowing development that may have serious and irreversible impacts on future generations.

Submission No. *042, 049, 054, 061, 062, 071, 076, 084, 085, 088*

Section 22.1.2 of the EA outlines how the Proposal addresses the precautionary principle. The EA has been prepared for the RTA by EA specialists and has relied on the best available technical information. Also, in line with the precautionary principle, the Proposal has adopted a best practice approach in developing management measures to minimise the risks associated with potential environmental impacts.

2.2.14 Climate change

Flooding and sea level rise

The following submissions were received with regards to climate change:

- Has climate change been considered in the flooding analysis undertaken for the Proposal.
- The *Sandy Beach Hearnes Lake Estuary Management Plan* takes into account rising sea levels and discourages the development of major infrastructure within the coastal zone. The Proposal plans to run within 600m of the high watermark. Has the influence of climate change on sea level rise been considered in the EA for the Proposal.

Submission No. *039, 042, 053, 060, 062*

Flooding analysis was undertaken by developing two dimensional hydraulic modelling used to represent the floodplain areas which were crossed by the Proposal. Where the highway was found to have insufficient flood immunity (less than 100 year ARI flood immunity), existing culvert arrangements would be augmented to achieve the 100 year ARI flood immunity.

Currently, the existing highway enables flood waters to pass underneath the highway through existing culverts. The Proposal has been designed so that the flooding regime of the area would not be altered.

The Proposal crosses the Hearnes Lake Estuary at Double Crossing Creek, south of Woolgoolga. The proposed bridge over Double Crossing Creek has been designed to be clear of the high watermark within this creek, with no piers proposed within the tidal influence of the creek. The Proposal was refined so that, where feasible, bridges were designed so that they would clear span all creeks crossed.

Climate Change has been considered in section 3.1 of this submissions report.

- Sea level rise should be considered in planning. A vertical buffer should be applied around Hearnes Lake and Moonee estuary to accommodate for potential sea level rise. A horizontal 100 m buffer is applied to the vertical buffer. This is mainly an issue for the western edge of Hearnes Lake and in planning compensatory measures.

Submission No. *057*

The RTA met with DECC staff on 23 April 2008 and clarified that this comment relates more to developments such as subdivisions, and as such does not relate to linear infrastructure such as the Proposal, which must cross Cunningham's Creek, Skinners Creek and Double Crossing Creek.

- DECC believe that it is prudent to make provision for climate change impacts on flood behaviour. DECC has issued the document " Practical Consideration in Climate Change" and recommends that a series of climate change scenarios be examined in order to give proper consideration of climate change as follows:
    - For sea level, increases of 0.18m, 0.55m, 0.91m (low level, mid range and high level ocean impacts respectively).
    - For rainfall intensities, increases of 10%, 20% and 30% in peak rainfall and storm volume.
    - The sensitive analysis should also consider combined sea level rise and rainfall factors where applicable.

Submission No. *057*

One of the objectives for the Sapphire to Woolgoolga upgrade is to "Provide flood immunity on at least one carriageway for a 1 in 100 year flood event." The current design for the Proposal achieves this objective.

As noted by DECC, the *Moonee Creek Flood Study, June 1988* found that "The hydraulic modelling also indicates that the (existing) Pacific Highway embankment and culverts provide a significant degree of (flood) storage routing, particularly for Moonee Creek and the various floodplain channels which drain to Moonee Creek to the north of Moonee Creek village. This storage routing effect is most significant at the northern end of the (Moonee Creek) study area."

As also noted by DECC "due to the limited size of the highway culverts, floodwater is diverted across the floodplain and through alternative culverts which re-enters the creek system downstream of the village area".

The RTA notes that the *Moonee Creek Flood Study* report concludes "that the culverts under the Pacific Highway are the primary hydraulic control for flood levels on the floodplain, both upstream and downstream." The RTA noted and concurs with DECC's advice that "It is therefore critical that the upgrade works not adversely affect this diversion process."

In recognition of the importance of the existing culverts under the Pacific Highway as flood control structures, the RTA generally proposes to retain existing flooding characteristics by extending the existing culverts along the upgrade section to pass under the new highway and/or local access road.

Only the seven culverts identified in Table 18.5 of the EA are proposed to be augmented to achieve 100 year design ARI. The changes to flooding behaviour resulting from these augmented culverts are shown in Table 18.5 of the EA and discussed in Chapter 18.2.1. The proposed culvert augmentations are predicted to decrease flood levels upstream of the Proposal by up to 0.9m without significantly altering downstream flood behaviour.

The bypass section of the Proposal crosses the upper catchment of the creek systems. Flood behaviour of these streams would not be influenced by future changes to ocean levels as a result of climate change. As all culverts on the bypass section have been designed to provide a minimum freeboard of 0.7 metres to the highway in the 100 year ARI flood event, predicted future increases in rainfall intensity and duration as a result of climate change would be unlikely to reduce the flood immunity at these culverts to less than the project objective of providing flood immunity on at least one carriageway for a 1 in 100 year flood event.

As the majority of the culverts along the upgrade section are proposed to be extended and culverts on the bypass section are unlikely to have their flood immunity reduced to less than the

objective for the project as a result of climate change, it is considered that, for these structures, there would be little benefit in undertaking the scenario testing recommended.

Three new bridge structures are proposed along the upgrade section of the Proposal – at Cunninghams, Skinners and Double Crossing creeks. The proposal crosses Cunninghams and Double Crossing creeks below the tidal limit and Skinners Creek just upstream of the tidal limit. At its northern end, the Proposal crosses Arrawarra Creek approximately 200m upstream of the tidal limit. Flood behaviour at these structures may be influenced by future changes to ocean levels as a result of climate change. A new bridge structure is also proposed at Woolgoolga Creek on the bypass section of the Proposal. Flood behaviour of the streams crossed by the bypass section of the Proposal would not be influenced by future changes to ocean levels as a result of climate change.

The superstructure of the five bridges is above both the 1 in 100 year and the 1 in 2,000 year flood events. Consequently, any future changes to the 1 in 100 year flood event due to either changes to ocean levels or to rainfall intensity and duration as a result of climate change would not affect the level of flood immunity provided.

Following discussions with DECC representatives on 23 April 2008, the RTA has undertaken further scenario modelling relating to increased rainfall intensity and increased mean sea levels at creeklines along the alignment where bridge structures are proposed. An outline of the different scenarios modelled is included in section 3.2 of this report.

The proposed bridges structures would not be affected by the increased rainfall intensity and increased mean sea level scenarios modelled that have the potential to occur as a result of climate change. Under these conditions the proposed bridges would be still be able to be traversed by vehicles, with the water level not even reaching the soffit height of the bridges structures (in this context, "soffit" refers to the underside of the bridge structure). The exception to this would be Skinners Creek bridge, where under a 1% Annual Exceedance Probability rainfall intensity and a 1% Annual Exceedance Probability storm surge level, the level of the creek could reach the soffit of the bridge. However, this bridge would still be able to be traversed by vehicles. The results of the scenario modelling are outlined in section 3.2.

For the Proposal, the RTA considers that an adaptive approach provides the most appropriate methodology for the management of the impact of future climate change on flood behaviour and the performance of the highway drainage structures. This approach would involve:

- Designing and constructing the Proposal to achieve the project objective of providing flood immunity on at least one carriageway for a 1 in 100 year flood event.
- Monitoring the performance of the installed drainage structures to identify and record details of any inundation of the highway.
- Periodic reviews of published rainfall and ocean level data and advices / guidelines issued by appropriate organisations, eg. DECC, CSIRO and Institution of Engineers, Australia. The documentation would assist in the identification of changes in rainfall intensity and duration and in ocean levels due to climate change.
- Determine, based on the above data, the actual and/or predicted performance of the highway drainage structures and compare this performance against the project objective of providing flood immunity on at least one carriageway for a 1 in 100 year flood event.
- Identify any location(s) where the performance of the highway drainage structures does not satisfy the project objective and identify and assess measures to manage these areas. Potential management measures could include, but would not be limited to:

  - Augmentation of the drainage structures and/or undertaking other works to provide flood immunity on at least one carriageway for a 1 in 100 year flood event.
  - Accept a reduced level of flood immunity at these locations and implement appropriate measures to any impacts of the reduced flood immunity.
  - A combination of the above.

- Implement the adopted management measure.

- It is recommended that the combination of ocean event Annual Recurrence Interval (ARI) with flood event ARI be discussed with the DECC specialist flood staff. Guidance can be provided on selection of appropriate events and use of envelop curves to provide a realistic upper bound for the combination of these events.

Submission No. *057*

Following discussions with DECC representatives on 23 April 2008, the RTA has undertaken further scenario modelling relating to increased rainfall intensity and increased mean sea levels at creeklines along the alignment where bridge structures are proposed. An outline of the different scenarios modelled is included in section 3.2 of this report.

The proposed bridges structures would not be affected by the increased rainfall intensity and increased mean sea level scenarios modelled that have the potential to occur as a result of climate change. Under these conditions the proposed bridges would be still be able to be traversed by vehicles, with the water level not even reaching the soffit height of the bridges structures (in this context, "soffit" refers to the underside of the bridge structure). The exception to this would be Skinners Creek bridge, where under a 1% Annual Exceedance Probability rainfall intensity and a 1% Annual Exceedance Probability storm surge level, the level of the creek could reach the soffit of the bridge. However, this bridge would still be able to be traversed by vehicles. The results of the scenario modelling are outlined in section 3.2.

2.2.15 Concept design

Construction

The following submissions were made in regards to construction:

- Where would the on-site workforce be housed during construction?

Submission No. *042, 053, 067*

No specific facilities are proposed for the workforce on-site. The workforce would choose their own accommodation off-site.

- Where would the estimated 160 mega litres of water required for construction be sourced from?

Submission No. *053*

Ultimately, water sources would be determined by the RTA and the construction contractor. The contractor would be required to consider the responsible use and reuse of water, and the potential also exists for water captured in water quality control basins to be reused on-site.

Potential water sources are identified within Table 8.4 of the EA. There are options for sourcing water from various areas, noting that there are different water quality requirements for different construction activities. Potential water sources include on-site capture, bore water, town water supply, use of recycled water from the Coffs Harbour City Council waste water treatment plant or use of water from non-water supply reservoirs in vicinity of the Proposal.

The RTA would (in consultation with the NSW Department of Health and the DECC) investigate the use of grey water for construction purposes which would satisfy NSW government's *Guidelines for Urban and Residential use of Reclaimed Water* and the DECC (EPA) *Use of Effluent by Irrigation* (refer SoC WR4).

- DECC requests consideration be given to the source of the material for concrete aggregates, bridging and drainage layers as some premises may be restrained by development consent or licensing requirements in terms of the amount of material that can be supplied or operating hours.

Submission No. *057*

Section 8.3.2 of the EA discusses sources of materials for use during construction. There would be maximum re-use of material on-site from cut excavations. Further geotechnical investigations in the detailed design phase would confirm the suitability of the materials. Where materials are not available on site, there would be the need to import construction materials.

As part of the EA a number of quarries were investigated as potential quarry sources to provide materials for the construction phase. The quarries investigated had a number of limitations as part of licensing and planning approval. Quarries supplying hard rock aggregate have extraction limits ranging from 45 000 tonnes to 285 000 tonnes, with limited truck movements per day. Further investigations into potential usable quarries during the construction would be undertaken during the detailed design phase to determine the availability of materials at that time as well as capacity of quarries to supply the construction and other customers.

- DECC request that Commitment T3 be amended to include "impacts on the environment will be considered in construction vehicle movement arrangements".

Submission No. *057*

The RTA has revised SoC T3 to reflect this request from DECC.

Road design

The following submissions were made with regards to road design:

- The respondent believes that to encourage trucks to take a different route the Proposal should include an 80km/hr speed limit and installation of one or two roundabouts.

Submission No. *022*

The suggestion to reduce the speed limit to 80km/hr is inconsistent with the objectives of the Pacific Highway Upgrade Program.

One of the objectives of the Pacific Highway Upgrade Program is to reduce freight transport costs, which would encourage its use by heavy vehicles. The increase in the number of heavy vehicles using the Pacific Highway is, therefore, an outcome of the achieving one of the program's objectives.

- The Proposal boundary line should be moved 30-50 metres from the planned highway which would cross through vacant land rather than through the respondent's blueberry plantation.

Submission No. *037*

The Proposal has been designed in order to minimise impacts on different land uses. The alignment of the boundary at this location has been subsequently adjusted to reduce the impacts on this property by 0.46 ha.

- The bypass should be moved at least 500m west of the respondent's property boundary.

Submission No. *038*

The Proposal has been designed in order to minimise impacts on different land uses. This has been undertaken by, where possible, running the alignment along the boundary of properties in order not to sever sections of properties. The respondent's request to shift the alignment (at least) 500m west would result in increased earthworks, as the alignment would pass through higher ridges of the mountain range to the west and would be a greater impact on agricultural land and the Wedding Bells State Forest. Consequently, the alignment will not be shifted as requested.

- The Proposal should be moved approximately 100 metres further west of the respondent's property boundary.

Submission No. *040*

The Proposal has been designed in order to minimise impacts on different land uses. This has been undertaken by, where possible, running the alignment along the boundary of properties in order not to sever sections of properties. The respondent's request to shift the alignment approximately 100m further west would not be possible due to the steeply sloping topography at that location.

However, the RTA has undertaken additional investigations to determine if it is possible to reduce the extent of acquisition for this property. As a result of further investigation, it is proposed that the road reserve boundary at this location be refined such that approximately 1.54 ha of land would be affected by the Proposal. This is a reduction of 0.37 ha compared with that identified in the EA.

- Priority for the upgrade is to enhance freight transportation routes ahead of improving safety for tourists and local residents. Alternative solutions such as rail for freight have not fully been considered.

Submission No. *042, 048, 049, 053, 061, 084, 088*

The existing Pacific Highway through the study area is a two lane, two way road with occasional overtaking lanes. The Proposal is for a Class M four lane dual carriageway highway with access via strategically located grade separated interchanges. The Proposal also includes a full length local access road comprising sections of the existing Pacific Highway and new and existing local roads that provides an alternative route for local residents who do not wish to travel along the highway for local trips. The local access road would maintain and improve community access for the length of the Proposal by:

- Facilitating the separation of local and through traffic.
- Linking the local road network to the strategically located grade separated interchanges on the highway.
- Providing an alternative local road link between Sapphire and Arrawarra.
- Providing safer access to properties and facilities which currently have direct highway access.

The RTA's *Road Environment Safety Update No.22* (April 2004) provides data on recorded accident rates for typical major road types. Based on the data provided in the update, the Proposal is anticipated to:

- Decrease total accident rates from approximately 29 crashes per 100mvkt to 20 crashes per 100mvkt (as identified in section 10.2.6 of the EA).

- Decrease injury accident rates from approximately 14 injury crashes per 100mvkt to approximately 6 injury crashes per 100mvkt.
- Decrease fatal accident rates from 1.4 fatal crashes per 100mvkt to 0.3 fatal crashes per 100mvkt.

The Pacific Highway Upgrade Program forms an important part of both State and Commonwealth strategies for the improvement of the Sydney – Brisbane transport corridor (see Section 2.2 of the EA).

The AusLink *'Sydney – Brisbane Corridor Strategy'* (2007) identifies the Pacific Highway as the key transport mode in the Sydney – Brisbane transport corridor. It also highlights the fact that the Main Northern railway is unlikely to meet the future inter-regional transport task even if major rail infrastructure upgrades were to occur.

Further to this, the upgrade of rail networks is the responsibility of the relevant rail transport / infrastructure authorities rather than the RTA, which is responsible for the development and maintenance of the road network in NSW.

Any decision on the upgrading of the rail network, as well as the timing and availability of funding for such works would rest with the State and/or Commonwealth authorities responsible for the rail network and is, therefore, outside the scope of the Sapphire to Woolgoolga Pacific Highway upgrade project.

- The Proposal is not consistent with the A-class dual carriageway constructed from Sapphire to Korora (Korora Hill reconstruction), however the EA stated that the Proposal would "be developed in a manner that would be consistent with the preferred route for the Southern Coffs Harbour section".

Submission No. *042*

The reference in the EA that the Proposal "would be developed in a manner that would be consistent with the Southern Coffs Harbour section" refers to the proposed Coffs Harbour bypass, and not the previously undertaken Korora Hill reconstruction.

The Korora to Sapphire section of the highway will be considered as part of the concept design for the Coffs Harbour bypass.

- Many towns have been bypassed along the highway and when Coffs Harbour is bypassed the road should continue straight or follow the rail line to the west – such a change in route options would result in less environmental impacts. A far western bypass would take less time to construct and could be utilised solely for defence movements should the need arise. Respondent is not sure why Woolgoolga and Coffs are bypassed but not other areas in between.

Submission No. *056*

The Proposal minimises the environmental impacts by utilising as much as possible, the existing highway corridor. One of the reasons that a far western bypass was not selected was due to the adverse environmental impacts that would occur. The Far Western bypass was not viable due to the significant engineering challenges, the high cost and having a poor value for money. It would also attract less traffic off the existing highway and result in longer travel time ad higher operating costs than other coastal options.

The Pacific Highway Upgrade Program forms an important part of both State and Commonwealth strategies for the improvement of the Sydney – Brisbane transport corridor (see Section 2.2 of the EA). The AusLink *'Sydney – Brisbane Corridor Strategy'* (2007) identifies the Pacific Highway as the key transport mode in the Sydney – Brisbane transport corridor. It also highlights the fact that

the Main Northern railway is unlikely to meet the future inter-regional transport task even if major rail infrastructure upgrades were to occur.

- Questions whether the RTA is going to introduce a toll. The RTA initially denied that there would be a toll between Hexham and the Tweed but the NSW and Commonwealth governments have been lobbied by the Tourist Transport Forum Ltd who believe there is a need for a motorway with shadow tolls.

Submission No. *043, 062*

There is no current proposal for tolls on this section of the highway. While both the State and Federal Governments have considered obtaining assistance from the private sector to finance the upgrading of the Pacific Highway, no decision has been made at this stage.

- Respondents say that RTA consultants Holmes Air Sciences described the upgrade as an equivalent 8 lane motorway in 2004.

Submission No. *062*

It is assumed that the comment is in reference to the *Air Quality Constraints Report* (Holmes Air Sciences, 2004). This report was undertaken as part of the Coffs Harbour Highway Planning, Coffs Harbour section, Strategy Report.

In this report, one option that was considered was a full upgrade of the existing highway through Coffs Harbour to 8 lane equivalent. This option is not part of this Proposal, and has not been selected as the preferred route for the upgrade of Coffs Harbour.

- It is unlikely that future bypasses will be considered once the highway is upgraded.

Submission No. *066, 080*

The route selection process is outlined in Chapter 6 of the EA. The value management workshop held in April 2003 concluded that of the five route options, options C and D should be considered further. The RTA then developed two revised options in response to a request from Council: Option C1 and Option E. The second value management workshop held in August 2004 considered options C, C1 and E using the same evaluation process as the first value management workshop (a triple bottom line of functionality, environmental and socio-economic issues). The majority of the participants recommended that Option E be considered further.

Option E was selected as the preferred route as it was considered to:

- Deliver the best overall socio-economic outcome.
- Better provide for future urban growth and provide greater flexibility for future land use planning decisions.
- Result in less severance of existing and future communities.
- Provide safety and noise improvements for Mullaway and Safety Beach.
- Be likely to have a higher degree of community acceptance.

The Proposal is the RTA's preferred route for this corridor, and caters for the predicted traffic growth into the foreseeable future. Approval is being sought for a four lane (Class M) highway. However, the Proposal has been designed to cater for 6 lane capacity in the future. When the highway would require expansion to the 6 lane capacity, this would be undertaken by reducing the central median without further extensive land acquisition.

- The proposed bypass of Woolgoolga would have a significant impact on the township. Further design and consultation is required on the Gateway statements at Hearn's Lake and Arrawarra Road interchanges, signposting to Woolgoolga township and services, and upgrading of the existing Pacific Highway through Woolgoolga.

Submission No. *077*

The RTA would consult with Council regarding appropriate signage to promote Woolgoolga and other areas along the length of the upgrade.

The RTA would not be upgrading the highway through Woolgoolga. However, RTA would consult with Council regarding the hand-over arrangements of the existing highway through Woolgoolga.

Local access road

The following submissions were received with regards to local access road:

- Bucca Road (existing intersection with the Pacific Highway) needs to be left open, or an alternative local access road down the eastern side of the highway connecting into the Moonee Beach interchange established, to remove the large trucks travelling to the highway via Hoys Road.

Submission No. *010*

Bucca Road would not remain open to the highway, rather, vehicles would travel down the local access road and connect to the Moonee Beach interchange. As part of the Proposal, there has been a rationalisation of the number of intersections with the highway in order to improve road safety through the removal of poor sight lines and the removal of locations that merge slower traffic with the highway traffic. The Proposal has been designed to utilise the existing road infrastructure where possible.

However, in acknowledgement of increased traffic along Hoys Road, the Proposal (as shown in Chapter 7 of the EA) would include the upgrade of Hoys Road to accommodate heavy vehicle traffic.

- The local road network would be more dangerous than the current highway, especially Graham Drive. The local access road would require navigating a number of roundabouts along the length of the Proposal until residents are forced to merge with the traffic at Korora. More school children will be at risk of accidents.

Submission No. *016, 042, 048, 049, 053, 054, 061, 067, 071, 076, 082*

Graham Drive would not be upgraded as part of the Proposal, as the road would be performing the same function as it currently does, that being a local traffic route.

In general, the local access road would be posted at a lower speed and all cross highway movements would be grade-separated from the highway. The local access road would cater for low traffic volumes for short local distances. The local access road would also provide for bus bays for bus routes (inclusive of school bus routes).

- There is no access provided from Bark Hut Road to the highway for the local existing or from the future communities of Safety Beach.

Submission No. *038*

Access onto the Woolgoolga bypass would be via the south Woolgoolga interchange or the Arrawarra interchange. Access from both Bark Hut Road and Safety Beach would be via access to the existing highway (to become the local access road) in Woolgoolga and then to either the south Woolgoolga Interchange or the Arrawarra Interchange.

Bark Hut Road does not have direct access onto the new highway as it is not designed to cater for additional traffic movements (including heavy vehicles). To provide access at this location would result in a number of additional environmental and socio-economic impacts, and would be inconsistent with the design standards required for the Proposal.

- Residents have no access into Emerald Heights from the southbound carriageway. They would either have to use the Graham Drive North exit and negotiate the dangerous bends and narrow road; or take the Emerald Beach exit and do a dangerous U-turn to access the overpass to Graham Drive South.

Submission No. *042, 067*

There is no access to Emerald Heights from the southbound carriageway at Graham Drive south. In order to improve road safety, there are no right hand turn movements across the highway.

Emerald Heights residents southbound on the highway would exit at the south Woolgoolga interchange and travel along the local access road (including Graham Drive) to reach Emerald Heights Drive. There would be no alteration to Graham Drive. There is another southbound off-ramp opposite Graham Drive south, and using this exit would result in the residents having to travel down to the Emerald Beach (Fiddaman Road) interchange, travelling around a roundabout to approach the Graham Drive south overpass northbound (still on the local access road). The proposed roundabout would be on the local access road, with lower traffic volumes and lower speed limits, so the U-turn would not be dangerous.

- DECC would like to see the Proposal maintain and improve community access to estuaries and the coastline for the length of the Proposal, as outlined in the Coastal Policy.

Submission No. *057*

The Coastal Policy identifies one of its nine goals as "providing for appropriate public access and use".

In addition to a four lane dual carriageway highway, the Proposal includes a full length local access road comprising sections of the existing Pacific Highway and new and existing local roads. The local access roads link with five key strategically located interchanges which provide safer and improved access on and off the new highway, and into the coastal communities of Woolgoolga and the northern beaches. Consequently, the Proposal would also maintain and improve community access to estuaries and the coastline by:

- Facilitating the separation of local and through traffic.
- Linking the local road network to the strategically located grade separated interchanges on the highway.
- Providing an alternative local road link between Sapphire and Arrawarra.
- Providing safer access to properties and facilities which currently have direct highway access – including those which provide community access to estuaries and the coastline.

- The EA states that a network of local roads would be developed to remove the need for locals to access the highway but the respondents believe this is improbable given that the access road is only single lane. Residents around the large deviation for local traffic around Sandy Beach will opt to use the highway as this provides a quicker route to Coffs Harbour. The respondents question why the upgrade is being flagged as an upgrade to assist local traffic when local traffic is being asked to use narrower service roads.

Submission No. *067, 073*

The local access road network has been established in order to provide locals who do not wish to travel on the highway for local trips, with an alternative travel route. This local access road would not preclude local residents from using the highway. Access onto the highway would be via the local access roads and the grade-separated interchanges.

Through the construction of the local access road, accessing the highway would become safer through the grade-separated interchanges, rather than the many existing intersections (from both local roads and individual properties), of which some have poor sight lines.

- Coffs Harbour City Council considers the right turn movement from Graham Drive North onto southbound lanes on the highway to be inefficient and would like to see a review of the Graham Drive/Hearn's Lake Road interchange configuration.

Submission No. *077*

This right hand turn from Graham Drive north was incorporated into the design, as there would be no access to the southbound carriageways from Graham Drive south for residents of Sandy Beach or Emerald Heights.

It was also incorporated due to planning approval conditions placed on the quarry on Morgans Road. The condition stipulates that trucks from the quarry cannot travel down Graham Drive and exit onto the highway at Graham Drive south, so this turn movement must occur at Graham Drive north.

2.2.16 Context and need for the proposal

Sustainability of road transport

The following submissions were made with regards to sustainability of road transport:

- The Proposal does not support sustainable means of freight transport, particularly rail. Expenditure on the Pacific Highway could be better put into an alternative freight solution.

Submission No. *023, 029, 043, 051, 061, 062, 071*

The Pacific Highway Upgrade Program is focused on major improvement of the Pacific Highway between Hexham and the Queensland border. The program objectives and the State and Commonwealth strategies that it is based on also deal with the broader environmental context of the highway. The objectives of the program address a range of key issues, in particular the reduction of road crashes and injuries, but also community interests, economic development, value for money, transport efficiency and ecologically sustainable development. The principles of ecologically sustainable development have been applied throughout the development of the project, and the application of these principles is discussed in Chapter 2 and 22 of the EA.

The AusLink '*Sydney – Brisbane Corridor Strategy'* (2007) in particular considers the transport and freight efficiencies of not only the Pacific Highway, but also the North Coast rail line and the New England Highway, all of which are integral parts of the Sydney – Brisbane transport corridor. This study identifies that the Pacific Highway is the key transport mode in this region. It also highlights the fact that the Main Northern railway is unlikely to meet the future inter-regional transport task even if major rail infrastructure upgrades were to occur.

The upgrade of rail networks is the responsibility of the relevant rail transport/infrastructure authorities rather than the RTA, which is responsible for the development and maintenance of the road network in NSW. Any decision on the upgrading of the rail network, as well as the timing and availability of funding for such works would rest with the State and/or Commonwealth authorities responsible for the rail network and is, therefore, outside the scope of the Sapphire to Woolgoolga

Pacific Highway upgrade project.

It is also relevant to note that only a relatively small proportion of the heavy vehicle traffic on the Pacific Highway is purely Sydney-Brisbane traffic, as the North Coast area of New South Wales generates a large volume of freight movement in itself. A reasonable amount of the heavy vehicle traffic on the Pacific Highway is of inter/intra regional nature, having either an origin/destination or a number of pick-up/drop-off points within the North Coast area.

As evidence, a recent Pacific Highway origin/destination survey (September 2006) indicates that approximately 60% of northbound heavy vehicle traffic passing through South Kempsey on the Pacific Highway had a destination in the section of the highway between South Kempsey and Woolgoolga. The survey also indicates a similar percentage of southbound heavy vehicles passing through Woolgoolga had destinations between Woolgoolga and South Kempsey.

The development of rail as a freight transport option has been considered in the cumulative impacts section (Chapter 21) of the EA. However, the development of increased rail freight is independent of this project, and the highway would still need to be upgraded to accommodate the increase in local traffic from future development as well as to improve road safety.

- The EA fails to prove that the necessary fuel supply that would support the assumed traffic growth would actually be available.

Submission No. *042, 062, 069*

There is considerable debate about the possibility of a peak in the production of oil, the timing of this event should the supply of oil begin to decline (BTRE Working Paper 61: Is the world running out of oil?) and the impact on transport and infrastructure requirements if in fact there is a decline in the availability of oil.

Government and industry are taking the view that, while the timing remains problematic, it is prudent to assume that peak oil is likely to occur and that there is a need to establish alternatives to oil as a fuel for transport, and to improve the energy efficiency of transport. This aligns with recognition of the greenhouse effect and the need to reduce greenhouse gas emissions.

There is a close link between economic growth and transport growth. As the Australian and NSW economies continue to grow the need for transport also grows. Freight transport, for example, is predicted to more than double between 2000 and 2020 (BTRE Report 107: Greenhouse gas emissions from transport – Australian trends to 2020).

Historically, there has been a link between transport growth and growth in the demand for fuel. Action is now being taken through Government-supported programs and commercial initiatives to identify alternative sources of fuel and to develop technology to reduce the fuel consumed by vehicles – as evidenced by the commercial availability of bio-diesel, ethanol blended fuels and hybrid cars. This would enable the economic benefits provided by road transport to continue to be delivered with a reduced need for fossil fuels.

Therefore, the Pacific Highway Upgrade Program is justifiable as it forms part of both the State and Commonwealth governments' strategies for a sustainable transport system. On the basis of these strategies, the highway is expected to remain the key interstate transport route for both freight and people between Sydney and Brisbane well into the foreseeable future. The highway would also continue to serve the ever-expanding coastal communities of the North and Mid North Coast of NSW.

Road safety

The following submissions were received with regards to road safety:

- The respondent has reviewed the EA and acknowledges the potential improvements to safety as a result of the Proposal.

Submission No. 006

Noted. A key objective of the Proposal is to improve the safety of the Pacific Highway, which would require the construction of an improved facility in line with current best practice design standards.

- Questions who built the current highway that is inadequate and is described in the EA as containing poor junctions with poor sight lines, inadequate merging/diverging arrangements and high accident rates.

Submission No. *053*

The existing Pacific Highway was developed in accordance with the appropriate design standards and guidelines at the time of its construction. Since constructed, the existing highway has been upgraded over time to manage current safety requirements as assessed by a number of safety reviews undertaken on the highway. Such improvements include resurfacing or reconstructing sections, upgrading existing intersections, providing u-turn facilities and speed reductions.

The primary objective of the Proposal is to improve the safety of the Pacific Highway, which would require the construction of an improved facility in line with current best practice design standards.

2.2.17 EA form and content

Content

The following submissions were received with regards to EA content:

- Impact on properties not fully understood. Believes there is too much technical information which the general public does not understand. Respondent does not have time or resources to seek appropriate independent assessment of the accuracy of the EA.
- Requests that the environmental impacts be summarised and published in a format suitable for the community to understand and posted to all residents along the upgrade route.

Submission No. *021, 048, 054, 061, 071, 076, 088, 092*

To the extent possible the EA has been prepared with the general public as the target audience. It is acknowledged that some issues require a certain level of technical interpretation.

However, during the EA display stage, the project team responded to specific requests for information. This was through people calling the toll-free line as well as people who attended the three public display days. During the exhibition period over 10,000 community updates were circulated through mailouts and placements at displays.

- The project is assessed against "do nothing". It should instead have compared it with a Class A upgrade and it would have a much less significant adverse impact on the community and the environment. It would deliver improved safety for all road users at a fraction of the cost.

Submission No. *021, 023, 042, 049, 054, 061, 067, 071, 076, 084, 088*

As set out by the Director General's requirement, the need for the Proposal and a justification for the project must be provided within the EA. This was undertaken by assessing the "base case" or what would occur if the upgrade was not to proceed.

A Class A standard upgrade would not include the strategically located grade separated interchanges or the full length local access road to separate local and through traffic and provide an alternate route to the highway for local trips that are proposed under the Class M scheme. Access to a Class A standard highway would be via at-grade junctions located at or near the present intersections with the existing highway.

As traffic volumes increase, at-grade junctions with the highway would experience increasing delays and provide decreasing Levels of Service (LoS) for vehicles accessing the highway. As shown in the EA (working paper no.1 – Traffic and Transport Assessment) all at-grade junctions with the highway south of Woolgoolga except Bucca Road, Killara Avenue and Graham Drive north would provide poor Levels of Service (LoS) by 2011 (LoS D or worse). By 2031, all at-grade junctions along the full length of the Proposal would provide very poor levels of service (LoS F).

The RTA's *Road Environment Safety Update No.22* (April 2004) provides data on recorded accident rates for typical major road types. Based on the data provided in the update, the Class M scheme included in the Proposal is anticipated to the following road safety improvements over a Class A scheme:

- Decrease total accident rates from approximately 29 crashes per 100mvkt to 20 crashes per 100mvkt.
- Decrease injury accident rates from approximately 12 injury crashes per 100mvkt to approximately 6 injury crashes per 100mvkt.
- Decrease fatal accident rates from 0.7 fatal crashes per 100mvkt to 0.3 fatal crashes per 100mvkt.

- The community update brochure released in November 2007 does not show even a quarter of the wetlands that exist at Sandy Beach/ Hearnes Lake.

Submission No. *026*

The brochure referred to was only a summary brochure and due to the scale of the map not all features, such as wetlands could be shown. The ones shown in the brochure are those wetlands which are classified SEPP 14 wetlands. Additional information and map location for wetlands in the Sandy Beach/ Hearnes Lake area are found within the Fauna Investigation Report (working paper 7a of the EA).

- A submission on the inconsistencies within the Project Application Report (Connell Wagner 2006) was made previously but the EA does not address any of the issues raised in the submission.

Submission No. *042*

The preparation of a submission to the Department of Planning on perceived inconsistencies within the *Project Application Report* (Connell Wagner 2006) by the respondent is acknowledged. As required under the EP&A Act Part 3A process, the EA addresses the Director General's requirements, which are confirmed as being adequately addressed through the Department of Planning's adequacy review process.

- Respondent believes that the 4 million litres of fuel required for the construction of the Proposal is understated.

Submission No. *042*

Section 8.5 of the EA discusses construction phase energy requirements and provides conservative estimates of energy and materials required. The EA calculates fuel consumption requirements for

vehicles and equipment on the basis that 1.5 litres of fuel is required per cubic metre of earthworks (this figure is based on other projects of a similar scale). This calculates out to four million litres of fuel being required for earthworks activities.

The EA then states (also in Section 8.5) that other construction activities, including bridge construction, material deliveries and batch plant operation would utilise up to an additional ten million litres of fuel.

Therefore (as the EA states) up to 14 million litres of fuel would be required for the project.

- Figure 14.1b does not show the watercourse south of Bark Hut Road, commencing west of the Proposal and under Palmer Road.

Submission No. *042, 067*

Figures within the EA are of various levels of detail and present information relating to varying issues. The watercourse south of Bark Hut Road is shown in Figure 7.5k.

- References Figure 18.2 of the EA (Sapphire to Emerald flood map) and questions where the missing Emerald Beach to Arrawarra map is.

Submission No. *053*

Figure 18.2 was derived from flood mapping available from Coffs Harbour City Council. There was no flood mapping undertaken for any other creeks along the northern beaches. As such, Figure 18.2 shows the full extent of flooding information available from Council's *Flood Risk Management Study (2006)*.

- The EA should not be approved; instead a more improved EA that fully addresses the wider aspects of Ecologically Sustainable Development (including cumulative impacts and greenhouse gases) should be prepared and publicly displayed.

Submission No. *053, 068*

The EA addresses Ecologically Sustainable Development (ESD) issues in Chapter 22, greenhouse gasses in Section 20.2 and cumulative impacts in Chapter 21 of the EA. The principles of ESD have been an integral consideration in the process of developing the Proposal and assessing its benefits and effects and the EA has been prepared based on the best currently available technical information, including that available for greenhouse gasses. The EA assesses the potential construction and operation phase impacts of the Proposal on greenhouse gasses and proposes a range of management measures to minimise greenhouse gas impacts and overall energy consumption.

- Sections of the EA (refer 19.3.2), discuss the Woolgoolga lighthouse however the respondent says that Woolgoolga does not have a lighthouse.

Submission No. *053*

The EA incorrectly refers to the structure on Woolgoolga Headland as a lighthouse. It is in fact a reservoir. The EA uses this structure as a reference point to describe the visual presence of the highway alignment at the base of the dividing range from this location. While the reference point was identified incorrectly, the statement relating to the visual presence of the highway at this location is still valid.

- The assessment report reports that there would be the loss of 197 tree hollows would be affected by the Proposal, but the EA reduces this number to 154 tree hollows.

Submission No. *057*

The fauna assessment working paper (Working Paper 7a, Appendix F of the EA), stated:

"Approximately 197 trees bearing hollows ranging in size from small (less than 10cm to large (greater than 30cm) were recorded during the fauna field survey. Since (the Arrawarra interchange and rest area were not included in the study area for the working paper) the entire road footprint was not surveyed the actual number of hollow-bearing trees to be affected is likely to be greater."

The number of hollow bearing trees identified (197) were those within the study area, not the number of trees that would require removal due to the footprint of the Proposal.

The Arrawarra interchange flora and fauna assessment (Working Paper 7c, Appendix F of the EA) identified 114 hollow bearing trees within the study area for the interchange and rest area. Consequently, a total of 311 hollow bearing trees were identified within the study areas for the two working papers.

Within the EA, assessment of the hollow-bearing trees identified within the fauna assessment and the Arrawarra interchange flora and fauna survey areas showed that 154 hollow bearing trees would be directly affected by the entire length of the Proposal. This number includes the number of trees potentially affected by the proposed rest area at Arrawarra.

- Respondent believes that the EA does not adequately address noise, air and water pollution and how these may be avoided, mitigated or managed. The EA uses flawed data to in an attempt to address these issues.

Submission No. *066, 088*

Noise, air and water pollution are addressed in Chapter 11, Chapter 20 and Chapter 18 of the EA respectively. Mitigation measures are included at the end of these chapters and are also outlined in the Statement of Commitments (Appendix A) of the document.

- Respondents dispute the title of the EA "Coffs Harbour Highway Planning – Sapphire to Woolgoolga Section" as the assessment extends to Arrawarra 6km north of Woolgoolga.

Submission No. *067*

Noted. Since 2001, the project has been known in the community as the Sapphire to Woolgoolga Pacific Highway upgrade. In order to keep consistency and not cause any confusion, the project name was kept as Sapphire to Woolgoolga.

- Respondent believes that good review practices have not been followed as one of the four authors of the EA is also the reviewer and approver.

Submission No. *067*

The respondent is referring to a table inserted in the EA prior to the Contents page. The term "approval" relates to Connell Wagner's internal quality system procedure. The RTA has also reviewed the EA and all specialist studies as part of the development of the project. Under the planning approval process, the "approver" of the project is the Minister for Planning.

- The EA makes reference to the Woolgoolga bypass section which misleads the reader into thinking that Option E bypasses Woolgoolga which it does not.

Submission No. *067*

The description of the upgrade and bypass sections of the Proposal are provided in Section 7.1 of the EA.

- Early environmental, social and economic investigations conducted prior to route selection consisted of only preliminary recommendations upon further investigation. Further assessments were only undertaken once the route was selected meaning that statements in the EA which say that detailed investigations were used for route selection is false.

Submission No. *067*

The executive summary of the EA stated *"As part of the Coffs Harbour Highway Planning Strategy, constraints analysis and detailed environmental, social and economic investigations were undertaken to identify a preferred route for the proposed highway upgrade."* Investigations undertaken during this phase were at a sufficient level of detail to assess the relative impacts between the route options and to minimise impacts (in line with ESD principles) associated with the options.

- The Woolgoolga Chamber of Commerce opposes the EA due to the inclusion of false and misleading statements particularly in regards to the decline of the banana industry with no mention of the shift to blueberries.

Submission No. *073*

In section 15.1.2 of the EA and the agricultural working paper (Appendix F), the pressures on and the future of agricultural (and in particular banana plantations) are discussed. Specifically, the EA states that *"Agriculture in the Coffs Harbour and Woolgoolga areas has undergone substantial changes even within the period during which this Proposal has been under investigation. Blueberries are now the fastest expanding crop on the North Coast, and they are often being planted as an alternative crop to bananas."*

- The 'typical cross section at Sapphire looking north' is not indicative of Gaudrons Road in regard to the positioning of the impact on homes. Cross section indicates that the motorway is well below the homes, but those homes would align the motorway at approximately the same elevation.

Submission No. *075, 082*

The "typical cross section at Sapphire looking north" (Figure 7.4b) is not indicative of Gaudrons Road nor does it purport to being so, instead it represents the cross sectional design north of Campbell Close. Figure 7.4a of the EA shows the locations of the indicative cross sections shown in Figures 7.4b – 7.4h.

- The respondent believes that the EA is a waste of money seeing that there is a significant proposition of stakeholders in this project who believe that the RTA is progressing with this EA without acknowledging that the route being assessed is far from a certainty.

Submission No. *076*

The RTA announced the preferred route for the Sapphire to Woolgoolga upgrade in December 2004. After undertaking a number of assessments and investigations and refining the design, the EA was submitted to the Department of Planning to seek planning approval. The submissions report provides for the collation of community and agency issues relating to the Proposal and provides an opportunity for consideration of issues raised and identification of design refinements proposed, where necessary, to address those issues.

- Coffs Harbour City Council would like more information on the staging for the proposed works. Notes that the staging report would be submitted to the Department of Planning four weeks prior to construction but believes that this timeframe is inadequate. The respondent wishes to be consulted about the staging options as the works could impact on the community in terms of road safety and amenity.

Submission No. *077*

In section 7.3.2 of the EA, the RTA outlined an undertaking to produce a staging report should the Proposal be staged. This has been included in the revised Statement of Commitments (refer SoC EM2) included in section 5 of this report and reflects consultation with Coffs Harbour City Council during preparation of the report.

- Any impact on timber production resulting from the acquisition is mitigated in part by the commitment by the proponent in the mitigation management measures (section 14.4) to allow harvestable timber from the footprint prior to the commencement of construction although this does not appear to have been included in Appendix A.

Submission No. *081*

Section 14.4 of the EA outlines a number of mitigation measures to mitigate property and land use impacts including:

> *(i) "The Department of Primary Industries (Forests) will have access to areas of State Forest land identified for acquisition by the RTA to remove any harvestable timber within the footprint of the Proposal prior to commencement of construction.*
>
> *(ii) In consultation with the Department of Primary Industries (Forests), access to and within State Forest lands adjacent to the Proposal will be retained for forestry operations, fire management activities and recreation purposes."*

In Appendix A, the first mitigation measure above was included as SoC AG7. The Statement of Commitments have been revised to include the second mitigation measure above (refer SoC AG8).

2.2.18 Economic analysis

Cost benefit

The following submissions were received with regards to cost benefit analysis:

- The cost benefit analysis undertaken was done prior to the opening of the Chinderah bypass and should be re-evaluated.

Submission No. *011*

A review of the economic analysis for the Far Western Bypass, the Council Corridor and the Coastal route options was undertaken in November 2007. Subsequently, the *Economic Analysis Update Coffs Harbour Highway Planning Strategy* which provides details on the review undertaken was released to the public in conjunction with the EA.

- Respondent notes that the EA (Chapter 10) references a benefit cost ratio of two; however in the Economic Analysis Update Coffs Harbour Highway Planning Strategy (Nov 2007) the preferred route has a benefit cost ratio of less than two (1.1-1.6).

Submission No. *043*

The reference in the EA (Chapter 10) to the Proposal having a benefit cost ratio (BCR) of 2 is correct and is detailed in working paper no 1 – Traffic and Transport Assessment (Appendix F of the EA).

The 1.1 to 1.6 range of BCR results quoted from the *Economic Analysis Update Coffs Harbour Highway Planning Strategy* (Nov 2007) is for the whole Coastal Corridor (from Englands Road, Coffs Harbour to Halfway Creek), including sections with significantly high costs (viz tunnels or deep cuttings on Coffs Harbour Bypass) or lesser benefits from travel time savings on sections of highway upgrade north of Woolgoolga. The economic analysis update also indicates that the Sapphire to Woolgoolga section alone of the coastal corridor has a BCR of 2.0.

- The Government and RTA are against a far western bypass for economic reasons but the respondents believe that to construct an expensive upgrade which would have an early 'used by' date is not a cost benefit.

Submission No. *073*

The Department of Planning has released a draft Strategy for the Mid North Coast to 2031 (Draft Mid North Coast Regional Strategy) and Coffs Harbour City Council is preparing a Settlement Strategy for the City to 2031. The planning horizon for the Proposal is consistent with these planning documents, both of which include consideration of the Proposal.

The Coffs Harbour Highway Planning Strategy (the "Strategy") was developed to address the need to upgrade the Pacific Highway between Sapphire and Woolgoolga while planning for future traffic needs within the Coffs Harbour urban area. The strategy is divided into two sections:

- The southern section from south Coffs Harbour to Sapphire (Coffs Harbour section).
- The northern section from Sapphire to Woolgoolga (this Proposal).

The preferred route for the strategy was announced in December 2004. The concept design for both the southern and northern sections of the preferred route incorporates local access road arrangements to facilitate the separation of local and through traffic and provides for a future additional lane in both directions to cater for further increases in traffic volumes.

Predictions of future traffic volumes undertaken for the development of the strategy indicated that the most heavily trafficked section of the preferred route (the Sapphire to south Woolgoolga section) would not need to be upgraded from four lanes to six lanes within the next 25 years. Longer term extrapolations of the traffic predictions suggest that, when upgraded to six lanes, the Sapphire to south Woolgoolga section of the preferred route would cater for anticipated traffic volumes well into the second half of this century.

Options assessment

The following submissions were received with regards to the economic options assessment:

- Economic analysis shows preliminary estimated costs for Korora to Sapphire to be $95 million. It is not clear whether a further $95 million is required to upgrade this section to M-class standard.

Submission No. *042*

The existing Pacific Highway south of Sapphire is currently a Class A standard dual carriageway highway. The 2km long section of the existing highway between Korora Hill and Sapphire would provide the connection between the northern end of the Coffs Harbour section of the Coffs Harbour Highway Planning Strategy and the southern end of the Sapphire to Woolgoolga upgrade. The estimated cost to upgrade this 2km long section of the existing highway to a Class M standard dual carriageway highway is $95m.

- The far western bypass would cost $1,164 million compared to $1,274 million for the coastal route currently proposed. In addition to this far western bypass, a dual carriageway upgrade from Sapphire to Safety Beach has been costed by the RTA at $195m, which is considerably less than the $465m designated for the highway upgrade.

Submission No. *049, 051, 054, 061, 071, 072, 076, 084, 088, 091*

The proposed $195 million is the estimated cost of a dual carriageway upgrade of the existing highway between Sapphire and Safety Beach. This has been assessed as the minimum treatment

required for the route in the event that an alternative to the Coastal Corridor was adopted – as such this cost has been added to any alternative corridor costs.

The difference between the $465m estimated for the Proposal and this $195m is primarily the costs of the Woolgoolga Bypass section of the Proposal ($260m) and the cost of the Class M component of the Sapphire to south Woolgoolga section, less the cost of the assumed upgrade from Woolgoolga to Safety Beach.

Project costs

The following submissions were received with regards to project costs:

- Questions whether the cost of property acquisition has been included in the costing for the Proposal.

Submission No. *042*

The cost of property acquisition has been incorporated into the cost of the Proposal.

- Questions whether the cost of water use has been included in the costing for the Proposal.

Submission No. *042, 067*

The cost of water has been included in average unit rate calculations for the total cost of earthworks operations and pavement material supply.

- Coffs Harbour City Council notes that requests for further consultation and studies would affect project costs and that extra costs should be included in project estimates. This could be included as a condition of the project approval.

Submission No. *077*

Project estimates include a contingency factor for unknown additional costs and estimating uncertainties. At this stage of concept development the Proposal has construction cost contingencies in the order of 30% and these would be updated and refined as necessary during the detail design phase of the project.

2.2.19 Greenhouse gases

Assessment

The following submissions were received with regards to greenhouse gas assessment:

- Greenhouse gas emissions in the transport sector are increasing at a rate greater than any other area. NSW Government projects need to ensure all transport policies provide an alternative to private vehicle use.

Submission No. *023*

There is a whole of government approach to transport planning and private vehicle usage. The Proposal is being undertaken in line with the Government's transport policies (see section 2.1 of the EA) and the Pacific Highway Upgrade Program.

The EA outlines the greenhouse gas emissions that are expected to be produced by the Proposal both in construction and operation modes. The Proposal incorporates a local access road for the length of the highway with provision for both cyclists and bus bays. For this Proposal, greenhouse gas emissions are outlined in section 20.2 of the EA and indicate that there is likely to be a net reduction in greenhouse gases over the longer term (Table 20.8).

- Consideration of greenhouse gas emissions is only briefly addressed in the EA and does not consider the increase in greenhouse gas emissions and air pollution resulting from increased traffic.
- The upgrade would generate a high level of greenhouse gases. Greenhouse gases from highway upgrades have not been addressed by *Our Living City Settlement Strategy* or the *Mid North Coast Regional Strategy*.

Submission No. *043, 062*

The EA undertook a quantitative assessment of greenhouse gas emissions that would be expected from the construction and operation of the Proposal. The assessment was based on the projected traffic data outlined in Chapter 10 of the EA and projected greenhouse gas emissions with and without the Proposal are outlined in Table 20.8 of the EA. All other factors being equal, at 2031 inclusive of forecast traffic volumes, the Proposal is estimated to generate 79 kilo-tonnes of greenhouse gas emissions compared to 82 kilo-tonnes of greenhouse gas emissions without the Proposal.

During construction, the Proposal is estimated to generate approximately 60 kilo-tonnes of greenhouse gas emissions.

Greenhouse gas emissions are considered in the *Our Living City Settlement Strategy* (Part 2: Environmental).

The *Our Living City Settlement Strategy* and the *Draft Mid North Coast Regional Strategy* are not RTA documents but they have been addressed in the development of the Proposal.

2.2.20 Hydrology

Effect on creeklines

The following submissions were received with regards to the Proposal's effect on creeklines:

- Questions whether the Proposal would affect hydrologic function of Darkum Creek given that the Proposal crosses its headwaters. Can you guarantee this creek will not be affected?

Submission No. *001*

Hydraulic modelling was used to represent Darkum Creek and the more defined watercourses crossed by the Proposal (typically along the bypass section).

The design of all bridge and drainage structures along the proposed alignment cater for the 100 year ARI (Annual Recurrence Interval) flood event. Indicative drainage structure dimensions are outlined in Table 7.4 of the EA.

Many of the proposed creek crossings on the bypass section are located in deep fill areas. These culverts (including at Darkum Creek) have been designed to provide a minimum freeboard of 0.7 metres to the highway in peak flood levels with minimal changes to the level and extent of flooding, inundation periods and flood flow velocities. In order to achieve this, at Darkum Creek, the Proposal would include 3 cell 1200mm pipe culverts.

During construction there would be some short-term effects to Darkum Creek, however, in order to minimise any water quality impacts, sedimentation and erosion basins would be constructed early in the construction phase (refer SoC SW4).

- There is no culvert for Bark Hut Creek, only a ten metre fill. Bark Hut Creek fills four dams before flowing into Darkum Creek.
- Water flowing west of Bark Hut Road will be cut by the Proposal and affect properties downstream.

Submission No. *053, 092*

All creeks and watercourses including Bark Hut Creek would be provided with drainage structures, suitably sized to minimise alteration to existing hydrological regime (refer section 18.2 of the EA).

- The respondents are concerned about the impact of the highway on the creek located north of Headland Road, Sapphire as it flows into Lower Paperbark Lagoon which is a remnant of a highly sensitive ecological coastal swampland community and a habitat for vulnerable species.

Submission No. *070*

In order to maintain the existing water quality of all creeks in the project area (section 7.5.4 of the EA), erosion and sedimentation control of all creek systems would be designed to best practice standard (refer SoC SW4).

Flooding

The following submissions were received with regards to flooding:

- The EA does not mention that sections of the highway at Sandy Beach are susceptible to overtopping.

Submission No. *042, 053, 067*

The culvert drainage structures at Sandy Beach have been checked and have 1:100 year flood immunity. At Sandy Beach there are many more banks of existing culverts with sufficient capacity to allow passage of major events without inundation of the existing highway.

- General concern regarding the funnelling of water flows during heavy rain.

Submission No. *056*

All drainage structures have been designed in order to minimise alterations to the existing hydrological regime (section 18.2.1 of the EA).

The passage of water flows during heavy rain would be via existing drainage systems upstream and downstream of the Proposal. Where water flows pass across the Proposal suitable drainage structures, energy dissipaters, channel protection, as well as other erosion and sedimentation control devices would be provided (refer SoC SW4).

- DECC would like to ensure that there are no adverse flood impacts on private property as a result of the Proposal. Currently in place is an effective system of water routing through floodplain channels and culverts which are the primary hydraulic control for flood levels on the floodplain. Due to the limited size of the highway culverts, floodwater is diverted across the floodplain and through alternative culverts which re-enters the creek system downstream of the village area. It is critical that the Proposal does not adversely affect this diversion process between two catchments.

Submission No. *057*

As noted by DECC, the *Moonee Creek Flood Study, June 1988* found that "The hydraulic modelling

also indicates that the (existing) Pacific Highway embankment and culverts provide a significant degree of (flood) storage routing, particularly for Moonee Creek and the various floodplain channels which drain to Moonee Creek to the north of Moonee Creek village. This storage routing effect is most significant at the northern end of the (Moonee Creek) study area."

As also noted by DECC "due to the limited size of the highway culverts, floodwater is diverted across the floodplain and through alternative culverts which re-enters the creek system downstream of the village area...."

The RTA notes that the *Moonee Creek Flood Study* report concludes "that the culverts under the Pacific Highway are the primary hydraulic control for flood levels on the floodplain, both upstream and downstream." The RTA notes and concurs with DECC's advice that "It is therefore critical that the upgrade works not adversely affect this diversion process."

In recognition of the importance of the existing culverts under the Pacific Highway as flood control structures, the RTA generally proposes to retain existing flooding characteristics by extending the existing culverts along the upgrade section to pass under the new highway and/or local access road. Only the seven culverts identified in Table 18.5 of the EA are proposed to be augmented to achieve 100 year design ARI. The changes to flooding behaviour resulting from these augmented culverts are shown in Table 18.5 and discussed in Chapter 18.2.1 of the EA. The proposed culvert augmentations are predicted to decrease flood levels upstream of the Proposal by up to 0.9m without significantly altering downstream flood behaviour.

- DECC has noted that there is a high average rainfall in the project area, influenced by the close proximity of the mountains to the coast. It is considered that procedures for inclusion of rainfall gradient (as outlined in the Coffs Creek Flood Study) are best practice for flood studies along the coast between Bonville and Woolgoolga, and should be included in flood investigations for this Proposal.

Submission No. *057*

The methodology of a local design rainfall gradient as outlined in the *Coffs Creek Flood Study* could be applied to the study area. However there would be limited value to re-modelling flood behaviour due to the application of the local design rainfall gradient as the flood modelling undertaken for the EA provided conservative flood modelling based on combined peak ARI events and peak storm surges. It is therefore considered that there would be little change to the predicted flood levels if the local design rainfall gradient was applied to the flood model.

- DECC considers that the full range of flood design events should be considered. Common practice is to consider the 1 in 100 year event, however when examining flood impacts on adjacent properties it is necessary to consider the full range of events up to the probable maximum flood event. As a minimum, a flood study should examine the 20%, 5%, 2%, 1% and 0.2% AEP design events as well as the probable maximum flood design event.

Submission No. *057*

As shown in Table 18.6 of the EA, 20 year ARI (5% AEP), 100 year ARI (1% AEP) and 2,000 year ARI (PMF) design flood events have been assessed for the major watercourses crossed by the Proposal. It is considered that these flood assessments provide an adequate and appropriate assessment of the potential flood impacts of the proposal on adjacent properties.

In recognition of their importance as flood control structures, the RTA generally proposes to retain existing flooding characteristics by extending the existing culverts along the upgrade section to pass under the new highway and/or local access road. As the extension of the existing culverts would not alter flooding impacts on adjacent properties, there would be little benefit in

undertaking the flooding assessments recommended. Only the seven culverts identified in Table 18.5 of the EA are proposed to be augmented to achieve 100 year design ARI. The changes to flooding behaviour resulting from these augmented culverts are shown in Table 18.5 of the EA and discussed in Chapter 18.2.1. The proposed culvert augmentations are predicted to decrease flood levels upstream of the Proposal by up to 0.9m without significantly altering downstream flood behaviour.

The bypass section of the Proposal crosses the upper catchment of the creek systems. The potential impact of the proposed culverts along this section of the Proposal on adjacent properties has been assessed and is discussed in Chapter 18.2.1 of the EA. The culverts have been designed to cater for the 1 in 100 year flood event with minimal changes to the level and extent of flooding, inundation periods and flood flow velocities. In developing the designs for the culverts, predicted upstream water levels were compared to existing property levels. Considerable freeboard is maintained to nearby residences in a 1 in 100 year ARI event and, due to the nature of the topography in the area, any afflux would be limited to the vicinity of the watercourses.

Given the level of investigation undertaken to date, the limited extent of flooding in the area due to the nature of the topography and the limited amount of development likely to be affected by any changes in flood behaviour, it is considered that the flood assessment undertaken for both the augmented culverts on the upgrade section and the proposed culverts on the bypass section provide an adequate and appropriate assessment of the potential flood impacts of the proposal on adjacent properties.

- The impacts of flooding/inundation have not been adequately explored. The lowering of the highway would increase the impact of floods and drainage run off into the Split Solitary Islands Marine Park and may also affect properties east of the highway. Respondent disputes the section of the EA that states that "culvert augmentations are predicted to decrease flood levels" (p18-13).

Submission No. *060, 073, 074*

The impacts on flooding and inundation, were assessed in order to develop a drainage strategy that would minimise impacts on existing hydrological regimes. Augmentation of culverts in locations identified within the EA (Table 18.5), would increase the capacity of the culverts to release water in a storm event, decreasing potential flood levels upstream.

- The highway construction could cause a 'dam' effect between Emerald Beach turnoff and South Moonee and flooding on the eastern side of the highway. Fiddaman Creek would flood and impact on residents in Fishermans Drive.

Submission No. *74*

Proposed highway levels are comparable to the existing highway and no additional dam effect would result from the Proposal. The Proposal (including drainage structures) has been designed in order to minimise impacts on the existing hydrological regime (section 18.2.1 of the EA).

Groundwater

The following submissions were received with regards to groundwater:

- DECC requests careful consideration of the impacts on groundwater quality as a result of construction. An investigation into the techniques to be used and the possible impacts needs to be undertaken as well as plans for monitoring. DECC agrees that investigations into groundwater should be carried out prior to construction in consultation with DWE and DECC.

Submission No. *057*

The RTA has committed to undertaking investigations pre-construction to assess the potential for change in the groundwater table in response to significant construction activities that have a likelihood of impact (refer SoC SW8). Where a potential for change is identified, the significance of the change and any resultant impacts would be determined and where necessary, measures to manage the changes would be designed and implemented in consultation with relevant government agencies during the detailed design phase.

An assessment of the geotechnical investigations and road design would be undertaken during the detailed design phase to determine where groundwater could potentially be affected by the Proposal, however potential groundwater replenishing treatments that could be used include: infiltration trenches and basins, bio-retention basins or swales that help to replenish groundwater levels and improve water quality. The treatments would be assessed on an individual basis with their locations and sizes to be determined during the detail design phase.

- Commitment SW8 should be amended to "The potential for changes in the groundwater table or groundwater quality or groundwater hydrology in response to the significant…."

Submission No. *057*

Statement of Commitment SW8 has been amended to reflect the request from DECC (refer revised SoC SW8).

- Respondent is concerned about the impacts on groundwater and would like to know what investigations have been undertaken. Section 18.1.4 of the EA indicates no pyrometers have been installed.

Submission No. *060*

Groundwater levels were measured during geotechnical drilling operations. The EA does note that no piezometers were installed and therefore no long term monitoring of groundwater levels and flow regimes has been undertaken. The RTA has made a commitment (refer SoC SW8) that the impact on groundwater would be further assessed as a detailed study as part of the detailed design phase.

Water reuse

The following submissions were received with regards to water reuse:

- The DECC wants to see the development of a water use and water re-use sub plan where the reuse of water from basins is given first consideration for use. Insight is given into design issues and the advantages of such a scheme.
- A new Commitment should be included outlining a commitment to an appropriate water use hierarchy.

Submission No. *057*

Agreed. The revised Statement of Commitments included in this submissions report includes a new SoC (WR4).

2.2.21 Project objectives

Project objectives

The following submissions were received with regards to project objectives:

- The respondent objects to the statement "develop a route that involves community and considers their interests". Community interests are best served by removing heavy traffic from populated areas.

Submission No. *029*

There were a number of routes assessed during the route options development phase of the project, including options which were inland from the coastal towns. The process to determine the preferred route is identified within Chapter 6 of the EA and the *Preferred Route Option Report (Connell Wagner, 2004)*.

The route selection process is outlined in Chapter 6 of the EA. The value management workshop held in April 2003 concluded that of the five route options, options C and D should be considered further. The RTA then developed two revised options in response to a request from Council: Option C1 and Option E. The second value management workshop held in August 2004 considered options C, C1 and E using the same evaluation process as the first value management workshop (a triple bottom line of functionality, environmental and socio-economic issues). The majority of the participants recommended that Option E be considered further.

Option E was selected as the preferred route as it was considered to:

- Deliver the best overall socio-economic outcome.
- Better provide for future urban growth and provide greater flexibility for future land use planning decisions.
- Result in less severance of existing and future communities.
- Provide safety and noise improvements for Mullaway and Safety Beach.
- Be likely to have a higher degree of community acceptance.

The Proposal has been designed as a Class M upgrade inclusive of interchanges in specific locations to accommodate the predicted increase in population along the northern beaches. A Class M upgrade would also enable a local access road along the entire length of the Proposal that would separate local traffic from through traffic.

- The EA is not truthful about the reason for the "upgrade" (Pacific Highway Upgrade) program.

Submission No. *042*

The RTA has been truthful and has developed the Proposal in accordance with the overall objectives of the Pacific Highway upgrade program, and the Sapphire to Woolgoolga upgrade. These objectives are stated in Chapter 3 of the EA. Further justification on how the Proposal achieves the project and Pacific Highway Upgrade Program objectives is detailed in Chapter 22 of the EA.

- The objective of a safety upgrade has changed to a motorway standard upgrade consisting of 6 lanes.

Submission No. *062*

One of the key objectives of the Pacific Highway Upgrade Program is to reduce road accidents and injuries significantly. While the EA is for a four lane Class M highway, the Proposal has been designed to cater for future traffic growth, with the expansion to 6 lanes achievable, if required, (and subject to a separate approval process) by reducing the width of the median.

2.2.22 Route options

Class A upgrade

The following submissions were made with regards to a Class A upgrade:

- The Proposal is for an upgrade of the highway and that an A class standard would adequately enhance safety and that the M class standard is not necessary.

Submission No. *025, 048, 049, 051, 053, 054, 061, 067, 071, 075, 084, 088*

Traffic assessments undertaken for a Class A scheme for this project indicated that the Sapphire and Moonee Beach intersections would be unacceptable by 2021during peak hour traffic. A Class M scheme would provide a better level of service than the Class A.

The RTA's *Road Environment Safety Update No.22* (April 2004) provides data on recorded accident rates for typical major road types. Based on the data provided in the update, the Class M scheme included in the Proposal is anticipated to the following road safety improvements over a Class A scheme:

- Decrease total accident rates from approximately 29 crashes per 100mvkt to 20 crashes per 100mvkt.
- Decrease injury accident rates from approximately 12 injury crashes per 100mvkt to approximately 6 injury crashes per 100mvkt.
- Decrease fatal accident rates from 0.7 fatal crashes per 100mvkt to 0.3 fatal crashes per 100mvkt.

As a Class M scheme, the Proposal can incorporate a local access road for the local traffic, which would not form part of a Class A scheme. As such, the Proposal provides an alternative route for local traffic enables them to travel along the northern beaches without having to access the highway.

Far Western Bypass

The following submissions were received with regards to a Far Western Bypass:

- A Far Western Bypass would pass through viable farmland, State Forests, water catchments, National Parks and Aboriginal Reserves and must never be allowed to happen.
- Many respondents prefer the option of a Far Western Bypass for varying economic, safety and traffic reasons.
- A far western bypass would achieve a better economic growth result for Coffs Harbour and Woolgoolga.
- Roads have been constructed in worse terrain than that west of Coffs Harbour, and yet a Far Western Bypass has been put in the 'too hard' basket in this case.

Submission No. *007, 008, 011, 015, 022, 042, 060, 064, 073, 074, 076, 078, 079, 085*

Various route options were assessed during the route selection phase of the project and the options and the process are identified in Chapter 6 of the EA.

The investigations into a Far Western option were assessed relative to other routes investigated. It was confirmed that it was not a viable corridor option for the strategy as it:

- Has poor functional performance.
- Has moderate adverse socio-economic impacts.

- Has moderate to very high environmental impacts.
- Requires high investment with little opportunity for staging.
- Requires significant investment into upgrading of the existing highway until the Far Western Bypass becomes viable in 20+ years.
- Has poor economic performance.
- Is likely to have poor community acceptance.

The Value Management workshop held in April 2003 concluded that of the five route options, options C and D should be considered further. The RTA then developed two revised options in response to a request from Council: Option C1 and Option E. The second value management workshop held in August 2004 considered options C, C1 and E using the same evaluation process as the first value management workshop (a triple bottom line of functionality, environmental and socio-economic issues). The majority of the participants recommended that Option E be considered further.

Option E was selected as the preferred route as it was considered to:

- Deliver the best overall socio-economic outcome.
- Better provide for future urban growth and provide greater flexibility for future land use planning decisions.
- Result in less severance of existing and future communities.
- Provide safety and noise improvements for Mullaway and Safety Beach.
- Be likely to have a higher degree of community acceptance.

A review of the economic analysis (November 2007) indicated that a Far Western option was not a viable alternative with a benefit cost ratio of 0.36 at the time of opening, compared to the Proposal which has a benefit cost ratio of 2.

This EA is seeking planning approval for the preferred route and the RTA has no current Proposal for a Far Western Bypass. While the EA is for a four lane Class M highway, the Proposal has been designed to cater for future traffic growth, with expansion to 6 lanes possible (and subject to a separate approval process) by reducing the width of the median.

Option A/ Option D

The following submissions were received with regards to Option A/ Option D:

- Upgrading the highway along its present site through Woolgoolga would have less impact on the community and environment than the current Proposal. If it is upgraded to 100kph or more with sound barriers, trucks could maintain speed with no engine braking and reduced hill climbing.
- The respondents believe that Option A was preferred by most of the population of Coffs Harbour. This option only traversed 500m of the Sherwood Nature Reserve where the vegetation had been rated by experts as 'low value'.

Submission No. *009, 067*

Various route options were assessed during the options development phase of the project (see chapter 6 of the EA), including a western option (Option A). The value management workshop

held in April 2003 concluded that of the five route options, options C and D should be considered further. The RTA then developed two revised options in response to a request from Council: Option C1 and Option E. The second value management workshop held in August 2004 considered options C, C1 and E using the same evaluation process as the first Value Management workshop (a triple bottom line of functionality, environmental and socio-economic issues). The majority of the participants recommended that Option E be considered further.

Option E was selected as the preferred route as it was considered to:

- Deliver the best overall socio-economic outcome.
- Better provide for future urban growth and provide greater flexibility for future land use planning decisions.
- Result in less severance of existing and future communities.
- Provide safety and noise improvements for Mullaway and Safety Beach.
- Be likely to have a higher degree of community acceptance.

Option A was not favoured due to its severe environmental (biophysical) and Aboriginal heritage impacts, poor functional performance, high cost and poor value for money.

Option assessment

The following submissions were received with regards to option assessment:

- EA stated that Option E was considered likely to have a higher degree of community acceptance. This is because there are fewer residents along Option E to complain.

Submission No. *042, 067*

The second value management workshop held in August 2004 considered options C, C1 and E using the same evaluation process as the first value management workshop (a triple bottom line of functionality, environmental and socio-economic issues). The majority of the participants recommended that Option E be considered further.

Option E was selected as the preferred route as it was considered to:

- Deliver the best overall socio-economic outcome.
- Better provide for future urban growth and provide greater flexibility for future land use planning decisions.
- Result in less severance of existing and future communities.
- Provide safety and noise improvements for Mullaway and Safety Beach.
- Be likely to have a higher degree of community acceptance.

- The route option development was geared towards a preferred route. Holmes Air Sciences prepared an Air quality Constraints Report which only covered the inner bypass. Option E was not included in the report.

Submission No. *042*

The air quality constraints report was an assessment undertaken as part of and related to the southern Coffs Harbour section and was published in the Coffs Harbour Highway Planning Strategy Report (January 2004). Consequently the report did not consider any route options for the

northern (Sapphire to Woolgoolga) section (including Option E). The report provided a comparison of the likely air quality impacts of the Inner Bypass of Coffs Harbour and existing highway upgrade options of the southern Coffs Harbour section, and as such, it was not within the brief of the document to assess any options for the Sapphire to Woolgoolga upgrade.

- Respondent provides a review to the RTA Summerland Way inland route report that was not independently reviewed as recommended by a Parliamentary inquiry.

Submission No. *042*

The respondent attached a one page review of the RTA's Technical Review of Inland Corridor (via the Summerland Way). The author of the review was not identified.

A technical review of an alternative inland corridor (via the Summerland Way) was undertaken in 2006 by the RTA with the assistance of independent experts in the area of estimating costs, traffic assessments and flora and fauna impacts. The report can be downloaded from the RTA's website www.rta.nsw.gov.au/pacific. This review is not the subject of this EA.

The report assessed an inland corridor between Grafton and Tyagarah/Ewingsdale as an alternative to upgrading the Pacific Highway to dual carriageways.

The report concluded that an alternative inland corridor is not a viable alternative to upgrading the Pacific Highway as:

- It would not take traffic off the Pacific Highway.
- The traffic that would use the Summerland Way would not justify the cost.
- It would cost more than the Pacific Highway upgrade.
- The Pacific Highway would require upgrading even if the Summerland Way was built.
- The majority of traffic remaining on the Pacific Highway would require continuing investment to upgrade the highway even if the inland corridor was built.
- It would have to be completed in one stage, which means that other sections of the Pacific Highway identified for upgrade would be delayed.

- The EA states that for the Sapphire to Moonee Beach section, the existing highway was identified as the only feasible upgrade option and this finding was examined and accepted by the CFG. Respondents believe this was because the upgrade was split into sections. If the Coffs Harbour project was viewed and investigated as a whole, the results would have been different.

Submission No. *042, 067*

For the whole Coffs Harbour Highway Planning Strategy, there were a number of route options assessed that included a Far Western option. Options that were assessed were for both the southern and northern sections.

The existing highway was identified as the only feasible upgrade option for the Sapphire to south Woolgoolga section of the upgrade due to the constraints that would be encountered west of the highway alignment.

- Option E was not on the table at the first value management workshop and was developed without input from the community, particularly the Sikh community.
- Route selection was meant to be driven by a triple bottom line approach of economic, social and environmental sustainability but the emphasis is on freight and economics.
- Current proposed route affects 40 agricultural properties, which is more than other route options no longer considered.

Submission No. *042, 049, 053, 054, 061, 062, 067, 071, 076, 084, 085, 088*

The first value management workshop was held in April 2003. Option C1 and E were developed after the first value management workshop, in response to a request from Council to minimise the impact on the South Woolgoolga urban investigation area and to facilitate the future expansion of the township.

The Supplementary Options Report provided details on Option E, was released to the public in February 2004 for comment. Over 5,000 copies of community updates were mailed out and placed at static display sites which included a "Have your Say" comment sheet, for community feedback. CFG meetings were also held during the exhibition period. As part of the community consultation, the RTA contacted the Sikh temples and offered to present the options to the congregation. This offer was not taken up by either temple. However posters in Punjabi were put up in the temples and a local doctor's surgery.

Option B (including sub-routes B1 and B2) did not merit further consideration due to the need to protect valuable agricultural land at this locality. The Proposal impacts on less agricultural land.

The second value management workshop held in August 2004 assessed a number of options including option E. This workshop was attended by community stakeholders, and representatives of the Sikh community and banana industry were invited to attend the value management workshop. The majority of the participants at the workshop recommended that Option E be considered further.

Option E was selected as the preferred route as it was considered to:

- Deliver the best overall socio-economic outcome.
- Better provide for future urban growth and provide greater flexibility for future land use planning decisions.
- Result in less severance of existing and future communities.
- Provide safety and noise improvements for Mullaway and Safety Beach.
- Be likely to have a higher degree of community acceptance.

Route options located west of the Proposal were assessed as part of the options development phase of the project. These assessments indicated that options west of the preferred route (in Council's Preferred Corridor):

- Present significant engineering challenges as a result of locating the options outside the coastal plain and into the steep and hilly terrain associated with the coastal ridge.
- Provide poor functional performance.
- Are high cost and provide poor value for money.

- Have significantly adverse impacts on native flora and fauna.
- Have significant impacts on a landscape of Aboriginal heritage.

- The highway upgrade would result in the bypassing of several areas, but will traverse closely along Korora North and Sapphire Beach. The impacts on Korora residential and tourist areas such as noise and air pollution have not been assessed in the current Environment Assessment report.
- To the respondents' knowledge no serious investigations have been undertaken into an alternative route 100-200 metres west of the current Korora North to Sapphire route. The route conflicts with the policy to develop route options that will avoid environment and public health impacts, but was justified by the RTA, as only a relatively small number of people (1500-2000) people will be affected and because the topography did not allow for another route alternative. The respondent disputes this justification on the grounds that there are other practical, technical and economically viable options available.

Submission No. *066, 080*

It was determined that for the Sapphire to south Woolgoolga section of the project, the only viable route was to follow the existing highway alignment. The preliminary constraints analysis identified that land use pattern and steep terrain immediately to the west of the highway as significant constraints such that there were no realistic alternatives that warranted further consideration.

The upgrade of the highway between Korora and Sapphire would be assessed as part of the EA for the southern (Coffs Harbour section) of the Coffs Harbour Highway Planning Strategy.

Impacts from noise and air pollution as a result of the Proposal on the study area are addressed in Chapters 11 and 20 of the EA.

- The majority of the population of the study area is located on the coast. Why is through traffic being routed through the middle of a population?

Submission No. *067*

The Proposal has been designed to reduce impacts on agricultural land uses and a number of mitigation measures have been implemented to minimise any impacts (refer SoCs AG1- AG7).

Various route options were assessed during the route selection phase of the project (see chapter 6 of the EA). The value management workshop held in April 2003 concluded that of the five route options, options C and D should be considered further. The RTA then developed two revised options in response to a request from Council: Option C1 and Option E. The second value management workshop held in August 2004 considered options C, C1 and E using the same evaluation process as the first value management workshop (a triple bottom line of functionality, environmental and socio-economic issues). The majority of the participants recommended that Option E be considered further.

Option E was selected as the preferred route as it was considered to:

- Deliver the best overall socio-economic outcome.
- Better provide for future urban growth and provide greater flexibility for future land use planning decisions.
- Result in less severance of existing and future communities.

- Provide safety and noise improvements for Mullaway and Safety Beach.
- Be likely to have a higher degree of community acceptance.

Route options located west of the Proposal were assessed as part of the options development phase of the project. These assessments indicated that options west of the preferred route (in Council's Preferred Corridor):

- Present significant engineering challenges as a result of locating the options outside the coastal plain and into the steep and hilly terrain associated with the coastal ridge.
- Provide poor functional performance.
- Are high cost and provide poor value for money.
- Have significantly adverse impacts on native flora and fauna.
- Have significant impacts on a landscape of Aboriginal heritage.
- EA states that a wide range of route options have been explored but did not report that an independent peer review by Arup highlighted that less attention has been given to alternative routes such as Orara Way (far western route).

Submission No. *067*

In 2003, ARUP were commissioned to undertake an independent peer review of the route selection process for work done up to May 2002. This report specifically addressed the southern (Coffs Harbour) section of the *Coffs Harbour Highway Planning Strategy*. ARUP's review concluded that, *"the Inner Corridor is the preferred of the options for a bypass of Coffs Harbour"*.

The investigations into a Far Western option were adequate and appropriate to assess the route relative to other routes investigated. The assessment confirmed that it was not a viable corridor option for the strategy as it:

- Has poor functional performance.
- Has moderate adverse socio-economic impacts.
- Has moderate to very high environmental impacts.
- Requires high investment with little opportunity for staging.
- Requires significant investment into upgrading of the existing highway until the Far Western Bypass becomes viable in 20+ years.
- Has poor economic performance.
- Is likely to have poor community acceptance.

A review of the economic analysis (November 2007) indicated that a Far Western option was not a viable alternative with a benefit cost ratio of 0.36 at the time of opening, compared to the Proposal which has a benefit cost ratio of 2.

2.2.23 Support proposal

Support proposal

The following submissions were received with regards to support for the proposal:

- Respondents are in favour of the highway upgrade, mostly as proposed, as it will improve road safety and traffic flow. Some respondents harbour concerns over noise and air pollution.

Submission No. *007, 019, 031, 036, 044, 063, 065, 090*

Noted. Noise and air pollution are assessed in Chapters 11 and 20 of the environment assessment. A full noise assessment has been undertaken and the report, including identified mitigation measures, is provided as Working Paper 2: Noise and Vibration Assessment (Appendix F of the EA).

- The project Proposal has covered all concerns raised including: local traffic separation, safe passage for fauna and possible noise reduction. A practical outcome with minimum effect on the environment at a reasonable cost.

Submission No. *014*

Noted.

2.2.24 Other issues

Hazard and risk

The following submissions were made with regards to hazard and risk:

- Commitment HR3 should be amended to "Potentially hazardous activities to be conducted where there are suitable containment, treatment and disposal measures in place".

Submission No. *057*

Statement of Commitment HR3 has been altered to "Potentially hazardous activities will be conducted where there are suitable containment, treatment and disposal measures in place".

Utilities and services

The following submissions were made with regards to utilities and services:

- Transgrid indicates that they have no interest in the land subject to the Proposal.

Submission No. *005*

Noted.

- The Rural Fire Service raises no concerns or issues in relation to bush fire.

Submission No. *012*

Noted.

- The respondents are opposed to power lines or any other utilities being erected at the top of the ridge in front of their property which would be a safety hazard, disrupt views and devalue land.

Submission No. *078*

The location of relocated utilities is currently un-confirmed and may be influenced by design refinements. The positioning of relocated utilities would be further investigated during the detailed design phase.

3 Additional investigations and assessment

3.1 Climate change

3.1.1 Effect of the Proposal on climate change

The effect of the Proposal on climate change has been assessed within the EA. This has included an assessment of greenhouse gas emissions both during construction and operation of the proposed upgrade (section 20.2). The assessment has also included a number of mitigation measures to mitigate identified greenhouse gas emissions and reduce energy consumption (section 20.2.2) and manage waste (section 20.4.2).

As discussed in the EA, overall, the modelled greenhouse gas emissions are expected to drop below the predicted existing highway greenhouse gas emissions by approximately 2025. However, after 2025, greenhouse gas emissions from the existing highway with no upgrade are modelled to climb rapidly, while the greenhouse gas emissions for the upgrade climb at a less aggressive rate.

3.1.2 Effect of climate change on the Proposal

The effects of climate change on the proposed upgrade can be assessed in terms of changes to:

- Weather patterns.
- Storm intensity.
- Flooding behaviour and extent.

Climate change has the potential to change weather patterns for the study area. This could be in the form of temperature increases and higher winds. The Commonwealth Scientific and Industrial Research Organisation (CSIRO), in conjunction with the Bureau of Meteorology, has published a technical report titled *Climate change in Australia: technical report 2007*. The key findings of the report include average increases in temperature across the continent of 1°C. However, in coastal areas this is likely to be less (CSIRO, 2007). These temperature increases would not have a likely impact on the proposed upgrade.

Climate change could also lead to an increase in the intensity of rainfall events. Essentially, this would mean that the rainfall expected to occur in a 100 year ARI flood event would occur more frequently. Rainfall projections and intensity have also been considered in the CSIRO report and a number of scenarios can be accessed at the climate change website (http://www.climatechangeinaustralia.gov.au/index.php) with variable emission levels and for different future years. By selecting annual changes for 2030 and assuming low emission levels, the changes in rainfall pattern for the area of the proposed upgrade could vary from minus 10 to plus five per cent relative to the 1990 baseline (CSIRO et al 2007).

There is still a large fluctuation in data, which makes it difficult to provide any solid conclusions on the expected increases in rainfall intensity. However, in terms of the impact on the proposed upgrade, it could mean that the design immunity of the road would reduce as a consequence. It is not possible to quantify this potential effect at this stage.

Climate change also has the potential to result in changes in the flooding behaviour of the local watercourses. Increased sea levels could result in higher ocean levels at the mouth of a river during flood events. As these flood events are assumed to coincide with a cyclonic event (or East Coast tropical low), they are often accompanied by a storm surge. Flood modelling for the proposed upgrade has included a combined flood and storm surge scenario. Climate change may result in an increase in the frequency and intensity of cyclonic lows. This would lead to an increase in the magnitude of storm surges.

Hence, the overall effect of this issue is a rise in the water levels assumed for the ocean during flood events. The flood modelling for the Proposal (refer Chapter 18 of the EA) and additional flood modelling undertaken as part of this Submissions Report focussing on increased rainfall intensity and increased mean sea level scenarios includes relatively conservative ocean storm surge levels. Section 3.2 below provides further details regarding considerations and conservative assumptions used when undertaking the additional flood modelling.

Due the uncertainty in expected impacts due to climate change, the RTA considers that an adaptive management approach to mitigation is appropriate to manage those impacts.

3.2 Additional flood modelling / sea level rise

3.2.1 Background

As part of the Sapphire to Woolgoolga environmental assessment public exhibition period, the Department of Environment and Climate Change made a submission expressing their concerns regarding the extent of flood modelling undertaken for the Proposal. Following discussions with Department of Environment and Climate Change representatives on 23 April 2008, it was agreed to run a number of flood scenario models (Scenarios 1 to 7) to address their submission request. The Department of Environment and Climate Change required that an assessment be made of the Proposal's flood immunity based on the potential impact of climate change; that is, increased rainfall intensity and increased mean sea levels. In addition to these scenarios, the RTA undertook to run an additional scenario (Scenario 8).

Table 3.1 lists the scenarios requested by the Department of Environment and Climate Change.

The additional flood modelling for the Proposal includes relatively conservative ocean storm surge levels. For example, the 1 % Annual Exceedance Probability ocean level storm surge is assumed to peak at 2.6 m Australian Height Datum. Recent revisions by the Department of Environment and Climate Change of the probability of the 1% Annual Exceedance Probability storm surge levels for northern NSW indicate a level of 2.2 m Australian Height Datum is more likely. However, this

TABLE 3.1 INCREASED RAINFALL INTENSITY AND INCREASED MEAN SEA LEVEL SCENARIOS MODELLED

SCENARIO	RAINFALL EVENT	TIDE BOUNDARY (RISE IN SEA LEVEL)
1 #	1% AEP	1.75m AHD (HAT + CC)
2 #	1% AEP +10% intensity	1.2m AHD (HAT)
3 #	5% AEP	2.6m AHD storm surge (1% AEP)
4 #	5% AEP	3.15m AHD storm surge (1% AEP + CC)
5 #	5% AEP +10% intensity	2.6m AHD storm surge (1% AEP)
6 *	1% AEP + 10% intensity	N/A
6a+	1% AEP + 10% intensity	N/A
7+	5% AEP + 10% intensity	N/A
8#	1% AEP	2.6m AHD storm surge (1% AEP)

\# Cunningham and Skinners Creeks
* Woolgoolga Creek only
\+ Double Crossing and Arrawarra Creeks
AHD Australian Height Datum
AEP Annual Exceedance Probability
CC Climate Change
HAT Highest Astronomical Tide

level would still need to include an allowance for increased storm surge magnitude and sea level rise possibly resulting from climate change. The increase would be in the order of 0.4 to 0.6 m, resulting in a sea level of approximately 2.8 m Australian Height Datum which is 0.35 m below the conservative 3.15 m Australian Height Datum used for the additional modelling for climate change.

Arrawarra Creek and Woolgoolga Creek are not affected by tidal conditions under the current Highest Astronomical Tide. Woolgoolga Creek would not be affected by increased sea levels from climate change and storm surge, however, Arrawarra Creek could potentially become tidal under increased sea levels and storm surge conditions. As a result, a normal depth has been applied for downstream areas at these locations in lieu of applying ocean conditions. Scenario 6 (for Woolgoolga Creek) is therefore essentially the same as Scenario 2 but instead of applying a Highest Astronomical Tide for the creek, a specific ("normal depth") factor is applied based on channel characteristics (width, depth, flow rate etc.) that are specific to Woolgoolga Creek. This situation applies equally to Arrawarra Creek, and as such Scenario 6a is essentially the same as Scenario 6 but applies a ("normal depth") factor specific to Arrawarra Creek. Scenario 7 is essentially the same as Scenario 5; however the ("normal depth") factor specific to Arrawarra Creek is applied to the Scenario 5 equation.

3.2.2 Methodology

The Moonee Beach (20m grid spacing) and Hearnes Lakes (5m grid spacing) were two floodplain models, generated for the environmental assessment. They were used to calculate tail water levels for the proposed highway upgrade crossings. Runs for each new scenario were created with the critical duration hydrograph from the RAFTS model inputted, and tidal boundary conditions applied as stipulated by the scenario. The topography from the previous model was utilised in the revised MIKE models. The Moonee Beach floodplain contains Cunninghams and Skinners Creek crossings while Hearnes Lakes modelled the proposed upgrade at Double Crossing Creek. A MIKE model was not produced for Arrawarra Creek or Woolgoolga Creek as the Proposal crosses these creeks in their non tidal reaches. To define the tailwater conditions, a normal depth of flow is applied based on bed slope of the creek downstream of the Proposal.

The HEC-RAS models for the bridge crossings were updated with the new boundary conditions to determine upstream water levels and the effect that proposed and existing bridges would have on the watercourses. There are limitations and assumptions to the modelling and these are discussed below.

3.2.3 Model limitations

The detailed survey data for the Proposal was obtained to a level which was sufficient for the environmental assessment. As such, this data does not cover the distance downstream for the flow to fully expand after the bridge constrictions and does not extend far enough upstream to assess the maximum influence the bridge would have on head water levels.

The bridge designs as identified in the environmental assessment have a greater cross sectional area for flow under the structures compared to the existing bridges, which minimises the impact of the proposed bridges on upstream flooding impacts (note that bridge design would be subject to further refinement during the detailed design phase). Tailwater conditions for Cunninghams and Skinners Creek are affected by tidal boundary conditions and will govern the downstream water level of the creeks. The two new bridges proposed to cross over Arrawarra Creek have a larger cross-sectional area for flows compared to the existing bridge. Hence, the existing bridge provides the greatest restriction to flow at this location. The water levels presented below do not reflect this because of assumptions made on the channel slope.

The Proposal includes in stream channelisation works at Arrawarra creek to accommodate two new bridge structures. The proposed re-alignment geometry and slope data for the proposed in stream channelisation works were obtained from the studies undertaken for the environmental assessment. It has been assumed that a channel long-section at the existing bridge would be replicated and extrapolated upstream at a slope similar to that of the downstream slope. This assumption is considered sufficient for the purposes of this assessment. Further investigations of the in-stream channelisation works would occur in the detailed design phase of the Proposal.

3.2.4 Results of the modelling

The scenario modelling is based on previous RAFTS models for input flows at bridge structures. Increases of 10% were applied to the rainfall intensity and duration on applicable catchments for the 1% Annual Exceedance Probability and 5% Annual Exceedance Probability design storms. The peak flows obtained are provided in Table 3.2 below.

TABLE 3.2 SUMMARY OF PEAK FLOWS AT 1% AEP AND 5% AEP WITH A 10% RAINFALL INTENSITY AND DURATION.

LOCATION	PEAK FLOWS (M3/S)#					
	5% AEP IN EA	5% AEP + 10% intensity	CHANGE	1% AEP IN EA	1% AEP + 10% intensity	CHANGE
Cunninghams Creek	50.9	58.2	+ 7.3	70.8	87.0	+ 16.2
Skinners Creek	67.8	77.5	+ 9.7	93.8	117.0	+ 23.2
Double Crossing Creek	63.8	73.6	+ 9.8	88.6	106.4	+ 17.8
Arrawarra Creek	50.7	57.3	+ 6.6	73.5	87.0	+ 13.5
Woolgoolga Creek	–	–	–	206	232.2	+ 26.2

No direct comparison can be made between the peak flows under these conditions and the scenario results (see Table 3.3) as the peak flows mentioned here do not take into consideration tailwater levels.

Table 3.3 outlines the upstream water levels for the existing and proposed structures for the different modelled scenarios. Downstream water levels were not assessed as the existing water levels should be the same as the design level due to the flow regime experienced in the channel.

TABLE 3.3 UPSTREAM WATER LEVELS FOR EXISTING AND PROPOSED STRUCTURES FOR MODELLED SCENARIOS

LOCATION	APPROX. BRIDGE DECK LEVEL (mAHD)	APPROX. BRIDGE SOFFIT LEVEL (mAHD)	SCENARIO*	EXISTING UPSTREAM WSL (mAHD)	CHANGE IN EXISTING UPSTREAM WSL FROM EA (m)	UPSTREAM WSL DESIGN (mAHD)	CHANGE IN UPSTREAM DESIGN WSL FROM EA (m)	DISTANCE FROM DESIGN WSL TO BRIDGE DECK (m)	DISTANCE FROM DESIGN WSL TO BRIDGE SOFFIT (m)
Cunninghams	4.8	3.9	EA+	3.02		3.08		1.72	0.82
Creek			1	3.27	0.25	3.23	0.15	1.57	0.67
			2	3.44	0.42	3.39	0.31	1.41	0.51
			3	3.12	0.10	3.10	0.02	1.7	0.8
			4	3.43	0.41	3.42	0.34	1.38	0.48
			5	3.22	0.20	3.19	0.11	1.61	0.71
			8	3.34	0.32	3.30	0.22	1.5	0.6
Skinners	6.7	5.7	EA+	5.25		5.27		1.43	0.43
Creek			1	5.71	0.46	5.76	0.49	0.94	**-0.06**
			2	5.98	0.73	6.12	0.85	0.58	**-0.42**
			3	5.29	0.04	5.31	0.04	1.39	0.39
			4	5.30	0.05	5.32	0.05	1.38	0.38
			5	5.46	0.21	5.49	0.22	1.21	0.21
			8	5.72	0.47	5.78	0.51	0.92	**-0.08**
Double	6.8	4.7	EA+	4.00		4.04		2.76	0.66
Crossing			6a	4.41	0.41	4.29	0.25	2.51	0.41
Creek^			7	3.85	-0.15	3.78	0.26	3.02	0.92
Woolgoolga	22.1	20.0	EA+	14.67		14.76		7.34	5.24
Creek			6	14.78	0.11	14.81	0.05	7.29	5.19
Arrawarra	9.5	7.7	EA+	5.94		6.05		3.45	1.65
Creek			6a	6.24	0.30	7.06	1.01	2.44	0.64
			7	5.67	-0.27	6.62	0.57	2.88	1.08

* Refer to Table 3.1 for scenario descriptions.
^ As Double crossing creek is not affected by tidal boundaries, scenario 2 and 5 were the only relevant model scenarios.
\+ Levels reported in Table 18.7 of the EA (levels based on 1% AEP storm event and a Highest Astronomical Tide).
WSL Water Surface Level.

All modelled scenario water levels were below the proposed deck level of these structures. All proposed bridge structures have immunity for all scenarios modelled, however the water level at the Skinners Creek bridge would impact on the superstructure. The impedance of Skinners Creek Bridge at a scenario of 1% Annual Exceedance Probability flows and up to the 0.05% Annual Exceedance Probability design event results in an afflux of up to 0.15 m which has the potential to impact on a local residential property near the bridge at Skinners Creek. Further bridge design and refinement would occur during the detailed design phase which would consider all relevant modelled scenarios, and an adaptive management approach would be taken at this location with regard to potential afflux issues.

Cunninghams Creek and Double Crossing Creek Bridge have minimal impact on water levels with a general decrease in afflux by reducing the upstream water level by up to 0.03 m at Cunninghams Creek and 0.11 m at Double Crossing Creek. This change in behaviour would reduce the impact on properties upstream. Downstream flooding would not change due to the interaction with ocean events.

The assumption made at Arrawarra Creek Bridge in re-aligning the creek and continuing the slope upstream would have a large impact on the water levels by 0.85 m upstream. Further analysis should be undertaken during detail design since a change in the water level of this magnitude is not desirable and possible alternatives such as a flatter slope or wider channel be investigated.

At Woolgoolga Creek the upstream water level would increase by up to 0.17 m with a 10% increase in rainfall intensity. This is in comparison with a 0.11 m increase as quoted in the environmental assessment. The land upstream of the proposed highway at Woolgoolga Creek is state forest and the increase in upstream water levels would not affect properties or residences.

3.2.5 Management measures

The current highway forms an existing barrier to water flow, particularly in flood prone areas. As such, the Proposal has been designed so that bridge and culvert structures would not substantially alter peak water levels, discharge or velocity distributions either upstream or downstream of the Proposal.

All substructures of the bridges would be subject to hydraulic flows and detailed design should be carried out accordingly. The bridge superstructures would be immune to hydraulic flows. Nonetheless, lateral stability should be provided through the headstocks and bearing pads. This is usually incorporated as standard design of bridge structures.

A balance needs to be identified between minimal changes to the hydrology of the area, as well as addressing potential impacts due to climate change. It is proposed that an adaptive management approach to mitigation measures is appropriate to manage potential identified flooding impacts.

The RTA has assessed the impacts of climate change on the Proposal through the identified flooding scenarios agreed to in consultation with the Department of Environment and Climate Change. This assessment is based on the characteristics of the catchments at the present time, utilising the best and most accurate information available at this time.

It should be recognised that the Proposal only crosses a small section of the identified catchments. All other development that occurs within these catchments has the potential to impact on and be affected by climate change. The RTA cannot and is not able to assess any potential future impacts that are outside the scope of this Proposal.

Subsequent development within these catchments may impact on climate change; however, the RTA cannot assess any potential future impacts. These impacts should be assessed by individual developers as projects evolve.

3.3 Flora and fauna investigations

3.3.1 Regional scale cumulative impacts

The Proposal is located in the NSW North Coast Bioregion which covers an overlap in the distribution of tropical and temperate species from the eastern sea board resulting in highly diverse array of species (NPWS 1994). Of the bioregions in NSW, the North Coast Bioregion has the second highest area of conservation land. Land under conservation tenures occupy about 1,061,709 hectares or 18.65 per cent of the bioregion. National parks and nature reserves (under

the *National Parks and Wildlife Act 1974*) make the greatest contribution to the area conserved. Other areas include world heritage areas, Aboriginal areas, historic sites and land under voluntary conservation agreements.

The Proposal forms part of the Pacific Highway Upgrade Program which includes sections of the highway already upgraded and sections proposed for upgrading. The cumulative impact of clearing of vegetation and habitats, including endangered ecological communities (EECs), within the NSW North Coast Bioregion would be greater for the entire Pacific Highway Upgrade Program than for those assessed as part of this individual Proposal.

There are 12 Pacific Highway Upgrade Program projects located in the NSW North Coast Bioregion that have been listed as critical infrastructure by the Minister for Planning under Section 75B(1) of the EP&A Act. The status and details for these projects are presented in Table 3.4.

TABLE 3.4 APPROXIMATE CLEARING ESTIMATES FOR PACIFIC HIGHWAY UPGRADE PROJECTS IN THE NSW NORTH COAST BIOREGION

PROJECT	STATUS	LENGTH (KM)	LIKELY VEGETATION REMOVAL (HA)*	LIKELY EEC REMOVAL (HA)
Banora Point	Environmental Assessment complete	2.5	8	4
Tintenbar to Ewingsdale	Environmental Assessment commenced	17	10	2
Woodburn to Ballina	Preferred route selected	36	66	52
Iluka Road to Woodburn	Concept design selected	35	117	31*
Wells Crossing to Iluka Road	Preferred route selected	71	410*	88*
Woolgoolga to Well Crossing	Preferred route selected	27	207*	33*
Sapphire to Woolgoolga	Environmental Assessment commenced	25	83	18
Coffs Harbour Bypass	Preferred route selected	55	TBA	TBA
Warrell Creek to Urunga	Environmental Assessment commenced	45	236*	82*
Kempsey to Eungai	Environmental Assessment commenced	40	258	65
Oxley Highway to Kempsey	Environmental Assessment commenced	37	229*	66*
Total		**391**	**1624**	**441**

\# Where the likely extent of removal of vegetation is not yet known it is indicated as to be advised (TBA)

* The clearing estimates are approximate figures only due to the stage of project development. These figures are based on 100 m corridor. Actual clearing footprint is likely to be less

From Table 3.4 it can be seen that the Sapphire to Woolgoolga Proposal is 25 km in length representing approximately 6 percent of the overall Pacific Highway Upgrade Program. In terms of the area of vegetation clearance required, the Sapphire to Woolgoolga Proposal represents approximately 5 percent of the currently known total for the entire Pacific Highway Upgrade Program. This proportion will decrease when additional data is available for those upgrade sections for which the extent of clearing is currently unknown (marked 'TBA' in Table 3.4). Similarly, the Sapphire to Woolgoolga Proposal accounts for approximately four percent of the current total area of EECs required to be cleared for the Pacific Highway Upgrade Program and this proportion may also decrease.

The individual projects comprising the Pacific Highway Upgrade Program are generally located in similar landscapes on the coastal plain; many of the vegetation communities affected will be similar across the projects. As identified above the Sapphire to Woolgoolga Proposal would account for a relatively small amount of the overall cumulative impact of the Program.

When considering the cumulative impacts on EECs, the data relating to the extent of the different ECCs within the region is limited. Also, due to the stage of project development for other Pacific Highway Projects there is limited available data on the different ECCs affected. Table 3.5 identifies the extent of clearing required for six of the twelve upgrade projects in the NSW North Coast Bioregion for Swamp Oak Floodplain EEC and the Lowland Rainforest on Floodplain EEC.

TABLE 3.5 LIKELY CLEARING EXTENT OF TWO EECS FOR SIX PACIFIC HIGHWAY UPGRADE PROJECTS IN THE NSW NORTH COAST BIOREGION.

PROJECT	SWAMP OAK FLOODPLAIN FOREST (ha)	LOWLAND RAINFOREST ON FLOODPLAIN (ha)
Banora Point	1.3	0.02
Woodburn to Ballina	38.2	–
Sapphire to Woolgoolga	5.3	1.0
Macksville to Urunga	1.2	–
Warrell Creek to Urunga	1.2	–
Kempsey to Eungai	23.1	–
Total	**70.3**	**1.02**
Extent in region	2,883*	<1,000#

* Based on CRA Forests Vegetation Habitat Modelling for Upper North East NSW
\# In NSW based on the NSW Scientific Committee final determination

The Sapphire to Woolgoolga Proposal would account for approximately 8 percent of the currently known clearing of the Swamp Oak Floodplain Forest and 98 percent of the Lowland Rainforest on Floodplain. It is expected that these proportions would decrease as further data is available for the remaining six projects comprising the wider program. When compared to the estimation of the extent of each EEC remaining in the region, the Sapphire to Woolgoolga Proposal relates to less than 0.2 percent for both communities. This is considered to be a minor regional scale cumulative impact.

3.3.2 *Phaius australis* (Southern Swamp Orchid)

The Southern Swamp Orchid is listed as endangered under both the *NSW Threatened Species Conservation Act 1995* and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.

Field investigations for the proposed Arrawarra interchange as part of the Sapphire to Woolgoolga EA were undertaken in March 2007. These investigations were undertaken outside the flowering period (September-October) of this species when it is most easily detected and as such recommended that further surveys be undertaken for *Phaius australis* (Southern Swamp Orchid) as suitable habitat was present within the study.

In response to this recommendation, SoC F5 was included within the Statement of Commitments as Appendix A to the EA. It stated:

> *"Surveys will be undertaken during the flowering period (September to October) of the Swamp Orchid (Phaius australis) within areas of suitable habitat (Swamp Sclerophyll Forest) within the Arrawarra interchange area to determine the presence or absence of this species and (if present) to develop appropriate mitigation strategies."*

To fulfil this commitment, targeted surveys for the Southern Swamp Orchid were undertaken on 24 October 2007 within identified suitable habitat for the species, including *Broad-leaved Paperbark Swamp Sclerophyll Forest* and *Swamp Oak Swamp Sclerophyll Forest,* and adjacent vegetation within the proposed Arrawarra interchange footprint.

Despite targeted surveys undertaken during the flowering period of the Southern Swamp Orchid, no individuals were identified within the proposed Arrawarra interchange area. All areas of Swamp Sclerophyll habitat and adjacent areas were searched during these surveys.

Therefore, it has been concluded that the proposed Arrawarra interchange would not affect the threatened Southern Swamp Orchid, as no individuals were recorded from the areas potentially affected.

The SoC relating to the targeted investigation for *Phaius australis* (Southern Swamp Orchid) (SoC F5) has subsequently been removed from the revised Statement of Commitments provided in Chapter 5 of this Submission Report.

3.3.3 *Typhonium brownii / Typhonium sp. Aff. brownii*

A Typhonium species without flowers was recorded during field flora surveys December 2005 on the eastern side of the proposed alignment, approximately 75 m south of Newmans Road. As no flowers were present the ecologist was unable to determine absolutely if this species was *Typhonium brownii*, a relatively common species, or the endangered species *Typhonium sp. Aff. brownii*.

In the absence of a conclusive identification, the EA applied the precautionary principle and the population was treated as being the *Threatened Species Conservation Act 1995* listed (endangered) *Typhonium sp. Aff. brownii* unless proven otherwise. The concept design was also refined to minimise the potential impact on this species and measures to protect it during construction were identified unless subsequent surveys could identify them as the common *Typhonium brownii* species.

The Statement of Commitments (SoC F4) stated that:

> *"Surveys would be undertaken during the flowering period of the Typhonium species recorded in the vicinity of Newmans Road to determine whether individuals present are threatened species. If the species cannot be positively identified prior to construction, then precautionary measures to protect the species during construction (such as exclusion fencing) will be employed."*

In fulfilling this commitment, targeted surveys for the Typhonium species were undertaken in February 2008 with the assistance of Steve Clemesha (member of the Ulitarra Conservation Society). Due to heavy rains in the area in the weeks preceding the targeted survey effort, this survey was not able to detect the species along Poundyard Creek, with the creek banks highly scarred from fast flowing waters.

As the species was not found during these surveys, SoC F4 remains in the Revised Statement of Commitments (refer Chapter 5 of this Submission Report). SoC F4 commits to another targeted *Typhonium sp. Aff. brownii* survey prior to construction and during the flowering period to determine the exact species of Typhonium present in the study area. It should be noted also that SoCs F2 and F3 commit to avoidance and / or protection of individual threatened plant species where possible.

4 Design refinements and clarifications to the EA

In response to individual concerns about property acquisition, the RTA has undertaken further investigation and made a number of amendments to the proposed extent of property acquisition in some areas in response to these concerns. These refinements are illustrated in Figures 4.1a to 4.1c.

4.1 Property boundary changes

Due to concerns raised within submissions there has been a review and subsequent refinement of the road reserve boundary at the following locations:

- Property Effect No. 16; located in Hunter Close (refer Figure 4.1a): It is proposed to shift the boundary to the east, closer to the existing property boundary, reducing the required area of acquisition by approximately 770m^2.
- Property Effect No.113 located at Newmans Road (refer Figure 4.1b): It is proposed that the road reserve boundary at this location be refined reducing the required area of acquisition by approximately 0.37 ha.
- Property Effect No.125; located in Bark Hut Road (refer Figure 4.1c): It is proposed that the road reserve boundary at this location be refined reducing the required area of acquisition by approximately 0.46 ha.

4.2 Property access arrangements

Due to concerns raised within submissions there has been a review and subsequent refinement of property access arrangements at the following locations:

- Property Effect No. 7; located on the Pacific Highway (refer Figure 4.1d): Access arrangements amended to permanently join to Hunter Close, rather than only providing a temporary access onto the Pacific Highway.
- Property Effect No. 90; access road grade reduced from 20% to 15%.

The changes to property access outlined above would enable the agricultural properties to maintain production with minimal impacts on access arrangements.

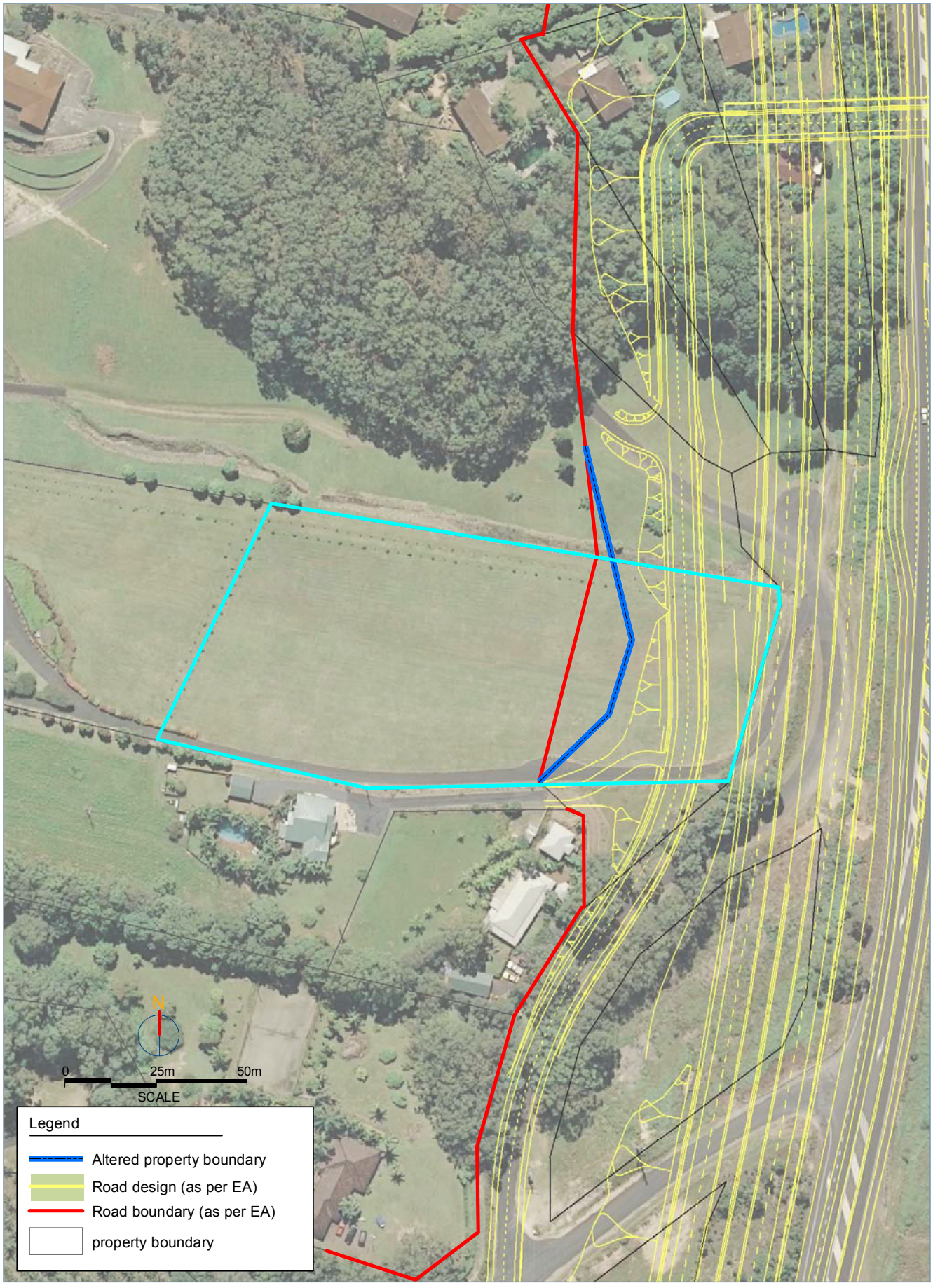

FIGURE 4.1A PROPOSED CHANGE TO PROPERTY AQUISITION AREA

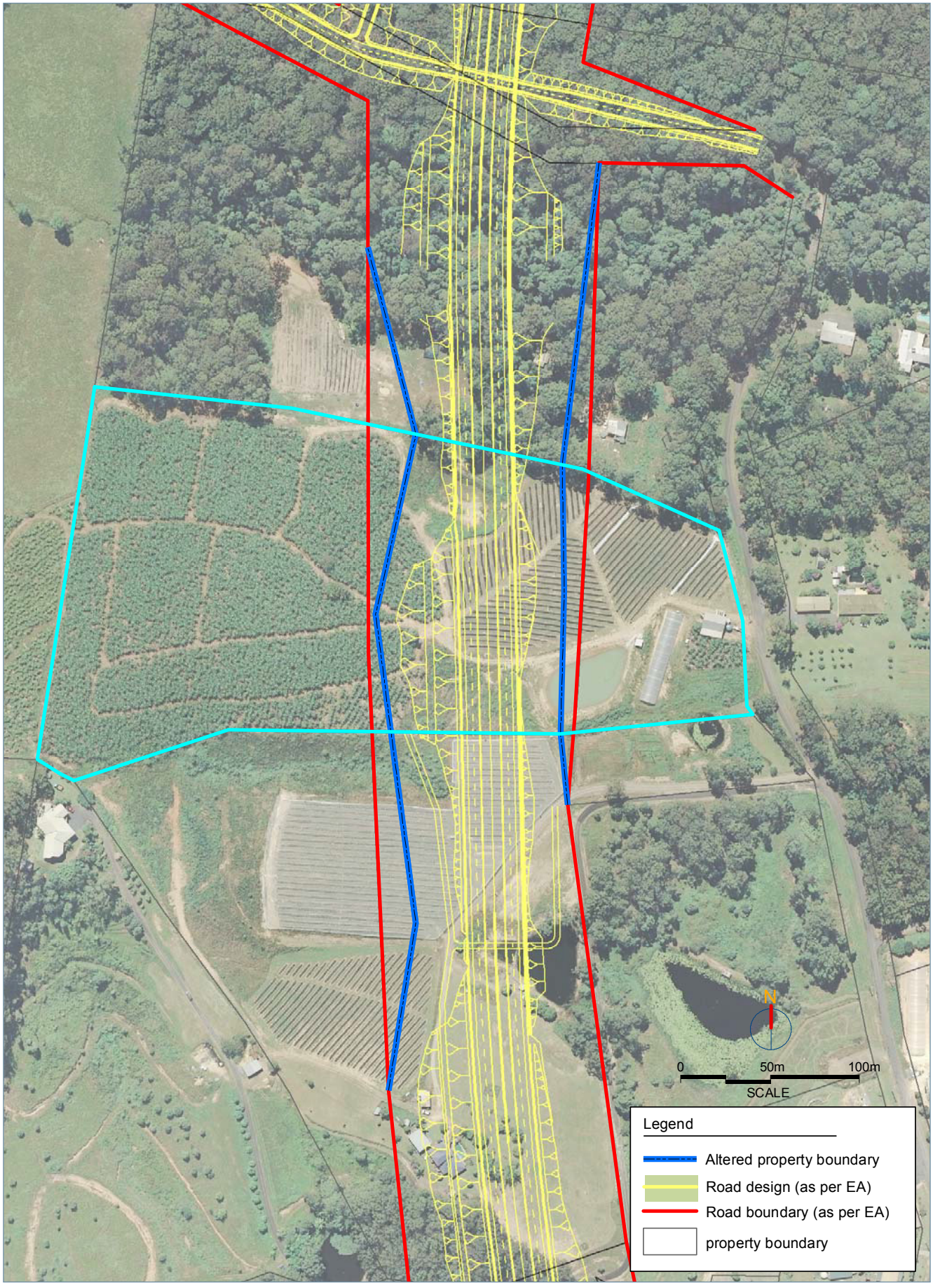

FIGURE 4.1B PROPOSED CHANGE TO PROPERTY AQUISITION AREA

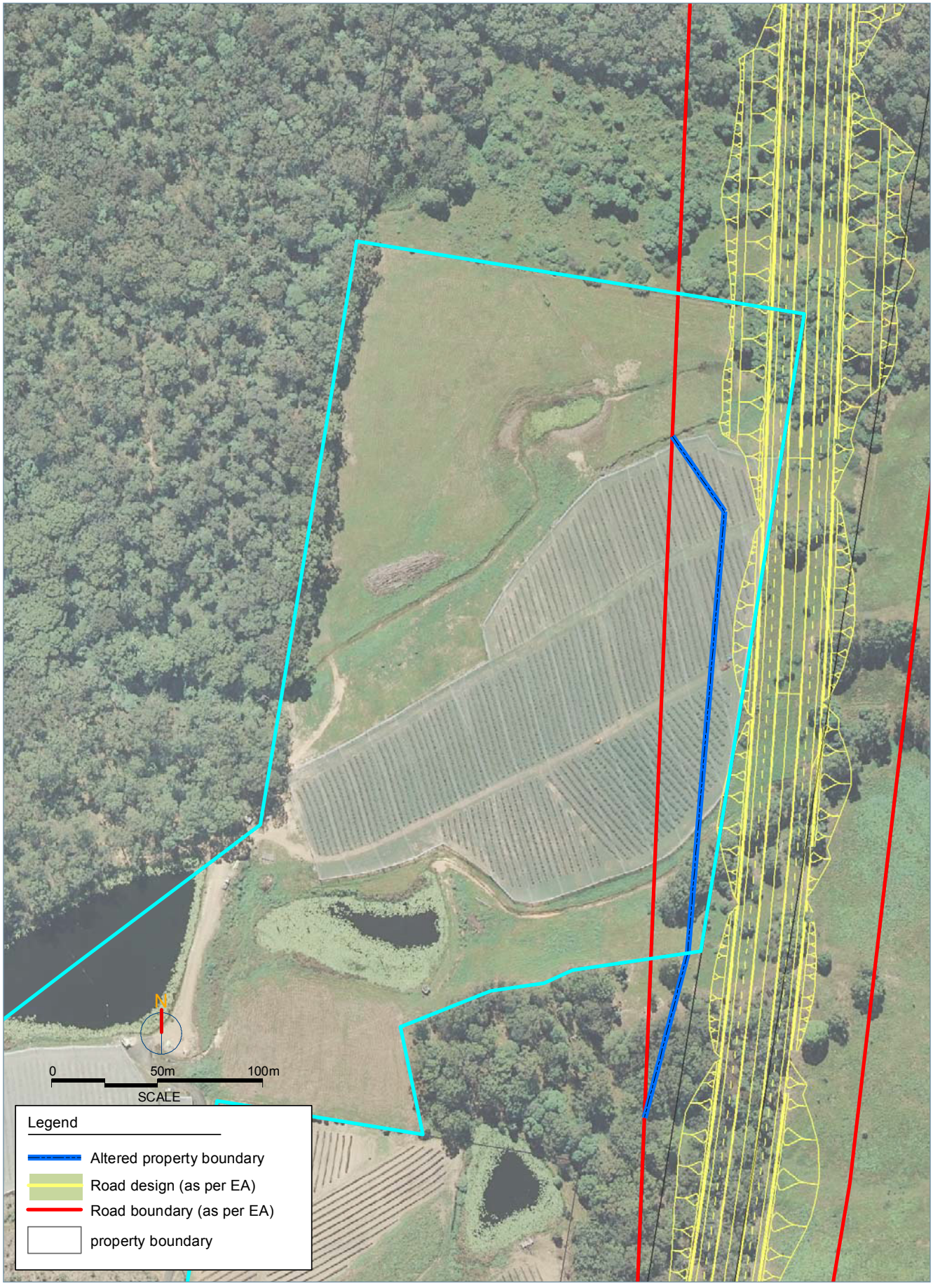

FIGURE 4.1C PROPOSED CHANGE TO PROPERTY AQUISITION AREA

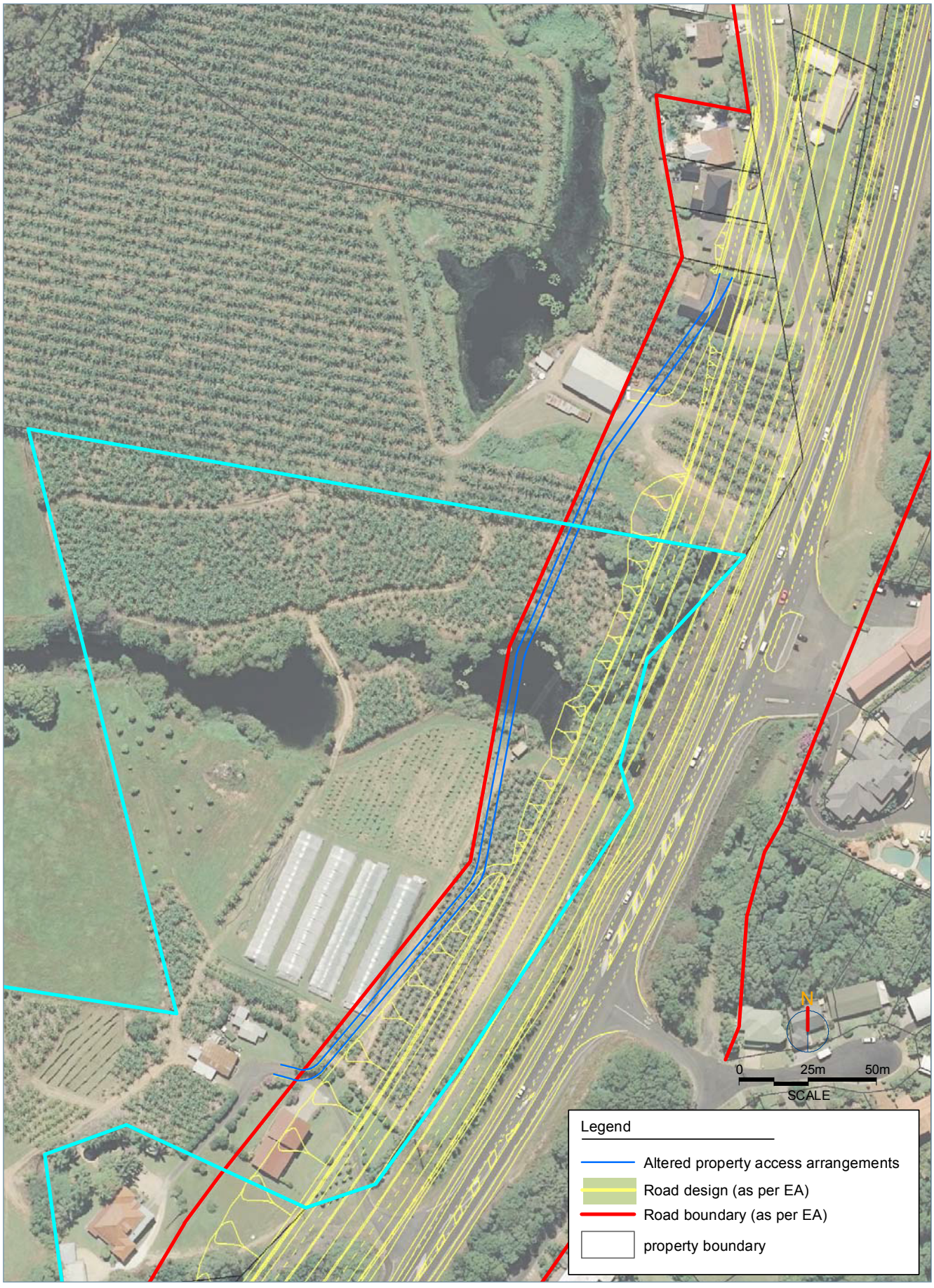

FIGURE 4.1D PROPOSED CHANGE TO ACCESS ARRANGEMENTS

4.3 Clarifications to the EA

The RTA would like to clarify some items which appeared in the EA.

4.3.1 Construction work hours

Issue: Page 11-23 of the EA and SOC (CN2) indicated that construction is proposed for Saturdays between 7am and 4pm. The Noise and Vibration assessment report (Working Paper 2) stated that construction would occur between 8am and 1pm on Saturday, as does Section 8.2.2 of the EA.

The statement that construction would occur between 8am and 1pm on Saturday was incorrect. Construction activities would be restricted to construction hours for the Proposal. The hours would be 7.00am to 7.00pm Monday to Friday; 7.00am to 4.00pm Saturdays and no work on Sunday or public holidays except in accordance with the following:

Works outside standard construction hours will be limited to:

- Any works that do not cause construction noise to be audible at any sensitive receivers.
- The delivery of materials required outside these hours by the Police or other authorities for safety reasons.
- Emergency work to avoid the loss of lives, property and/or to prevent environmental harm.
- Any other work as agreed after appropriate consultation with affected residents, the Department of Environment and Climate Change, and local council.

4.3.2 Aboriginal Heritage sites impact

Issue: Table 12.1 of the EA indicated that the project will have a direct and indirect impact on S2W 3, S2W4, S2W5, S2W10, S2W11 and S2W12.s

Table 12.1 in the EA outlined the impacts the Proposal would have on the identified Aboriginal heritage sites. Impacts were identified as direct and indirect impacts:

- Direct impacts are those where the Aboriginal heritage site falls within the footprint of the Proposal and would be directly affected by construction activities.
- Indirect impacts are those where the footprint of the Proposal does not directly affect the Aboriginal heritage site, however there is still potential that activities associated with the construction of the Proposal could affect the site due to the proximity of the Aboriginal heritage site to construction activities.

S2W-3 is a single artefact located on the edge of Skinner's Creek. It is possible that the Proposal would impact on the location through the construction of bridges over Skinners Creek. However, as the artefact was not found during the field surveys, it is uncertain whether a direct impact on the artefact would occur. Within Table 12.1 in the EA, it was identified as being both a direct and indirect impact due to the uncertainty of impact.

S2W-4 is a highly significant campsite. The highway alignment has been designed to avoid the property within which the campsite is located. However, construction of the Proposal may indirectly impact on artefacts from the site that are within the road reserve. The property would also have its access re-instated. This re-instatement would result in a direct impact to the site.

S2W-5 consists of a single artefact and a Potential Archaeological Deposit (PAD). The single artefact falls within the construction footprint and would be directly affected by the Proposal. The

defined PAD site (associated with the artefact) does not fall within this footprint and as such the PAD could be indirectly affected during construction of the Proposal.

S2W-10 is a PAD site (associated with a ceremonial/ sacred site located approximately 800m to the west of the highway). The PAD site falls within the Proposal footprint as local Aboriginal representatives believe that sub-surface artefacts may be present. As such, there would be a direct impact on the PAD site. However, as the ceremonial/sacred site itself is not within the footprint of construction, only potential indirect impacts are considered possible at this site through the construction period.

S2W-11 is a PAD site located within the construction footprint, having been identified by local Aboriginal representatives who believe that there may be sub-surface materials present at this site. This PAD site is associated with a ceremonial/ sacred site further upstream. The relationship between direct and potential indirect impacts for S2W-11 is as described for S2W-10 above.

S2W-12 is an artefact scatter that only partially falls within the Proposal footprint. The area of the artefact scatter within the Proposal footprint has been identified as being directly affected, whereas the remainder of the scatter is close to the alignment (not directly affected), as such there is potential that this portion of the site could be indirectly affected during the construction period.

5 Revised Statement of Commitments

After consideration of the issues raised in the public and stakeholder submissions, the draft Statement of Commitments for the Pacific Highway upgrade between Sapphire and Woolgoolga (refer Appendix A of the EA) has been revised. The revised commitments would guide the subsequent phases of the Sapphire to Woolgoolga development to minimise impacts on the environment.

Should the Proposal be approved, the RTA would implement the environmental management measures outlined in the draft Statement of Commitments. Any contractor selected to undertake further planning, design or construction of the proposed project would be required to undertake all works in accordance with these commitments.

New Statements of Commitments are shown in red, previous draft Statements of Commitments which have been removed are shown in strikethrough.

The following definitions apply in relation to the revised Statement of Commitments:

PRE-CONSTRUCTION	Work in respect of the Proposal that includes design, survey, acquisitions, fencing, investigative drilling or excavation, building / road dilapidation surveys, minor clearing (except where threatened species, populations or ecological communities would be affected), establishing ancillary facilities such as site compounds (in locations meeting the criteria identified in section 8.4.4 of the EA) or other relevant activities determined to have minimal environmental impact (e.g. minor access roads).
CONSTRUCTION	All work in respect of the Proposal other than that defined as a pre-construction activity / work.
OPERATION	The operation of the activity, but not including commissioning trials of equipment, or temporary use of parts of the Proposal during construction.

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
Environmental management				
Manage the potential environmental impacts of the project.	EM1	A construction environmental management plan will be prepared in consultation with relevant government agencies and implemented to guide project delivery.	Pre-construction and construction.	Department of Planning *Guideline for the Preparation of Environmental Management Plans* (2004). RTA *QA Specification G36,* Section 4.1.1.
	EM2	A staging report will be prepared in consultation with relevant government agencies, should the project be elected to be constructed in stages. The RTA will submit the staging report to the Director-General prior to the commencement of construction.	Pre-construction	
Communication and consultation				
Pro-active consultation with the community.	C1	Newsletters and media coverage will be used regularly to outline the proposed works schedule, areas in which works are proposed and the construction hours of those works. The newsletters and media coverage will provide contact names and phone numbers of relevant staff.	Pre-construction and construction.	RTA *Community Involvement Practice Notes and Resource Manual* (RTA 1998).
	C2	An internet site which contains periodic updates of work progress, consultation activities and proposed work schedules will be established and maintained regularly. The internet site will also provide a description of relevant approval authorities and their areas of responsibility and contact names and phone numbers of relevant staff.	Pre-construction and construction.	RTA *Community Involvement Practice Notes and Resource Manual* (RTA 1998).
Responsive and pro-active management of complaints.	C3	A 24 hour, toll free complaints telephone number will be established for the Proposal and advertised.	Pre-construction and construction.	RTA *Community Involvement Practice Notes and Resource Manual* (RTA 1998). AS 4269 Complaints Handling.
	C4	A system to receive, record, track and respond to complaints within a specified timeframe will be established.	Pre-construction and construction.	RTA *Community Involvement Practice Notes and Resource Manual* (RTA 1998). AS 4269 Complaints Handling.

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
Communication and consultation				
Pro-active consultation with directly affected property owners.	C5	Property owners will be consulted about the implementation of mitigation measures that affect their property and any issues raised will be considered where reasonable and feasible.	Pre-construction and construction.	RTA *Community Involvement Practice Notes and Resource Manual* (RTA 1998).
Traffic and access				
Resolution of damage to roads as a result of construction.	T1	Pre-construction road condition reports will be prepared for all non-arterial roads likely to be used by construction traffic.	Pre-construction.	
	T2	Post-construction road condition reports will be prepared for the roads assessed prior to construction. Copies of the reports will be provided to the relevant roads authority. Any damage resulting from construction, (not normal wear and tear), will be repaired at the RTA's cost, unless an alternative arrangement for road damage is agreed with the relevant roads authority.	Operation.	
Maintain traffic movements on the road network through all phases of construction.	T3	Construction vehicle movement arrangements will be developed to limit impacts on other road users (including pedestrians, vehicles, cyclists and disabled persons) and the environment, with specific regard to other road works in the area, local traffic movement requirements and peak traffic volumes, including long weekends and holiday periods.	Pre-construction and construction.	RTA *Traffic Control at Work Sites*. RTA *QA Specification G10 Control of Traffic*.
Manage property access.	T4	Where any legal property access is temporarily or permanently affected by the project, alternative access to an equivalent standard will be provided where feasible and reasonable or other alternative arrangements agreed in consultation with the property owner.	Construction and operation.	RTA *Traffic Control at Work Sites*. RTA *QA Specification G10 Control of Traffic*. *Land Acquisition (Just Terms Compensation) Act 1991.* RTA *Land Acquisition Policy.*
	T5	In consultation with the Department of Primary Industries (Forests), access to and within State Forest lands adjacent to the Proposal will retained for forestry operations, fire management activities and recreation purposes.	Construction and operation.	

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
Construction noise and vibration				
Establish baseline noise conditions prior to the start of construction.	CN1	Pre-construction noise monitoring will be undertaken in locations used to identify the background noise levels for the environmental assessment and/or at representative noise sensitive locations.	Pre-construction.	RTA *Environmental Noise Management Manual* (2001). *NSW Industrial Noise Policy* (EPA 1999).
Minimise the effects of construction noise and vibration on surrounding sensitive uses and on the community.	CN2	Construction activities will be restricted to construction hours for the Proposal. The hours will be 7.00am to 7.00pm Monday to Friday; 7.00am to 4.00pm Saturdays and no work on Sunday or public holidays except in accordance with commitment CN4 below.	Construction.	
	CN3	Rock breaking, rock hammering, sheet piling, pile driving and any similar project activity will be scheduled only between the hours of 9 am to 12 pm and 2 pm to 5 pm, Monday to Friday; and 9 am to 12 pm, Saturday except in accordance with commitment CN4 below.	Construction.	
	CN4	Works outside standard construction hours will be limited to: i. Any works that do not cause construction noise to be audible at any sensitive receivers; or ii. The delivery of materials required outside these hours by the Police or other authorities for safety reasons; or iiii. Emergency work to avoid the loss of lives, property and/or to prevent environmental harm; or iv. Any other work as agreed after appropriate consultation with affected residents, the Department of Environment and Climate Change, and local council.	Construction.	RTA *Environmental Noise Management Manual* (2001).
	CN5	All plant and equipment will be well maintained and fitted with adequately maintained silencers which meet the vehicle design specifications.	Construction.	AS 2436-1981 *Guide Noise Control on Construction, Maintenance and Demolition Sites.*
	CN6	Prior consultation and notification will be undertaken with nearby residents who may be affected by noise or vibration generating activities.	Construction.	Refer to commitments P2 to P5 below.
	CN7	Public address systems used at any construction site will not be used outside normal construction hours except in accordance with commitment CN4 above. Public address systems will be designed to limit noise spillage off-site.	Construction.	AS 2436-1981 *Guide to Noise Control on Construction, Maintenance and Demolition Sites.*

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
	CN7A	All reasonable and feasible noise measures will be utilised to comply with construction noise levels	Construction	
Minimise the effects of any required blasting on surrounding sensitive uses and on the community.	CN8	Blasting trials will be undertaken if blasting is to be used, with results from the trials used to determine site-specific blast designs to satisfy relevant performance criteria.	Construction.	*Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration* (ANZECC). German Standard *DIN 4150 Part 3 Structural Vibration in Buildings (Effects on Structures).* *Assessing Vibration: A Technical Guideline* NSW DECC (2006).
	CN9	All reasonable attempts will be made to contact sensitive receivers located within 500 metres of a blast location. The contact will be made at least 48 hours before a blast and advice given to the receiver will include a schedule of blast time(s) and a telephone number and contact name.	Construction.	RTA *Community Involvement Practice Notes and Resources Manual* (1998).
Identify if vibration and construction noise goals set prior to construction are being met.	CN10	Noise and vibration monitoring will be undertaken during construction to determine the effectiveness of mitigation strategies.	Construction.	RTA *Environmental Noise Management Manual* (2001). *NSW Industrial Noise Policy* (EPA 1999).
	CN11	Monitoring of blasting, including wave form traces and video taping will be undertaken in areas where sensitive receivers could be potentially impacted	Construction	

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
Operational noise				
Minimise the operational noise impact on existing surrounding sensitive receivers.	ON1	A reasonable and feasible approach will be adopted to limit operational noise impacts in accordance with the NSW Government's *Environmental Criteria for Road Traffic Noise.* The approach to operational noise impacts will be developed further during detailed design and in consultation with relevant property owners.	Pre-construction and construction.	NSW Government's *Environmental Criteria for Road Traffic Noise.* RTA's *Environmental Noise Management Manual.*
	ON2	Low-noise pavement will be utilised from the southern limit of works at Sapphire to approximately 700 metres north of Bark Hut Road, Woolgoolga.	Construction.	
	ON3	Other noise mitigation measures (eg. road design, noise mounds or noise barriers) will be installed at the locations and to the specifications identified in the environmental assessment (subject to detailed design).	Construction.	Section 7.5.9 of the environmental assessment. RTA's *Noise Wall Design Guidelines*
Determine effectiveness of operational noise control measures.	ON4	Architectural treatments will be provided to properties identified in the environmental assessment as requiring such (subject to further design refinement of the project; and to owner agreement).	Construction.	Table 7.7 of the environmental assessment.
	ON5	Monitoring of operational noise will be undertaken between six months and one year after opening along the proposed highway upgrade and within Woolgoolga. Should the monitoring indicate traffic noise impacts exceeding the relevant noise level criteria in NSW Government's *Environmental Criteria for Road Traffic Noise*; the RTA will investigate and implement further "reasonable and feasible" mitigation measures. The selection of these measures will be undertaken in consultation with affected property owners. The mitigation measures will be confirmed against predictions of noise levels 10 years after opening.	Operation.	NSW Government's *Environmental Criteria for Road Traffic Noise.* RTA's *Environmental Noise Management Manual.*

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
Flora and fauna				
Minimise adverse impacts on aquatic habitat and fish species.	F1	Waterway crossings will be designed to facilitate fish passage where appropriate and in consultation with relevant government agencies.	Pre-construction	*Fishnote: Policy and Guidelines for Fish Friendly Waterway Crossings* (NSW Fisheries). *Policy and Guidelines for Design and Construction of Bridges, Roads, Causeways, Culverts and Similar Structures* (NSW Fisheries 1999). *Fish Passage Requirements for Waterway Crossings* (Fairfull and Witheridge 2003).
Avoid or protect individual threatened plant species where possible.	F2	Threatened plants in proximity to the Proposal to be retained will be identified and protected during construction through exclusion fencing and education of construction workers through the site induction process.	Pre-construction and construction.	
	F3	The feasibility of relocating individuals of Rusty Plum (*Amorphospermum whitei*) and, if required, any individuals of the threatened *Typhonium sp.* directly affected by the Proposal to suitable habitat on nearby land in secure tenure will be investigated and resultant action determined on the basis of expert advice.	Pre-construction.	Australian Network for Plant Conservation 2004 guidelines.
	F4	Further surveys will be undertaken during the flowering period of the Typhonium species recorded in the vicinity of Newmans Road to determine whether individuals present are threatened species. If the species cannot be positively identified prior to construction, then precautionary measures to protect the species during construction (such as exclusion fencing) will be employed.	Pre-construction.	Section 17.3.2 of the environmental assessment. Australian Network for Plant Conservation 2004 guidelines.
	~~F5~~	~~Surveys will be undertaken during the flowering period (September to October) of the Swamp Orchid (*Phaius australis*) within areas of suitable habitat (Swamp Sclerophyll Forest) within the Arrawarra Interchange area to determine the presence or absence of this species and (if present) to develop appropriate mitigation strategies.~~	~~Pre-construction.~~	~~Australian Network for Plant Conservation 2004 guidelines.~~

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
Minimise impacts on native fauna during construction.	F6	A suitably qualified ecologist will undertake specific searches for native fauna immediately prior to clearing activities. Searches will include nests and large hollow-bearing trees and target habitats of hollow-dwelling species, koalas and frogs.	Construction.	
	F6A	Stands of trees containing hollow-bearing trees will be cleared using a staged clearing process developed in consultation with the Department of Environment and Climate Change.	Pre-construction	
	F7	Fauna species found in areas to be cleared prior to clearing activities will be re-located into suitable habitat as close as possible to the area in which they were found.	Construction.	
	F8	Where feasible and reasonable, removal of frog habitat along drainage lines will not be undertaken during periods of wet weather.	Construction.	
	F9	Strategies will be developed to deal with incidents involving individual animals during construction activities in consultation with local Department of Environment and Climate Change officers, WIRES and / or other relevant local wildlife carer groups.	Pre-construction.	
	F10	Surveys will be undertaken for threatened bat species to identify any roosting bats prior to the demolition of the existing highway bridges at Double Crossing, Skinners and Cunninghams Creeks and the existing Hoys Road bridge over Cunninghams Creek. The surveys will include bridge inspections by a suitably qualified ecologist to identify any roosting bats. If found, any bats will be moved and relocated following consultation with the Department of Environment and Climate Change.	Pre-construction and construction.	
	F11	The large nest located approximately 100 metres south of the Wedding Bells State Forest boundary (approximate Chainage 28.700 kilometres) will be inspected to determine if it is being used by an osprey or a White-bellied Sea Eagle. If in use, expert advice will be sought regarding the feasibility of translocation of the nest / tree.	Pre-construction.	
Minimise impacts on fauna habitat	F12	Habitat features and resources for native fauna (such as hollow-bearing trees, hollow logs and bush rocks) will be distributed along the route of the Proposal where feasible and reasonable. Such relocation will be undertaken in a manner to limit damage to existing vegetation and will not occur in high condition remnant vegetation.	Construction.	
	F13	Where feasible and reasonable and as part of the biodiversity offset package, nest boxes will be utilised to help mitigate against the loss of hollow-bearing trees. If used, nest boxes will be fixed to suitable retained vegetation and in a way that does not damage the tree. A nest box plan will be developed in consultation with DECC and participatory landowners if required.	Pre-construction and construction.	
Maintain terrestrial fauna connectivity	F14	Culverts identified in the environmental assessment as having a potential role in fauna crossing will be designed to facilitate fauna movements.	Pre-construction.	Table 7.5 of the Environmental Assessment.

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
	F14A	The locations of fauna movement structures will be consistent with forest management zoning and the management intent of the adjacent Wedding Bells state forest and identified in consultation with DPI (Forests).	Pre- construction.	
	F15	Expert advice will be sought to assist in identifying the need and location for crossing points for glider populations. If required, and in consultation with relevant government agencies, the location and design of crossing points will be incorporated into the Proposal.	Pre-construction.	
	F15A	The potential for widening the median of the Proposal through the Wedding Bells State Forest will be further investigated in consultation with relevant government agencies.	Pre-construction	
	F16	Bridges at Double Crossing Creek, Cunninghams Creek, Skinners Creek, Woolgoolga Creek and Arrawarra Creek will be designed to facilitate fauna movements.	Pre-construction.	
Limit opportunities for animals to access the highway and reduce potential for wildlife injury and mortality during operation.	F17	Fauna exclusion fencing (eg. floppy-top fencing) will be erected along the Proposal at appropriate locations to direct fauna movement towards fauna-crossing structures.	Pre-construction.	Table 17.6 of the environmental assessment.
	F18	In selecting flora species for landscaping, consideration will be given to avoiding species that might attract wildlife for feeding or other purposes.	Pre-construction and construction.	
	F19	Adjoining vegetation will be maintained to limit overhang of fences or other barriers.	Operation.	
Protect habitats of threatened wetland birds.	F20	Water quality control measures will be installed as early as possible in the construction program and will be designed / selected to meet identified receiving water objectives.	Construction.	Refer SW1 to SW5 below.
Minimise native vegetation disturbance.	F21	The limits of vegetation clearing disturbance will signposted clearly, delineated on site and recorded on work plans prior to clearing.	Construction.	RTA *QA Specification B30 – Clearing, Excavation & Backfill for Bridgeworks.* RTA *QA Specification R178 – Vegetation.*

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
Reduce weed invasion as a result of vegetation clearance.	F22	Weeds in areas disturbed by construction activities will be managed for a minimum of two years after construction completion.	Construction and operation.	NSW *Noxious Weeds Act, 1993.*
	F23	Native and locally indigenous plants will be used in the landscaping and disturbed areas will be progressively revegetated.	Construction.	Landscape design plans (Chapter 7 of environmental assessment). Refer F18 above.
	F24	Equipment storage areas and stockpile areas will be located in existing cleared locations or in locations otherwise cleared for the construction of the Proposal.	Construction.	
Offset the residual impacts of the Proposal on key habitat.	F25	A biodiversity offset package will be developed in consultation with the Department of Environment and Climate Change.	Pre-construction and construction.	
Determine effectiveness of flora and fauna mitigation measures.	F26	An adaptive monitoring program will be developed to allow the effectiveness of mitigation and offset measures to be assessed and allow for their modification if necessary. The program will be for a minimum of 12 months after construction completion.	Pre-construction, construction and operation.	
Aboriginal heritage				
Minimise the impact on Aboriginal heritage.	AH1	Any Aboriginal heritage items directly affected will be managed in consultation with Aboriginal stakeholders and the Department of Environment and Climate Change.	Pre-construction and construction.	RTA *Aboriginal Heritage Guidelines*. *Aboriginal cultural heritage: standards and guidelines kit* (DECC). *Protecting Aboriginal objects and places – interim guidelines for community consultation* (DECC). *National Parks and Wildlife Act, 1979.*
	AH2	Aboriginal heritage sites and potential archaeological deposits will be clearly identified on construction drawings.	Pre-construction.	
	AH3	All construction personnel will receive training on their obligations for protection of Aboriginal cultural materials, including information on site locations, conservation management requirements and legal obligations in regard to Aboriginal cultural materials.	Pre-construction.	*National Parks and Wildlife Act, 1979.*

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
	AH4	If any part of the project (such as an ancillary facility) is located in an area which has not been subject to detailed Aboriginal heritage field survey and assessment, additional survey and assessment will be undertaken before that part of the project proceeds.	Pre-construction.	
	AH5	Subsurface investigations will be conducted of identified potential archaeological deposits at sites S2W-1, 4, 5, 6, 8, 9, 10 and 11 with support from the local Aboriginal stakeholders. Any subsequent salvage that may be warranted will occur at that time.	Pre-construction.	Subsurface investigations work method (Appendix D of Working Paper 3).
	AH6	Areas of the artefact scatter sites associated with S2W-4, 5, 6, 10 11, 13, Site # 22-1-143, Embankment Road historic camp and Arrawarra Creek ceremonial / sacred sites not directly affected by the Proposal will be fenced to avoid any accidental disturbance of these sites.	Pre-construction.	
	AH7	The descendents of the previous property owner(s) will be consulted and a field inspection will be undertaken with the Aboriginal stakeholders to confirm the location of S2W-13.	Pre-construction.	
	AH8	Aboriginal stakeholders will be engaged to salvage surface artefacts identified at sites S2W-2 and 7 and at S2W-12 after removal of the existing building on site.	Construction.	
	AH9	Aboriginal stakeholders will observe initial ground disturbance works / topsoil stripping (regardless of results of potential archaeological deposit investigations) and salvage artefacts identified at sites S2W-1, 4, 5, 10, 11, 12 and 13.	Construction.	
	AH10	If any presently unknown Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find will cease until Aboriginal heritage specialist advice is obtained.	Construction.	
	AH11	The RTA will comply with the NSW Government's *Aboriginal Participation in Construction Guidelines*.	Pre-Construction and construction.	NSW Government's *Aboriginal Participation in Construction Guidelines* (2007).
Non-Aboriginal heritage				
Minimise impacts on Non-Aboriginal heritage items.	NAH1	An archival record will be prepared and disseminated by an appropriate heritage expert, for the Woolgoolga forest nursery and nursery cottage, the British Australian timber company and Great Northern timber company tramlines and the Postmaster General's department cable.	Pre-construction.	RTA Heritage Guidelines. *Heritage Act, 1977.*

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
	NAH2	All personnel working on site will receive training in their responsibilities under the *Heritage Act, 1977*. Site specific training will be given to workers when working in the vicinity of identified heritage items.	Pre-construction and construction.	
	NAH3	Should any additional heritage items be uncovered during works, all works in the vicinity of the find would cease until specialist heritage advice is obtained.	Construction.	
Soil and water management				
Minimise water quality impacts.	SW1	Water quality will be monitored upstream and downstream of the project site during construction to determine the effectiveness of mitigation strategies. Should water quality controls prove to be ineffective, alternative strategies or measures will be investigated.	Pre-construction and construction.	Draft DECC *"Managing Urban Stormwater: Soils and Construction, Volumes 1 and 2, Book 4, Main Road Construction* (2006). *Managing urban stormwater: soils and construction* (Landcom 2006). The RTA's *Code of Practice for Water Management – Road Development and Management.* RTA *QA Specification G38 Soil and Water Management.* RTA *QA Specification G39 Soil and Water Management (Erosion and Sediment Control Plan).*
	SW2	Where feasible and reasonable, the area of soil exposure during construction will be minimised.	Construction.	RTA *QA Specification G40 Clearing and Grubbing.*

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
	SW3	There will be progressive revegetation of earthworks areas and stabilisation and restoration works.	Construction.	RTA *QA Specification G38 Soil and Water Management.* Draft DECC *"Managing Urban Stormwater: Soils and Construction, Volumes 1 and 2, Book 4, Main Road Construction* (2006).
	SW4	Design requirements for construction and operation phase water quality control structures will be determined on the basis of a site-specific investigation to consider the sensitivity of the receiving environment and the proximity of the discharge point to receiving waters and in consultation with relevant government agencies.	Pre-construction and construction.	Chapter 7 of the environmental assessment. Draft DECC *"Managing Urban Stormwater: Soils and Construction, Volumes 1 and 2, Book 4, Main Road Construction* (2006). The RTA's *Code of Practice for Water Management – Road Development and Management.* RTA *QA Specification G38 Soil and Water Management.* RTA *QA Specification G39 Soil and Water Management (Erosion and Sedimentation Control Plan)*

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
	SW5	Specific construction methods will be developed and implemented for in-stream works in consultation with relevant government agencies to limit water quality impacts.	Pre-construction and construction.	*Managing urban stormwater: soils and construction* (Landcom 2006). The RTA's *Code of Practice for Water Management – Road Development and Management.* RTA *QA Specification G38 Soil and Water Management.*
Minimise impacts on the Solitary Islands Marine Park.	SW6	Site-specific construction methods and water management controls will be developed and implemented where the Proposal crosses the Solitary Islands Marine Park in consultation with relevant government agencies to limit water quality impacts.	Pre-construction and construction.	
	SW7	Water quality will be monitored at locations where in-stream works are proposed and where the Proposal crosses the Solitary Islands Marine Park to determine the effectiveness of water management controls. Should water quality controls prove to be ineffective, alternative strategies or measures will be investigated.	Construction.	See SW1.
Minimise ground water related impacts.	SW8	The potential for changes to groundwater levels, quality or hydrology in response to construction activities such as the earthworks associated with deep cuttings that may have a likelihood of impact will be investigated. Where a potential for change is identified, the nature of the change and any resultant impacts will be determined and where necessary, measures to manage the changes will be designed and implemented in consultation with relevant government agencies.	Pre-construction.	Refer commitment P6 below.

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
Effectively manage known and unknown areas of acid sulfate soils and their exposure (oxidisation).	SW9	Areas of Potential Acid Sulfate Soils and actual Acid Sulfate Soils will be identified and oxidisation of acid sulfate soil material will be limited, any exposed acid sulfate soil will be neutralised and surface water drainage and buffer acid runoff will be controlled.	Pre-construction and construction.	*Guidelines for the Management of Acid Sulfate materials: Acid Sulfate Soils, Acid Sulfate Rock and Monosulfiidic Black Ooze* (RTA 2005).
	SW10	Containment strategies will be identified and implemented which seek to prevent acidic leachate associated with the oxidation of acid sulfate soil is contained for treatment or removal and is prevented from entering downstream watercourses.	Pre-construction and construction.	*Guidelines for the Management of Acid Sulfate materials: Acid Sulfate Soils, Acid Sulfate Rock and Monosulfiidic Black Ooze* (RTA 2005).
Air quality				
Minimise dust generation and monitor effectiveness of air quality management measures.	AQ1	Potential dust sources and dust suppression measures will be identified in consultation with the Department of Environment and Climate Change.	Pre-construction.	
	AQ2	Baseline dust deposition monitoring will be undertaken and dust deposition gauges installed at sensitive locations to determine the effectiveness of dust suppression measures. Should dust suppression measures prove to be ineffective, alternative strategies or measures will be investigated.	Pre-construction and construction.	AS 3580.10.1-1991 *Methods of Sampling Analysis of Ambient Air.* DECC guideline *Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales.* AS 2922 *Ambient Air Guide for Siting of Sampling Equipment.*
Greenhouse gases and energy				
Minimise energy consumption and the generation of greenhouse gasses as a result of construction.	G1	Energy efficient work practices will be adopted to limit energy use. Measures will include conducting awareness programs for all site personnel regarding energy conservation methods and conducting energy audits during the project to identify and address energy waste.	Pre-construction and construction.	

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
	G2	Plant and office-based equipment (including lights and computers) will be operated in an efficient manner and regularly maintained. If economically available, electrical energy derived from a renewable energy source accredited by the National Green Power Accreditation Steering Group (or equivalent) will be used for the supply of at least 50 per cent of the on-site electrical energy required during construction.	Construction.	
	G3	The energy saving measures implemented will be monitored to determine their effectiveness. Should these measures prove to be ineffective, alternative strategies or measures will be investigated.	Construction.	
Contaminated soil management				
Manage known and previously unknown areas of contaminated material.	CS1	Areas of potential soil contamination will be identified, investigated and appropriately managed.	Pre-construction and construction.	DECC (1999) *Environmental Guidelines – Assessment, Classification and Management of Liquid and non-liquid Waste.* *Contaminated Land Management Guideline* (RTA 2005) DECC Guidelines for NSW Site Auditor Scheme. *Contaminated Land Management Act, 1997.*
	CS2	If contamination is found to pose unacceptable risk to either the environment or human health receptors a remedial action plan will be developed and remediation works will be undertaken.	Pre-construction and construction.	SEPP 55 – Remediation of Land.
Urban design and landscaping				
Introduce an integrated urban design scheme for the project, applying established urban design principles.	UD1	Urban design treatments will reflect the urban design and landscape objectives and principles identified in the environmental assessment.	Pre-construction.	*Beyond the Pavement – RTA Urban and Regional Design Practice Notes* (RTA 2004) *Pacific Highway Urban Design Framework* (RTA 2005) Chapter 19 of the environmental assessment.

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
Minimise the visual impact of the Proposal.	UD2	The schedule of species to be used in the landscaping treatments will include native and locally indigenous plants selected in consultation with a qualified landscape specialist.	Pre-construction and construction.	Chapter 19 of the environmental assessment. Refer F18 above.
	UD3	Disturbed areas will be progressively revegetated with consideration to erosion and sedimentation controls, drainage, future road user safety requirements and fauna movement corridors.	Pre-construction and construction.	RTA *QA Specification DCM R179 – Landscape Planting.* RTA *QA Specification DCM R178 – Vegetation.*
Maintenance and management of landscaping.	UD4	Landscape and rehabilitation works will be subject to monitoring and any remedial measures where required for a minimum of two years.	Construction and operation.	
Hazard and risk				
Minimise the risk of an incident during construction.	HR1	Bunded storage areas will be located away from watercourses and will be established for oils and other hazardous liquids in accordance with Australian Standards. Any spillages will be contained and collected for appropriate disposal.	Construction.	*AS 1940 The Storage and Handling of Flammable and Combustible Liquids.*
	HR2	Activities with the potential for spillage such as refuelling, maintenance of equipment, mixing of cutting oil and bitumen will be conducted in bunded areas away from watercourses and where suitable containment, treatment and disposal measures are in place.	Construction.	*AS 1940 The Storage and Handling of Flammable and Combustible Liquids.*
	HR3	Potentially hazardous and contaminating activities (such as washing construction plant and handling hazardous chemicals) will be conducted in bunded areas away from watercourses and where suitable containment, treatment and disposal measures are in place.	Construction.	*AS 1940 The Storage and Handling of Flammable and Combustible Liquids.*
Waste and resource management				
Reduce creation of waste and maximise re-use and recycling.	WR1	The waste minimisation hierarchy principles of avoid / reduce / re-use / recycle / dispose will be applied to all aspects of the Proposal.	Pre-construction and construction.	*Waste Avoidance and Resource Recovery Act 2001.*

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
	WR2	Waste will be handled, stored and disposed of in accordance with relevant guidelines.	Pre-construction and construction.	NSW Government's *Waste Reduction and Purchasing Policy.* *Waste Avoidance and Resource Recovery Strategy* (DECC 2006). DECC (1999) *Environmental Guidelines – Assessment, Classification and Management of Liquid and non-liquid Waste.*
Reduce demand on resources.	WR3	Secondary waste materials, such as fly ash and steel slags will be used in construction materials where reasonable and feasible.	Construction.	
	WR4	A water use hierarchy will be established. The use of run-off from sedimentation/ erosion basins and other water sources will be investigated to identify safe and appropriate uses.	Pre-construction.	*NSW Government's Guidelines for Urban and Residential use of Reclaimed Water (1993)* *DECC (EPA) (2004) Use of Effluent by Irrigation*
	WR5	The amount of mulch required, stockpile locations and environmental controls will be determined prior to construction.	Pre-construction.	
	WR6	Procedures for vegetation clearance will be developed and incorporate a hierarchy of use for the timber resource obtained from the site. The hierarchy of use will include, but not be limited to, consideration of timber resource use for harvestable timber, habitat usage or mulch. Procedures will incorporate the selection of timber for habitat usage prior to clearing and the removal of all harvestable timber from the site prior to the removal of habitat trees).	Pre-construction.	

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
Agricultural property impacts				
Minimise impacts on Agricultural properties.	AG1	Negotiations for agricultural property acquisition will include consultation on property adjustments where required to limit impact on farm management practices.	Pre-construction.	
	AG2	At the request of agricultural landowners whose properties are severely or critically affected (as defined in Section 15.2 of the environmental assessment) by the Proposal, specialist consultants will be engaged to provide assistance to owners in assessing opportunities for agricultural diversification.	Pre-construction.	Section 15.3 of the environmental assessment.
	AG3	At the request of agricultural landowners whose properties are severely or critically affected (as defined in Section 15.2 of the environmental assessment) by the Proposal, specialist consultants will be engaged to provide assistance to the owners in deciding whether to seek a purchase of available residual agricultural land.	Pre-construction.	Section 15.3 of the environmental assessment.
Minimise the spread of agricultural diseases.	AG4	Panama disease and banana bunchy top virus will be identified and appropriately managed in consultation with the NSW Department of Primary Industries (Agriculture) on all ex-banana farms acquired as part of the Proposal.	Pre-construction and construction.	DECC *Guidelines on the Assessment and Management of Banana Plantations.*
Minimise impacts on highway users as a result of spray drift.	AG5	Consultation will be undertaken with individual blueberry farmers regarding provision of a suitable vegetation buffer to manage pesticide spray drift from farms onto the highway. The vegetation buffer will be developed for all blueberry farms adjacent to the highway alignment and, subject to agreement by the property owner, will be located within the farm properties.	Pre-construction and construction.	
Minimise impacts on permanent springs.	AG6	The integrity of water flows from permanent springs in the foothill region will be preserved.	Pre-construction and construction.	Refer commitment P6 below.
Maximise use of existing forestry resources.	AG7	The Department of Primary Industries (Forests) will have access to areas of State Forest land identified for acquisition by the RTA to remove any harvestable timber within the footprint of the Proposal prior to commencement of construction.	Pre-construction.	
	AG8	Access for forestry operations, fire management activities and recreation purposes in the adjacent state forest will be maintained in consultation with DPI (Forests).	Construction and operation.	
Property impacts				
Provide appropriate level of compensation in relation to property acquisitions.	P1	All property acquisitions will be negotiated in accordance with the RTA *Land Acquisition Policy* and compensation will be assessed under the provisions of the *Land Acquisition (Just Terms Compensation) Act 1991.*	Pre-construction.	RTA *Land Acquisition Policy.* *Land Acquisition (Just Terms Compensation) Act 1991.*

OBJECTIVE	REF NO.	COMMITMENT	TIMING	REFERENCE DOCUMENT
Identify and inspect structures or properties potentially affected by construction.	P2	A risk assessment will be undertaken to determine which structures or properties may be affected by construction activities and therefore need to be inspected. The risk assessment will be undertaken by geotechnical and construction engineering experts with appropriate registration on the National Professional Engineers Register.	Pre-construction.	
	P3	Property inspections will be conducted, subject to landowner agreement, on all structures within 200 metres of proposed blasting locations, within 50 metres of construction activities that generate vibration impacts and at any other locations identified in the risk assessment.	Pre-construction.	AS 4349.1 *Inspection of Buildings.*
	P4	The owners of all properties on which property inspections are to be conducted will be advised of the inspection, its scope and methodology and of the process for making a property damage claim at least two weeks prior to the inspection. The owners of all properties on which property inspections are to be conducted will be given a copy of the property inspection report at least three weeks prior to the commencement of any construction that could affect the property.	Pre-construction.	
Manage potential impacts on structures or properties affected by construction.	P5	Where liable, any property damage caused directly or indirectly by the Proposal's construction or operation will be rectified at no cost to the property owner(s). Alternatively the RTA may negotiate compensation for the property damage with the property owner.	Construction and operation.	ISO 4866 *Mechanical Vibration & Shock – Vibration of Buildings – Guidelines for the Management of the Vibrations and Evaluation of their Effects on Buildings.*
Maintain water supply to properties.	P6	Where a licensed bore, dam or other property water supply is adversely affected by the project, water supply of equivalent quality and quantity will be reinstated. Alternatively the RTA may negotiate compensation for the loss with the landowner.	Construction and operation.	
Miscellaneous issues				
Utilities and services Minimise disruption to utilities and services.	US1	Utilities and services potentially affected by construction will be identified and requirements for their diversion, protection and / or support identified. Alterations to services will be determined in negotiation with the service providers and will ensure that disruption to services resulting from the project are limited and advised to customers.	Pre-construction.	
Ancillary facilities Minimise environmental and social impacts from the construction of temporary ancillary facilities.	AF1	Sites chosen for ancillary facilities will satisfy the criteria provided in the environmental assessment.	Pre-construction.	Section 8.4.4 of the environmental assessment.

6 Conclusion and next steps

This Submissions Report has addressed the outcomes of the consultative process conducted during and following the public exhibition of the EA for the proposed Sapphire to Woolgoolga Pacific Highway upgrade.

In addressing both compliance with legislative requirements and the requirements of the consultative process, this Submissions Report demonstrates that:

- The RTA has considered all issues arising from the submissions and provided a written response to the issues raised (Chapter 2).
- The RTA has proposed modifications to the concept design, and substantiated that each modification is minor or beneficial (Chapter 4).
- The Statement of Commitments has been revised as a result of submissions received, demonstrating the RTA's commitment to a comprehensive management approach to reduce environmental impacts (Chapter 5).

In consideration of the above, the RTA seeks the approval of the Minister for Planning under Part 3A of the EP&A Act for the Proposal as described in Chapter 7 of the EA and inclusive of the design refinements described in Chapter 4 of this Submissions Report.

7 References

Legislation

Aboriginal and Torres Strait Islander Heritage Act 1984

Land Acquisition (Just Terms) Compensation Act 1991

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RTA; (2006); *Technical Review of the Inland Corridor (via Summerland Way)*