New South Wales Government

RTA

Review of environmental factors for Waterfall Way realignment at

Cameron's Corner

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EXECUTIVE SUMMARY

The Proposal

The NSW Roads and Traffic Authority (RTA) proposes to realign Waterfall Way (Main Road 76) at Cameron's Corner. The realignment would be approximately 560 metres in length and take place 1.71 kilometres to 2.26 kilometres west of the Waterfall Way / Pacific Highway intersection (the Proposal).

This Review of Environmental Factors (REF) has been prepared by Eco Logical Australia Pty Ltd (ELA) on behalf of RTA Northern Region.

Statutory and planning framework

Clause 94 of State Environmental Planning Policy - Infrastructure 2007 (SEPP Infrastructure) operates to remove the consent obligations from the consent authority and therefore the proposed road upgrade does not require consent from Council.

For the purposes of these works, the RTA is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment* (EP&A) *Act* 1979.

Community and stakeholder consultation

Relevant State government agencies and stakeholders were contacted and provided with the opportunity to comment on the Proposal for the road realignment at Cameron's Corner. Comments received relevant to the Proposal related to:

- Impacts to biodiversity;
- Suggested alternatives to realignment of the road; and
- Community involvement in the development of options.

Community consultation for the Proposal has been undertaken by the NSW RTA, with reference to the IAP2 spectrum. The RTA has implemented the following additional consultative actions;

- invitation for public comment
- attendance at information sessions
- public displays, and
- public exhibition of the REF.

Community feedback received by the RTA to date identified concerns with community representations on the Cameron's Corner project options assessment and its impact on biodiversity.

Need for the proposal

The Waterfall Way is an important arterial route connecting the seaboard and Coffs Harbour District with the coastal hinterland of the Bellingen area, the tablelands of Dorrigo, Armidale and beyond. The section of road from Raleigh to Bellingen has a high percentage of commuter and service traffic between Coffs Harbour and Bellingen. The Cameron's Corner Section of Waterfall Way exhibits poor horizontal and vertical alignment, with a history of road crashes and is subject to inundation.

Since 1993 Dumaresq (now known as Armidale-Dumaresq), Nymboida (now known as Clarence Valley), Coffs Harbour City, Inverell Shire, and Bellingen Shire Councils lobbied the RTA for improvements to Waterfall Way. These Council's focused on the entire route and the need to improve the standard of road in relation to the commercial, economic and tourist value to their LGA's. Three (3) submissions have been received by the RTA from this group of Council's between 1994 and 2003.

On the basis of the Council's requests, RTA consulted with Bellingen Shire Council in October 1999 requesting a draft alignment plan for Cameron's Corner. In 2001, Bellingen Shire Council responded by providing RTA with three (3) options of which one is the Proposal.

Options considered

Four options, including the "Do nothing" option were considered:

1. Option 1 – Do Nothing
2. Option 2 – Realignment to provide design speed of 80km/h
3. Option 3 – Realignment to provide design speed of 70km/h
4. Option 4 – Modified existing alignment

The preferred Option 2 'Realignment to provide design speed of 80km/h' is expected to achieve all Proposal objectives and has accordingly been selected.

The Proposal would improve road safety within the area of the proposed works in line with the NSW *State Plan* objectives by improving the vertical and horizontal alignment of Waterfall Way, thereby increasing the design speed of the road and flood immunity within the study area.

Environmental impacts

A comprehensive environmental impact assessment has been undertaken and the key matters for consideration are provided.

Water quality and hydrology - The RTA undertook a flood assessment in February 2004 (see **Appendix H**). A new triple cell box culvert would be designed to maintain the existing low flow levels in the wetlands but would extend into adjacent farmland up to RL 3.5 compared with the previous level of RL 3.1. This would ensure that the hydrology of the wetland remains unchanged.

Biodiversity - Direct impacts of the Proposal include the clearing of 0.8 hectares of native vegetation, of which 0.5 hectares is Swamp Sclerophyll Forest, 0.1 hectares is Freshwater Wetland and 0.2 hectares is Tallowwood – Narrow-leaved White Mahogany. Swamp Sclerophyll Forest and Freshwater Wetland are listed as Endangered Ecological Communities under the TSC Act. The clearing of 0.8 hectares of native vegetation is considered to be an unavoidable impact related to the Proposal. Assessments of Significance (Seven Part Tests) as defined in Section 5A of the *Environmental Planning and Assessment Act 1979* were undertaken for two EECs, one flora and 23 fauna species. The Seven Part Tests concluded that the Proposal was unlikely to have a significant impact on threatened biodiversity as listed on the TSC Act. Significant Impact Criteria were carried out for threatened or migratory species with the potential to occur in the study area as listed on the EPBC Act. The Significant Impact Criteria concluded that the Proposal was unlikely to have a significant impact on these species.

Aboriginal heritage – An Archaeological assessment was undertaken by Adise Pty Ltd and the LALC consulted with indicating that land to be affected by the Proposal is not known to contain any sites places or resources of significance to the local Aboriginal community.

Non-Aboriginal heritage - There are currently no heritage items that would be impacted upon by the development as listed on relevant databases.

Noise and vibration – In accordance with DECC guidelines, target construction noise levels for the Proposal would be 'background' +10dBA, as the construction period is between 4 and 26 weeks. Short-term noise is more likely to be accepted when the works are part of necessary safety works such as those being undertaken for this Proposal. Where daytime goals are likely to be exceeded, a performance approach would be followed that allows the implementation of best management practice in reducing construction noise levels towards the above goals. Current ambient noise levels are moderate at this location as a result of moderate traffic volumes using Waterfall Way, particularly during peak times. The road alignment would be moved further away from nearby rural properties, reducing future road traffic noise exposure of the residents.

Air quality - During, and immediately after the construction phase, there is potential for a localised deterioration in air quality due to dust generated from exposed surfaces. Moderate amounts of dust would be generated during earthworks and construction of the road base and roadside batters, and removal of redundant sections of the existing roadway. The Proposal is expected to have a minor long-term positive impact on air quality following the establishment of the proposed rehabilitation activities. Long-term operational greenhouse gas emissions for this section of the road can be expected to be less than current emissions due to improved traffic flow within the Proposal site. Additionally, the Proposal is not expected to encourage increased traffic levels. An increase in vehicle emissions would therefore not result.

Visual amenity - The Proposal would realign the road to the north at chainage 1,810 metres, and to the south at chainage 2,000 metres. This would require the removal of a narrow band of vegetation from the existing remnant on the northern side of the road, and the removal of a wider corridor (approximately 20 metres) of the *Swamp Sclerophyll Forest* on the southern side. Construction of the road across the low lying area would modify the appearance of the wetland as fill would be imported into the wetland area, elevating the road surface and providing a visually discordant feature on the low lying topography, however trees to be retained would act to screen this impact from adjacent viewpoints. It is anticipated the above issues would be minimised through the implementation of safeguards.

Justification and conclusion

The Proposal to upgrade the Waterfall Way at Bellingen would improve the movement of tourist, freight, commercial and residential traffic between regional population centres. It would also improve road safety, flood immunity and reduce vehicle operating costs and travel time. The proposal is consistent with the objectives of the *RTA Blueprint* and NSW *State Plan* through the upgrade of a regional road.

The implementation of the Proposal would have the following beneficial effects:

- Provision of an improved speed environment improving sight distance;
- Provision of a new, wider road to improve safety;
- Anticipated reduction of the incidence of vehicle accidents;
- Improvement of travel conditions and travel times;
- Provide a road network that would promote economic development;
- Achieve an acceptable return on project investment;
- Improve flood immunity; and
- Reduce demand on resources.

In addition, implementation of the Proposal would have the following adverse effects:

- Loss of biodiversity;
- Strain on unrenewable resources;
- Short term construction impacts e.g. noise, air, visual; and
- Alteration of the hydrology of a wetland.

It is considered the Proposal would have an overall positive effect on the social, economic and environmental characteristics of the region.

Display of the review of environmental factors

This REF is on display for comment between **6 February and 9 March 2009**. You can obtain access to the documents in the following ways:

Internet
The documents would be available as PDF files on the RTA website at www.rta.nsw.gov.au

Display
The review documents can be viewed at the following locations:

- Bellingen Shire Council – Monday to Friday 8.30am to 4.30pm.
- Urunga Library – Tuesday to Friday 10.30am to 5pm (closed 1pm – 2pm). Saturday 10am to 12noon.
- Dorrigo Library – Tuesday 1pm to 5pm, Wednesday to Friday 10am to 5pm (closed 12pm-1pm). Saturday 9.30am to 12 noon.

How can I make a submission?

To make a submission on the proposal, please send your written comments to:

RTA Project Manager
Mr Paul Leonard
31 Victoria Street
Grafton NSW 2460
Fax: 02 6640 1006
Submissions must be received by Monday, 9 March 2009.

Privacy information

All information included in submissions is collected for the sole purpose of assisting in the assessment of this proposal. The information may be used during the environmental impact assessment process by relevant RTA staff and its contractors.

Where the respondent indicates at the time of supply of information that their submission should be kept confidential, the RTA would attempt to keep it confidential. However there may be legislative or legal justification for the release of the information, for example under the *Freedom of Information Act 1989* or under subpoena or statutory instrument.

The supply of this information is voluntary. Each respondent has free access at all times to the information provided by that respondent but not to any identifying information provided by other respondents if a respondent has indicated that the representation should be kept confidential.

Any respondent may make a correction to the information that they have provided by writing to the same address the submission was sent.

The information would be held by the Roads and Traffic Authority, 31 Victoria Street Grafton NSW 2460.

What happens next?

Following the submissions period, the RTA would collate submissions. Acknowledgement letters would be sent to each respondent. The details of submission authors would be retained and authors would be subsequently advised when project information is released.

After consideration of community comments the RTA would determine whether the Proposal should proceed as proposed, or whether any alterations to the proposal are necessary. The community would be kept informed regarding this RTA determination.

If the Proposal is approved, the RTA will proceed with final design and tenders will be called for construction of the project.

If you have any queries, please contact the RTA project manager on (02) 6640 1300.

1. INTRODUCTION

Waterfall Way is an important arterial route connecting the Coffs Harbour district with the coastal hinterland of the Bellingen area and the tablelands of Dorrigo, Armidale and beyond. The section of road from Raleigh to Bellingen receives a high percentage of commuter and service traffic travelling between Coffs Harbour and Bellingen.

The section of Waterfall Way under investigation commences west of the previously upgraded intersection with Short Cut Road and includes two sub standard reverse curves. The proposed works are required to improve road safety for motorists by improving the vertical and horizontal alignment and widening road shoulders. The Cameron's Corner section of Waterfall Way exhibits poor horizontal and vertical alignment and is subject to inundation.

This Review of Environmental Factors (REF) has been prepared by Eco Logical Australia Pty Ltd (ELA) on behalf of RTA Northern Region.

For the purpose of these works, the RTA is the proponent and determining authority under Part 5 of the *Environmental Planning and Assessment* (EP&A) *Act 1979*.

The purpose of the REF is to describe the Proposal, to document the likely impacts of the Proposal on the environment, and to detail mitigation measures to be implemented.

The description of the proposed works and the associated environmental impacts has been undertaken in the context of Clause 228 of the *Environment Planning and Assessment* (EP&A) *Regulation 2000,* the *Threatened Species Conservation (TSC) Act 1995,* the *Fisheries Management (FM) Act 1994,* and the (Commonwealth) *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. In doing so, the REF helps fulfil the requirements of Section 111 of the EP&A Act, that the RTA examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the Proposal is likely to have a significant impact on the environment and the necessity for approval to be sought under Part 3A of the *EP&A Act;*
- The significance of any impact on threatened species as defined by the *TSC Act* and/or FM Act, Section 5A of the *EP&A Act* and the requirement for a Species Impact Statement (SIS); and
- The potential for the proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of the Environment, Water, Heritage and the Arts (DEWHA) (formerly the Department of the Environment and Water Resources) for a decision by the Commonwealth Minister for the Environment, Heritage and the Arts on whether assessment and approval is required under the EPBC Act.

The construction cost of the Proposal would be approximately $3.5M.

1.1 Proposal identification

Realignment of Waterfall Way at Cameron's Corner, east of Bellingen, northern NSW.

The NSW Roads and Traffic Authority (RTA) proposes to realign Waterfall Way (Main Road 76) at Cameron's Corner. The realignment would be approximately 550 metres in length and take place approximately 1.71 kilometres to 2.26 kilometres west of the Waterfall Way/Pacific Highway intersection. **Figure 1** shows the location of the Proposal.

This section of Waterfall Way is located on the floodplain of the Bellinger River. The Bellinger River is located approximately 300 metres north of the study area. The surrounding environment is rural in nature with five

rural residential dwellings located in the vicinity of the proposed works. Remnant vegetation and an associated wetland are located on the southern side of the road midway along the length of the Proposal.

The 'Proposal footprint' is defined as the area encompassing the existing road and related infrastructure, and the area of the proposed realigned road, including all areas impacted by the construction of shoulders, batters and drainage structures, as well as the proposed site of the compound, site office and stockpile site. The 'study area' includes the Proposal footprint as well as the area surrounding the Proposal footprint that may be impacted upon as a result of the Proposal (refer **Figure 2**).

The site is within the Local Government Area (LGA) of Bellingen governed by the Bellingen Shire Council.

The site is within the New South Wales (NSW) RTA Northern Region.

Funding has been made available by the NSW State Government Road Maintenance Funds, Infrastructure Maintenance Program.

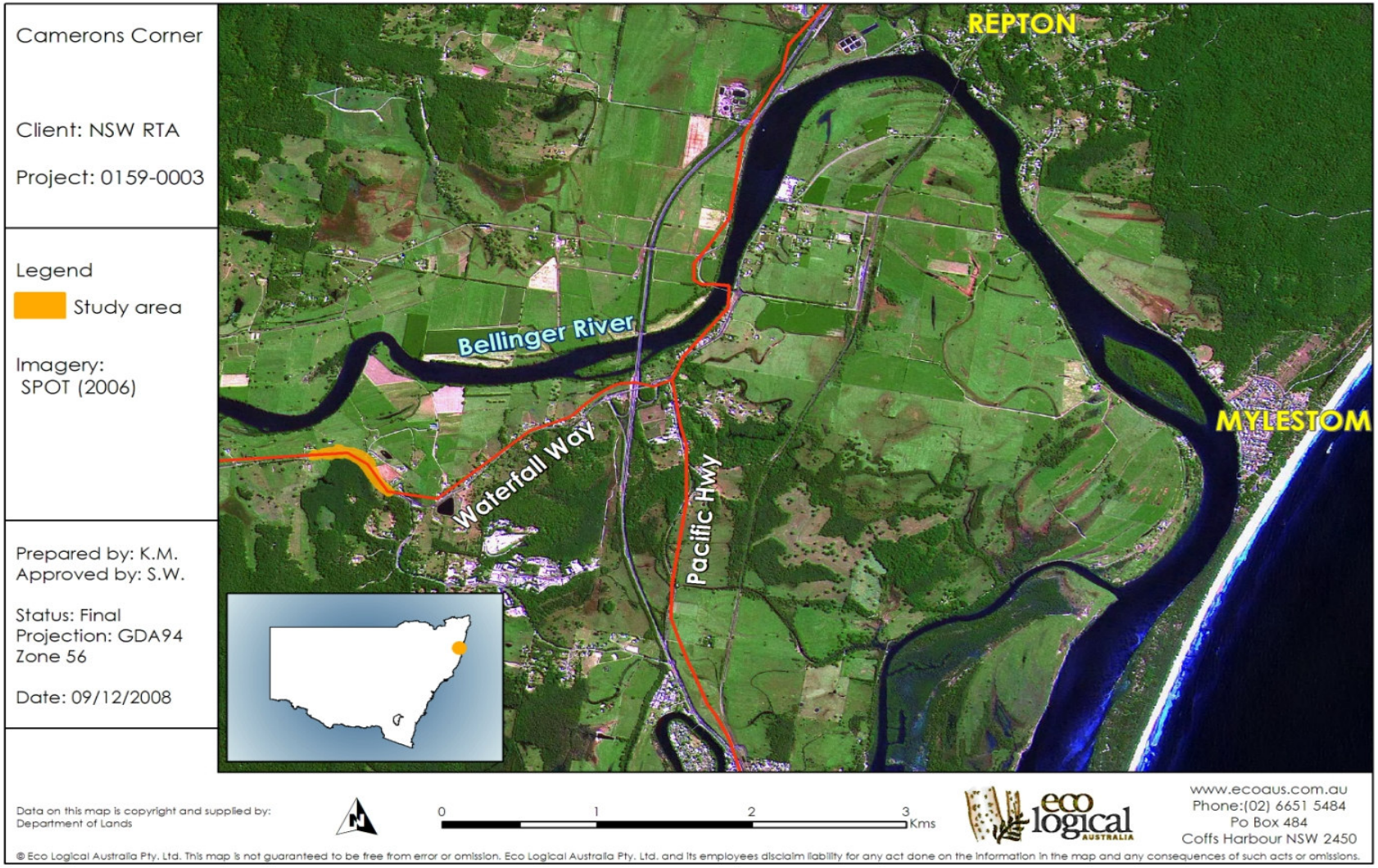

Figure 1: Site Location

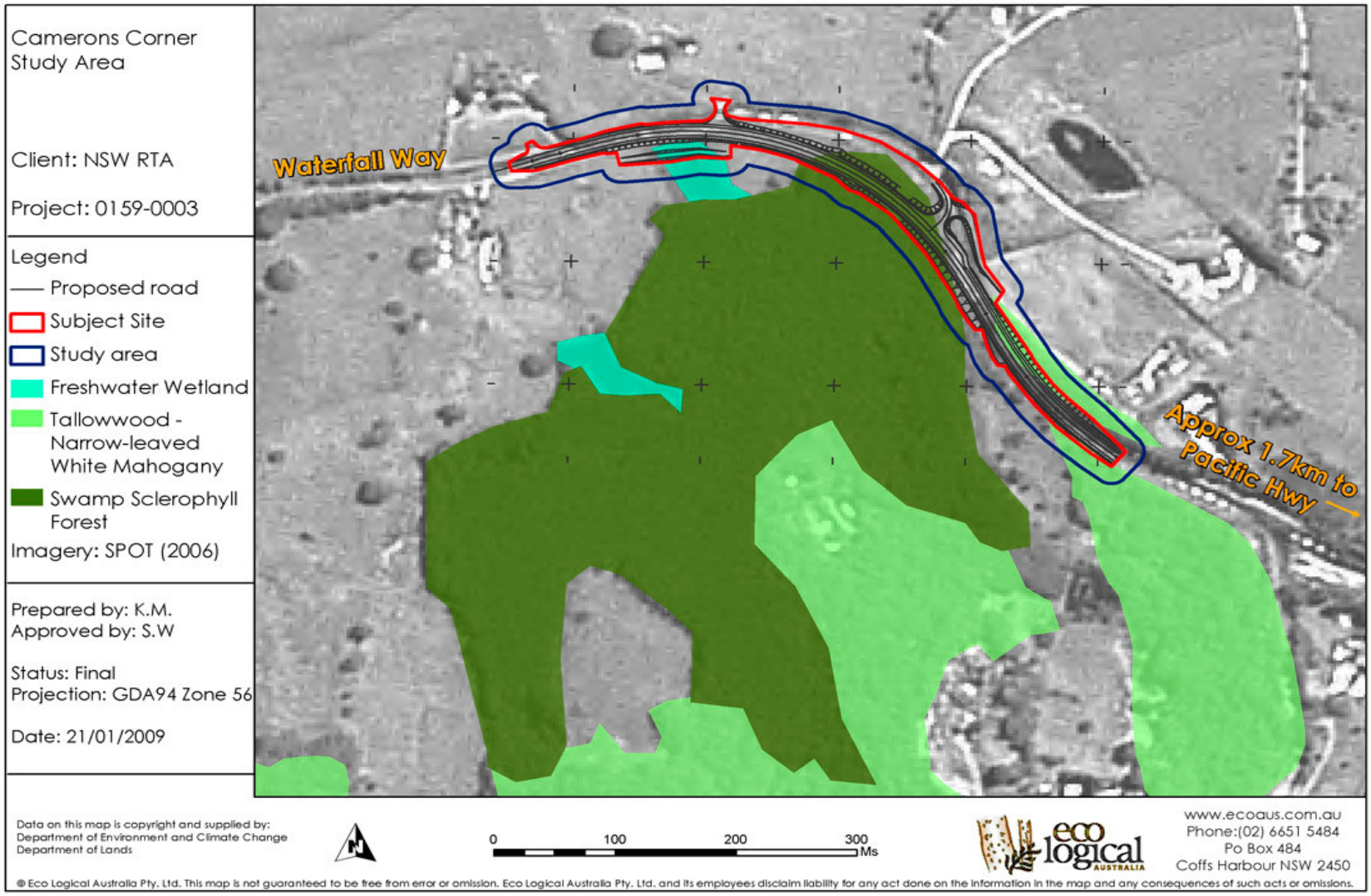

Figure 2: Study Area showing concept plans

2. PROPOSAL DESCRIPTION

2.1 Description of the Proposal

The Proposal is located east of Bellingen on Waterfall Way at Cameron's Corner, from approximately 1.71 kilometres to 2.26 kilometres west of the Pacific Highway (refer to **Figure 1**).

The Proposal includes the following key features:

- Realignment of approximately 550 metres of road to a safer 80km/h standard;
- Incorporation of 3.5 metre lanes and two (2) metre shoulders;
- Installation of three (3) new culverts and extensions to two (2) culverts; and
- Improved flood immunity to 1 in 5 year average recurrence interval.

The proposed works are required to improve road safety for motorists by upgrading the vertical and horizontal road alignment to provide a consistent standard and speed of travel along Waterfall Way, whilst improving flood immunity. In addition, the Proposal would include widening of the road shoulders and upgrading the existing road pavement.

The realigned road would be located approximately 30 metres (maximum separation) to the south of the existing road (refer to **Appendix B** for concept design). The Proposal would be approximately 550 metres in length, with two (2) 3.5 metre wide single carriageway lanes with two (2) metre wide road shoulders. The design travel speed for the Proposal would be 80km/h.

Existing legal access for private properties from the road would be maintained.

2.2 Existing road, traffic and infrastructure

The existing road is a two lane single carriageway with a posted speed limit of 80 km/h. The Cameron's Corner section of the Waterfall Way has an advisory speed of 55 km/h.

Existing traffic in the area of the Proposal consists of a mix of light and heavy vehicle traffic. Traffic movements in the area of the Proposal include eastbound and westbound travel on Waterfall Way. The road is used by commuter and service vehicles travelling to and from the regional centre of Coffs Harbour.

The Average Annual Daily Traffic (AADT) volume for 2007 was 6,700 vehicles per day in the vicinity of the Proposal site. The heavy vehicle AADT volume for 2007 was approximately 6% of AADT in the vicinity of the Proposal site.

The forecast traffic for the Waterfall Way within the Proposal site is 8,900 (AADT) for the year 2018 (10 years after project opening) based on a growth rate of 3.1% per annum.

In the 10 years from 1 April 1998 to 31 March 2008, 19 accidents were recorded within the Proposal site resulting in injuries to a total of 18 people.

2.3 Design and hydraulics

The Proposal would involve reconstruction along the edge of the Bellinger River floodplain. The existing road has an RL of 2.7 and is subject to flooding at about once every four years and the existing culvert under the road is inadequate.

The main drainage structure within the study area is a 1.5 metre x 1.2 metre reinforced concrete triple box culvert (RCBC) located at chainage 1,990 metres. This culvert would improve flood immunity at the new alignment as it is designed for a 1 in 50 local flood assuming outlet control and a 300 millimetre head difference. This requires a triple cell 3.0 metre by 1.2 metre box culvert. The 1 in 50 year upstream flood level would be

approximately RL 2.5, which is below the estimated flood levels predicted for the Bellinger River flooding (RL 5.95). The existing culvert is inadequate as the 1 in 50 local flood would cross the existing road at RL 3.1. The local flooding upstream would extend into the swamp area but would only inundate areas of farmland up to RL 2.5.

The existing road at Cameron's Corner is subject to flooding from both the Bellinger River and also the local catchment. The predicted flows at Cameron's Corner from the local catchments and the corresponding flood heights are described in Table 1 'preliminary flood calculations'.

Table 1: Preliminary Flood Calculations

Flood Frequency	Flood Height Bellinger River	Flood height (local flood)	Flow (local flood)
1 in 5 year	3.5	3.2	10.3 cumecs
1 in 10 year	4.35	3.25	12.7 cumecs
1 in 20 year	5.1	3.3	15.7 cumecs
1 in 50 year	5.95	3.33	18 cumecs
1 in 100 year	6.4	3.35	20.7 cumecs

(Source: Preliminary Flood Calculations Waterfall Way by Bruce Fidge and Associates 2001)

The road floods at RL 3.1, which is less than the 1 in 5 year, flood for the local catchment. The local catchment area is small and the time of concentration is also small (time for maximum discharge from start of rainfall is 0.76 hours). Any flooding due to the local catchment would be of short duration (less than 0.5 hours). Note that the existing road level is about RL 2.7 (centreline).

The Proposal would involve raising the road level from RL 2.7 to RL 3.5 (centreline) and installation of three (3) new culverts. The new road would be raised to RL 3.5, providing immunity for the 1 in 100 year local catchment flood occurrence, but would still be subject to flooding from the Bellinger River however only at a 1 in 5 year flood occurrence.

2.4 Construction activities

2.4.1 Construction processes and work methodology

The works would be undertaken in stages using the following methodology:

- Fencing of new property boundaries;
- Installation of temporary erosion and sedimentation controls;
- Clearing and grubbing of vegetation;
- Deposition of fill material (preload) and a settlement period of 6 to 8 months;
- Stripping excess fill to achieve desired road heights;
- Stripping topsoil for respreading on batters;
- Ground excavation;
- Construction of new culverts, including and de-watering;
- Excavation of cuttings and disposal of excess fill;
- Construction of access track;
- Respreading topsoil on batters and hydro-mulching;
- Placing sub base and base of road;
- Ripping and removal of redundant seal and topsoil;
- Seal application;

- Installation of signs and line marking; and
- Revegetation.

2.4.2 Construction equipment

Plant and equipment required for the road construction works would include, but not be limited to, the following:

- Front end loaders;
- Rollers/vibrating compactors;
- Excavation plant;
- Concrete supply agitator trucks;
- Back hoes;
- Bitumen spray truck;
- Aggregate truck (cockerel spreader);
- Jack hammers;
- Concrete vibrators;
- Drilling equipment;
- Cranes;
- Dump trucks;
- Road sweepers;
- Bulldozers;
- Water pumps;
- Trucks delivering construction materials;
- Trucks transporting cut and fill material;
- Water tankers;
- Low loader transporters;
- Graders;
- Light commercial and passenger vehicles;
- Trenching machines;
- Chain saws;
- Hydraulic hammer;
- Concrete saw;
- Stump grinder;
- Line marking vehicles; and
- Traffic Control Devices (e.g. portable variable message signs and traffic lights).

2.4.3 Traffic management and access

Traffic management and access will be undertaken in accordance with the RTA Traffic Control at Worksites Manual 2006.

During operation, the Proposal would retain access for all land uses surrounding the Proposal site. Access to residences adjacent to the Proposal site would be maintained.

During construction, traffic on the existing Waterfall Way would be restricted to one lane with traffic control causing delays to through traffic. The Proposal would result in approximately 20 additional truck movements per day, for the importation of fill and pavement materials.

All other truck movements for the excavation and fill placement would take place within the Proposal footprint.

Construction vehicles would enter and exit the Proposal site via Waterfall Way.

2.4.4 Sources of material

The Proposal would require approximately 14,200 cubic metres of fill material to construct the road, including pavement materials. Of this, 1,200 cubic metres would be sourced from the cutting and the remainder would be imported. There are a number of approved, operational quarries in the area, including Coffs Harbour and Dorrigo, from which materials could be sourced. The material required for the Proposal includes, but is not limited to the following:

- Earthworks cut to fill 1200 cubic metres
- Fill material for preloading and surcharge 8600 cubic metres
- Select material 1000 cubic metres
- Bridging layer 1000 cubic metres
- Subbase material 1200 cubic metres
- Base course material 1200 cubic metres

2.4.5 Stockpile and compound sites

It is likely that a site compound with an approximate area of 1,200 square metres would be required, most likely on adjacent farmland, and would require the temporary removal of approximately 1,200 square metres of pasture.

The site compound would include ancillary items such as stockpile and works compound facilities. On-site temporary works facilities for the Proposal would include a site office, equipment/plant compound area, and materials stockpile sites. All storage and plant maintenance areas would be bunded.

Environmental criteria that would be considered when choosing a site are provided below.

The site would be located:

- More than 50 metres from any waterway;
- In an area of low conservation significance for flora, fauna and Aboriginal or non-Aboriginal heritage;
- Within an already disturbed area which would not require clearing of native vegetation;
- In areas previously disturbed, if possible;

- More than 100 metres from residential uses or other activities that may be affected by operational noise or other impacts of construction plant;
- All stockpiles would be established, managed and decommissioned in accordance with the *RTA's Stockpile Management Procedures (2001)*;
- All fuels and chemicals would be stored in accordance with Section 6.12 (Chemicals, Dangerous Goods and other Potential Contaminants) of the RTA's QA Specification G36;
- The compound site would be enclosed with appropriate security fencing;
- Construction vehicles and stockpiles would not be placed or stored within five (5) metres of trees; and
- Potentially hazardous activities, including washing out of concrete delivery vehicles, washing down of construction plant, refuelling plant and handling hazardous chemicals would only be permitted on-site at locations that have adequate environment protection measures and are more than 20 metres away from stormwater drainage systems or natural watercourses and include an impervious surface and bunding.

Based on the above criteria, site location would be best suited on the northern side of Waterfall Way, in the western section of the study area.

2.4.6 Working hours

Construction activities would be undertaken in accordance with the Department of Environment and Climate Change (DECC) standard working hours of:

- Monday-Friday: 7am to 6pm
- Saturday: 8am to 4pm
- Sunday and Public Holidays: No Work

Should work be required outside standard working hours, the consultation procedure for Practice Note vii (Roadworks outside normal working hours) of the RTA's *Noise Management Guidelines* would be followed. Refer to **Section 6.7** of this REF for detailed information regarding noise and vibration.

2.5 Property acquisition

Property acquisition has been undertaken for the properties required to implement the Proposal. All property acquisitions were negotiated in accordance with the *RTA's Land Acquisition Policy*, and compensation in accordance with the *Land Acquisition (Just Terms Compensation) Act* 1991. Property acquisitions and/or leasing arrangements were resolved between the RTA and property owners. A total of 9530 square metres has been acquired for the Proposal which consisted of the partial acquisition of properties on five allotments.

2.6 Utilities

Existing utilities within the study area include telephone, powerlines, and water supply infrastructure. The Proposal would not impact upon these utilities.

3. STATUTORY POSITION

The Proposal is for the purpose of a road and road infrastructure facilities (Infrastructure SEPP 2007) and is to be carried out on behalf of the RTA. It will be assessed under Part 5 of the *Environmental Planning and Assessment Act* 1979. Development consent from Council is not required.

3.1 State Environmental Planning Policies (SEPPs)

3.1.1 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 94 of ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for the purposes of a road and road infrastructure facilities and is to be carried out on behalf of the RTA, it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979*. Development consent from Council is not required.

The proposal is not located on land reserved under the *National Parks and Wildlife Act* 1974 and does not affect land or development regulated by *State Environmental Planning Policy No. 14 - Coastal Wetlands, State Environmental Planning Policy No. 26 - Littoral Rainforests* or *State Environmental Planning Policy (Major Projects)* 2005.

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Consultation, including consultation as required by ISEPP (where applicable), is discussed in **Section 5.2** of this REF.

3.1.2 SEPP 14 Coastal wetlands

State Environmental Planning Policy 14 Coastal Wetlands (SEPP14) is aimed at ensuring coastal wetlands are preserved and protected in the environmental and economic interests of the state. Mapping exists which shows the locations of all Coastal Wetlands protected under SEPP14.

The nearest SEPP 14 wetland is located approximately 1.5 kilometres to the south east of the Proposal, consequently no SEPP 14 wetlands would be impacted upon by the proposed road realignment.

3.1.3 SEPP 26 Littoral rainforests

Littoral rainforests are a distinct type of rainforest well suited to harsh salt-laden and drying coastal winds. SEPP 26 Littoral Rainforest requires that the likely effects of proposed development be thoroughly considered in when assessing the impact of development. The policy applies to 'core' areas of littoral rainforest as well as a 100 metre wide 'buffer' area surrounding these core areas, except for residential land and areas to which SEPP No. 14 - Coastal Wetlands applies.

The nearest SEPP 26 littoral rainforest is located approximately seven (7) kilometres to the north east, consequently no SEPP 26 littoral rainforest would be impacted upon by the proposed road realignment.

3.1.4 SEPP 44 – Koala habitat protection

The Bellingen LGA is identified within the Schedules of *SEPP 44 Koala Habitat Protection* as a LGA in which koalas are known to occur. While the requirements of the SEPP do not technically apply to this Proposal, as it is not subject to Council consent, it is the RTA's practice to consider SEPP 44 criteria in the environmental impact assessment (EIA) process. These criteria relate to the percentages of feed tree cover, particularly trees

listed under Schedule 2 - Known Feed Trees. The assessment criteria consider the percentage cover of known feed trees, and whether these are greater or less than 15% of the total tree canopy.

Known feed trees in the study area include Tallowwood *Eucalyptus microcorys* and Swamp Mahogany *Eucalyptus robusta*. However, the tree canopy cover of these species is considered to comprise less than 15% of the total number of trees in the study area and, therefore, the study area is not considered potential koala habitat.

3.1.5 SEPP 62 Sustainable Aquaculture

SEPP 62 Sustainable Aquaculture encourages the sustainable expansion of the aquaculture industry in NSW. The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks. Part 3A addresses the need to assess impacts on priority oyster aquaculture areas.

The Proposal is approximately seven (7) kilometres (via the Bellinger River) from a priority aquaculture area (Mylestom) and includes comprehensive mitigation measures to ensure no offsite impacts occur. The Proposal is therefore unlikely to have an adverse effect the Mylestom priority oyster aquaculture area.

3.2 Regional Environmental Plans and Strategies

3.2.1 North Coast Regional Environmental Plan

The *North Coast Regional Environmental Plan* (REP) applies to the Bellingen LGA. The provisions of this plan do not apply specifically to the proposed works. However, the relevant aims of this plan have been considered in the EIA and include:

- To develop regional policies that protect the natural environment, encourage an efficient and attractive built environment and guide development into a productive yet environmentally sound future; and
- To provide a basis for the coordination of activities related to growth in the region and encourage optimum economic and social benefit to the local community and visitors to the region.

The Proposal would improve the economic and social benefits of Waterfall Way by improving the safety of the route and improving travel times and would be undertaken in an environmentally sound manner. This would also make travel more efficient, reducing fuel usage.

3.2.2 Draft Mid North Coast Regional Strategy

The draft Mid North Coast Regional Strategy is a 25-year land use strategy aiming to:

- Protect high value environments and habitat corridors, cultural and Aboriginal heritage and scenic landscapes;
- Provide up to 58,400 new homes by 2031 to cater for a forecast population increase of 91,000. With smaller households and an ageing population, a more suitable mix of housing will be encouraged, including more multi-unit style dwellings;
- Ensure an adequate supply of land is available to support economic growth and an additional 47,000 jobs;
- Encourage the growth and redevelopment of the Region's four major regional centres (Grafton, Coffs Harbour, Port Macquarie and Taree) and six major towns (Maclean, Woolgoolga, Bellingen, Macksville, Kempsey and Forster-Tuncurry) through urban design and renewal strategies; and

- Protect the coast by focusing new settlement in areas identified on local strategy maps. Development in places constrained by coastal processes, flooding, wetlands, important farmland and landscapes of high scenic and conservation value will be limited.

The Proposal would provide a safer road network for local motorists and tourists which are consistent with the objectives of the draft plan.

3.3 Local Environmental Plan

The study area is located within the local government area of the Bellingen Shire Council. The study area is currently zoned 1(a1) Agricultural Protection, 1(c2) Rural Small Holdings and 7(a) Environmental Protection Zone (Wetlands) pursuant to the *Bellingen Local Environmental Plan* 2003 (Bellingen LEP).

Clause 94 of the ISEPP operates to remove the consent obligations from the consent authority and therefore the proposed road upgrade does not require consent from Council.

3.4 Legislation, licenses and approvals

3.4.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) administered by the Department of Environment, Water, Heritage and the Arts (DEWHA) is the Australian Government's central piece of environmental legislation. The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places (defined in the Act as Matters of National Environmental Significance [NES]) and Commonwealth land.

Consideration of EPBC matters is provided in **Sections 5.1, 9.2** and **Appendices G** and it has been concluded that referral pursuant to the EPBC Act to the DEWHA is not required.

3.4.2 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act* 1995 (TSC Act) aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. Obligations placed on the RTA under the TSC Act in relation to the Proposal includes consideration of threatened species, populations, ecological communities, key threatening processes and recovery plans in fulfilling its statutory responsibilities.

The TSC Act inserts provisions to the approvals process if it is determined under Section 5A of the EP&A Act that there is likely to be a significant effect on a threatened species, population or ecological community. If this is the case the Act requires a Species Impact Statement (SIS) to be prepared. The consent or determining authority must seek the concurrence of the Director-General of National Parks and Wildlife where there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats or where the Proposal impacts on identified critical habitat or contributes to the operation of a key threatening process.

In relation to the Proposal, an assessment of the likely impacts on threatened species, populations or Endangered Ecological Communities (EECs), their habitats or where the Proposal impacts on identified critical habitat or contributes to the operation of a key threatening process, has been undertaken and the results are discussed in **Section 6.4** and **Appendix F**.

It has been concluded that the proposal is not likely to be have a significant impact upon any of threatened species, populations, or EECs under the TSC Act.

3.4.3 Water Management Act 2000

The *Water Management Act 2000* controls the extraction of and use of water, the construction of works such as dams and weirs, and the carrying out of activities in or near water sources in New South Wales. 'Water sources' are defined very broadly and include any river, lake, estuary, place where water occurs naturally on or below the surface of the ground and New South Wales coastal waters.

If a 'controlled activity' is proposed on 'waterfront land', an approval is required under the Water Management Act (s91[2]).

'Controlled activities' include:

- The construction of buildings or carrying out of works;
- The removal of material or vegetation from land by excavation or any other means;
- The deposition of material on land by landfill or otherwise; or
- Any activity that affects the quantity or flow of water in a water source.

'Waterfront land' is defined as the bed of any river or lake, and any land lying between the river or lake and a line drawn parallel to and forty metres inland from either the highest bank or shore (in relation to non-tidal waters) or the mean high water mark (in relation to tidal waters). The distance of forty metres can be reduced by the regulations. Depending upon the regulations, land adjoining coastal waters may also be waterfront land.

However, Pursuant to Clause 39A (1), the RTA is exempt from the need to obtain a Controlled Activity Approval.

3.4.4 Heritage Act 1977

The *Heritage Act* 1977 provides for the conservation of items of environmental heritage in NSW. The Act defines heritage as items or places that are of state and/or local heritage significance and include: places, buildings, works, relics, moveable objects and precincts. As part of NSW heritage protection and management the Act establishes a register including an inventory and list to protect the listed items.

A search of the State Heritage Register and Inventory Heritage register was undertaken resulting in no items on the State Heritage Register or LEP listed being located within proximity to the Proposal.

3.4.5 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act* 1974 (NPW Act) provides the basis for the legal protection and management of Aboriginal sites within NSW. Sections 84 and 90 of the NPW Act provide statutory protection for any physical / material evidence of Aboriginal occupation of NSW and places of cultural significance to the Aboriginal community. The key principles of the Act in relation to Aboriginal heritage are the prevention of unnecessary or unwarranted destruction of Aboriginal objects, and the active protection and conservation of objects which are of high cultural significance. It is an offence to knowingly disturb an Aboriginal object, irrespective of its nature or significance, without the prior consent of the Director-General of the NSW DECC.

An archaeological assessment of the study area was undertaken by Adise Pty Ltd in October 2008, in consultation with members of the Coffs Harbour and District Local Aboriginal Land Council (CHDLALC). The assessment found there were no known Aboriginal objects or places within the study area.

Therefore, the proposed development does not trigger any further assessment pursuant to the NPW Act. Notwithstanding this, safeguards would be in place in the event of the discovery of any Aboriginal objects during construction (refer **Section 6.5**).

3.4.6 Fisheries Management Act 1994

The Minister for Fisheries would be notified of any proposed dredging or reclamation works associated with the Proposal (i.e. installation of new culverts) in accordance with s199 of the *Fisheries Management Act* 1994.

A permit would be required from NSW Fisheries to temporarily or permanently block fish passage under s219 of the Act. Such blockages may include placement of erosion and sediment controls across waterways, inappropriately designed drainage structures that block fish passage, and bunding and dewatering works during the construction of culverts and placement of fill in wetlands. However, it is not proposed to block any waterways likely to be used for fish passage.

The *Fisheries Management Act* 1994 through the Fish Habitat Protection Plan No. 1 requires public authorities, including local government and state authorities, to notify the Minister for Fisheries of any Proposal to remove or relocate woody debris. In addition, modification to wetlands is also detailed within this plan.

3.4.7 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act* 1997 (POEO Act) includes provisions relating to the protection of the environment. One of the objectives of the Act is to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development. There are serious offences under this Act for causing pollution of air, noise, water or land. The RTA and contractor are required to meet the waste licensing obligations of cl.39-42 of Schedule 1 of the POEO Act in relation to the proposed works, except where the RTA road material exemption 2008 applies for application of excavated road material.

The Contractor and the RTA are obliged to notify DECC when a "pollution incident" occurs that causes or threatens "material harm" to the environment.

3.5 Confirmation of Part 5 position

All relevant statutory planning instruments have been examined for the Proposal. Pursuant to clause 94(1) of the ISEPP, it is confirmed that this Proposal is subject to environmental impact assessment under Part 5 of the EP&A Act 1979.

4. NEED FOR THE PROPOSAL AND OPTIONS CONSIDERED

The Proposal would improve the movement of tourist, freight and commercial traffic between regional population centres. The provision of a wider carriageway, improved alignment and improved road surface would provide a safer and reliable access along this section of Waterfall Way.

The Proposal aims to:

- Provide a safer and consistent standard of road;
- Improve flood immunity; and
- Contribute to the RTA's strategic policy for regional road improvements to reduce travel time, freight and maintenance costs for the Waterfall Way.

4.1 Strategic need

4.1.1 State Plan

The NSW State Plan is the key driver for the RTA's activities. The State Plan was launched in November 2006 after extensive community consultation. The State Plan provides the vision for NSW for the next 10 years. The plan sets goals and provides direction for delivery of priorities and targets.

Under the direction of the State Plan, the RTA is the lead agency for:

- S7 Safer roads.

and a partner agency for:

- E3 Cleaner air and progress on greenhouse gas reductions.
- E7 Improving the efficiency of the road network.
- S6 Increasing share of peak hour journeys on a safe and reliable public transport system.
- P2 Maintaining and investing in infrastructure.
- S8 Increased customer satisfaction with government services.

The upgrade of Waterfall Way contributes to State Governments commitment to its goals set out in the State Plan with the investment in the provision of safer roads, which in turn contributes to improving the efficiency of the Waterfall Way, and increases customer satisfaction with the reduction in disruptions associated with flooding along Waterfall Way.

4.1.2 RTA Blueprint

The Blueprint sets out the vision and values for the RTA and outlines the key priorities and milestones the organisation would deliver over the next four years and beyond. The Blueprint drives the organisational planning and performance management processes.

Aligned with the NSW State Plan and other NSW Government priorities and strategies, the Blueprint agenda, while not covering all aspects of the RTA's operations, sets the priorities and focus areas for the organisation in the shorter term.

The RTA understands its responsibility is to put in place the right structure operating within sound policy settings to contribute to a strong NSW economy, a secure road/rail balance for freight movements, stable and improved travel times, better public transport, reduced vehicle emissions and enhanced road safety. One of the key items on the Agenda is putting in place world leading maintenance practices across the network through setting standards, setting up processes and the use of technology.

The upgrade of the Waterfall Way is in line with the principles of the RTA Blueprint and works to achieve the goals set including improving road safety and maintaining the road network.

4.1.3 Action for transport 2010

The Proposal incorporates the initiatives of the NSW Government's integrated transport plan, Action for Transport 2010 and its companion document Road Safety 2010 by:

- Keeping the road network in good order;
- Getting the best out of the road network;
- Preventing accidents and saving lives; and
- Safeguarding our environment.

4.2 Need for the Proposal

The Waterfall Way is an important arterial route connecting the seaboard and Coffs Harbour District with the coastal hinterland of the Bellingen area, the tablelands of Dorrigo, Armidale and beyond. The section of road from Raleigh to Bellingen has a high percentage of commuter and service traffic between Coffs Harbour and Bellingen. The Cameron's Corner Section of Waterfall Way exhibits poor horizontal and vertical alignment, with a history of road crashes and is subject to inundation.

In addition, there has been lobbying for the Proposal from local Councils. Since 1993 Dumaresq (now known as Armidale-Dumaresq), Nymboida (now known as Clarence Valley), Coffs Harbour City, Inverell Shire, and Bellingen Shire Councils lobbied the RTA for improvements to Waterfall Way. The Council's focused on the entire route and the need to improve the standard of road in relation to the commercial, economic and tourist value to their LGA's.

The following three (3) submissions have been received by the RTA from this group of Council's between 1994 and 2003:

1. In August 1994, an initial submission signed by five (5) Councils was presented to the NSW Minister for Roads and Transport for the upgrading of Waterfall Way, highlighting the economic and social benefits of the project and the required road safety considerations. The upgrading of the Proposal (Cameron's Corner road improvements) was included in the Waterfall Way priority list.

2. A second submission was received in 1998 for the upgrading of Waterfall Way. The submission identified that the road usage by private motorists, coaches and freight transport had increased substantially and called for urgent road improvements to be undertaken. The upgrading of the Proposal (Cameron's Corner road improvements) was again included in the Waterfall Way priority list.

3. In March 2003 a third report was submitted to the RTA by the Local Government Council's of Armidale/Dumaresq, Pristine Waters (now known as Clarence Valley), Bellingen Shire and Coffs Harbour City. This report requested RTA provide information and participate in the development of an improvement strategy for Waterfall Way. The upgrading of the Proposal (Cameron's Corner road improvements) was included in the list of projects.

In 1998, the State Government developed the Action for Transport 2010, a long term strategy for transport requirements in NSW. In this report, Waterfall Way was identified as an important east–west route in the region, requiring safety improvements by providing a safer and consistent standard of road.

On the basis of the Council's requests, RTA consulted with Bellingen Shire Council in October 1999 requesting a draft alignment plan for Cameron's Corner. In 2001, Bellingen Shire Council responded by providing RTA with three (3) options of which one is the Proposal (refer to **section 4.5**).

4.3 Proposal objectives

The primary objectives of the Proposal are:

- Upgrade the section to provide a consistency of travel speed along Waterfall Way.
- Upgrade the section to a safer 80 km/h standard.
- Increase flood immunity of the road.
- Reduce the severity and the incidence of road crashes.
- Improve transport efficiency by reducing travel times.
- Provide a project in harmony with the natural and social environment.
- Provide a road network that would promote economic development.

4.4 Proposal design

Design parameters

The Proposal would include the following:

- Increased traffic lane widths to 3.5 metre with 2.0 metre shoulders.
- Improved vertical alignment to achieve a safer 80km/h design speed and provide 1 in 5 year immunity from flooding;
- Improved horizontal alignment to achieve a safer 80km/h design speed by increasing the radii of curves to 240 metres;
- New Triple Cell 3.0 metre x 1.2 metre box culvert;
- Pavement construction along the new realignment;
- Installation of signage, safety barriers and other road furniture, line marking;
- Both curves have been designed with a superelevation of 7%; and
- A fill embankment slope of 2H:1V has been adopted. A slope of 2H:1V has been adopted for cuttings and 4H:1V for drainage swales.

Design outcomes

The outcomes for this Proposal would be:

- Realignment of Waterfall Way at Cameron's Corner to improve vertical and horizontal alignment to an 80 km/h design speed;
- Improved flood immunity of Waterfall Way; and
- Improved road safety and travel time.

Constraints

The Proposal has the following constraints:

- Road construction within a wetland environment (i.e. soft ground);
- Impact of Proposal on floodplain and wetland environment;
- Requirement for maintenance of access to neighbouring properties; and
- Statutory environmental obligations.

4.5 Options considered

In 2001, Bellingen Shire Council developed three (3) options for the improvements to Waterfall Way detailed within a Concept Design Report (undated). Options investigated for Cameron's Corner include:

- Realignment to provide horizontal design speed of 80 km/h;
- Realignment to provide horizontal design speed of 70 km/h; and
- Modify existing alignment.

RTA further refined the options analysis by including a fourth option (Do Nothing) to be considered during the project concept development.

4.5.1 Option 1 – Do Nothing Option

This option would involve no changes to the existing road.

Advantages

- No immediate and short term costs.
- Avoids biodiversity impacts.
- Avoids impacts on resident and subsequent land acquisition.

Disadvantages

- Does not meet the Proposal objectives described in **Section 5.1** of this REF.
- Does not reduce risk of road accidents.
- Not in accordance with Action for Transport 2010, State Plan, and RTA Blueprint.
- Does not improve flood immunity.

4.5.2 Option 2 – Realignment to provide horizontal design speed of 80km/h

This option would involve the following:

- Increasing the radius of the curve to achieve an 80km/h design speed.
- Deviation of the road alignment into a left curve of 240 metres radius and reconnection with the existing road alignment.
- Designing the new culvert for a 1 in 50 local flood.
- Increasing the vertical curve lengths for crest curve one and two, to 80 km/h design speed.
- Widening of the existing road formation to include two (2) 3.5 metre travel lanes with 2.0 metre sealed shoulders.
- Raising the road level to an appropriate level consistent with flood immunity improvements along Waterfall Way.

Advantages

- Improve the corners to a safer 80 km/h standard of road and maintains a consistent travel speed.
- Contributes to the overall route efficiency and travel time improvements along Waterfall Way.
- Improve flood immunity.
- Widen shoulders to improve road safety for all users.

- Allow majority of construction to be carried out without impacting upon traffic; and
- Anticipated reduction of the incidents of vehicle accidents.

Disadvantages

- Impacts on biodiversity.
- Requires land acquisition.
- Requires importation of fill material.
- High construction costs.

4.5.3 Option 3 – Realignment to provide design speed of 70 km/h

This option would involve the following:

- Modification of the existing curve to increase the radius to 155 metres and the curve to increase the radius to 170 metres, providing a 70 km/h design speed standard.
- Widening of the existing road formation (as in option 2) to include two (2) 3.5 metre travel lanes with 2.0 metre sealed shoulders.
- Raising the road level to improve flood immunity.

Advantages

- Requires less land acquisition than Option 2.
- Improve flood immunity.
- Widen shoulders to improve road safety for all users.

Disadvantages

- Impacts on biodiversity.
- Minimal improvements to road safety.
- Does not provide consistent travel speed along Waterfall Way.
- Not in accordance with Action for Transport 2010, State Plan, and RTA Blueprint.
- Requires traffic restrictions and delays.

4.5.4 Option 4 – Modified existing alignment

This option would involve the following:

- Widening of existing road formation (as in options 2 & 3) to include two (2) 3.5 metre travel lanes with 2.0 metre sealed shoulders.
- Maintain the existing road alignment where possible.
- Increasing the vertical curve lengths to an 80km/h design speed (as in option 2 & 3).
- Raising the road level to a 1 in 5 year design flood level (as in option 2 & 3).

Advantages

- Improve flood immunity.

- Avoids impact on residents and subsequent land acquisition.

Disadvantages

- Minor impact on biodiversity.
- Does not provide consistent travel speed along Waterfall Way.
- Does not improve the safety of the alignment.
- Does not meet the Proposal objectives described in **Section 4.3** of this REF.

4.5.5 Options Summary

The following checklist provides a summary of each option investigated and how the objectives are met and satisfied by each.

	Do Nothing Option	Option 2 – Realignment to provide horizontal design speed of 80km/h	Option 3 – Realignment to provide design speed of 70 km/h	Option 4 – Modified existing alignment
Upgrade the section to provide a consistency of travel speed along Waterfall Way.		✓		
Upgrade the section to a safer 80km/h standard.		✓		
Increase flood immunity of the road.		✓	✓	✓
Reduce the severity and the incidence of road crashes.		✓		
Improve transport efficiency by reducing travel times.		✓		
Provide a project in harmony with the natural and social environment.		✓	✓	✓
Provide a road network that would promote economic development.		✓		

4.5.6 Preferred option

Option 2 'Realignment to provide a design speed of 80km/h' achieves the objectives of providing a safer and consistent road network in comparison with the advantages and disadvantages of options 1, 3 and 4. Option 2 is expected to achieve all of the objectives and has accordingly been selected as the Proposal.

The Proposal will help improve the movement of tourists, freight and commercial traffic between regional population centres. It is needed to improve road safety and contribute to the reduction in vehicle operating costs and travel time for vehicles traveling along Waterfall Way by providing a consistency of travel speed. In addition, implementation of the proposal would have the following beneficial effects:

- Provision of an improved speed environment with improved sight distances;
- Provision of a new, wider road to improve safety;

- Anticipated reduction of the incidents of vehicle accidents; and
- Provision of a road network that will promote economic development.

5. BACKGROUND INVESTIGATION AND CONSULTATION

5.1 Background investigations and database searches

The following results were obtained from desktop database searches conducted for the study area between September and December 2008, unless otherwise stated. The information below provides a summary of the search results. Copies can be viewed in **Appendix I**.

LEP Heritage Listings
The nearest heritage items registered on the Bellingen LEP 2003 heritage listing are five (5) osprey nesting sites. They are located at south-east and north-west of Cameron's Corner, approximately two (2) to three (3) kilometres from the study area. It is unlikely that these Osprey Nesting Sites would be affected by the current Proposal (refer **Figure 3**).

Australian Heritage Database
A search of the Australian Heritage Database was undertaken in December 2008 for sites listed within the Bellingen LGA. The search resulted in 30 items being identified with one (1) site being in proximity to the Proposal.

Bellinger River (North Arm) Valley is classed as an Indicative Place on the Register of the National Estate. As an indicative place, information of the heritage value of the area has been provided to or obtained by, the Australian Heritage Commission, has been entered into the database and the place is at some stage in the assessment process. The Commission has therefore not made a decision on whether the place should be entered in the Register, and no legislative restrictions related to the Proposal apply as a result of the area being classed as an Indicative Place.

This area encompasses the Proposal footprint and is approximately 58,000 hectares, comprising generally the main valley and escarpments of the river from Point Lookout to Raleigh. The main heritage value of this area relates to the aesthetics of the river valley and the diversity of flora associated with the great range in altitude, various and rich soil types and a high annual rainfall. Due to the nature and relatively minor extent of the Proposal, it is not considered that the Proposal would substantially alter the characteristics of this area.

It is anticipated that the Proposal would not impact upon any item on the Australian Heritage Database.

NSW Heritage Office State Heritage Register/Inventory
A search of the State Heritage Register and Inventory was undertaken in December 2008 for sites listed within the Bellingen LGA. A total of nine (9) records were listed in the LGA (two [2] State Heritage Listed and seven [7] other government agency). However the nearest item (Osprey Nest Sites) on the State Heritage Register is located at south Bellingen, approximately 2-3 kilometres from the study area.

The Proposal would not impact on any items listed on the State Heritage Register and/or Inventory.

RTA Heritage and Conservation Register
A search of the RTA s.170 Heritage Register and Conservation Register was undertaken in December 2008. There were no items identified within the study area.

National Native Title Tribunal
The Tribunal is an independent Australian Commonwealth Government agency set up under the *Native Title Act 1993* (Cth). Under the *Native Title Act 1993* (Cth), the Registrar has specific functions that may also be carried out by appointed delegates. These functions include, inter alia, the maintenance of the Register of Native Title Claims, the National Native Title Register and the Register of Indigenous Land Use Agreements and provision of public access to these registers.

These registers were searched in December 2008 as part of this investigation to determine the presence of claims over the subject land. Five (5) claims are recorded on the Register of Native Title Claims within Bellingen LGA, none of which are within the study area.

NSW DECC Aboriginal Heritage Information Management System
A search of the DECC Aboriginal Heritage Information Management System (AHIMS) undertaken by Jacqueline Collins, revealed no listed Aboriginal sites or places in or near the study area. The closest registered site is a natural mythological site (DECC AHIMS #21-3-034), situated on a spur footslope adjacent to the Kalang River floodplain approximately one (1) kilometre to the south-east. Refer to **section 5.2.2** and **6.5** for further information.

NSW DECC Atlas of NSW Wildlife – Threatened Flora and Fauna Records
A search of the Atlas of NSW Wildlife (DECC 2008) for records of threatened flora and fauna within a 10 kilometre radius of the study area was undertaken in September 2008. The search identified five (5) threatened flora and 37 threatened fauna, as listed on the TSC Act and/or EPBC Act, have been recorded within 10 kilometres of the study area. Refer to **section 6.4** for further discussion.

Commonwealth DEWHA - Protected Matters Database
A search of the *Environment Protection and Biodiversity Conservation Act 1999* Act Database was conducted in December 2008 for records of listed matters of National Environmental Significance (NES) known from within 10 kilometres of the study area. A summary of the results is included below in **Table 2**.

Table 2: Summary of EPBC Act Protected Matters for the Proposal

EPBC Act Protected Matters	From within 10 kilometres of the Study Area
World Heritage Properties	None
National Heritage Places	None
Wetland of International Significance (RAMSAR sites)	None
Commonwealth Marine Areas	None
Commonwealth Heritage Places	None
Threatened Ecological Communities	1 potentially occurring
Threatened Species	47 potentially occurring
Migratory Species	44 potentially occurring
Listed Marine Species	53 potentially occurring
Commonwealth Land	1 occurring
Places on the Register of the National Estate	7 occurring
Critical Habitats	None
State and Territory Reserves	2 occurring
Regional Forest Agreements	2 occurring

Further consideration of EPBC matters is provided in **Section 6.4, 9.2** and **Appendix G**.

NSW DPI Noxious Weeds List
A search of the NSW Department of Primary Industries Noxious Weeds declarations for the Bellingen Shire Council (as declared under the *Noxious Weeds Act 1993*) was undertaken in October 2008. Over 30 noxious weed species are listed to be controlled within the Bellingen Shire Council area, of which 11 were found in the study area. Refer to **section 6.4** for further discussion.

NSW Department of Primary Industries Bionet
A search of the DPI Bionet database was undertaken in December 2008 for records of any threatened species (as listed under the *Fisheries Management Act 1994*) known from within the Bellingen Shire Council area. The search revealed one (1) threatened fish species Black Cod *Epinephelus daemelii* and no threatened species of amphibians within Bellingen LGA. Refer to **section 6.4** for further discussion.

NSW Department of Environment and Climate Change Contaminated Lands Records
The DECC Contaminated Land register search was undertaken in December 2008 for known records of contaminated land within the Bellingen LGA. Only one (1) record was identified within the DECC Contaminated Land register for the LGA and this site is located within Urunga, less than 10 kilometres from

the study area. It is anticipated that the Proposal would not impact on any contaminated sites listed on the DECC Contaminated Land register.

Commonwealth Department of Energy, Water, Heritage and the Arts National Pollutant Inventory

A search of the National Pollutant Inventory (NPI) was undertaken using an area search (by postcode) in December 2008 for substance emissions from all sources within the area. No results were identified from this search.

5.2 Government and community consultation and involvement

Relevant State government agencies and stakeholders were contacted by ELA in August 2008 and provided with the opportunity to comment on the Proposal for the road re-alignment at Cameron's Corner.

Table 3 lists the government agencies and stakeholders that replied to the consultation letters regarding the Proposal. Responses received relevant to the Proposal are summarised in column 1, whilst column 2 identifies the section in the REF where the issue has been addressed.

Table 3: Government authority responses

Summary of Issues	Section of REF addressing comments
NSW Department of Environment and Climate Change	
A response to the consultation letter dated 4 August 2008 was received on 21 August 2008. DECC had the following comments to make with regard to the proposed works. • Ensure the following environmental issues be addressed in the REF: - Local Air Quality - Noise and Vibration - Soil and Water Management • The operator would need to implement all practical measures to minimise air, noise and water pollution during the construction works. Other issues were raised and outlined in the Attachments.	 Section 6.8 Section 6.7 Section 6.1, 6.3 Section 7.2 Noted.
NSW Department of Primary Industries	
The NSW DPI was sent information on the 4 August 2008 and a response was received on 17 August 2008. The DPI had the following comments to make with regard to the proposed works. • There is a need to obtain a s200 permit and s218-220 permit • In addition, the site is within 10 kilometres of SEPP 62 Priority Oyster Aquaculture Areas which requires strict water quality parameters. • Information detailing the degree of encroachment into the wetland to the south would be required for assessment. NSW Planning and subsequently NSW DPI require encroachment into SEPP14 wetland areas be compensated for at a ratio of 10:1. • DPI would need to assess both the impact of the final works but also impacts of construction activities such as placement of compound, dewatering, temporary waterway crossings and other wetland encroachments associated with the construction footprint should be detailed. • Included DPI Aquatic Habitat Protection's standard minimum information requirements for environmental assessment, requirements for bridges and a permit application form.	 Section 3.4.6 Section 3.3.5 Section 3.3.2 Noted. Noted.
NSW Department of Water and Energy	
A response to the consultation letter dated 4 August 2008 was received on 19 August 2008. DWE had the following comments to make with regard to the proposed works: • *Water Management Amendment Act (Controlled Activities) Regulation 2008* provides that public authorities are exempt from the need to obtain a CAA in relation to all controlled activities that they carry out in, on or under waterfront land.	 Noted. Section 3.4.3

Summary of Issues	Section of REF addressing comments
• On order to assist in ensuring minimal harm would be done to any waterfront land your attention is invited to DWE Guidelines for controlled activities available at www.dwe.nsw.gov.au	Noted.
Bellingen Shire Council	
A response to the consultation letter dated 4 August 2008 was received on 30 September 2008. The Bellingen Shire Council had the following comments to make with regard to the proposed works.	
• Since the preparation of the original REF there have been several new listings of Endangered Ecological Communities (EEC) announced by the NSW Scientific Committee. Two of these communities are highly likely to occur on the site, in addition to numerous other threatened species that have been recorded in the locality.	Section 6.4
• The declaration of these communities is considered to be a matter of significant importance in terms of Council's overall approach to this project.	Noted
• Therefore it is considered that the process of identifying and selecting an appropriate option needs to be reviewed to take into account the new and significant listing of the EECs.	Noted. Section 6.4
• The work should be planned and executed in such a way as would ensure:	
- Minimal disruption to traffic during construction.	Section 2.4.3
- Private property accesses are suitably catered for.	Section 2.4.3, 2.5
- Sections of existing road not forming part of new alignment be restored with low maintenance natural vegetation or alternatively, be closed and disposed of.	Section 6.4
- Consideration is given to improving the flood immunity of this section of road.	Section 2.3, 6.3,
• The progressive upgrade of Waterfall Way to achieve a minimum level of flood immunity of 5% AEP (20 year ARI) has been identified in Council's Floodplain Risk Management Study (refer to correspondence for further information regarding this).	Noted. Refer section 2.3, 6.3,
• It is essential that any works undertaken on various sections of Waterfall Way are progressively upgraded to achieve the long term objective of providing an appropriate level of flood immunity along Waterfall Way from Bellingen to Raleigh/Urunga.	Noted. Refer section 2.3, 6.3,
• Council has produced a Flood Study of the Lower Bellinger River in 1991 and has undertaken surveys to investigate the level of flood immunity of Waterfall Way at various locations (refer to correspondence for further information regarding this).	Noted. Refer section 2.3, 6.3,
• Any works on flood affected sections of Waterfall Way have the potential to have an adverse effect on flood behaviour and local drainage. This requires further investigation and modelling to assess appropriate bridge and culvert openings. As the required investigations may take some time to complete, they should be undertaken as soon as possible to avoid delays in the finalisation of the design for the works.	Noted. Refer section 2.3, 7.3,
• The above matters require further detailed consideration in the preparation of any Environmental Assessment of works for the proposed upgrade.	Noted.
Northern Rivers Catchment Management Authority	
A response to the consultation letter dated 4 August 2008 was received on 7 November 2008. The NRCMA had the following comments to make with regard to the proposed works.	
• From the information available, the Cameron's Corner realignment seems to trim the edge of floodplain swamp forest EEC. Appropriate hydrological regimes	Section 6.3, 6.4

Summary of Issues	Section of REF addressing comments
must be maintained throughout the area to support this community. • Adjacent areas of native vegetation should be protected from weed infestation and sedimentation. • Restoration works should be implemented using native plants sourced from local stock.	Section 6.1, 6.4 Section 6.4

5.2.1 Community consultation and involvement

Community consultation for the Proposal has been undertaken by the RTA. The level of community consultation has been determined using the International Association for Public Participation (IAP2) spectrum. Community involvement on this project, under the IAP2 spectrum, is to Inform/Consult. The objectives are to keep the community informed, listen to and acknowledge concerns and aspirations and provide feedback on how public input influenced the final decision. The level of consultation and community involvement undertaken for this project is greater than what is usually adopted for minor road improvement works of this scale. The RTA has undertaken the following consultative actions:

- Invitation for public comment;
- Community information sessions;
- Public displays; and
- Exhibition of the REF.

The RTA placed advertisements in the Coffs Harbour Advocate and Bellingen Courier inviting community to view and comment on the proposal. The displays and information session gave an overview of the proposed upgrade, allowing the public to gain an appreciation of the background, progress, benefits, stages, design issues and key features of the project. The displays also advised the community how to gain further information about the project and provide input (via post, email, the RTA website or telephone) on any issues associated with the proposal.

Feedback forms and letters have been received by the RTA to date relating specifically to the Proposal. A number of comments supporting the project were also received at the information session.

In summary, the RTA has received feedback relating to:

- Impacts to biodiversity;
- Suggested alternatives to realignment of the road; and
- Community involvement in the development of options.

At the conclusion of the exhibition period of the REF, written submissions will be considered by the RTA.

5.2.2 Consultation with the Aboriginal community

The study area is located within the territory administered by the Coffs Harbour and District Local Aboriginal Land Council (CHLALC), close to its boundary with the Bowraville Local Aboriginal Land Council (BLALC). On advice from Chris Spencer, CEO of the CHLALC, the BLALC was invited to participate in the field survey. However, the BLALC sites officer did not attend.

As advised by the Department of Environment and Climate Change (DECC), Urunga Elder Tom Kelly is a recognised Aboriginal stakeholder for the lower Bellinger district. Tom Kelly works in conjunction with and advises the CHLALC within the southern section of its territory, which includes Cameron's Corner. Field

survey of the study area was undertaken with the assistance of CHLALC senior sites officer Mark Flanders and Tom Kelly. Cultural heritage issues/values and impact mitigation alternatives were discussed during the course of the survey, and the management recommendations presented in this report were endorsed as the most appropriate means of conserving the study area's Aboriginal heritage values.

Tom Kelly advised that no known sites/places/resources of traditional, historic or contemporary socio-cultural significance, attachment or concern would be adversely affected by the Proposal. The nearest sites/places of known past Aboriginal occupation are located at Fernmount (3.8 kilometres west of the study area), where one camp continued to be used from the early historic period through to the 1950s.

Although no sites/places of Aboriginal spiritual, ceremonial or archaeological significance were identified in the study area, CHLALC Senior Sites Officer Mark Flanders considers it likely that the paperbark swamp at the western foot of the hillslope would have provided traditional water, food and material culture resources. For this reason, Mark Flanders assessed the swamp to be of general Aboriginal heritage value and advised that he would like to see avoidance or at least minimisation of construction impacts on this feature.

Refer to **section 6.5** for further discussion of Aboriginal heritage.

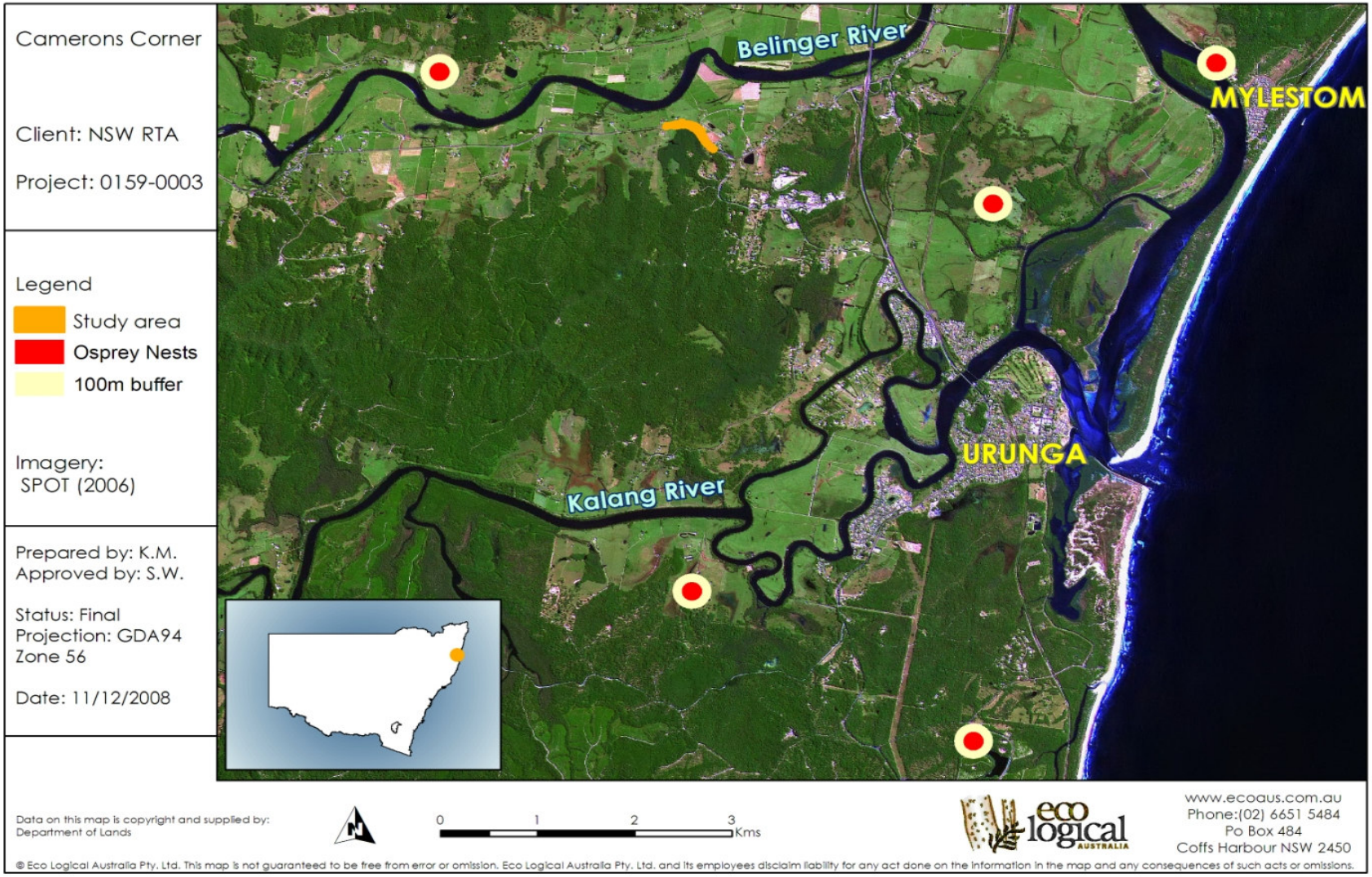

Figure 3: Osprey Nest Sites

6. ENVIRONMENTAL ASSESSMENT

This section provides a detailed description of the potential environmental impacts associated with the construction and operation of the Proposal. All aspects of the environment with the potential to be impacted upon by the Proposal are considered. Site specific safeguards are provided to ameliorate these identified potential impacts.

6.1 Landform, geology and soils

Existing environment

The study area is located at a transition from rolling low hills at the eastern end of the study area, to low lying alluvial floodplain with long, narrow curved fluvial levees, interspersed with flat to gently inclined swampy floodplains at the western end of the study area.

Soils within the study area consist of deep, moderately well-drained to poorly-drained alluvial clays, earthy sands, alluvial loams, yellow podzolic soils, and gleyed podzolic soils. Soils within the wetland (swampy floodplain) are very soft. Limitations of these soils include strong acidity, low wet bearing strength, high aluminium toxicity potential, high localised acid sulphate potential, localised salinity, high localised sodicity and extreme localised subsoil erodibility.

The potential for the presence of Potential Acid Sulphate Soils (PASS) was investigated via a search of the DLWC PASS database in 2008. Acid sulphate risk maps produced by DLWC have shown the low lying wetland area within the study area as having a high risk occurrence of acid sulphate soils.

Potential impacts

The Proposal would involve the import of 13,500 square metres of fill, and the creation of a raised road surface in a currently low-lying area. The Proposal would expose soils to erosion hazards through excavation works, vegetation removal, the extension of existing culverts within the drainage channels, stockpiling and the respreading of topsoil. The erosion potential of the soil batters of the Proposal will increase with batter grade. The disturbance of soils near the existing drainage channel and within the *Melaleuca* wetland would also have the potential to cause sedimentation downstream.

PASS are a major concern as if exposed they oxidise, creating acid leachate leading to impacts on engineering, agricultural, ecological and aquatic systems. Soil excavated from and disturbed in the *Melaleuca* wetland would have a high potential of oxidising. Acid leachate would potentially impact adjacent vegetation growth including in the wetlands and decrease downstream water quality. For example, in the wetlands and the unnamed creek by increasing the acidity.

The potential for erosion and sedimentation from the Proposal and oxidation of PASS would be minimised by the implementation of mitigation measures detailed below.

Safeguards and management measures

- As per RTA specification G36, a soil and water management plan would be prepared and implemented.
- All stockpiles would be designed, established, operated and decommissioned in accordance with the RTA's *Stockpile Site Management Procedures* 2001.
- To prevent erosion, any stockpile that is not worked for a period longer than two weeks would be covered or seeded using self sterile grass covers.
- Hard stand material or grids would be installed at all site entry and exit points to minimise the tracking of soil and particulates onto pavement.
- Imported construction materials would be sourced from licensed/registered suppliers.
- Scour protection would be provided at the inlet and outlets of culverts.

- Table drains would be suitably lined to minimise erosion and scouring.
- To minimise erosion and sedimentation, drainage works would be completed in the early phases of construction.
- Site rehabilitation of disturbed areas would be undertaken progressively.
- If unidentified sites of contaminated land are found within the Proposal site, works would cease at that location, any contaminants would be immediately contained and the RTA's Environmental Officer, Northern Region would be notified immediately.
- Disturbed areas would be restored to a natural shape at the completion of works where possible.
- An acid sulphate material (ASM) management plan would be developed in accordance with RTA's guidelines for the Management Acid Sulphate Materials (RTA, 2005). This would detail the specific measures to be incorporated in the detailed design and to be followed during construction.
- The acid sulphate material (ASM) management plan would be prepared as part of the contractor's environmental management plan (CEMP) for the site and would be approved by the Environmental Officer, RTA Northern Region, before works commence and be in accordance with Acid Sulphate Soil Management Committee (ASSMAC) Guidelines, 1998.
- Disposal of ASM offsite would be undertaken in accordance with the DECC Waste Classification Guidelines.
- Areas where soil has been exposed would be revegetated and restored as construction work is completed, or stabilised using geotextile.
- A Soil and Water Management Plan (SWMP) would be developed for the Proposal and would be incorporated into the Contractors Environmental Management Plan (CEMP). The ESCP would incorporate specifications outlined in the NSW Erosion and Sediment Control Handbook No.2 and be reviewed by the RTA's Environmental Officer prior to the commencement of works;
- Regular inspection of the work site would be undertaken during construction activities to ensure that the erosion and sediment control measures are properly implemented.
- All erosion and sediment control measures are to be removed once the site has been rehabilitated.
- An appropriate spill containment kit would be kept on site at all times during construction and site staff trained in its uses.

6.2 Climate

Existing environment
The climate of the area is warm in summer and cool in winter. The coldest month is typically July with average maximum and minimum temperatures of approximately 20 and 8 degrees C respectively. The warmest month is January with average maximum and minimum temperatures of approximately 27 and 19 degrees C, respectively. Average annual rainfall is between 1,500 millimetres to 1,700 millimetres. The highest average monthly rainfall occurs in March, at approximately 240 millimetres and the lowest average monthly rainfall occurs in September at approximately 65 millimetres.

Potential impacts
It is considered that the proposed works would not have an impact upon climate either within the local area or on a regional scale.

The Proposal would involve soil disturbance, thereby increasing the likelihood of soil erosion during periods of high rainfall or high winds and sediment-laden water entering a waterway.

There is the potential for construction works to be delayed during periods of flooding.

Safeguards and management measures

- A traffic management plan (TMP) would be prepared and would consider periods of inclement weather including fog.
- Daily weather forecasts would be obtained to allow sufficient time to stabilise the site and to prevent erosion and sedimentation prior to heavy rainfall events. Such actions would be recorded and dated to verify and demonstrate that activities and controls were implemented prior to rainfall events.
- Works would not be undertaken during heavy periods of rainfall and the wetland water level would be factored into how the works are carried out; and
- Sufficient time would be given prior to an announced Bureau of Meteorology (BOM) predicted heavy rainfall event, or anticipated rise in water levels, to vacate and clean up the construction site.

6.3 Water quality and hydrology

Existing environment

Drainage of the existing road pavement is directly into the adjacent wetland and into informal table drains lining the roadside. Cross drainage is provided by three (3) culverts, located at either end of the study area and at the location of the wetland. These flow to the wetland and to the creek line (unnamed), which flows into the Bellinger River to the north of the study area. The Bellinger River flows into the South Pacific Ocean at Urunga, approximately six (6) kilometres south-east of the study area.

The study area is located on the Bellinger River Floodplain and as such is subject to flooding. Most of the study area is low lying, the exception being a portion of higher ground at the eastern end of the study area. The hydrology of the existing *Melaleuca* wetland is relatively complex and is a result of natural and anthropogenic processes. The wetland area has formed in a natural depression, caused in part by a small creek line that flows across the study area to join the Bellingen River approximately 600 metres north of the existing road. This creek line is currently drained by a single box culvert beneath the existing road. It would appear from the topography of the area that the wetland existed prior to construction of the road; however it is unclear whether construction of the road has restricted drainage of the wetland and in doing so, modified the hydrology of the area to increase the depth and area of the wetland.

Drainage of the wetland is limited by the level of the invert of the culvert. When water levels in the wetland exceed this level, drainage through the culvert occurs. If water levels upstream of the culvert increase beyond the drainage capacity of the culvert, water backs up on the southern side of the road until inflows to the wetland from the catchment upstream of the culvert are reduced to below the drainage capacity of the culvert or overtopping of the road occurs.

When flooding occurs, the creek line north of the existing culvert would also be expected to back-up from the Bellinger River and the wetland would fill above the height of the existing road culvert, and then either continue to fill until the road surface was overtopped, or eventually drain down via the culvert, to the invert level of the existing culvert. Further drainage would then be limited to sub-surface flow and evapotranspiration.

Water quality monitoring was carried out as part of the Aquatic Ecological Survey by Marine Pollution Research Pty Ltd in June 2003. Low dissolved oxygen values are expected in still bodies of water as is the case with this *Melaleuca* wetland. In periods of increased flow, oxygen levels would be expected to increase dramatically.

Potential impacts

The Proposal has considered the hydrology of the wetland, its flow and drainage regime and its potential to impact on aquatic ecology. The design has ensured that there is no change to the flow and drainage regime by leaving the existing culvert and road embankment in place. This will ensure the existing low flow conditions of the wetland are maintained.

The RTA prepared a flood assessment in February 2004 (see **Appendix H**). The proposed culvert at Cameron's Corner would be designed for a 1 in 50 year local flood, which requires a triple cell 3.0 metres by 1.2 metre box culvert. For the 1 in 50 year and 1 in 100 year floods the difference in water level would be approximately 200 and 250 millimetres respectively. The differences would only occur over a six (6) to eight (8) hour period until the Bellinger River flood height overtops the new embankment and then levels would be quickly equalised on both sides of the road.

The flood durations and extent would be similar to the existing flooding at this location. The new triple cell box culvert would be designed to maintain the existing low flow levels in the wetlands. The culvert would be constructed in accordance with DPI - Fisheries guidelines. The existing culvert and part of the road embankment would be retained to ensure impacts on the flood retention and drainage characteristics of the wetland as a result of the Proposal are minimised (refer to **section 6.4**).

During the construction, the main potential impacts on water quality in the adjacent wetland, creekline and Bellinger River would be release of sediment laden waters and of pollutants such as fuel and hydraulic fluid leaks, spills, pavement material and general litter. Spills during the refuelling of plant and equipment have the potential to cause localised contamination of waterways and the adjacent wetland. Construction of the new drainage works would be a high risk activity for potential pollution, erosion and sedimentation of waterways, particularly when works are being undertaken within an adjacent unknown creekline and wetland.

The Proposal would involve disturbance of waterlogged and inundated soil, and increases in the turbidity of the waters within the Proposal footprint during construction would be expected. Potential impacts of increased turbidity include lower light penetration and heat transfer from solar radiation which can affect water quality and ecosystem health. Lower light penetration can decrease the ability of aquatic macrophytes to photosynthesize, and macrophytes are important in regulating dissolved oxygen levels and provide habitat for aquatic macroinvertebrates and fish. Changes in temperature of the wetland can alter pH and other water quality parameters.

Providing correct sediment control measures are implemented, along with measures to prevent the erosion of exposed soil generated by the Proposal, turbidity increases are likely to be minor and short term in nature.

During operation of the Proposal, road runoff has the potential to cause a decline in water quality in the wetland and downstream areas due to discharges of fuel, oil and rubber from the road surface during rainfall events; however it should be noted that this occurs under existing conditions.

Safeguards and management measures

- A Soil and Water Management Plan (SWMP) would be developed for the Proposal and would be incorporated into the Contractors Environmental Management Plan (CEMP). The ESCP would incorporate specifications outlined in the NSW Erosion and Sediment Control Handbook No.2 and be reviewed by the RTA's Environmental Officer prior to the commencement of works;
- Where required, temporary sedimentation basins or traps would be designed, positioned, constructed and managed in accordance with the Landcom's *Managing Urban Stormwater: Soils and Construction* ("the Blue Book") and would be implemented in the initial stages of works to effectively collect sediment and dirty water from the site.
- The Proposal would be undertaken in accordance with RTA's *Water Policy and Code of Practice for Water Management* (RTA 1999) and the Blue Book.
- To provide temporary protection to creek beds and banks, geotextile material would be installed where there is potential for erosion, including areas where there is contact between unconsolidated fill embankments and water. Permanent creek bed and bank stabilisation works would be completed immediately after completion of works;
- The roadwork's would be designed and constructed to minimise disturbance to the existing wetland and waterways. A work method statement outlining (but not limited to) how this would be achieved for the culvert works would be provided to and discussed with DWE;

- Drainage of the wetland would be designed to maintain the existing drainage characteristics of the wetland. That is, the extended culvert drain would be designed to provide the same drainage characteristics as the present culvert drain, in order to maintain the present drainage time lags and flood retention period;
- Should any contaminated spillage occur during construction the RTA's Environmental Officer, Northern Region, would be contacted immediately, and contaminants would be immediately contained, removed, treated (if necessary) and disposed of in accordance with DECC requirements.
- An incident emergency spill plan would be developed and incorporated in the CEMP. This would include measures to avoid spillages of fuels, chemicals, and fluids near and/or into any waterways. All personnel would be made aware of these measures. An emergency spill kit would be kept onsite at all times during construction.
- All fuels, chemicals, and liquids would be stored at least 40 metres away (the standard is 40 metres) from any waterways or drainage lines and would be stored within an impervious bunded area within the compound site.
- Any wastewater generated from construction processes would be contained onsite and/or treated to legislative requirements prior to its disposal.
- All clean water would be diverted around or through the site with adequate and effective erosion and sedimentation controls to prevent the mixing of clean and dirty water.
- Any groundwater encountered during construction would be managed in accordance with legislative requirements.
- All concrete works would be undertaken in accordance with the DEC *Environmental Best Management Practice Guideline for Concreting Contractors* (2002).
- The refuelling of plant and maintenance of machinery would be undertaken within impervious bunded areas within the compound sites and not within 40 metres of any waterways.
- Vehicle wash downs and/or cement washouts would be undertaken within designated bunded areas with impervious surfaces and not within 40 metres of any waterways.
- The natural hydrology and alignment of ephemeral drainage lines would be retained where possible.
- In the event that groundwater is intersected, it would be managed in accordance with the ESCP; and
- Wherever possible, operational road runoff would be treated through vegetated table drains.

6.4 Biodiversity

ERM Pty Ltd was engaged to undertake an ecological assessment of the Proposal site in 2003. ERM implemented the following survey and assessment techniques; random vegetation meander survey, quadrat sampling, transect sampling, habitat assessment, koala habitat assessment, diurnal bird survey, fauna features search, dusk census, spotlighting, call playback, bat detection, and amphibian and reptile searches. ERM found that although the proposed upgrade was not expected to have a significant impact on threatened species, it was still likely to impact on native terrestrial and aquatic flora and fauna assemblages in the locality. As such numerous mitigation and management measures were recommended. The results of ERM (2003) are provided in **Appendix C** and throughout this section.

ELA used the ERM 2003 survey data and completed 2008 database searches to prepare assessments of significance under both the EP&A Act Seven Part Tests – Section 5A and the Commonwealth EPBC Act Significant Impact Criteria for threatened biodiversity as listed on the NSW TSC Act and EPBC Act. The likelihood of occurrence of threatened flora and fauna is provided in **Appendix D and E**.

ELA conducted Seven Part Tests and/or Significant Impact Criteria for two (2) endangered ecological communities, one (1) threatened flora and 23 threatened fauna. These assessments found that the Proposal was unlikely to have a significant impact on threatened biodiversity as listed on the TSC or EPBC Acts (**Appendices F and G**).

This section outlines the findings of the ERM (2003) report and the ELA (2008) Assessments.

Direct impacts of the Proposal include the clearing of 0.8 hectares of native vegetation of which 0.6 hectares is EEC as listed on the TSC Act. This is comprised of 0.5 hectares of Swamp Sclerophyll Forest (EEC), 0.1 hectares of Freshwater Wetland (EEC) and 0.2 hectares of Tallowwood - Narrow-leaved White Mahogany (not EEC). The clearing of 0.8 hectares of native vegetation is considered to be an unavoidable impact related to the Proposal (refer **Figure 2**).

Indirect impacts of the Proposal are related to the creation of a new bushland edge not previously exposed to disturbance and are likely to include rubbish dumping and other non-specific human use and weed invasion. It is unlikely that the Proposal would lead to erosion and sedimentation as it is largely located on flat land. Whilst some indirect impacts, such as non-specific human use, are unavoidable the design of the Proposal would include measures to ameliorate the indirect impacts related to weed invasion.

6.4.1 Plant communities

Existing environment

Three Biometric Vegetation Types (DEC 2004) were recorded within the study area, including; Paperbark Swamp Forest, Coastal Freshwater Meadows and Forblands of Lagoons and Wetlands and Tallowwood – Narrow-leaved White Mahogany Open Forest. There is also cleared land within the study area.

Paperbark swamp forest of the coastal lowlands of the North Coast

This community occurs on the flat, poorly drained parts of the study area. It is a tall forest clearly dominated by Broad-leaved Paperbark *Melaleuca quinquenervia* with occasional Swamp Mahogany *Eucalyptus robusta.* There is a sparse small tree and shrub layer and a dense tall ground layer dominated by the sedges *Carex appressa* and *Gahnia clarkei*.

The Paperbark Swamp Forest was considered to be in good condition within the study area, despite impacts from adjacent land uses. This community had few weeds and tall mixed-age canopy with many Broad-leaved Paperbark over 40 centimetres diameter and occasional larger Swamp Mahogany. This patch of Paperbark Swamp Forest extends to the south of the study area and is one of the larger stands of this community in the lower Bellinger valley.

Paperbark Swamp Forest equates to the Endangered Ecological Community (EEC) Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions (SSF), as listed under the TSC Act.

SSF is not listed as a threatened ecological community under the EPBC Act.

Coastal freshwater meadows and forblands of lagoons and wetlands (Coastal Freshwater Wetland)

A small area of Coastal Freshwater Wetland occurs near the north-west corner of the study area. There are scattered Broad-leaved Paperbark *Melaleuca quinquenervia* with species such as Woolly Waterlily *Philydrum lanuginosum,* Water Ribbons *Triglochin procera* and *Persicaria strigosa* growing in the semi-permanent open water swamp.

The Coastal Freshwater Wetland was considered to be in poor condition within the study area and largely derived from the previous clearance of Paperbark Swamp Forest (SSF) within the study area. This community within the study area has also been affected by grazing of domestic stock.

Despite being derived from previously cleared SSF, this plant community is considered to function as Coastal Freshwater Wetland and therefore equates to the EEC, Freshwater Wetlands on Coastal Floodplain of the NSW North Coast, Sydney Basin and South East Corner Bioregions (Coastal Freshwater Wetland), as listed on the TSC Act.

Freshwater Wetland is not listed as a threatened ecological community under the EPBC Act.

Tallowwood - Narrow-leaved White Mahogany open forest of the hinterland ranges of the North Coast
A small area of a variant of this community occurs along the northern side of Waterfall Way in the eastern part of the study area. It is dominated by Narrow-leaved White Mahogany *Eucalyptus acmenoides* with occasional Tallowwood *E. microcorys,* Nambucca Ironbark *E. ancophila* and Small-fruited Grey Gum *E. propinqua.* There is an open mid storey of a number of small tree and shrub species and the ground layer is sparse.

Within the study area, the portion of Tallowwood – Narrow-leaved White Mahogany Open Forest is considered to be in moderate condition. The vegetation in this area has good resilience and composition however it has been structurally altered along the road edge due to road-side vegetation maintenance (slashing), fragmentation and weed invasion.

Tallowwood – Narrow-leaved White Mahogany Open Forest is not listed under either the TSC Act or EPBC Act.

Cleared Land
There is a small cleared area in the north of the study area that is dominated by exotic grasses such as Kikuyu *Pennisetum clandestinum* and Vasey Grass *Paspalum urvillei*.

This area was assessed as being in poor condition and has little natural resilience. This plant community has negligible conservation value.

Table 4 provides a comparison between three of the main vegetation classification systems used in NSW, including reference sources for each. The names of vegetation communities used in this report follow the updated names in the Biometric / PVP Developer database (DECC 2004).

Table 4: Comparison between different vegetation classification systems for NSW

1. Keith Class	2. Forest Ecosystems	3. Biometric	TSC Act EEC equivalent	EPBC Act EEC Equivalent
Coastal Swamp Forests	Paperbark Swamp Sclerophyll Forest (112)	Paperbark swamp forest of the coastal lowlands of the North Coast	Swamp Sclerophyll Forest on Coastal Floodplain	N/A
North Coast Wet Sclerophyll Forests	Moist Open Escarpment White Mahogany (91)	Tallowwood - Narrow-leaved White Mahogany open forest of the hinterland ranges of the North Coast	N/A	N/A
Coastal Freshwater Lagoons	N/A	Coastal freshwater meadows and forblands of lagoons and wetlands	Freshwater Wetland on Coastal Floodplain	N/A

1. Keith, D.A. (2004). *Ocean Shores to Desert Dunes – The Native Vegetation of New South Wales and the ACT*. Department of Environment and Conservation.
2. National Parks and Wildlife Service (NPWS 1999). *Forest Ecosystem Classification and mapping for the upper and lower north east CRA regions*. CRA Unit Northern Zone.
3. BioMetric Vegetation Types Database (2004). PVP Developer Tool. Department of Environment and Conservation.

6.4.2 Flora

Within the study area, 86 flora species were recorded during the field survey. Of these, 11 (approximately 10%) were introduced species, of which two (2) are listed as noxious weeds in the Bellingen LGA (Camphor Laurel and Lantana). The flora species identified in the study area are recorded in **table 5** below.

No threatened flora species, as listed under the TSC Act or EPBC Act were recorded in the study area.

Five (5) threatened flora, as listed under the TSC Act and/or EPBC Act were recorded within a 10 kilometre radius of the study area. Of these, it is considered that only *Parsonsia dorrigoensis* is likely to occur in the study area (refer **Appendix D**).

Although about 10% of the flora species recorded are exotic most of these occur in the cleared areas in the north, and the open forest along Waterfall Way in the east of the study area.

6.4.3 Fauna

Existing environment

ERM (2003) conducted systematic surveys for all fauna groups, the results of which are provided in **Appendix C**. The results from the ERM survey and records from the Atlas of NSW Wildlife were utilised to determine the likelihood of occurrence of threatened fauna within the study area.

Among other species, the Black-necked Stork was recorded during the field survey conducted by ERM (2003). Informal observations by amateur and professional ecologists alike have also been made of this species utilising the study area (acknowledged by the NSW RTA). These formal and informal observations are supported by the Atlas of NSW Wildlife, which has a single record within the study area. The species was not recorded during the field survey conducted by ELA in 2008.

No threatened fauna were recorded during the field survey conducted by ELA in August 2008; however the surveys conducted by ERM (2003) recorded five threatened fauna as listed on the TSC and/or EPBC Acts. These species included the Black-necked Stork *Ephippiorhynchus asiaticus*, Grey-headed Flying Fox *Pteropus poliocephalus*, Little Bentwing Bat *Miniopterus australis*, Large Bentwing Bat *Miniopterus schreibersii* and Large-footed Myotis *Myotis adversus*. Additionally, the Spotted-tailed Quoll *Dasyurus maculates* (refer **Appendix E**).

In addition, the 2003 ERM ecological survey report concluded that due to the type of vegetation present, hollow bearing trees of the sort suitable for animals to roost/breed in are unlikely to occur.

The likelihood of occurrence of threatened fauna within the study area based on known or potential habitat is shown in the table in Appendix E. Based on this, 23 threatened fauna are considered to potentially occur in the study area.

Table 5: Flora List

Species	Exotic (NW Act Category)	Common Name	Swamp Sclerophyll Forest	Coastal Freshwater Wetland	Tallowwood-Narrow-leaved White Mahogany Open Forest
Acacia disparrima subsp. *disparrima*		Southern Salwood			y
Acacia fimbriata		Fringe Wattle			y
Acacia maidenii		Maiden's Wattle	y		
Acacia melanoxylon		Blackwood			y
Acronychia oblongifolia					y
Allocasuarina torulosa		Forest Oak			y
Alphitonia excelsa		Red Ash			y
Archontophoenix cunninghamiana		Bangalow Palm			y
Asplenium australasicum		Bird's Nest Fern			y
Azolla pinnata				y	
Blechnum cartilagineum		Gristle Fern			y
Blechnum indicum		Swamp Water Fern	y		
Breynia oblongifolia		Coffee Bush			y
Bursaria spinosa subsp. *spinosa*		Boxthorn			y
Callistemon salignus		Wouldow Bottlebrush	y		y
Calochlaena dubia		Rainbow Fern			y
Carex appressa			y		
Cinnamomum camphora	Y (4)	Camphor Laurel			y
Cissus antarctica		Water Vine			y
Cordyline stricta		Narrow-leaved Palm Lily			y
Corymbia intermedia		Pink Bloodwood			y
Crinum pedunculatum		Swamp Lily	y		
Croton verreauxii		Green Native Cascarilla			y
Cryptocarya microneura		Murrogun			y
Cupaniopsis anacardioides		Tuckeroo	y		y
Cynodon dactylon		Couch	y		
Cyperus lucidus			y		
Dianella caerulea		Blue Flax-lily			y
Dioscorea transversa		Native Yam			y
Dodonaea triquetra		Large-leaf Hop-bush			y

Species	Exotic (NW Act Category)	Common Name	Swamp Sclerophyll Forest	Coastal Freshwater Wetland	Tallowwood-Narrow-leaved White Mahogany Open Forest
Elaeocarpus obovatus		Hard Quandong	y		y
Elaeocarpus reticulatus		Blueberry Ash			y
Eleocharis sphacelata			y		
Entolasia stricta		Wiry Panic			y
Eucalyptus acmenoides		Narrow-leaved White Mahogany			y
Eucalyptus ancophila		Grey Ironbark			y
Eucalyptus pilularis		Blackbutt			y
Eucalyptus propinqua		Small-fruited Grey Gum			y
Eucalyptus robusta		Swamp Mahogany	y		
Eustrephus latifolius		Wombat Berry			y
Ficus coronata		Creek Sandpaper Fig	y		y
Ficus superba var. *henneana*		Deciduous Fig	y		
Ficus watkinsiana		Strangling Fig	y		
Gahnia clarkei		Tall Saw-sedge	y		y
Glochidion ferdinandi		Cheese Tree			y
Glycine species					y
Guioa semiglauca					y
Gymnostachys anceps		Settler's Flax			y
Hibbertia aspera		Rough Guinea Flower			y
Hibbertia scandens		Climbing Guinea Flower			y
Histiopteris incisa		Bat's Wing Fern	y		
Hypolepis muelleri		Harsh Ground Fern	y		
Imperata cylindrica		Blady Grass			y
Ipomoea cairica	Y	Morning Glory	y		
Jagera pseudorhus		Foambark			y
Juncus sp.				y	
Lantana camara	Y (4/5)	Lantana	y		y
Lemna trisulca			y		
Ligustrum sinense	Y	Small-leaved Privet			y
Lomandra longifolia		Spiny-headed Mat-rush	y		y
Lophostemon confertus		Brush Box			y

Species	Exotic (NW Act Category)	Common Name	Swamp Sclerophyll Forest	Coastal Freshwater Wetland	Tallowwood-Narrow-leaved White Mahogany Open Forest
Maclura cochinchinensis		Cockspur Vine	y		y
Melaleuca quinquenervia		Broad-leaved Paperbark	y	y	
Morinda jasminoides					y
Oplismenus imbecillis					y
Parsonsia straminea		Common Silkpod	y		y
Paspalum urvillei	Y	Vasey Grass			y
Paspalum wettsteinii	Y	Broad-leaf Paspalum	y		y
Passiflora subpeltata	Y	White Passionflower			y
Pennisetum clandestinum	Y	Kikuyu Grass			y
Persicaria strigosa			y	y	
Persoonia media					y
Philydrum lanuginosum		Woolly Waterlily		y	
Phragmites australis		Common Reed	y		
Platycerium bifurcatum		Elkhorn Fern	y		y
Polyscias sambucifolia					y
Rhodamnia rubescens		Scrub Turpentine			y
Senna pendula var. *glabrata*	Y		y		
Smilax australis		Wait-a-while			y
Solanum mauritianum	Y	Wild Tobacco			y
Syncarpia glomulifera		Turpentine			y
Tabernaemontana pandacaqui		Banana Bush			y
Tradescantia fluminensis	Y	Trad			y
Triglochin procera		Water Ribbons		y	
Trochocarpa laurina		Tree Heath			y
Zieria smithii		Sandfly Zieria			y

6.4.4 Aquatic ecology

The information presented in this section is from the aquatic ecology assessment carried out by Marine Pollution Research Pty Ltd detailed within ERM (2003).

Existing environment

The present aquatic ecology of the creeks and drainage lines through the study area is a function of the relationship of the drainage lines to the upper catchments and the downstream connections to the Bellinger River. The lower creek system provides fish passage between the wetland and the Bellinger River during periods of increased flow and in times of flood.

The main aquatic features of the study area are the Paperbark Swamp Forest and Freshwater Wetland areas which currently drain north to the river via a single box culvert under the existing Waterfall Way. It would appear from the topography of the location that the swamp area existed prior to original road construction, but it is not clear whether the construction of the road created a restriction on the stormwater discharge of the swamp such that the swamp area expanded in area and depth.

The aquatic ecology of the area was determined by visual inspection and sampling of fish, and macroinvertebrates present in the swamp and creekline. Water quality was tested in a number of locations within the swamp and adjacent creekline. Only one fish species, the introduced Plague Minnow (*Gambusia holbrooki*), was caught in the wetland area. A total of 16 macroinvertebrate were collected from the waters of the swamp (refer to **Appendix C** for a complete list of these species).

It was concluded that no fish or macroinvertebrate species listed as threatened under the threatened species provisions of the Fisheries Management Act 1994 (FM Act) were likely to occur in the study area, and therefore no seven part test for any endangered, threatened or vulnerable species populations listed under the FM Act would be required for the Proposal.

Potential impacts

For the purpose of the ecological impact assessment it was assumed that all native vegetation within the proposed footprint would require removal. The proposed footprint (area of direct impact) is 2.1 hectares, of which 0.8 hectares is native vegetation and 1.3 hectares is either paddock or existing road. The 0.8 hectares of native vegetation to be removed is composed of 0.5 hectares of Swamp Sclerophyll Forest (SSF), 0.1 hectares of Freshwater Wetland and 0.2 hectares of Tallowwood - Narrow-leaved White Mahogany open forest (TWMOF). It is anticipated that a further 2.2 hectares of native vegetation would be indirectly affected by the Proposal, of which 0.8 hectares is SSF, 0.2 hectares is Freshwater Wetland and 1.2 hectares is TWMOF. SSF and Freshwater Wetland are both listed as EECs under the TSC Act.

Two EECs as listed under the TSC Act were recorded within the study area; Swamp Sclerophyll Forest on Coastal Floodplain (SSF) and Freshwater Wetland on Coastal Floodplain (Freshwater Wetland). Both of these EECs would be impacted upon by the Proposal and, therefore, Seven Part Tests for the impacts of the Proposal on these EEC's have been undertaken and are included in **Appendix F**. These Seven Part Tests conclude that the Proposal would be unlikely to have a significant impact upon either SSF or Freshwater Wetland.

No threatened ecological communities as listed under the EPBC Act were recorded within the study area and, therefore, none would be impacted upon by the Proposal.

No threatened flora, as listed on the TSC or EPBC Acts, were recorded during the field surveys by either ELA (2008) or ERM (2003).

Parsonsia dorrigoensis is listed as vulnerable on the TSC Act and endangered on the EPBC Act and, therefore, a Seven Part Test (**Appendix F**) and Significant Impact Criteria (**Appendix G**) have been undertaken for this species. Both assessments concluded that the Proposal would be unlikely to have a significant impact on *Parsonsia dorrigoensis*.

In total, 23 threatened fauna have been considered further in both EP&A Act Seven Part Tests and EPBC Act Significant Impact Criteria in **Appendices F** and **G** respectively. These assessments concluded that the Proposal (action) was unlikely to have a significant impact on threatened fauna.

Due to the occurrence of several similar freshwater wetlands outside the immediate study area, it is not considered that the loss of the area of wetland to be impacted by the Proposal would be significant on a regional basis. The Proposal would result in the loss of a small proportion of the *Melaleuca* wetland plus a portion of the open water wetland as a result of clearing and filling. However, both of these areas to be filled are on the shallow margins of the wetland and as such utilisation of these areas by aquatic fauna would be restricted to periods of high water levels. With the implementation of mitigation measures provided below the impacts of the Proposal could be restricted to the Proposal footprint.

The Proposal has the potential to alter the hydraulic regime of the wetland as a result of changes to drainage patterns including flood retention and drainage delay, and altering the water level of the wetland during periods of low water levels. It would be important to match the present time lags in the drainage system, as the whole Melaleuca Swamp aquatic system has evolved around the drainage characteristics of the present culvert which imposes a particular flood retention and drainage delay on the catchment stormwater drainage. The aquatic assessment found that by retaining the drainage characteristics of the wetland through the implementation of the measures provided below, the Proposal would not substantially alter the aquatic or fish habitat potential of the remaining Melaleuca wetland.

The Proposal may also limit fish passage as a result of the installation of a new triple cell box culvert. Fish passage would need to be maintained during construction and operation. The new triple cell box culvert would be designed to maintain the existing low flow levels in the wetlands. The culvert would be constructed in accordance with DPI - Fisheries guidelines. The existing culvert and part of the road embankment would be retained to ensure impacts on the flood retention and drainage characteristics of the wetland as a result of the Proposal are minimised.

Table 6 summarises the known and potential impacts on flora and fauna associated with the Proposal.

Table 6: Potential impacts of the Proposal on biodiversity

Direct Impacts	**Likelihood of Impact (Known, Potential or Unlikely)**
Death through predation	Unlikely
Death through trampling	Unlikely
Death through poisoning	Unlikely
Death of individuals of species	Known Impact
Death of a population of a species	Unlikely
Clearing of Native Vegetation	Known Impact
Removal and/or fragmentation of an EEC	Known Impact
Removal and/or fragmentation of habitat for a species	Known Impact
Loss of breeding opportunities	Known Impact
Loss of shade/shelter	Known Impact
Indirect Impacts	**Likelihood of Impact (Known, Potential or Unlikely)**
Starvation	Unlikely
Exposure	Unlikely
Predation by domestic and/or feral animals	Unlikely (already a pressure due to surrounding land use and not likely to be exacerbated by the Proposal)
Deleterious hydrological changes	Unlikely
Increased soil salinity	Unlikely
Erosion	Unlikely
Inhibition of nitrogen fixation	Unlikely
Weed invasion	Potential impact on newly created edge but already a pressure due to surrounding land use and not likely to be exacerbated by the Proposal
Fertiliser drift	Unlikely
Increased human activity within or directly adjacent to sensitive habitat areas	Unlikely (already a pressure due to surrounding land use and not likely to be exacerbated by the Proposal)

Safeguards and management measures

- Before and during any works that may impact vegetation; the limits of clearing would be clearly marked on relevant site plans and on site by fencing. All areas outside of the limits of clearing would be signed as no go areas/exclusion zones.
- Any clearing of native vegetation beyond the study area would require further impact assessment.
- Environmentally sensitive sections of the road corridor would be fenced to prevent unauthorised access. The sections requiring fencing would be determined in consultation with the Environmental Officer, RTA Northern Region.
- Prior to working on site, all site personnel and subcontractors would be trained in the limits of works and the no go areas/exclusion zones.
- Native vegetation material that has been cleared would be chipped/mulched on-site and used in revegetation and erosion control works within the Proposal site where necessary.
- Where possible, revegetation would occur using a mix of native species endemic to the local area, and may include native laurels to replace the exotic weed species Camphor laurel

- Weed infested or contaminated topsoil and vegetation would not be reused for revegetation works and would not be stockpiled adjacent to any areas of native vegetation.
- All construction areas would be clearly delineated to minimise the construction 'footprint'.
- All trees to be removed would be directionally felled into the Proposal site where possible in order to minimise potential damage to retained vegetation.
- Any imported fill used would be free of weed propagules.
- The extent of clearing and disturbance to native vegetation would be minimised so that impacts on flora is restricted.
- Redundant road pavement and associated road infrastructure would be removed and these areas revegetated using endemic native species sourced within a five kilometre radius
- Existing dead wood from the Proposal site would be reused, where possible, in adjoining areas to provide habitat.
- To prevent the spread of weeds and pathogens, machinery to be used on the Proposal site would be disinfected prior to its initial entry to the site.
- Where any hollow bearing trees are located and are proposed to be removed, targeted dusk and dawn surveys would be conducted by a qualified and experienced ecologist at a maximum of 48 hours prior to the commencement of clearing. Before construction any hollow-bearing trees would be identified and marked. A staged approach to clearing would be undertaken, by removing non-habitat trees first. Clearing in the area would cease for a period of not less than 24 hours to enable fauna potentially inhabiting the remaining trees to leave. Prior to the recommencement of clearing works, the habitat trees would be re-inspected for the presence of fauna. A suitably qualified wildlife carer/ecologist would be present onsite to remove the fauna prior to clearing and during the felling of habitat trees. All felled trees would be inspected immediately after felling to check for the presence of fauna. Any fauna found in the hollows would be reported to the Environmental Officer, RTA Northern Region.
- A licensed and registered wildlife carer (i.e. from WIRES) or ecologist would be invited to inspect felled trees and vegetation for any displaced fauna when the site is safe to enter. All fauna found during clearing would be identified and recorded. Any injured fauna would be taken to a local veterinary clinic by the wildlife carer. Non injured displaced fauna would be relocated to an area of suitable habitat by the wildlife carer.
- Careful checking of all other trees and areas to be cleared would be undertaken by a qualified ecologist immediately prior to removal to detect any residing fauna. Any trees containing fauna would be retained until the animal leaves the site.
- Any hollow bearing trees removed would be cut into sections and placed within adjacent bushland to provide fauna habitat.
- The timing of vegetation clearing would consider the breeding seasons and periods of torpor (i.e. hibernation) of microchiropteran bat species likely to occur on site. Tree removal would not be undertaken between June and August to avoid disturbing bats in torpor, or between November and February to avoid disturbance of bats nursing young.
- Felled trees other than Paperbarks and weed species (Camphor Laurel) would be used to create terrestrial fauna habitat on elevated ground around the Proposal area and in adjacent bushland. Felled trees would be cut into manageable lengths and placed approximately 5m from bases of existing trees, fences and road table drains.
- Relocation of fauna species found inhabiting the areas to be disturbed shall be undertaken by appropriately trained person(s) prior to any clearing activities.
- An erosion and sediment control plan would be prepared and implemented to maintain water quality and protect sensitive aquatic environments on and adjacent to the Proposal site.

- Embankments would be sufficiently stabilised with sterile annual grasses and endemic native species to help reduce the risk of erosion and sedimentation.
- Stockpiles of spoil or construction materials would be stored at least 40 metres from waterways .
- Sufficient freeboard would be retained between the bed of the swamp and the invert of the new extended culvert drain so that sufficient water would remain to support the wetland plus its aquatic ecology over prolonged dry periods. This freeboard should be retained at least at the present level.
- The existing drainage characteristics of the wetland would be retained. The extended culvert drain would be designed to provide the same drainage characteristics as the present culvert drain.
- Fish passage between the freshwater wetland and the lower drainage creek would be retained post construction.

6.5 Aboriginal heritage

An Aboriginal heritage assessment was undertaken by Adise Pty Ltd in 2008 (Adise 2008) in accordance with the RTA PACHI.

Aboriginal consultation indicates that land to be affected by the Camerons Corner Proposal is not known to contain any sites/places of spiritual, ceremonial, archaeological or otherwise traditional, historic or contemporary cultural/social significance. However, the SSF (described as paperbark swamp, Adise 2008) at the western base of the hillslope was assessed to be of general heritage value by virtue of its likely association with the extraction of traditional resources. Based on the survey results and available background information, undetected archaeological evidence (if any) within the proposed impact area is unlikely to be substantial and is expected to be of low scientific/ archaeological significance.

Given the study area's small size, it was decided to undertake as thorough a survey as possible in the face of access and visibility constraints imposed by the existing road pavement, surface vegetation and inundated parts of the SSF (described as paperbark swamp, Adise 2008).

The survey was conducted on foot by Jacqueline Collins and involved inspection of all available ground surface exposures, including erosion scours, road verges and cuttings, unpaved road surfaces, stock tracks, and areas supporting light and patchy vegetation cover. The trunks of all mature/large trees were inspected for evidence of Aboriginal marking.

More than 90 per cent of the study area was covered during the survey. Once the constraints imposed by ground surface vegetation and standing water are taken into account it is estimated that approximately 3.6 per cent of the study area (off the existing road pavement) was effectively searched for surface evidence, including 10 per cent of the hillslope and five percent of the paperbark swamp. Despite the limited overall opportunities for surface site detection, the effective survey sample (in conjunction with LALC and recognised Aboriginal stakeholders and past survey results) is considered to have been adequate for assessing the study area's archaeological potential.

Existing environment

The nil survey result is consistent with the results of past surveys in the Camerons Corner locality, which have failed to detect any archaeological evidence off the level crests of prominent ridges/spurs. Irrespective of the low level of effective survey coverage, the study area's topography in conjunction with disturbance caused by vegetation clearing, stock grazing and past road construction points to a low level of archaeological potential.

The study area's assessed low level of Aboriginal cultural heritage sensitivity was confirmed by Urunga Elder Tom Kelly. Tom Kelly advised that no sites/places or resources of traditional, historic or contemporary socio-cultural significance are known to occur in the study locality. CHLALC senior sites officer Mark Flanders nevertheless identified the paperbark swamp as a place likely to have provided traditional water, food and material culture resources, and on this basis assessed it to be of general heritage value. To preserve this value, Mark Flanders advised that he would like to see construction impacts on the paperbark swamp avoided or at least minimised as far as possible.

Potential impacts

No evidence of Aboriginal occupation or use was detected during the survey, nor were any areas of Potential Archaeological Deposit (PADs) identified, either in the field or as a result of consultation with local Aboriginal community members.

The likelihood of finding presently undetected Aboriginal objects and/or places within the Proposal site during construction is considered to be low. Impacts on Aboriginal objects and/or places are therefore unlikely to occur as a result of the Proposal.

Given that there is no potential for undetected scarred trees, it is anticipated that undetected archaeological evidence (if any) would be restricted to a low density 'background' distribution of isolated stone artefacts lost or discarded during resource gathering. In the absence of artefacts on the 10 percent exposed hillslope, it seems that any such artefacts would most likely occur in and around the paperbark swamp at the foot of the hill. Owing to the dispersed and unpredictable nature of 'background' artefact distributions and the relatively

small area to be affected by the Proposal, neither subsurface archaeological testing nor monitoring of construction is considered warranted.

Safeguards and management measures
The following safeguards and management measures were developed in liaison with the Aboriginal stakeholders, and are designed to minimise impacts on Aboriginal sites and values.

- The paperbark swamp traversed by the Proposal at the western foot of the hill slope is of general Aboriginal heritage value. To preserve this value (given that the swamp cannot be entirely avoided) it is recommended that construction impacts be confined as far as possible to the road footprint itself;
- The Coffs Harbour and District Local Aboriginal Land Council would be advised of the location of any temporary works depot (construction compound/site office/stockpile). In the event that any planned construction compound/site office/stockpile location lies outside the area assessed in this report (i.e. outside the proposed new road reserve boundary fence lines) an additional environmental impact assessment would be undertaken;

In the event that any suspected 'Aboriginal objects' are detected during the course of the works:

- All disturbance in the vicinity of the find would immediately cease and the RTA Environmental Officer (Northern Region) would be immediately contacted. Temporary protective fencing be erected around the find to define a 'no go zone';
- The RTA would contact the Coffs Harbour and District Local Aboriginal Land Council and the Department of Environment and Climate Change (Planning and Aboriginal Heritage Section, North East Branch, Coffs Harbour) to inspect the find so that appropriate actions and management recommendations can be formulated. In the event that the find consists of or includes possible or identified skeletal remains, the NSW Police Department would be additionally contacted;
- Work may proceed at an agreed distance from the find, in consultation with the Aboriginal stakeholder representatives Coffs Harbour and District Local Aboriginal Land Council and the Department of Environment and Climate Change; and
- If the find is identified as an 'Aboriginal object', work causing any disturbance or destruction of the object may not recommence until an appropriate Section 90 Aboriginal Heritage Impact Permit has been issued by the Department of Environment and Climate Change.

Therefore, the proposed development does not trigger any further assessment pursuant to the NPW Act. Notwithstanding this, safeguards would be in place in the event of the discovery of any Aboriginal objects during construction.

6.6 Non-Aboriginal heritage

Existing environment
A number of heritage registers and listings were reviewed during this assessment to identify whether any known heritage items were present within the Proposal site, including:

- Roads and Traffic Authority Section 170 Heritage and Conservation Register;
- NSW Heritage Office State Heritage Register/Inventory;
- Bellingen Local Environmental Plan 2003; and
- Australian Heritage Database Register.

A search of non-Aboriginal heritage registers and inventories found no items or places were located within the study area. The majority of items and places that are listed are located within and surrounding the towns of Bellingen and Dorrigo.

However, a search of the Australian Heritage Database resulted in 30 items being identified with one site being in proximity to the Proposal.

Bellinger River (North Arm) Valley is classed as an Indicative Place on the Register of the National Estate (RNE). As an indicative place, information of the heritage value of the area has been provided to or obtained by, the Australian Division. The Australian Heritage Council no longer adds places to the RNE as of 2006.

A search of the State Heritage Register and Inventory identified a total of nine records listed in the LGA (two [2] State Heritage Listed and seven [7] other government agency). However the nearest registered item is located at south Bellingen, approximately five kilometres from the study area.

Potential impacts
It is anticipated that the Proposal would not impact upon any item on the Australian Heritage Database or on the State Heritage Register and/or Inventory. There are no known heritage items that would be impacted upon by the development (refer **Section 6.1**).

Safeguards and management measures
To ensure minimal impact on potential heritage items, the following safeguards and management measures would be applied where necessary by the NSW RTA and relevant contractors.

- If any archaeological remains are uncovered during the works, all works would cease within the vicinity of the material/find and the Environmental Officer, RTA Northern Region would be contacted immeidately. Further advice would be sought from a heritage consultant if required.

6.7 Noise and vibration

Existing environment
The study area is rural in nature and existing noise sources are limited to traffic noise generated by vehicles using the existing road and farm machinery. The nearest sensitive noise receptors are houses located north of Waterfall Way. The nearest rural dwelling is located approximately 40 metres north-east of the road. Another is located approximately 60 metres north of Waterfall Way at the eastern end of the study area.

Current ambient noise levels are moderate at this location as a result of moderate traffic volumes using Waterfall Way, particularly during peak times. Using the criteria set out in the DEC'S *Environmental Criteria for Road Traffic Noise 1999,* the Proposal is a realignment of an existing road.

Potential impacts

Construction noise
The RTA adopts the construction noise control criteria of the NSW DECC and the *DECC Environmental Noise Control Manual (1999).* In accordance with the DECC guidelines, target construction noise levels for the Proposal would be 'background' +10dBA as the period of construction works is between 4 and 26 weeks. Short-term noise is more likely to be accepted when the works are part of necessary safety works such as those being undertaken for this Proposal. Where daytime goals are likely to be exceeded, a performance approach would be followed that allows the implementation of best management practice in reducing construction noise levels towards the above goals. Current ambient noise levels are moderate at this location as a result of moderate traffic volumes using Waterfall Way, particularly during peak times.

Construction noise would be generated by standard road construction earthmoving activities including bulldozers, scrapers, excavators, front-end loaders, vibratory rollers, graders, haul trucks, and standard pavement construction and service vehicles. During construction noise would also be generated by general traffic braking and accelerating during traffic restrictions.

Close consultation with the affected community is essential where it is expected that construction works would exceed DECC criteria. Consultation protocols (*RTA Community Involvement Practice Notes and Resource Manual 1998*) would be followed. No blasting would be undertaken during the works.

Operational noise

The Proposal would not generate new traffic, change the traffic mix or increase the capacity of Waterfall Way. The road alignment would not be exposing nearby properties and residents to increased levels of noise therefore no operational noise amelioration would be required for the Proposal.

Construction Vibration

In regards to vibration there are no set guidelines to limit peak particle velocity (PPV), which is a measure of vibration, however it is generally accepted that for continuous vibration, a level of 5mm/sec is considered safe for residential construction (German Standard DIN 4150 1986). It is predicted that normal construction techniques would not result in levels greater than 1.5 mm/sec at a distance of 30m. No blasting would be undertaken as part of the Proposal.

One (1) residence to the north east of the Proposal site is located within 40 metres of the proposed road construction, and may experience vibration from the use of vibratory rollers. The level of vibration expected from construction activities would be below levels that could cause architectural damage, but would be at a level that may cause adverse comment from residents.

Safeguards and management measures

- A Noise and Vibration Management Plan (NVMP) would be prepared prior to the commencement of works and would form the noise and vibration management section of the CEMP. The Plan would be prepared in accordance with Practice Note vi of RTA's *Environmental Noise Management Manual*, and would apply best management practice. Should works be required outside standard working hours, the procedures contained in the RTA's *Environmental Noise Manual 2001c*, "Practice Notes vii – Roadwork's Outside of Normal Working Hours" would be followed
- Consultation would be undertaken with potentially affected stakeholders including local landowners prior to commencement of works and in accordance with the *RTA's Community Involvement Practice Notes and Resource Manual, 1988*. Consultation would include discussion of land management options that may be required particularly in relation to minimising disturbance to stock.
- All potentially affected stakeholders would be provided with a contact name and number to allow complaints or questions to be raised. They would be informed at least seven (7) days prior to the commencement of any high noise activities and of the likely vibration or noise impact they may experience.
- Best management practices to minimise noise would be adopted in accordance with the *RTA's Environmental Noise Management Manual 2001* and would include selection of plant and equipment based acoustic performance, wherever practical.

6.8 Air Quality

Existing environment

Air quality in the study area is influenced by vehicle emissions and farming practices. In the study area there are unlikely to be any regional air quality problems associated with vehicle emissions. Other factors, such as bushfires, may contribute more significantly to air pollution in rural areas than motor vehicle emissions. Rural residences along the Waterfall Way could experience occasional localised decreases in air quality from motor vehicles using the Waterfall Way, particularly from heavy vehicles.

Potential impacts

During, and immediately after the construction phase, there is potential for a localised deterioration in air quality due to dust generated from exposed surfaces. Moderate dust would potentially be generated during earthworks and construction of the road base and roadside batters, and removal of redundant sections of the existing roadway. The emissions from plant and construction equipment have the potential to impact negatively upon air quality by increasing the amount of vehicle emissions. However, these impacts would be localised and short-term. The nearest residences may be affected by exhaust fumes and/or dust. Impacts would be influenced by climatic conditions, and safeguards described below would minimise impact on the residences in the vicinity of the Proposal site.

The Proposal is expected to have a minor long-term positive impact on air quality following the establishment of the proposed rehabilitation activities. Long-term operational greenhouse gas emissions for this section of the road can be expected to be less than current emissions due to improved traffic flow within the Proposal site. Additionally, the Proposal is not expected to encourage increased traffic levels. An increase in vehicle emissions would therefore not result.

Safeguards and management measures

- All stockpiles would be managed to prevent and control dust generation and in accordance with the RTA's *Stockpile Management Procedures*, 2001.
- Dust would be visually monitored and suppressed with water where available or alternative suppression methods would be employed e.g. altering work activities.
- Dust generating activities would be suspended during periods of windy conditions.
- Truck loads to and from the site would be covered and tailgates would be secured.
- There would be no burning of any materials or wastes.
- Machinery would be turned off, rather than left idling for long periods.
- Trucks entering and leaving the Proposal site would be well maintained in accordance with the manufacturer's specifications to comply with all relevant regulations.
- Truck wheel washes or other dust removal procedures would be introduced to minimise transport of dust off site.
- Construction activities that generate high dust levels would be avoided during high wind periods and stockpiles and exposed areas would be covered or watered.

6.9 Visual amenity and landscape

The existing road within the study area is within an area of medium to high visual amenity and commences near the intersection of Short Cut Road on a cut and fill embankment on a south west facing slope. A narrow band of mature and juvenile native trees are located on the cut batter on the northern side of the road, whilst the southern side of the road is densely vegetated with similar native trees. The road curves to the north and slopes to the west into the low lying wetland area, curving back to the south along the northern edge of the wetland and its tall Broad Leaved Paperbark Forest and Broad Leaved Paperbark/ Swamp Mahogany forest, whilst the narrow band of vegetation on the northern side of the road gives way to cleared grazing pasture, providing broad views of the floodplain to the banks of the Bellinger River and beyond.

Potential impacts

The Proposal would realign the road to the north at chainage 1,810 metres, and to the south at chainage 2,000 metres. This would require the removal of a narrow band of vegetation from the existing remnant on the northern side of the road, and the removal of a wider corridor (approximately 20 metres) of the SSF on the southern side.

Construction of the road across the low lying area would modify the appearance of the wetland as fill would be imported into the wetland area, elevating the road surface on the low lying topography.

During construction the visual quality of the area would be reduced as the area would become a construction site. The batter slopes would be topsoiled and grassed. It is anticipated the above issues would be minimised through the implementation of the safeguards outlined below.

Safeguards and management measures

- A revegetation plan would be prepared and would be reviewed by the Environmental Officer, RTA Northern Region prior to commencement of revegetation works.

- All working areas would be maintained, kept free of rubbish and cleaned up at the end of each working day.
- Vegetation removal would be minimised, and mature trees would be retained where possible.
- Endemic native grasses would be used to vegetate batter slopes.
- All areas affected or exposed during works would be revegetated and landscaped after the completion of construction works.

6.10 Socio-economic considerations including land use

Existing environment
The surrounding land is predominantly used for agricultural purposes including dairy and grazing land. Residences are generally rural in nature and interspaced with hobby farms and rural small acre lots.

Potential impacts
The Proposal would provide safer travel conditions along Waterfall Way within the study area, and improve travel times between Bellingen and Coffs Harbour. It is not anticipated that there would be adverse socio-economic impacts as a result of the proposed road realignment at this location. Land acquisition has not involved large areas of agricultural land or affected other businesses or communities.

Traffic would be maintained throughout construction by utilising the existing road until the new section of road has been constructed. Traffic management measures would be implemented to manage traffic during connections of the new roadwork's with the existing road.
The Proposal would have little impact on agricultural land, and stock would be able to access existing grazing land, except for land acquired by the new length of road. Existing access to rural residences would be maintained.

Safeguards and management measures

- A traffic control plan would be prepared and implemented in accordance with the RTA's *Traffic Control at Work Sites Manual* and RTA's QA Specification G10 Control of Traffic.
- Access to private property would be maintained during construction.
- Temporary access would be provided as necessary, in order to minimise any potential disruption to traffic and designed to ensure that the safety of motorists using Waterfall Way is paramount.
- All local residents would be notified of any potential delays regarding access and traffic flows during construction.
- In accordance with the RTA's *Draft community involvement and communications resource manual* (RTA 2008), members of the affected community (including local residents, businesses, school bus services, emergency services) would be notified of the proposed works at least two weeks prior to commencement. The notification would identify the nature of the works, give an estimated duration, advise of anticipated delays and identify any changes to traffic, wide load restrictions, or access during the works.
- Government and stakeholder consultation would be undertaken as required.

6.11 Waste management and minimisation

Potential impacts
The Proposal would generate the following waste streams:

- Timber and vegetation;
- Excavated material (soil and rock);

- Old Road Pavement/Concrete;
- Excess construction materials;
- Domestic type waste generated by workers;
- Noxious weed material;
- Waste oils, liquids and fuels from construction plant and equipment; and
- Approximately 5300 cubic metres of spoil material.

The principles of waste management are to minimise the amount of waste generated, recycle waste wherever possible and dispose of the remainder in a responsible manner in accordance with appropriate RTA policy. The RTA adopts the Resource Management Hierarchy principles embodied in the *Waste Avoidance & Resource Recovery Act 2001* (WARR Act).

Safeguards and management measures

- The Resource Management Hierarchy principles of the WARR Act would be adopted. They are as follows:
    1. Avoid unnecessary resource consumption as a priority;
    2. Avoidance is followed by resource recovery (including reuse of materials, reprocessing recycling, and energy recovery); and
    3. Disposal is undertaken as a last resort.
- The minimisation of surplus material would be a feature of the works. Any waste material unable to be re-instated as part of the Proposal would be taken to an appropriately licensed landfill.
- Domestic-type refuse would be collected and disposed of in a licensed landfill.
- An appropriate spill containment kit would be kept on site at all times and all staff onsite would be trained in its use.
- The Contractor shall determine whether any licenses are required under the POEO Act for the stockpiling, application to land or processing of waste.
- Prior to export of waste from the site, waste would be classified in accordance with the NSW DECC Guidelines for the Assessment, classification and Management of Liquid and Non-Liquid Wastes and may be transported off site upon receipt of a signed Section 143 Notice under the Protection of the Environment and Operations ct, 1997 from the landholder who would receive the waste.
- A waste management plan would be prepared in accordance with RTA's QA Specifications and in accordance with RTA's *Waste Minimisation and Management Guidelines* 1998c and the principles of the WARR Act.
- Trees to be removed would be assessed for their timber value or would be reused for the Proposal eg, reuse of hollows, habitat logs, mulch.
- Leaf material and small branches of native vegetation would be chipped and used as mulch in revegetation works.
- All noxious weeds and exotic plant species removed would be bagged and disposed of at a licensed waste facility.
- Waste material generated (ie. aggregate, road base, steel, cement, cleared vegetation, excess cut material, waste oils and liquids, water, garbage and sewage) would be reused or recycled where possible or as a final options disposed at a licensed waste facility.

6.12 Contaminated land

Existing environment
No contaminated land or indications of past land uses likely to cause contaminated lands were identified during the site visit. However, contaminants may be present within the Proposal site. Contaminants could include hydrocarbons from roadwork's, fuel/oil leaks and spills from vehicles or agricultural activities. Agricultural activities may also contribute chemicals from irrigation, applications and stock dips.

Potential impacts
The Proposal has potential to expose contaminated land during earthworks. The Proposal has the potential to create contaminated land through the spillage of fuels and other chemicals used during construction. This risk is minimal as the amount of fuels and chemicals used for the works would be relatively low.

Safeguards and management measures
Should areas be found to be affected by contaminated waste, all works would cease and the following safeguards and management measures would be would be adopted:

- Contaminated waste would be identified and classified by a suitably qualified consultant.
- Contaminated waste identified or generated during the Proposal would be disposed in accordance with DECC guidelines.
- Should any spillage occur during construction, the Environmental Officer, RTA Northern Region, would be contacted immediately, and contaminants would be immediately contained, removed, treated (if necessary) and disposed of to the satisfaction of the DECC.

6.13 Ancillary works

Existing environment
It is likely that a site compound with an approximate area of 1,200 square metres would be required, most likely on adjacent farmland, and would require the temporary removal of approximately 1,200 square metres of pasture.

The site compound would include ancillary items such as stockpile and works compound facilities. On-site temporary works facilities for the Proposal would include a site office, equipment/plant compound area, and materials stockpile sites. All storage and plant maintenance areas would be bunded.

Environmental criteria that would be considered when choosing a site are provided below.

The site would be located:

- More than 50 metres from any waterway;
- In an area of low conservation significance for flora, fauna and Aboriginal or non-Aboriginal heritage;
- Within an already disturbed area which would not require clearing of native vegetation;
- In areas previously disturbed, if possible;
- More than 100 metres from residential uses or other activities that may be affected by operational noise or other impacts of construction plant;
- All stockpiles would be established, managed and decommissioned in accordance with the *RTA's Stockpile Management Procedures (2001)*;
- All fuels and chemicals would be stored in accordance with Section 6.12 (Chemicals, Dangerous Goods and other Potential Contaminants) of the RTA's QA Specification G36;
- The compound site would be enclosed with appropriate security fencing;

- Construction vehicles and stockpiles would not be placed or stored within five (5) metres of trees; and
- Potentially hazardous activities, including washing out of concrete delivery vehicles, washing down of construction plant, refuelling plant and handling hazardous chemicals would only be permitted on-site at locations that have adequate environment protection measures and are more than 20 metres away from stormwater drainage systems or natural watercourses and include an impervious surface and bunding.

Based on the above criteria, site location would be best suited on the northern side of Waterfall Way, in the western section of the study area.

Potential impacts
Disturbance of vegetation can increase soil erosion and sedimentation of waterways. There would also be the potential for impacts to soil and water from spillage or leakage of chemicals from plant or during the refuelling process. Stockpiled material may also provide a source of pollution.

There is potential that the site compound may cause impact to public utilities or require connection to public utilities.

Safeguards and management measures

- The "dial before you dig" hotline would be contacted prior to commencement of works.
- Consultation with the affected utility owners would be undertaken prior to commencement of works to identify any requirements.
- Protection/relocation of utilities would be undertaken with consent from the affected utility owner and would aim to minimise impacts on the environment.
- Any stockpile site or compound site that is outside the scope of this REF including any change to the boundaries of the assessed stockpile and compound sites would be referred to the Environmental Officer, RTA Northern Region for advice on whether further environmental impact assessment is required.
- All compound sites and stockpiles sites would be subject to the site location criteria detailed in the RTA's *Stockpile Site Management Procedures* (RTA 2001).
- Should any chemical spillage occur during the construction activity the Environmental Officer, RTA Northern Region, would be contacted immediately, and contaminants would be immediately contained, removed, treated (if necessary) and disposed of to the satisfaction of the DECC.
- An appropriate spill containment kit would be kept on site at all times and staff would be trained in its use.

6.14 Demand on resources

Existing environment
Approximately 14,200 cubic metres of fill would be required from which 1200 cubic metres would be obtained from the excavation of the cutting and the remainder would be imported.

Pavement materials would be obtained from an approved local quarry. Likely sources include the Bellingen Shire quarry at Dorrigo, or quarries located at Coffs Harbour. Approximately 2,400 cubic metres of pavement material is required for the proposed works.

The Proposal would source all materials required from approved sources and locally known suppliers. There would be no increased demand on resources, natural or otherwise, which are, or are likely to become, in short supply as a result of the Proposal.

Safeguards and management measures

- Use of recycled water from off-site sources would be investigated and any use of recycled water would be in accordance with the RTA Environmental Direction No. 19, Use of Reclaimed Water. Otherwise water would be obtained from local licensed sources.
- Where practicable, alternative fuels would be used. Alternative fuel sources for heavy vehicles include low sulphur diesel, ultra low sulphur diesel, compressed natural gas, liquefied natural gas, ethanol and diesohol and aquadiesel. Standard diesel would be used as a last resort where use of alternative fuels is not practicable.
- Energy efficiency would be achieved by sourcing green power where possible and by ensuring that electrical lights and devices are switched off when not in use.

6.15 Cumulative impacts

The proposed works are part of ongoing safety improvements for the Waterfall Way and would contribute to the overall efficiency and operation of Waterfall Way .

The Proposal would have the potential to contribute to the following socio-economic impacts in the region:

- Improved safety for road users as a result of improving the alignment of the Waterfall Way.
- A short-term decrease in visual amenity as a result of excavation, clearing and construction equipment.
- A potential increase in background ambient noise as a result of operation of construction equipment and plant during construction.
- A short-term decrease in air quality as a result of an increase in point sources for dust generation during construction.
- Short-term disruption and delay to traffic flows during construction.
- Reduction in delays and disruptions associated with road flooding.

The Proposal would have the potential to contribute to the following economic impacts in the region:

- Long-term improvement to road conditions and road infrastructure enabling travel cost savings for motorists and environmental savings in terms of energy use.
- Short-term provision of employment during construction.

The Proposal would have the potential to contribute to the following bio-physical impacts in the region:

- Reduction in the area of native vegetation;
- Loss of native fauna habitat as a result of clearing; and
- A potential reduction in water quality in local waterways due to an increase in point sources of pollution and sedimentation during the construction period.

6.16 Summary of beneficial effects

The works would have a number of beneficial effects for road users of the Waterfall Way including:

- Improved flood immunity;
- Reduced road noise;
- Increase in air quality;
- Reduction in the number of accidents; and

- Reduced demand on resources.

6.17 Summary of adverse effects

The works would result in some potential adverse effects, which would include:

- Loss of biodiversity;
- Strain on unrenewable resources;
- Short term construction impacts e.g. noise, air, visual; and
- Alteration of the hydrology of a wetland.

However, the implementation of mitigation measures included in this section and summarised in **Section 7.2** would minimise any potential adverse impacts.

7. ENVIRONMENTAL MANAGEMENT

7.1 Environmental management plan

A contractor's environmental management plan (CEMP) would be developed in accordance with the specifications set out in the RTA's Environmental Protection (Management Plan) – QA Specifications G36, G38, G40 and R178. The CEMP would incorporate additional site-specific requirements, outlined below, which are not covered by the specified. The CEMP would be reviewed and certified by the RTA Environmental Officer Northern Region, prior to the commencement of any site works.

7.2 Summary of safeguards and management measures

Table 7: Safeguards and management measures

Impact	Mitigation Measures
Landforms, Geology & Soils	• As per RTA specification G36, a soil and water management plan would be prepared and implemented. • All stockpiles would be designed, established, operated and decommissioned in accordance with the RTA's *Stockpile Site Management Procedures* 2001. • To prevent erosion, any stockpile that is not worked for a period longer than two weeks would be covered or seeded using self sterile grass covers. • Hard stand material or grids would be installed at all site entry and exit points to minimise the tracking of soil and particulates onto pavement. • Imported construction materials would be sourced from licensed/registered suppliers. • Scour protection would be provided at the inlet and outlets of culverts. • Table drains would be suitably lined to minimise erosion and scouring. • To minimise erosion and sedimentation, drainage works would be completed in the early phases of construction. • Site rehabilitation of disturbed areas would be undertaken progressively. • If unidentified sites of contaminated land are found within the Proposal site, works would cease at that location, any contaminants would be immediately contained and the RTA's Environmental Officer, Northern Region would be notified immediately. • Disturbed areas would be restored to a natural shape at the completion of works where possible. • An acid sulphate material (ASM) management plan would be developed in accordance with RTA's guidelines for the Management Acid Sulphate Materials (RTA, 2005). This would detail the specific measures to be incorporated in the detailed design and to be followed during construction. • The acid sulphate material (ASM) management plan would be prepared as part of the contractor's environmental management plan (CEMP) for the site and would be approved by the Environmental Officer, RTA Northern Region, before works commence and be in accordance with Acid Sulphate Soil Management Committee (ASSMAC) Guidelines, 1998. • Disposal of ASM offsite would be undertaken in accordance with the DECC Waste Classification Guidelines.

Impact	Mitigation Measures
	• Areas where soil has been exposed would be revegetated and restored as construction work is completed, or stabilised using geotextile. • A Soil and Water Management Plan (SWMP) would be developed for the Proposal and would be incorporated into the Contractors Environmental Management Plan (CEMP). The ESCP would incorporate specifications outlined in the NSW Erosion and Sediment Control Handbook No.2 and be reviewed by the RTA's Environmental Officer prior to the commencement of works; • Regular inspection of the work site would be undertaken during construction activities to ensure that the erosion and sediment control measures are properly implemented. • All erosion and sediment control measures are to be removed once the site has been rehabilitated. • An appropriate spill containment kit would be kept on site at all times during construction and site staff trained in its uses.
Climate	• A traffic management plan (TMP) would be prepared and would consider periods of inclement weather including fog. • Daily weather forecasts would be obtained to allow sufficient time to stabilise the site and to prevent erosion and sedimentation prior to heavy rainfall events. Such actions would be recorded and dated to verify and demonstrate that activities and controls were implemented prior to rainfall events. • Works would not be undertaken during heavy periods of rainfall and the wetland water level would be factored into how the works are carried out; and • Sufficient time would be given prior to an announced Bureau of Meteorology (BOM) predicted heavy rainfall event, or anticipated rise in water levels, to vacate and clean up the construction site.
Water quality and Hydrology	• A Soil and Water Management Plan (SWMP) would be developed for the Proposal and would be incorporated into the Contractors Environmental Management Plan (CEMP). The ESCP would incorporate specifications outlined in the NSW Erosion and Sediment Control Handbook No.2 and be reviewed by the RTA's Environmental Officer prior to the commencement of works; • Where required, temporary sedimentation basins or traps would be designed, positioned, constructed and managed in accordance with the Landcom's *Managing Urban Stormwater: Soils and Construction* ("the Blue Book") and would be implemented in the initial stages of works to effectively collect sediment and dirty water from the site. • The Proposal would be undertaken in accordance with RTA's *Water Policy and Code of Practice for Water Management* (RTA 1999) and the Blue Book. • To provide temporary protection to creek beds and banks, geotextile material would be installed where there is potential for erosion, including areas where there is contact between unconsolidated fill embankments and water. Permanent creek bed and bank stabilisation works would be completed immediately after completion of works; • The roadwork's would be designed and constructed to minimise disturbance to the existing wetland and waterways. A work method statement outlining (but not limited to) how this would be achieved for the culvert works would be provided to and discussed with DWE;

Impact	Mitigation Measures
	• Drainage of the wetland would be designed to maintain the existing drainage characteristics of the wetland. That is, the extended culvert drain would be designed to provide the same drainage characteristics as the present culvert drain, in order to maintain the present drainage time lags and flood retention period; • Should any contaminated spillage occur during construction the RTA's Environmental Officer, Northern Region, would be contacted immediately, and contaminants would be immediately contained, removed, treated (if necessary) and disposed of in accordance with DECC requirements. • An incident emergency spill plan would be developed and incorporated in the CEMP. This would include measures to avoid spillages of fuels, chemicals, and fluids near and/or into any waterways. All personnel would be made aware of these measures. An emergency spill kit would be kept onsite at all times during construction. • All fuels, chemicals, and liquids would be stored at least 40 metres away (the standard is 40 metres) from any waterways or drainage lines and would be stored within an impervious bunded area within the compound site. • Any wastewater generated from construction processes would be contained onsite and/or treated to legislative requirements prior to its disposal. • All clean water would be diverted around or through the site with adequate and effective erosion and sedimentation controls to prevent the mixing of clean and dirty water. • Any groundwater encountered during construction would be managed in accordance with legislative requirements. • All concrete works would be undertaken in accordance with the DEC *Environmental Best Management Practice Guideline for Concreting Contractors* (2002). • The refuelling of plant and maintenance of machinery would be undertaken within impervious bunded areas within the compound sites and not within 40 metres of any waterways. • Vehicle wash downs and/or cement washouts would be undertaken within designated bunded areas with impervious surfaces and not within 40 metres of any waterways. • The natural hydrology and alignment of ephemeral drainage lines would be retained where possible. • In the event that groundwater is intersected, it would be managed in accordance with the ESCP; and • Wherever possible, operational road runoff would be treated through vegetated table drains.
Biodiversity	• Before and during any works that may impact vegetation; the limits of clearing would be clearly marked on relevant site plans and on site by fencing. All areas outside of the limits of clearing would be signed as no go areas/exclusion zones. • Any clearing of native vegetation beyond the study area would require further impact assessment. • Environmentally sensitive sections of the road corridor would be fenced to prevent unauthorised access. The sections requiring fencing would be determined in consultation with the Environmental Officer, RTA Northern Region.

Impact	Mitigation Measures
	• Prior to working on site, all site personnel and subcontractors would be trained in the limits of works and the no go areas/exclusion zones. • Native vegetation material that has been cleared would be chipped/mulched on-site and used in revegetation and erosion control works within the Proposal site where necessary. • Where possible, revegetation would occur using a mix of native species endemic to the local area, and may include native laurels to replace the exotic weed species Camphor laurel • Weed infested or contaminated topsoil and vegetation would not be reused for revegetation works and would not be stockpiled adjacent to any areas of native vegetation. • All construction areas would be clearly delineated to minimise the construction 'footprint'. • All trees to be removed would be directionally felled into the Proposal site where possible in order to minimise potential damage to retained vegetation. • Any imported fill used would be free of weed propagules. • The extent of clearing and disturbance to native vegetation would be minimised so that impacts on flora is restricted. • Redundant road pavement and associated road infrastructure would be removed and these areas revegetated using endemic native species sourced within a five kilometre radius • Existing dead wood from the Proposal site would be reused, where possible, in adjoining areas to provide habitat. • To prevent the spread of weeds and pathogens, machinery to be used on the Proposal site would be disinfected prior to its initial entry to the site. • Where any hollow bearing trees are located and are proposed to be removed, targeted dusk and dawn surveys would be conducted by a qualified and experienced ecologist at a maximum of 48 hours prior to the commencement of clearing. Before construction any hollow-bearing trees would be identified and marked. A staged approach to clearing would be undertaken, by removing non-habitat trees first. Clearing in the area would cease for a period of not less than 24 hours to enable fauna potentially inhabiting the remaining trees to leave. Prior to the recommencement of clearing works, the habitat trees would be re-inspected for the presence of fauna. A suitably qualified wildlife carer/ecologist would be present onsite to remove the fauna prior to clearing and during the felling of habitat trees. All felled trees would be inspected immediately after felling to check for the presence of fauna. Any fauna found in the hollows would be reported to the Environmental Officer, RTA Northern Region. • A licensed and registered wildlife carer (i.e. from WIRES) or ecologist would be invited to inspect felled trees and vegetation for any displaced fauna when the site is safe to enter. All fauna found during clearing would be identified and recorded. Any injured fauna would be taken to a local veterinary clinic by the wildlife carer. Non injured displaced fauna would be relocated to an area of suitable habitat by the wildlife carer. • Careful checking of all other trees and areas to be cleared would be undertaken by a qualified ecologist immediately prior to removal to detect any residing fauna. Any trees containing fauna would be retained until the animal leaves the site.

Impact	Mitigation Measures
	• Any hollow bearing trees removed would be cut into sections and placed within adjacent bushland to provide fauna habitat. • The timing of vegetation clearing would consider the breeding seasons and periods of torpor (i.e. hibernation) of microchiropteran bat species likely to occur on site. Tree removal would not be undertaken between June and August to avoid disturbing bats in torpor, or between November and February to avoid disturbance of bats nursing young. • Felled trees other than Paperbarks and weed species (Camphor Laurel) would be used to create terrestrial fauna habitat on elevated ground around the Proposal area and in adjacent bushland. Felled trees would be cut into manageable lengths and placed approximately 5m from bases of existing trees, fences and road table drains. • Relocation of fauna species found inhabiting the areas to be disturbed shall be undertaken by appropriately trained person(s) prior to any clearing activities. • An erosion and sediment control plan would be prepared and implemented to maintain water quality and protect sensitive aquatic environments on and adjacent to the Proposal site. • Embankments would be sufficiently stabilised with sterile annual grasses and endemic native species to help reduce the risk of erosion and sedimentation. • Stockpiles of spoil or construction materials would be stored at least 40 metres from waterways. • Sufficient freeboard would be retained between the bed of the swamp and the invert of the new extended culvert drain so that sufficient water would remain to support the wetland plus its aquatic ecology over prolonged dry periods. This freeboard should be retained at least at the present level. • The existing drainage characteristics of the wetland would be retained. The extended culvert drain would be designed to provide the same drainage characteristics as the present culvert drain. • Fish passage between the freshwater wetland and the lower drainage creek would be retained post construction.
Aboriginal heritage	• The paperbark swamp traversed by the Proposal at the western foot of the hill slope is of general Aboriginal heritage value. To preserve this value (given that the swamp cannot be entirely avoided) it is recommended that construction impacts be confined as far as possible to the road footprint itself; • The Coffs Harbour and District Local Aboriginal Land Council would be advised of the location of any temporary works depot (construction compound/site office/stockpile). In the event that any planned construction compound/site office/stockpile location lies outside the area assessed in this report (i.e. outside the proposed new road reserve boundary fence lines) an additional environmental impact assessment would be undertaken; In the event that any suspected 'Aboriginal objects' are detected during the course of the works: • All disturbance in the vicinity of the find would immediately cease and the RTA Environmental Officer (Northern Region) would be immediately contacted. Temporary protective fencing be erected around the find to define a 'no go zone'; • The RTA would contact the Coffs Harbour and District Local Aboriginal Land

Impact	Mitigation Measures
	Council and the Department of Environment and Climate Change (Planning and Aboriginal Heritage Section, North East Branch, Coffs Harbour) to inspect the find so that appropriate actions and management recommendations can be formulated. In the event that the find consists of or includes possible or identified skeletal remains, the NSW Police Department would be additionally contacted; • Work may proceed at an agreed distance from the find, in consultation with the Aboriginal stakeholder representatives Coffs Harbour and District Local Aboriginal Land Council and the Department of Environment and Climate Change; and • If the find is identified as an 'Aboriginal object', work causing any disturbance or destruction of the object may not recommence until an appropriate Section 90 Aboriginal Heritage Impact Permit has been issued by the Department of Environment and Climate Change.
Non-Aboriginal heritage	• If any archaeological remains are uncovered during the works, all works would cease within the vicinity of the material/find and the Environmental Officer, RTA Northern Region would be contacted immeidately. Further advice would be sought from a heritage consultant if required.
Noise and vibration	• A Noise and Vibration Management Plan (NVMP) would be prepared prior to the commencement of works and would form the noise and vibration management section of the CEMP. The Plan would be prepared in accordance with Practice Note vi of RTA's *Environmental Noise Management Manual*, and would apply best management practice. Should works be required outside standard working hours, the procedures contained in the RTA's *Environmental Noise Manual 2001c*, "Practice Notes vii – Roadwork's Outside of Normal Working Hours" would be followed • Consultation would be undertaken with potentially affected stakeholders including local landowners prior to commencement of works and in accordance with the *RTA's Community Involvement Practice Notes and Resource Manual, 1988*. Consultation would include discussion of land management options that may be required particularly in relation to minimising disturbance to stock. • All potentially affected stakeholders would be provided with a contact name and number to allow complaints or questions to be raised. They would be informed at least seven (7) days prior to the commencement of any high noise activities and of the likely vibration or noise impact they may experience. • Best management practices to minimise noise would be adopted in accordance with the *RTA's Environmental Noise Management Manual 2001* and would include selection of plant and equipment based acoustic performance, wherever practical.
Air Quality	• All stockpiles would be managed to prevent and control dust generation and in accordance with the RTA's *Stockpile Management Procedures*, 2001. • Dust would be visually monitored and suppressed with water where available or alternative suppression methods would be employed e.g. altering work activities. • Dust generating activities would be suspended during periods of windy conditions. • Truck loads to and from the site would be covered and tailgates would be secured. • There would be no burning of any materials or wastes.

Impact	Mitigation Measures
	• Machinery would be turned off, rather than left idling for long periods. • Trucks entering and leaving the Proposal site would be well maintained in accordance with the manufacturer's specifications to comply with all relevant regulations. • Truck wheel washes or other dust removal procedures would be introduced to minimise transport of dust off site. • Construction activities that generate high dust levels would be avoided during high wind periods and stockpiles and exposed areas would be covered or watered.
Visual amenity and landscape	• A revegetation plan would be prepared and would be reviewed by the Environmental Officer, RTA Northern Region prior to commencement of revegetation works. • All working areas would be maintained, kept free of rubbish and cleaned up at the end of each working day. • Vegetation removal would be minimised, and mature trees would be retained where possible. • Endemic native grasses would be used to vegetate batter slopes. • All areas affected or exposed during works would be revegetated and landscaped after the completion of construction works.
Socio-economic considerations	• A traffic control plan would be prepared and implemented in accordance with the RTA's *Traffic Control at Work Sites Manual* and RTA's QA Specification G10 Control of Traffic. • Access to private property would be maintained during construction. • Temporary access would be provided as necessary, in order to minimise any potential disruption to traffic and designed to ensure that the safety of motorists using Waterfall Way is paramount. • All local residents would be notified of any potential delays regarding access and traffic flows during construction. • In accordance with the RTA's *Draft community involvement and communications resource manual* (RTA 2008), members of the affected community (including local residents, businesses, school bus services, emergency services) would be notified of the proposed works at least two weeks prior to commencement. The notification would identify the nature of the works, give an estimated duration, advise of anticipated delays and identify any changes to traffic, wide load restrictions, or access during the works. • Government and stakeholder consultation would be undertaken as required.
Waste minimisation and management	• The Resource Management Hierarchy principles of the WARR Act would be adopted. They are as follows: 4. Avoid unnecessary resource consumption as a priority; 5. Avoidance is followed by resource recovery (including reuse of materials, reprocessing recycling, and energy recovery); and 6. Disposal is undertaken as a last resort. • The minimisation of surplus material would be a feature of the works. Any waste

Impact	Mitigation Measures
	material unable to be re-instated as part of the Proposal would be taken to an appropriately licensed landfill. • Domestic-type refuse would be collected and disposed of in a licensed landfill. • An appropriate spill containment kit would be kept on site at all times and all staff onsite would be trained in its use. • The Contractor shall determine whether any licenses are required under the POEO Act for the stockpiling, application to land or processing of waste. • Prior to export of waste from the site, waste would be classified in accordance with the NSW DECC Guidelines for the Assessment, classification and Management of Liquid and Non-Liquid Wastes and may be transported off site upon receipt of a signed Section 143 Notice under the Protection of the Environment and Operations ct, 1997 from the landholder who would receive the waste. • A waste management plan would be prepared in accordance with RTA's QA Specifications and in accordance with RTA's *Waste Minimisation and Management Guidelines* 1998c and the principles of the WARR Act. • Trees to be removed would be assessed for their timber value or would be reused for the Proposal eg, reuse of hollows, habitat logs, mulch. • Leaf material and small branches of native vegetation would be chipped and used as mulch in revegetation works. • All noxious weeds and exotic plant species removed would be bagged and disposed of at a licensed waste facility. • Waste material generated (ie. aggregate, road base, steel, cement, cleared vegetation, excess cut material, waste oils and liquids, water, garbage and sewage) would be reused or recycled where possible or as a final options disposed at a licensed waste facility.
Contaminated lands	• Contaminated waste would be identified and classified by a suitably qualified consultant. • Contaminated waste identified or generated during the Proposal would be disposed in accordance with DECC guidelines. • Should any spillage occur during construction, the Environmental Officer, RTA Northern Region, would be contacted immediately, and contaminants would be immediately contained, removed, treated (if necessary) and disposed of to the satisfaction of the DECC.
Ancillary works	• The "dial before you dig" hotline would be contacted prior to commencement of works. • Consultation with the affected utility owners would be undertaken prior to commencement of works to identify any requirements. • Protection/relocation of utilities would be undertaken with consent from the affected utility owner and would aim to minimise impacts on the environment. • Any stockpile site or compound site that is outside the scope of this REF including any change to the boundaries of the assessed stockpile and compound sites would be referred to the Environmental Officer, RTA Northern Region for advice on whether further environmental impact assessment is required. • All compound sites and stockpiles sites would be subject to the site location criteria detailed in the RTA's *Stockpile Site Management Procedures* (RTA 2001b).

Impact	Mitigation Measures
	• Should any chemical spillage occur during the construction activity the Environmental Officer, RTA Northern Region, would be contacted immediately, and contaminants would be immediately contained, removed, treated (if necessary) and disposed of to the satisfaction of the DECC. • An appropriate spill containment kit would be kept on site at all times and staff would be trained in its use.
Demand on Resources	• Use of recycled water from off-site sources would be investigated and any use of recycled water would be in accordance with the RTA Environmental Direction No. 19, Use of Reclaimed Water. Otherwise water would be obtained from local licensed sources. • Where practicable, alternative fuels would be used. Alternative fuel sources for heavy vehicles include low sulphur diesel, ultra low sulphur diesel, compressed natural gas, liquefied natural gas, ethanol and diesohol and aquadiesel. Standard diesel would be used as a last resort where use of alternative fuels is not practicable. • Energy efficiency would be achieved by sourcing green power where possible and by ensuring that electrical lights and devices are switched off when not in use.

8. CONCLUSION

8.1 Justification

Since 1993 Dumaresq (now known as Armidale-Dumaresq), Nymboida (now known as Clarence Valley), Coffs Harbour City, Inverell Shire, and Bellingen Shire Councils lobbied the RTA for improvements to Waterfall Way. These Council's focused on the entire route and the need to improve the standard of road in relation to the commercial, economic and tourist value to their LGA's. Three (3) submissions have been received by the RTA from this group of Council's between 1994 and 2003.

On the basis of the Council's requests, RTA consulted with Bellingen Shire Council in October 1999 requesting a draft alignment plan for Cameron's Corner. In 2001, Bellingen Shire Council responded by providing RTA with three (3) options of which one is the Proposal.

The Proposal to upgrade the Waterfall Way at Bellingen would improve the movement of tourists, freight, commercial and residential traffic between regional population centres. It would also improve road safety and reduce vehicle operating costs, reduce fuel usage and emissions and provide a more efficient travel time. The proposal is consistent with the objectives of the RTA Blueprint and State Plan by upgrading a regional road.

In addition, implementation of the Proposal would have the following beneficial effects;

- Provision of an improved speed environment improving sight distance;
- Provision of a new, wider road to improve safety;
- Anticipated reduction of the incidence of vehicle accidents;
- Increased flood immunity for the Waterfall Way;
- Improvement of travel conditions and travel times;
- Provide a road network that would promote economic development; and
- Achieve an acceptable return on project investment.

It is considered the Proposal would have an overall positive effect on the social, economic and environmental characteristics of the region.

8.2 Ecologically sustainable development

The National Strategy for Ecologically Sustainable Development (NSESD) has been formulated to ensure ESD is accounted for in all Proposals. There are three core objectives:

- To enhance individuals' and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- To provide for equity within and between generations; and
- To protect biological diversity and maintain essential ecological processes and life-support systems.

These principles are considered below in **Table 8** in terms of the Proposal.

Table 8: Principles of ESD Applied to the Proposal

Precautionary principle	Design aspects of the Proposal have considered potential hazards and risks resulting from both construction and operation of the Proposal. Specialist studies have also been undertaken to gain a detailed understanding of the existing environment. No issues have been identified that would cause any serious or irreversible environmental damage as a result of the Proposal at this location. The introduction of site specific safeguards as outlined in **Section 7.2** of this REF would ameliorate potential environmental impacts.
Intergenerational equity	The Proposal would improve the level of supporting infrastructure required for Waterfall Way, and make provision for a more accessible and safer transport corridor for use by future generations. Concurrently, the Proposal considers and minimises impacts to the local environment through the introduction of site specific safeguards to ensure the integrity of natural and social values of the environment are maintained for future generations.
Conservation of biological diversity and ecological integrity	Thorough assessment of the local environment has been undertaken to identify and manage any potential environmental hazards or risks associated with the Proposal. Site specific safeguards outlined in **Section 7.2** of this REF would ensure that the Proposal does not compromise biological diversity or ecological integrity.
Improved valuation and pricing of environmental resources	It is often difficult to place a monetary value on environmental resources. An indirect indication of the value of such resources is the cost of the proposed site specific safeguards. The costs of the proposed site specific safeguards would be calculated once design of the road is finalised.

9. CONSIDERATION OF ENVIRONMENTAL FACTORS

9.1 Clause 228 checklist (NSW Legislation)

Factor	Comment	Impact
a) Any environmental impact on a community?	The Proposal is expected to have a positive impact on the community in the long-term through the provision of improved road safety and traffic flow on the Waterfall Way. Short-term disruption to traffic flows can be expected to occur during construction of the Proposal. Impacts on a community from construction works (noise and exhaust fumes and/or dust) are likely, as the nearest residence is located approximately 40 metres from the closest point of the Proposal site.	Long-term positive Short-term negative
b) Any transformation of a locality?	During construction, the study area would undergo a negative transformation as it would become a construction site. In the long term only minor transformation of the locality would be experienced as a result of the Proposal. Whilst the Proposal would alter the appearance of a section of Waterfall Way due to earthworks and the removal of vegetation, the safety of the locality would be improved and construction impacts would be minimised by carrying out revegetation of the area.	Potential Long-term minor negative
c) Any environmental impact on the ecosystems of the locality?	The Proposal involves the removal of 0.8 hectares of native vegetation of which 0.5 hectares is Swamp Sclerophyll Forest (NSW EEC), 0.1 hectares is Freshwater Wetland (NSW EEC) and 0.2 hectares is Tallowwood – Narrow-leaved White Mahogany open forest. Seven Part Tests (**Appendix F**) have concluded that the Proposal is unlikely to have a significant impact on either of Swamp Sclerophyll Forest or Freshwater Wetland. Indirect impacts of the Proposal (such as edge effects) are likely to be mitigated by the measures outlined in **Section 7.2** of this REF.	Short-term negative Short-term negative
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	The visual amenity of the study area would decrease during construction as the area would become a construction site. Revegetation of disturbed areas with locally indigenous native species after the construction period would improve the aesthetic and environmental quality of the area in the long term. The change in alignment that would give the road user a better visual of the river / valley. The Proposal would not substantially reduce any other aesthetic, recreational, scientific or other environmental quality of the locality.	Short-term negative Long – term neutral
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	It is not anticipated that there would be any impact upon any locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social or other special value for present or future generations as a result of the Proposal.	Nil
f) Any impact on the habitat of any protected or endangered fauna (within the meaning of the National Parks and Wildlife Act 1974?	The Proposal is unlikely to have a significant impact upon threatened biodiversity as listed on the TSC Act and/or EPBC Act. The Proposal would involve the removal of potential habitat resources for native fauna. However, the extent and nature of the proposed development is considered unlikely to have a significant impact upon protected species (under the NPW Act) due to the relatively small extent of proposed habitat removal; sub-optimal habitat quality on site; minimal increase in	Short-term negative Long-term neutral

Factor	Comment	Impact
	existing road related impacts; and the high mobility of fauna known or likely to occur in the study area. Mitigation measures outlined in **Section 7.2** of this REF would minimise any potential impacts.	
g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	The Proposal is not likely to have a significant impact upon threatened biodiversity as listed on the TSC Act and/or EPBC Act. The removal of vegetation and potential habitat is not expected to endanger any other species of animal, plant or other form of life living on land, in the water or in the air with the introduction of mitigation measures outlined in **Section 7.2** of this REF.	Short term negative
h) Any long-term effects on the environment?	The Proposal would involve the loss of 0.8 hectares of native vegetation and the creation of a new edge in good condition habitat. The indirect impacts related to the creation of a new edge would be mitigated through the measures outlined in **Section 7.2** of this REF.	Minor-negative
i) Any degradation of the quality of the environment?	There would be short term reduction in the quality of the environment during construction as a result of vegetation removal. Any potential impacts would be kept to a minimum through the introduction of the mitigation measures outlined in **Section 7.2** of this REF.	Short-term negative
j) Any risk to the safety of the environment?	The Proposal would not cause any risk to the safety of the environment in the long term. There would be some disruption and a short term risk for motorist and worker safety during construction as the works would be undertaken in trafficked conditions. This disruption would be minimised through the implementation of mitigation measures as outlined in **Section 7.2**. In the long term, the Proposal would result in an increase to the safety of the environment through the provision of an improved road network.	Long-term neutral Long-term positive
k) Any reduction in the range of beneficial uses of the environment?	The Proposal would improve road safety and increase flooding immunity at Camerons Corner by upgrading the existing road. The Proposal would not result in any reduction in the range of beneficial uses of the environment. However there would be a relatively minor loss of agricultural land. This would be mitigated by areas of road reserve being revegetated.	Long-term positive Nil
l) Any pollution of the environment?	The Proposal has the potential to pollute waterways, the soil, the air and the surrounding environment during construction. The mitigation measures outlined in this REF would reduce or eliminate those impacts identified for both construction and operation.	Short-term negative
m) Any environmental problems associated with the disposal of waste?	All waste generated by the Proposal would be reused and recycled where possible and disposed of in an appropriate manner where recycling is not possible. With the implementation of the mitigation measures outlined in **Section 7.2** of this REF there would be no environmental problems associated with the disposal of waste.	Short-term negative
n) Any increased demands on resources, natural or otherwise, which are, or are likely to become, in short supply?	There would be no increased demand on resources, natural or otherwise, which are, or are likely to become in short supply as a result of the Proposal.	Short-term negative
o) Any cumulative environmental effect with other existing or likely future activities?	There is potential for future projects to occur on other sections of Waterfall Way, and these may result in negative cumulative effects such as vegetation removal and generation of wastes. A positive cumulative impact would be the increase in safety due to an improved road network. The implementation of safeguards listed in **Section 7.2** of this REF would minimise any potential negative cumulative impacts.	Long-term neutral

9.2 EPBC Act 1999 (Commonwealth Legislation)

The EPBC Act requires that the following matters of National Environmental Significance (NES) be considered:

Factor	Comment	Impact
a) Any environmental impact on a World Heritage property?	There are no World Heritage properties in the vicinity of the Proposal, and therefore no impact upon a World Heritage property would occur as a result of the Proposal.	Nil
b) Any environmental impact on wetlands of international importance?	There are no wetlands of international importance in the vicinity of the Proposal, and therefore no impact upon wetlands of international importance would occur as a result of the Proposal.	Nil
c) Any environmental impact on Commonwealth listed threatened species or ecological communities?	Potential impacts of the Proposal upon Commonwealth listed species and ecological communities have been investigated. No significant impacts would occur as a result of the Proposal.	Nil
d) Any environmental impact on Commonwealth listed migratory species?	Potential impacts of the Proposal upon Commonwealth listed migratory species have been investigated. No impacts would occur as a result of the Proposal.	Nil
e) Does any part of the Proposal involve a nuclear action?	The Proposal would not involve a nuclear action.	Nil
f) Any environmental impact on a Commonwealth marine area?	The Proposal would not impact upon a Commonwealth marine area.	Nil
g) Any environmental impact on Commonwealth land?	Commonwealth land would not be affected, directly or indirectly, as part of this Proposal.	Nil

10. CERTIFICATION

This Review of Environmental Factors provides a true and fair review of the Proposal in relation to its potential effects on the environment. It addresses to the fullest extent all possible matters affecting or likely to affect the environment as a result of the Proposal.

……..

Simon Williams
BEnvP, M Env Law, MPIA, CPP
Senior Consultant
Eco Logical Australia Pty Ltd
Date:

I have examined this Review of Environmental Factors and the certification by Simon Williams and accept the Review of Environmental Factors on behalf of the RTA.

……..

Paul Leonard
Project Manager
RTA Northern Region
Date:

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