Warrell Creek to Nambucca Heads Compliance Tracking Report February 2017 – August 2017

Pacific Highway Upgrade:
Warrell Creek to Urunga Stage 2

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Report name	**Warrell Creek to Nambucca Heads compliance tracking report (4)** **February 2017 – August 2017**
Revision Number	**B**

Contents

Terms and Abbreviations

AADJV	Arup and Aurecon Design Joint Venture
ACCIONA	ACCIONA Infrastructure Australia Pty Ltd
AFG	Aboriginal Focus Group
AFJV	ACCIONA and Ferrovial Joint Venture
AADJV	Arup Aurecon Design Joint Venture
ASF	Ancillary Site Facility
AS/NZS	Australian and New Zealand Standard
CEMP	Construction Environmental Management Plan
D&C	Design and Construction
DG	Director General – Department of Planning and Environment
DP&E	Department of Planning and Environment
EDMS	Electronic Document Management System (TeamBinder)
EPA	Environment Protection Authority
EPL	Environment Protection Licence
ERG	Environmental Review Group
Ferrovial	Ferrovial Agroman (Australia) Pty Ltd
ID Planning	ID Planning Pty Ltd
IMS	Integrated Management System
ISO	International Standards Organisation
KPI	Key Performance Indicator
MCoA	Ministers Conditions of Approval
NSW	New South Wales
O&M	Operations and Maintenance
OEH	Office of Environment and Heritage
PMT	Project Management Team
PV	Project Verifier
Roads and Maritime	Roads and Maritime Services

SoC	Statement of Commitments
SWTC	Scope of Works and Technical Criteria
WC2NH	Warrell Creek to Nambucca Heads (the Project)

Definitions

Client	An organisation inviting and receiving tenders and letting contracts. For the purposes of this project - Roads and Maritime Services
Contractor	An organisation that contracts with a client to carry out construction and related services. For the purposes of this Project - ACCIONA Ferrovial Joint Venture.
Deed	D&C Project Deed, IC-DC-C91-1, Pacific Highway Warrell Creek to Nambucca Heads
Design Joint Venture	Joint Venture consisting of Arup and Aurecon
Director General	Director General of the Department of Planning and Environment
Government Agency	NSW government department, authority, corporation or entity established by an Act of the NSW Parliament
Persons Conducting a Business or Undertaking	Is an employer, corporation, partnership, unincorporated association that has the primary duty of care for workplace health and safety - (AFJV and Contractors are a PCBU)
Planning Approval	Refers to the Consolidated Instrument for Modification 8 of the Planning Approval which contains the Ministers Conditions of Approval.
Principal Contractor	A person conducting a business or undertaking that commissions a construction project. For the purposes of this project - AFJV
Project	The design and construction of the upgrade to the Pacific Highway between Warrell Creek and Nambucca Heads
Project Verifier	For the purpose of the Project, this is Davis Langdon Australia Pty Ltd
Proof Engineer	For the purpose of the Project, Cardno Pty Ltd
Site	'Site' generally refers approved construction site. 'site' may refer to other sites specifically referred to, such as sensitive area sites, compound sites, on-site activities, site inspections etc.
Subcontractor	Organisation that contracts with a principal contractor as the client to carry out construction and related services
Worker	Is anyone who carries out work for a PCBU and includes: an employee, contractor or sub-contractor or an employee of, labour hire personnel, apprentice or trainee, work experience student

1. Introduction

The Pacific Highway Warrell Creek to Nambucca Heads Upgrade project (the Project) is being designed and constructed by AFJV, a joint venture consisting of ACCIONA Infrastructures Pty Ltd (ACCIONA) and Ferrovial Agroman (Australia) Pty Ltd (Ferrovial), herein referred to as the AFJV - ACCIONA Ferrovial JV (AFJV), with overall project management and site supervision of the project by Roads and Maritime Services (Roads and Maritime).

1.1 Project Background

The Warrell Creek to Nambucca Heads (WC2NH) Upgrade project consists of the detailed design and construction of 19.6 km of new dual carriageway road on the Pacific Highway between the northern end of the existing Allgomera Deviation south of Warrell Creek and the southern end of the Nambucca Heads to Urunga Pacific Highway upgrade project west of Nambucca Heads. Figure 1-1 shows the location of the project.

The project includes:

- 19.6 km of new four lane divided carriageway with safe driving conditions for speeds of 110 km/h;
- Aa continuous local road between Warrell Creek and Nambucca Heads combining the existing Pacific Highway and new local roads. The local road would:
    - Offer safer access to properties that currently have direct access to the highway.
    - Let residents travel to local shops and other facilities without having to use the new highway.
    - Provide another route between Warrell Creek and Nambucca Heads for motorists and cyclists.
- new grade-separated interchanges at:
    - Warrell Creek at Browns Crossing Road
    - South Macksville at Bald Hill Road
- a northbound on-ramp and southbound off-ramp at Letitia Close, North Macksville;
- longitudinal bridges across Upper Warrell Creek, Williamson Creek, Warrell Creek, Nambucca River floodplain (2 of) and Nambucca River;
- overbridges on Cockburns Lane, Rosewood Road, Albert Drive, Scotts Heads Quarry access road, Bald Hill Road, Old Coast Road South, Mattick Road and Old Coast Road North;
- underpass underneath North Coast Railway Line near Browns Crossing Road;
- local roads, drainage and fauna crossing structures;
- no direct property access to or from the highway;
- measures to reduce environmental, noise and visual effects; and
- associated infrastructure.

1.2 Commencement of Construction

Construction of the Warrell Creek to Nambucca Heads Pacific Highway Upgrade commenced on 8 February 2015.

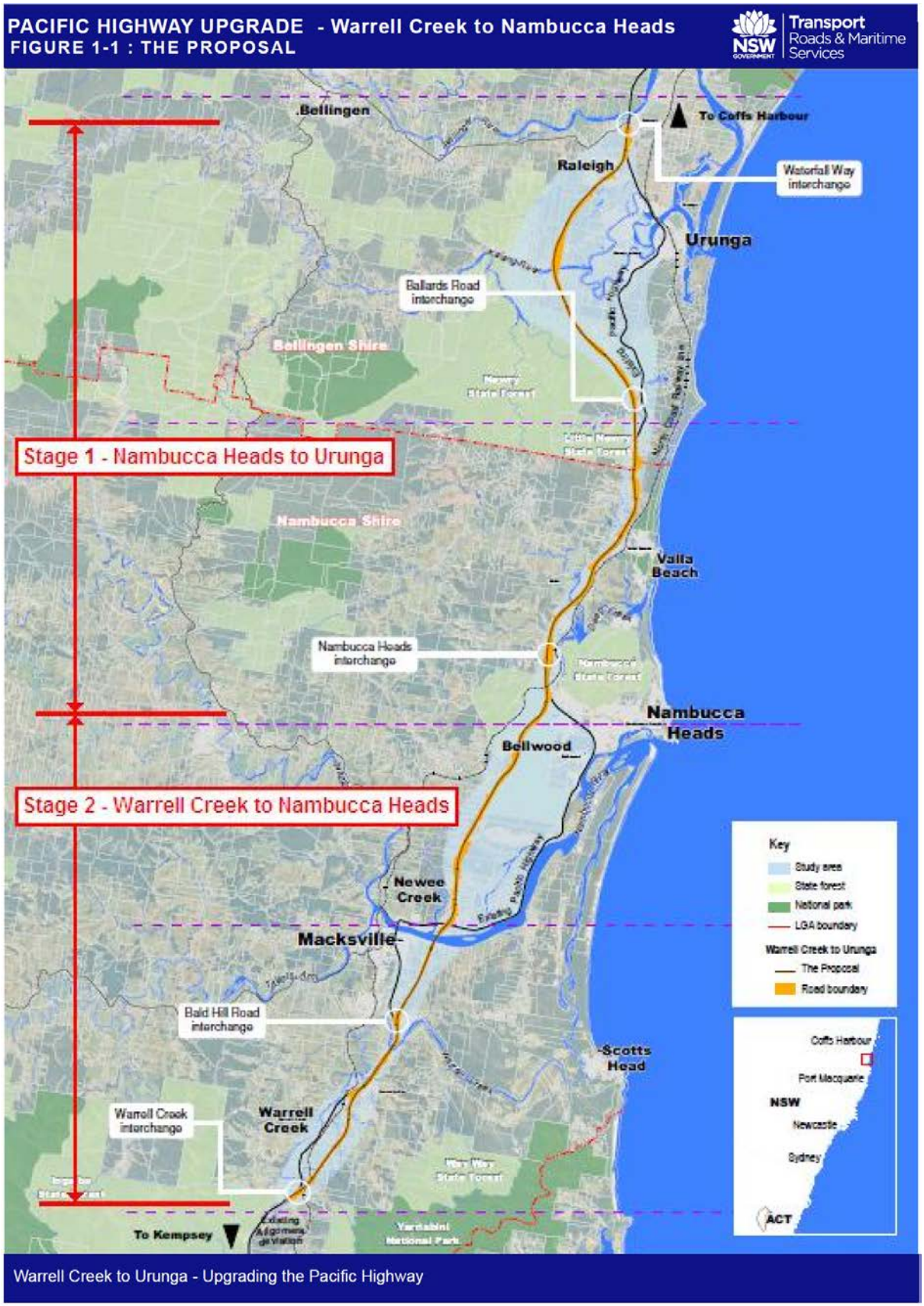

Figure 1.1. Location of the Warrell Creek to Nambucca Heads Project.

1.3 Purpose of this report

This report has been prepared to fulfil the requirements of MCoA B25 for the period 9 August 2016 to 8 February 2017. Table 1 details the requirements of MCoA B25 and where each has been addressed in this report.

Table 1 – Compliance reference.

MCoA Reference	Comment	Section Reference
B25 The Proponent shall develop and implement a **Compliance Tracking Program** to track compliance with the requirements of this approval. The Program shall be submitted to the Director General for approval prior to the commencement of construction and relate to both the construction and operational phases of the project, and include, but not necessarily be limited to:	Compliance Tracking Program prepared by Roads and Maritime and approved in March 2013 by the Director General. Document updated in October 2014 for WC2NH Project and resubmitted to the Director General. The Compliance Tracking Program was approved by the Director General on the 16/12/14. Construction Phase of the WC2NH Project commenced on the 9th of February 2015.	NA
(a) provisions for the notification of the Director General of the commencement of works prior to the commencement of construction and prior to the commencement of operation of the project (including prior to each stage, where works are being staged);	Compliance Tracking Program states that 48 hours' notice to be provided to the Director General prior to the commencement of construction. Notification provided to Director General by RMS to commence construction on the 9/2/2015.	NA
(b) provisions for periodic review of project compliance with the requirements of this approval, Statement of Commitments and documents listed under condition A1;	Compliance Tracking Program requires 6 monthly reviews of the MCoA, SoC and other relevant approvals. This report will be produced after the compliance review and reported for the Director General 6 months after the commencement of construction and for every six month period thereafter during the construction phase of the Project.	This report Section 2
(c) provisions for periodic reporting of compliance status against the requirements of this approval, Statement of Commitments and documents listed under condition A1 to the Director General including at least one month prior to the commencement of construction and operation of the project and at other intervals during the construction and operation, as identified in the Program;	A Compliance Tracking Report will be prepared and submitted to the Director General for the six month period after the commencement of construction and for every six month period thereafter throughout the construction phase of the WC2NH Project.	This report
(d) a program for independent environmental auditing in	The Compliance Tracking Program and the Project Construction	Section 2

MCoA Reference	Comment	Section Reference
accordance with *ISO 19011:2003 - Guidelines for Quality and/ or Environmental Management Systems Auditing*;	Environmental Management Plan include the requirements for regular independent auditing. Six-monthly independent audits will be undertaken in accordance with ISO 19011:2003 – Guidelines for Quality and/or Environmental Management Systems Auditing and the findings included in the Compliance Tracking Report. No independent audits were undertaken during the reporting period as the six-monthly audit frequency has been extended to annually during year 3 of construction.	
(e) mechanisms for reporting and recording incidents and actions taken in response to those incidents;	The Compliance Tracking Program refers to the Roads and Maritime's Environmental Incident Classification and Reporting Procedure and includes details on incident reporting in Section 2.5.	Section 6
(f) provisions for reporting environmental incidents to the Director General during construction and operation; and	This Compliance Tracking Report will include a brief description of the incidents that have occurred in the reporting period, including the corrective and preventative actions to prevent reoccurrence.	Section 6
(g) procedures for rectifying any non-compliance identified during environmental auditing, review of compliance or incident management.	This Compliance Tracking Report will include a brief description on audits undertaken during the reporting period, a review of the Project's compliance with the MCoA and SoC and any non-compliance raised. This report will also address the corrective/preventative actions undertaken to rectify the non-compliance. The Compliance Tracking Program includes procedures for rectifying non-compliance in Section 2.7.	Section 4

1.4 Scope of Activities undertaken during reporting period

The Construction works undertaken during the reporting period include:

- Ongoing earthworks including cut excavation and embankment filling works;
- Crushing and screening of rock material;
- Installation of cross drainage culverts and transverse drainage;
- Bridge headstock construction;
- Bridge deck construction;
- Precast and Batch Plant Operation;
- Ongoing operation of Second Concrete Batch plant in the southern portion of the Project;

- Ongoing operation of Asphalt Batch Plant in the southern portion of the Project;
- Girder manufacture and installation;
- Fauna Fence Installation;
- Installation of permanent rural fencing;
- Environmental Monitoring including water quality, noise, air and ecological monitoring;
- Permanent Landscaping;
- Waterway Crossing installation and removal;
- Installation of permanent noise mounds;
- Installation of longitudinal pavement drainage;
- Laying upper zone material in preparation for paving;
- Ongoing concrete and asphalt paving operations;
- Ongoing work on the pergola near Upper Warrell Creek
- Opening of Albert Drive Bridge to traffic
- Acid Sulfate Soil Treatment;
- Basin installation, augmentation, decommissioning and dewatering activities.

The following photographs provide some general examples of activities undertaken during the period

Photo 1: Girder installation on Upper Warrell Creek. All girder placements are complete for the Project.

Photo 2: Construction of frog breeding ponds in accordance with the Green-Thighed Frog Management Plan

Photo 3: Revegetated batter, part of the permanent landscaping in the Southern area of the Project

Photo 4: Rehabilitation of floodplain on the northern side of Nambucca River

Photo 5: Widened median through the Nambucca State Forest to allow glider crossing points.

1.5 General performance of environmental management

The Project has received generally lower than average rainfall since February 2017, with higher than average rainfall events experienced in March and June. A significant rainfall event occurred between the 15th and 23rd March in which the total rainfall received during this period was 357mm. As a result, flooding

of the major waterways adjacent to the worksite occurred and several sections of the worksite became inundated with flood water. No incidents were recorded during this event and the erosion and sediment controls operated in accordance with their design intent.

One incident occurred during the reporting period involving seepage from a sediment basin. No non-compliances have been raised in relation to the installation and/or maintenance of erosion and sediment controls during the reporting period.

Ecological monitoring is ongoing in accordance with the Ecological Monitoring Program. Results of ecological monitoring undertaken in Autumn and Winter of year 3 of construction have shown the construction activities are not having an impact on threatened species located adjacent to the Project construction works. Monitoring in accordance with the approved Ecological Monitoring Program undertaken in Autumn and Winter of year 3 of construction (this reporting period) include:

- Giant Barred Frog habitat and population monitoring;
- Microbat monitoring including:
    - roost box monitoring; and
    - habitat monitoring.
- Flying Fox population monitoring;
- Landscape rehabilitation; and
- Nest Box Monitoring

RMS and the ER team currently conduct fortnightly inspections assessing issues raised during the inspection based on the environmental risk.

An Environmental Work Method Statement (EWMS) has also been prepared for each high risk activity, which is reviewed by Roads and Maritime, the ER and relevant agency representatives. The EWMS includes control measures required to reduce the risk of hazards to the environment and compliance is closely monitored on site by AFJV and Roads and Maritime.

2. Statutory matters

2.1 Project Approval

Roads and Maritime Services completed an environmental assessment of the Warrell Creek to Urunga Pacific Highway Upgrade (the Project EA) in January 2010. The Project EA identified a range of environmental, social and planning issues associated with the construction and operation of the Warrell Creek to Urunga Pacific Highway Upgrade and proposed measures to mitigate or manage those potential impacts.

The Project EA was publicly exhibited from 28 January to 29 March 2010 for a period of 60 days. Following public exhibition, submissions from stakeholders were received and addressed by RMS in the Submissions Report which was lodged with the Director-General in November 2010.

After consideration of the Project EA and Submissions Report, the Minister for Planning approved the Warrell Creek to Urunga Pacific Highway Upgrade under Section 75J of the Environmental Planning and Assessment Act 1979 (EP&A Act) on 19 July 2011 subject to the Minister's Conditions of Approval (CoA) being met.

Approval was also granted under Part 9 of the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 for the Warrell Creek to Nambucca Heads Pacific Highway upgrade (EPBC 2013/7101) on 11 December 2014.

The AFJV - Acciona Ferrovial JV (AFJV) was awarded the contract to construct the Warrell Creek to Nambucca Heads section which is Stage 2 of the overall Warrell Creek to Urunga Pacific Highway Upgrade.

Appendix E of this report present the conditions of the NSW Minister for Planning Project approval and associated Roads and Maritime's statement of commitments, and provides detail on the status of compliance for each. No non-compliances were found during the reporting conditions.

2.2 Licensing, Permits and Reviews

The Warrell Creek to Urunga Pacific Highway Upgrade project was referred to the Commonwealth Minister in accordance with the requirements of the EPBC Act. The Project received Minister's Approval on the 11 December 2014 (2013/7101) subject to a number of conditions.

Acciona holds an environment protection licence (EPL 20533) for the construction activities of the project. This was issued on the 16/12/14.

The Project has also obtained permits to access surface water from Upper and Lower Warrell Creek. Groundwater bore licences have also been obtained. The details of the permits are provided in Table 2.

Table 2 – Groundwater and Surface Water Permits

Type of Permit	Permit Number	Location
Groundwater Bore Licence – Industrial Use (Road Construction and dust suppression)	30BL207257	Lot 5 DP258324
Groundwater Bore Licence – Industrial Use (Road Construction and dust suppression)	30BL207262	Lot 16 DP1154963
Groundwater Bore Licence – Industrial Use (Road Construction and dust suppression)	30BL207263	Lot 5 DP1067522
Groundwater Bore Licence – Industrial Use (Road Construction and dust suppression)	30BL207307	Lot 1 DP1209891
Groundwater Bore Licence – Industrial Use (Road Construction and dust suppression)	30BL207307	Lot 1 DP1209891
Groundwater Bore Licence – Industrial Use (Road Construction and dust suppression)	30BL207310	Lot 22 DP1185837
Groundwater Bore Licence – Industrial Use (Road Construction and dust suppression)	30BL207308	Lot 2 DP1018234
Surface Water Taking for industrial (road construction and dust suppression)	30PE002487	Warrell Creek Lot 66 DP 1175835
Surface Water Taking for industrial (road construction and dust suppression)	30PE002486	Warrell Creek Lot 108 DP 1181639
Surface Water Taking for industrial (road construction and dust suppression)	30PE002485	Warrell Creek Lot 48 DP 1172072
Surface Water Taking for industrial (road construction and dust suppression)	30PE002488	Warrell Creek Lot 6 DP 1014123

No new licences or permits were required during this reporting period. However the EPL underwent 7 variations during this period..

A Consistency Assessment has been prepared and approved by RMS and endorsed by the ER for works that are consistent with the Planning Approval and environmental assessment and planning documents during the reporting. A summary is provided below in Table 3.

Table 3 – List of Consistency Assessments approved throughout the reporting period

Consistency Assessment	Date Approved	Reference to Approval Condition
Addendum to Minor Consistency Review – Temporary Stockpiles outside of the Project Boundary (allowing crushing activities to occur)	29/04/17	MCoA A6, B30

Submissions to DP&E have been undertaken during the reporting period including

1. the revised Groundwater Monitoring Program in accordance with Condition B17 to exclude permanently dry groundwater bores from monitoring.

2. update on the Operational Noise Mitigation Review in accordance with condition C12. On 2 May 2017, RMS a draft Operational Noise Mitigation review was submitted to DP&E with a request for an extension of time to 8 October 2017 to submit the final report.

The CEMP and Sub-plans are currently under review, with a number of minor changes currently being addressed by AFJV, RMS and the ER. These were minor changes to the CEMP accepted by the Project ER under MCoA B29 (g) during the reporting period. Four appendices of the approved Flora Fauna Management Plan were amended and endorsed by the ER during this review period as listed in Table 4 below.

Twenty-one minor ancillary sites including crib sheds and ablution blocks have been approved in total for the Project by the Project ER under conditions C27 and C28 of the MCoA to date, twelve of these facilities are no longer utilised by the Project.

Table 4 – CEMP sub plans and appendices updated this review period (ER Endorsement)

CEMP Sub-Plan Amended	Amendment Made	Reference to Approval Condition
FFMP Nest Box Management Plan	Revised nest box calculations and locations based on the final quantity of habitat trees cleared for the Project.	MCoA A6, B30 B31(b)
FFMP Ecological Monitoring Program	Revised to include the requirements for Landscape Rehabilitation Monitoring in accordance with the approved Urban Design and Landscape Plan	MCoA A6, B30 B31(b)

2.3 Environment Protection Licence performance

Acciona holds an environment protection licence (EPL 20533) for the construction activities of the project. There were 4 non-compliances with the EPL during the reporting period detailed below:

1. 01/05/2017 – Letica Close overbridge - Construction work was undertaken outside of standard construction hours not in accordance with EPL Condition L4.2(d). The work involved a late

finishing concrete pour on the new Old Coast Road South Bridge that could not be avoided (or risk the requirement to re-work the concrete on the bridge deck). Noise monitoring was undertaken and the work was found to be compliant with the EPL Condition L4.2(d) in which the work was less than 5 dB(A) above the rating background level. However, the EPA was not notified in accordance with this condition.

2. 22/05/17 - Upper Warrell Creek - discoloured water entered Upper Warrell Creek during girder lifting operations Coordinator attended site and noted discoloured water which had travelled approx. 30m downstream. Upstream water was checked with no signs of discolouration noted. Silt Curtains were installed at Upper Warrell Creek Crossing (downstream). No sources identified during investigation. Controls were verified as working effectively onsite. Settlement of rock crossing and/or crane pad during girder placement and/or crane movement is a potential source of discoloured water during investigation but cannot be verified. It should be noted that another girder was lifted with the 750T crane in the same location on 23/5/17 with no discoloured water being noted during and post lifting operations.

3. 26/06/17 - Lower Warrell Creek, A small quantity (approx 1L) of concrete slurry material dripped from the bridge deck at Lower Warrell Creek during a deck pour due to the foam piping used to waterproof the transfloor panels becoming dislodged during the pour. Going forward, the decks over Lower Warrell Creek and Nambucca River will be further inspected by the AFJV Engineering Team and RMS/The PV prior to the concrete pour to ensure the decks have been adequately waterproofed. Equipment, including an emergency boat and a spotter will be available for all future pours at Lower Warrell Creek and Nambucca River to monitor for and capture any material that may drip from the bridge deck.

4. 26/06/17 - Lower Warrell Creek - Water run-off from Lower Warrell Creek Bridge entered Lower Warrell Creek during wet curing. The pH of the water was measured at 8.4 and within release criteria. A potable water hose used to wet cure the concrete decks on Lower Warrell Creek bridge was left running for too long, with a larger volume than expected discharged onto the deck. This then caused a volume of approximately 50L to escape the control measures and enter the creek. As the deck had been poured on Monday, the pH of the run-off had reduced to 8.4 (within sediment basin release criteria). The water hose was switched off and wet vac used to clean up excess water on the deck. The waterproof taping used to prevent water from running over the deck was repaired in several sections of the deck. The Supervisor has been nominated as the person solely responsible for ensuring the water hose is turned off without excess water applied to the deck.

2.4 Outcome of Independent Audits

No independent audits were undertaken during the reporting period as the six-monthly audit frequency has been extended to annually during year 3 of construction.

An independent audit was undertaken by RMS over the 26th and 27th April to determine the Project's compliance with the CEMP, relevant approvals and RMS specifications relating to Environmental Management (G36 and G38 respectively). Three observations of concern were raised during the audit relating to RMS Specification G36, no issues were raised in relation to the Ministers Conditions of Approval or compliance with the Project CEMP.

2.5 Outcomes of ERG Inspections

The Project has held six Environmental Review Group meetings during the reporting period. The meetings generally have involved the following discussions / briefings:

- Site inspection
- Approval Update (CEMP, Sub-plans, Consistency Assessments);
- Design Updates;
- Construction Status Updates and Activities Completed;

- Ecologist Update (Flora and Fauna)
- Monitoring Update (Air Quality, Noise Monitoring, Water Quality etc.);
- Environmental Incidents;
- EWMS Updates; and
- Workshops;

These meetings include a site inspection by the attending stakeholders to gain an understanding of the design / construction implications for different aspects of the works as well as to gauge the environmental management and associated processes being delivered by AFJV on the ground during daily operations. Inspections also focus on high risk activities being undertaken onsite during this scheduled meeting including clearing and grubbing, design refinements, basin inspections (including augmentation and decommissioning), stockpile management, utility relocations, erosion and sediment controls for works adjacent to sensitive areas, creek realignments (Williamson Creek/Stoney Creek), widened medians inspections, consistency assessment site inspections and bridge construction. Inspections have also been undertaken during the ERG's on specific mitigation measures contained within the flora and fauna management plans (i.e. Giant Barred Frog Management Plan) where inspections have focused on the installation and monitoring associated with exclusion fencing, translocation of fauna species etc. and this provides an opportunity for both agencies and contractor to discuss these mitigation measures, their effectiveness and monitoring results of works undertaken to date.

Table 5 below provides a summary of the items discussed at each ERG undertaken during the reporting period.

Table 5 – ERG Discussion Notes

Date	Stakeholder Attendees	Summary of Items Discussed
ERG #34 06/03/2017	Chris Wicks – RMS Jim Steen – RMS Brian Tolhurst – EPA David Bone – ER James Sakker – DPI Craig Dunk – EPA Noelene Rutherford – AFJV Emma Wright – AFJV Stan Viney – EPA Alex Dwyer – AFJV Neil Glastonbury - RMS	Approval Update; Biodiversity Update Landscape and rehabilitation update; At House Noise Treatments update; Construction Update; Structures Update; Monitoring Update; Sediment Basin Review; Out of Hours Works; Incidents; Complaints; Community Consultation Activities
ERG #35 04/04/17	Chris Wicks – RMS Jim Steen – RMS Sean Hardiman - RMS Brian Tolhurst – EPA Craig Dunk – EPA	Approval Update; Biodiversity Update At House Noise Treatments; Construction Update; Monitoring Update;

Date	Stakeholder Attendees	Summary of Items Discussed
	David Bone – ER Noelene Rutherford – AFJV Emma Wright – AFJV Kris Hincks – RMS Alex Dwyer – AFJV	Out of Hours Works; Incidents; Complaints; Community Consultation Activities
ERG #36 09/05/17	Sean Hardiman - RMS Jim Steen – RMS Peter Higgs - EPA Craig Dunk – EPA James Sakker – DPI Chris Clark – RMS Alex Dwyer - AFJV Noelene Rutherford – AFJV David Bone – ER Kris Hincks – RMS Johnathon Yantsch – DPI	Approval Update; Biodiversity Update; At House Noise Treatments; Construction Update; Monitoring Update; Out of Hours Works; Incidents; Complaints; Community Consultation Activities
ERG #37 06/06/17	Sean Hardiman - RMS Jim Steen – RMS Brian Tolhurst – EPA Craig Dunk – EPA Noelene Rutherford - AFJV David Bone – ER Alex Dwyer – AFJV Kris Hincks – RMS Johnathon Yantsch – DPI Jack Henderson – AFJV	Review of Action Tracker Approval Update; Biodiversity Update; Landscape Rehabilitation Update; At House Noise Treatments; Construction Update; Monitoring Update; Out of Hours Works; Incidents; Complaints; Community Consultation Activities
ERG #38 11/07/17	Sean Hardiman - RMS Jim Steen – RMS Brian Tolhurst – EPA Stuart Murphy – EPA Noelene Rutherford - AFJV	Review of Action Tracker Approval Update; Biodiversity Update; At House Noise Treatments; Construction Update;

Date	Stakeholder Attendees	Summary of Items Discussed
	David Bone – ER Alex Dwyer – AFJV Kris Hincks – RMS James Sakker – DPI Jack Henderson – AFJV Michael Young – at house noise mitigation treatments. Lindsay Cooper – RMS Daniel Gorgioski – DP&E Allison Kelly - AFJV	Monitoring Update; Out of Hours Works; Incidents; Complaints; Browns Crossing Road Flood Modelling Presentation – delivered by RMS Community Consultation Activities
ERG #39 08/08/17	Sean Hardiman - RMS Jim Steen – RMS Kris Hincks – RMS Peter Higgs– EPA Craig Dunk – EPA Alex Dwyer – AFJV David Bone – ER James Sakker – DPI Jack Henderson – AFJV Michael Young – DP&E (teleconference close out) Daniel Gorgioski – DP&E (teleconference close out)	Review of Action Tracker Approval Update; Biodiversity Update; At House Noise Treatments; Construction Update; Monitoring Update; Out of Hours Works; Incidents; Complaints;

2.6 Environmental Incidents

Roads and Maritime, and its contractors, take the view that any environmental related unplanned events, whether they impact the environment or not, are reported and recorded as incidents. This type of approach allows for the analysis of trends and encourages a culture within the workforce for continual improvement.

Environmental incidents are identified by the AFJV in accordance with the Roads and Maritime Incident Classification and Reporting Procedure (Feb 2016). Roads and Maritime has acknowledged the AFJV incident reporting culture and the focus that the AFJV takes on minimising recurrences of incidents.

A total of 16 environmental related unplanned events categorised as environmental incidents occurred on the project during the reporting period. Eleven incidents were of a minor nature; with the remaining 5 classified as Category 1 incidents in accordance with the Incident Classification and Reporting Procedure. The procedure states that:

“An environmental incident…need not necessarily be an incident that comprises a breach of legislation. Nonetheless, it is important to capture this information to improve RMS’s environmental practices and contractor performance”.

- Category 1: Generally breaches of environmental legislation, such as pollution of waters, non-compliance with EPL / approval conditions, and unauthorised activities.
- Category 2: Generally less environmental serious with no or minimal offsite environmental impact. E.g. Minor non-compliances with CEMP, small spills."

A breakdown of the Category incidents is provided below.

Table 6 – Category 1 incidents reported during this reporting period.

Date	Description
16/03/17	Sediment Basin B56.75 was found to be seeping into the adjacent drainage line after a 126mm rainfall event. During a post-rainfall inspection undertaken by Alex Dwyer st 8am on the 16/03/17, it was identified that the water level in basin B56.75 had dropped to 100mm below the spillway height. The previous day (during heavy rainfall where the site received 126mm of rain) the basin was observed to be overtopping through the spillway. Approximately 7,000L of water from the basin appears to be seeped from the basin into the drainage line approximately 25m south of the basin. Four water carts were placed on rotation to dewater the sediment basin which was dewatered by 4:15pm. The basin and drainage line was also treated with gypsum flocculant. The weather forecast was taken into consideration)more heavy rain forecast) and P47 Polyacrylamide soil binder has been applied to batters and stockpiles within the basin and drainage line catchment area to reduce the sediment loading on the basin and drainage line. Additional controls have been installed where possible to reduce the sediment loading on the basin. An inspection with SCS has been arranged for the 16/03 to discuss further actions to be undertaken. AFJV will aim to stabilise the catchment area by applying more hydromulch and polyacrylamide soil binder to batters and permanent visual mounds. The Project will then seek to decommission the sediment basin in accordance with the "Blue Book" requirements and the Project EPL and finalise this area in accordance with the permanent design.
01/05/17	As discussed in section 2.3, construction work occurring outside of standard construction hours which complied with the EPL, however notification was not made to the EPA prior to commencing the work.
22/05/17	As discussed in section 2.3, sediment plume appeared to be coming from unknown source in Upper Warrell Creek. Sediment may have been attributed to settlement underneath the crane platform utilized for bridge construction.
30/05/17	As discussed in section 2.3, small quantity (approx. 250ml) of concrete slurry entered Lower Warrell Creek during deck pour activities due to a minor failure in the backing rod used to waterproof the bridge decking.
26/6/17	As discussed in section 2.3, a small volume of water run-off from Lower Warrell Creek Bridge entered Lower Warrell Creek during wet curing.

In accordance with the Roads and Maritime Incident Classification and Reporting Procedure, the AFJV reported a number of minor spills. During the reporting period of 24 working weeks, there were:

- 8 minor oil spills (including fuel and hydraulic oil leaks)
- 1 minor solvent spill
- 2 other minor spills (mud/slurry tracking)

All the spills were managed within the site and installed controls. Any contaminated material or soil was collected and disposed of at licensed waste facilities in accordance with the approved CEMP. The table below summarises the general statistics regarding hydrocarbon and solvent spills on site.

Table 7 summaries the details of the hydrocarbon spills reported and shows that 8 hydrocarbon spills occurred during the reporting period of 24 working weeks, more than 50% less than the previous period.

Table 7 – Summary of minor oil/solvent spills reported during this reporting period.

Total No. spills	Average No. spills/week	Total volume spilt (l)	Average volume/spill (l)	Volume range (l)			No. spills >5 litres	Total Volume leaving boundary
				Min	Median	Max		
8	0.33	155	19.38	1	5	100	5	0

During the reporting period, there was on average, approximately 165 pieces of major plant operating on the project ranging from heavy earthmoving equipment to large haulage trucks and lifting equipment. This does not include a large number of light vehicles, pumps and generators.

In continuing to encourage the reporting of all spills, Roads & Maritime can effectively develop processes for the ongoing improvement of equipment spill management within this part of our operations. These processes include refining the reporting, response and oversight of spill management in collaboration with Agencies and Regulators.

3. Initiatives and Innovations

AFJV have undertaken a number of initiatives and innovations this reporting period which have enhanced the environment within and surrounding the construction site including:

- Use of carpet underlay for wet curing on bridge decks;
- Successful population enhancement of *Alexfloydia repens*.

3.1 Use of carpet underlay for wet curing

AFJV commenced pouring deck slabs on Nambucca River Bridge and Lower Warrell Creek bridge in early 2017. Conventionally, damp hessian is placed over the freshly poured concrete to ensure moisture is retained in the concrete during the curing process and prevent excess cracking. Water is applied to the hessian to ensure it is kept moist and a tarp is placed over the hessian to retain moisture.

AFJV were experiencing issues keeping the hessian damp, whilst not generating too much water which may run-off the deck into the creek/river below. Therefore, AFJV have trialed the use of carpet underlay instead of hessian. The benefit of carpet underlay is that it is more absorbent than hessian, can retain moisture for longer, does not need to be wet down as much and will absorb excess water that would otherwise run-off into the creek/river. The water used for “wet curing” is often high in pH, particularly within the first 48 hours after the pour is complete.

Strips of carpet underlay were applied to the “downslope” sections of the concrete deck to act as a sponge to intercept any excess water that may run-off from the deck.

Photo 8: Use of carpet underlay for wet curing

3.2 Successful population enhancement of *Alexfloydia repens*

The Project's approved Threatened Flora Management Plan (TFMP) includes the requirement to translocate *Alexfloydia repens* (herein known as Floyds Grass) outside of the "directly" impacted construction zone. The translocation project aimed to establish populations of Floyds Grass in habitat adjacent to the highway corridor. To achieve this aim, the translocation program had three components:

- salvage transplanting of impacted individuals from the construction footprint;
- population enhancement by introduction of additional plants propagated from locally collected seed, to promote population establishment and long-term viability; and
- restoration of good quality habitat to the receival sites.

During the reporting period, the results of monitoring the Floyds Grass translocation were provided and detailed promising results in relation to the long-term growth and viability of the population of Floyds Grass adjacent to Lower Warrell Creek. The receival site (known as Receival Site 9) was prepared by stripping the pest species Broad-Leafed Paspalum from the surface of the topsoil to ensure the Floyds Grass was not subject to competition for space and to ensure the seed bank of paspalum was removed to minimize regeneration. Small clumps of Floyds Grass approximately 10cm square were dug up with a spade and planted at the receival site. The clumps were watered thoroughly and sugar cane mulch (weed free) spread lightly over the soil surface to prevent raindrop compaction. Follow-up watering was carried out as conditions were dry. 'Seasol' seaweed and fish emulsion fertiliser was applied two weeks after introduction to stimulate growth. As the site was exposed to the afternoon sun, shade-cloth fences approximately 1m high and running N-S were erected to provide additional shade. To promote population establishment and long-term viability, approximately 100 additional Floyds Grass plants were propagated and planted out in a second area at Receival Site 9 in March 2016. The plants were propagated from small pieces of runner that broke off plants during transplanting. As Area 2 was more exposed than Area 1 and had little shade, the shade cloth fences erected to protect from the afternoon sun, also had a roof to protect from the overhead sun. Hand weeding to remove competing exotic and native species was carried out by AFJV under the supervision of the plant ecologist.

The survival rate of 54 clumps of Floyds Grass translocated to Area 1 in Receival Site 9 at the end of the second year of monitoring was 94%. In Area 2 planted in March 2016, the clumps have established well with minimal mortality and are sending out runners. The results showed that Floyds Grass can rapidly colonise bare soil stripped of other ground layer vegetation and with only a light litter layer.

Photo 9: Receival Site 9, Floyds Grass translocation and population enhancement site.

4. Outcome of monitoring undertaken

4.1 Surface Water and Groundwater Monitoring

Roads and Maritime have developed water quality parameter trigger levels based on the preconstruction surface water monitoring data for the construction phase as per MCoA Condition B17. Currently, AFJV are comparing construction phase data with these 80th and 20th percentile trigger values provided by RMS in October 2015, as well as ANZECC guidelines where no trigger values were provided in the final interpretive report.

Surface water monitoring has generally shown elevated nutrient levels, lower dissolved oxygen levels, particularly in Warrell Creek (Upper and Lower) and Stony Creek and occasionally elevated turbidity in the creeks and rivers adjacent to the Project both upstream and downstream of the Project (not associated with the Project activities). The monitoring has shown metals levels generally consistent with the trigger values or marginally above these levels, particularly Arsenic, Manganese and occasionally Zinc and Nickel. The pH is generally low after rainfall and the turbidity is generally higher during rainfall (due to background sources). Low dissolved oxygen readings were recorded in March 2017 at Nambucca River, Gumma Wetlands, Stony Creek and Upper Warrell Creek, which was most likely attributed to a heavy rainfall event that occurred prior to the monitoring event.

Groundwater trigger levels have also been developed by RMS for comparison with data collected during construction. The groundwater quality is within or only marginally above the trigger levels provided for metals. Elevated conductivity, nutrients, major cations and anions and some metals occur from monitoring results taken from Fill 15. Cut 11 has shown lower pH levels and metals outside of trigger values. The elevated levels have not been contributed to by construction activities as bulk earthworks within the cut/fill areas is mostly complete, evidence of groundwater ingress is negligible. Where available, down-gradient results are compared with the up-gradient results to confirm the changes in groundwater quality are not attributed to the Project. Levels recorded outside of the trigger values are likely attributed to seasonal variation, low rainfall and natural variability within the groundwater table. Further investigation is being undertaken and will be reported on to the ERG once finalized.

4.2 Noise and Vibration Monitoring

Noise monitoring has been undertaken in accordance with the approved Noise and Vibration Management Plan (NVMP). Monthly noise monitoring is conducted at eight monitoring locations alongside the Project alignment. Noise levels have been monitored above Noise Management Levels on 28 occasions during the reporting period out of 48 monitoring sessions. The noise levels have been within the predicted levels for the Project. Mitigation measures as outlined in the NVMP have been implemented and noise complaints have been addressed.

Vibration monitoring has been undertaken in response to complaints or when vibratory activities are occurring within 50m of a resident in accordance with RMS specifications. Vibration monitoring has been undertaken on five (5) occasions during the reporting period. The monitoring results have shown levels below or only marginally above the human comfort criteria set out in the Environmental Noise Management Assessing Vibration: A Technical Guideline (DEC 2006) in accordance with MCoA C8. Results are explained to the resident and reasonable and feasible mitigation measures are agreed upon. Vibration monitoring results have not exceeded the threshold of causing building damage.

Noise monitoring has also been undertaken to verify noise modelling conducted for activities occurring outside of standard construction hours.

4.3 Air Quality Monitoring

Air Quality Monitoring has been undertaken in accordance with the approved Air Quality Management Plan (AQMP). Thirteen dust deposition gauges are placed at strategic locations alongside the Project alignment. Nine dust deposition gauges were previously placed at strategic locations alongside the Project alignment, with an additional four installed in response to complaints or to further identify sources of dust exceedances as reported in the last period. The air quality monitoring results are available in Appendix C.

The Project has recorded dust levels above annual average amenity criteria at two (2) locations (DDG5 and DDG6N) (out of 65 monitoring events) during this review period down from six (6) during the last review period. AFJV have increased the dust control measures in the vicinity of the dust exceedances including:

- Dedicated water carts for the earthworks activities;
- Stopping earthworks in periods of high winds;
- Adding an additional water fill point near Letitia Close to ensure water carts have easy access to water without having to leave the vicinity of the work area;
- Application of soil binders to the exposed areas and batters;
- Topsoiling and hydromulching batters as soon as possible.

The rolling 12 month averages for the monthly dust levels shown below indicate that all gauges are below the level of concern. A reduction in dust generation has coincided with the completion of the bulk earthworks activities and the commencement of paving operations which has helped to minimise exposed soil surfaces. It is anticipated that dust levels will continue to decrease for the remaining construction period.

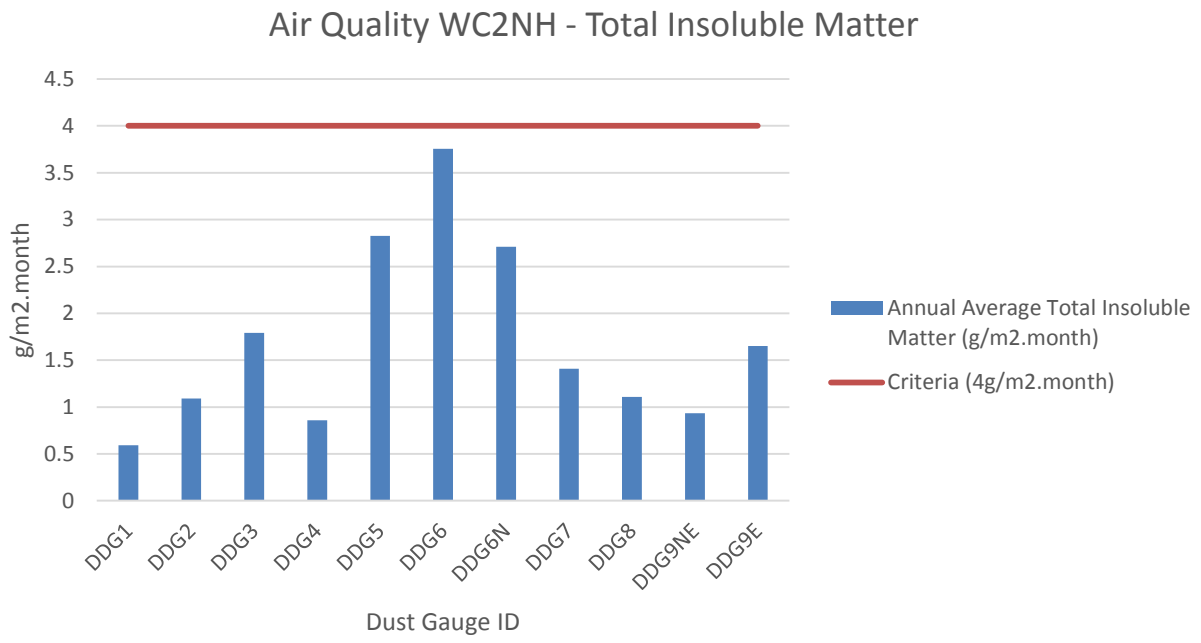

Figure 1: Dust monitoring results12 month rolling average for Total Insoluble Matter (TIM)
Note Outliers removed were those suspected of sabotage > 10gram/m^2/mth

4.4 Ecological Monitoring

Ecological Monitoring has been undertaking during the reporting period in accordance with the approved Ecological Monitoring Program, developed in consultation with the EPA as per MCoA Condition B10. The following monitoring was undertaken between February 2017 – August 2017:

- Grey-Headed Flying Fox – monthly detailed population counts and daily pre works presence checks (undertaken prior to the 1st May) in accordance with the approved Grey-Headed Flying Fox Management Plan;
- Giant Barred Frog population monitoring (Autumn year 3 of construction)

- Nest Box Monitoring (Winter year 3 of construction)
- Microbat Monitoring including roost box, overwintering and habitat monitoring (Roost Box monitoring has occurred in year 3 during Summer, Autumn and Winter. Overwintering monitoring occurred in year 3 during Winter. Habitat monitoring involves monthly flyway photo points and a 6-monthly report).
- Roadkill monitoring in accordance with the Roadkill Monitoring Strategy
- 6-Monthly Weed Monitoring Reports (June 2017).
- Landscape Rehabilitation Monitoring has also commenced (Monthly photo points and a quarterly checklist is completed).

The above listed monitoring of key threatened species conducted during the third year of construction activities has confirmed there has been negligible change to habitat usage from construction activities. The monitoring has also indicated use of the nest boxes/micro-bat roost boxes and confirmed the relative success of the ecological monitoring program compared with similar programs on other RMS Pacific Highway Upgrade Projects.

4.5 Heritage Monitoring

Monitoring of heritage significant areas is undertaken during the weekly Environmental Inspections. No-go zone fencing as placed is inspected and rectified as and where necessary. An Aboriginal Focus Group meeting was held in March 2017 to discuss the progress of the Project and any cultural heritage assessments that had been undertaken since the previous meeting. No non-conformances with the approved heritage management plan occurred this reporting period.

5. Community Engagement

Roads and Maritime has an approved Community Involvement Plan (CIP) (which covers the requirements of the Condition B28 of the MCoA Community Communication Strategy) to provide the mechanisms to facilitate communication between the Roads and Maritime, its contractor AFJV, the Environmental Representative, Nambucca Shire Council and the local community (broader and local stakeholders).

The Plan was approved by DP&E on the 16/12/14. AFJV has been maintaining and implementing the Plan throughout construction of the project. The Community Involvement Plan has been reviewed and was being updated during this reporting period. The revised CIP will be sent to DP&E for approval under MCoA B28.

5.1 Community Complaints

Ninty-nine complaints were received during the reporting period. General themes of complaints received included:

- Traffic management
- Dust and mud tracking from construction work
- Worker behaviour associated with construction vehicles
- Property and motor vehicles damage
- Construction noise and vibration

There are also a number of residents who have ongoing issues that are being are being managed by RMS and the AFJV. The EPA and DP&E are aware of these issues, which are discussed at the regular Environment Review Group meetings. In general, these residents have concerns relating to property damage, at house noise treatments, storm water drainage / flooding or dust from unsealed public roads and are being worked through with the community members to resolve their concerns.

5.1.1 Traffic management

Seventeen complaints broadly categorized as “traffic management” have been received across the project during the reporting period. Traffic management complaints were investigated and addressed on a case -by-case basis.

The highest number of traffic management complaints (nine) related to delays experienced by motorists during traffic control operations managing activities such as line marking. The highest number (four) of the remaining complaints related to the increased number of construction vehicles on River Street Macksville during works on the Nambucca River Bridge on 21 February. In each occasion the complainant was contacted by the project team.

5.1.2 Dust and mud tracking

Ten dust complaints were received during the reporting period, generally consistent with previous periods and 9 complaints relating to mud tracking (generally referring to the potential for dust generation). It is expected that these will further reduce through the ongoing consultation with residents and as progress on rehabilitation and paving activities continue.

Complaints relating to dust emissions from site have been dealt with directly by construction personnel. The increased frequency of water cart use has been a direct response to drier conditions where either construction traffic and/or strong winds have resulted in dust emissions on site. In other instances, the use of street sweepers to remove dirt and debris accumulating on local roads has assisted with reducing nuisance dust emissions. These actions have been implemented as per the project approved Air Quality Management Plan (AQMP). Among other things, the AQMP includes the following management measures within air quality catchment areas:

> **AQ8** Construction activities will be modified, reduced or controlled during high or unfavourable wind conditions if they have a potential to increase the generation or emission of dust.
> **AQ9** Control measures including water carts, mechanical sweepers, sprinklers, sprays, dust screens or the application of geo-binding agents will be utilised where applicable to control dust emissions. The frequency of use will be modified to accommodate prevailing conditions.

While complaints relating to dust were received during the reporting period, it should be noted that dust monitoring results from across the project remain below the annual rolling average of 4g/m^2/month.

5.1.3 Worker behaviour associated with construction vehicles

There were eleven complaints regarding worker behavior generally relating to the operation of construction vehicles on the local road network eg vehicles speeding or maneuvers performed. In all cases the complaints were investigated. Workforce toolbox sessions and inductions are used to reinforce expectations for worker behaviour when travelling on the public road network. In some instances, additional road construction signage was also erected. The operation of construction vehicles on public roads will continue to be monitored and issues addressed should they arise.

5.1.4 Damage to property

There were twenty four complaints broadly categorised as “damage to property” received across the project during the period. The majority (twenty one) were in relation to motor vehicle damage (typically windscreen damage) through use of the public road network ie construction debris on road damaging vehicles. In each case, the damage was repaired with agreement of the complainant.

5.1.5 Construction noise and vibration

There were twelve complaints relating to construction noise and vibration” received across the project during the period. Four of the complaints related to noise during night works. In all cases the complainants were contacted and the cause of the noise rectified as soon as possible. AFJV are in the process of seeking written agreements from residents advising of upcoming out of hours activities for the remaining portion of the Project construction period. This should see a decrease in complaints received relating to activities occurring outside of standard construction hours. The remaining eight complaints related to vibration from trucking or vibratory roller activity, four of the complaints were received from a single location which were referred to the site supervisors who worked to mitigate the impacts through alternative operations.

Figure 2 below shows the breakdown of the complaints by type and number recorded this reporting period.

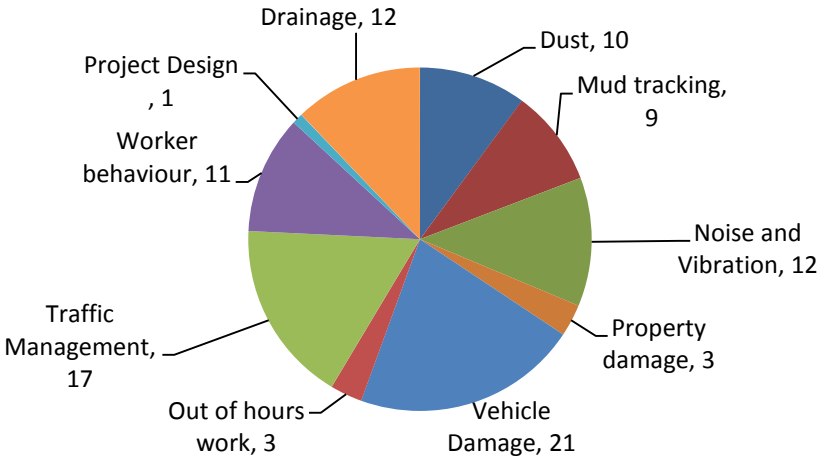

Figure 2 Complaints by type and number

5.1 Community Engagement

During the reporting period the AFJV Community Team published and distributed:

- 30 community notifications; and
- 2 quarterly community project updates

The project held community information and drop-in sessions on the following dates:

- 15 March at Warrell Creek construction compound (regular Community Information Session)
- 11 May at Warrell Creek construction compound (in relation to Browns Crossing Road flooding)
- 26 and 27 July at Nambucca Heads and Warrell Creek (in relation to directional signage community consultation).
- Nine regular roadside community meetings were held specifically for residents in close proximity to the North Facing Ramps.

Relevant and timely community relations topics were provided to the Construction Team through “Toolbox Talks” every week during this period.

Feedback from the Community to the Project team can be made at the following locations:

- Site compound at 124 Albert Drive, Warrell Creek
- Nambucca Shire Council
- via the project phone No1800 074 588 or
- via email community@afjv.com.au

6. Summary of Compliance Status

Appendix E (Compliance Tracking Tables) provides details of the compliance status of the Ministers Conditions of Approval (MCoA) and Statement of Commitments (SoC’s).

APPENDIX A – Surface Water and Groundwater Monitoring

Monitoring results for Surface Water

Table 1a Surface Water Quality Results – February 2017 Wet event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				10-Feb-17			10-Feb-17			10-Feb-17			10-Feb-17			10-Feb-17			10-Feb-17			10-Feb-17			10-Feb-17			10-Feb-17			10-Feb-17			10-Feb-17		
Time of Sampling		Freshwater	Marine	12:51 PM			1:04 PM			12:25 PM			12:05 PM			3:44 PM			3:35 PM			2:49 PM			2:35 PM			2:40 PM			15:15			3:07 PM		
Comments																									Unable to sample - water level too low			Unable to sample - water level too low			Wind chop - sediment stirred up			Wind chop - sediment stirred up		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Laboratory data																																				
Metals																																				
Aluminium	mg/L	0.055	-	0.244	0.0162	<0.01	0.194	0.016	<0.01	0.098	0.02	<0.01	0.114	0.01	0.01	0.28	0.01	<0.01	0.28	0.01	<0.01	0.25	0.02	<0.01	0.25	0.02	-	0.25	0.02	-	0.11	0.01	<0.10	0.11	0.01	<0.10
Arsenic	mg/L	0.024	0.0023	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.003	0.002	0.001	0.002	0.001	0.001	0.002	0.001	0.001	0.002	0.002	0.001	0.004	0.002	0.001	-	0.002	0.001	-	0.002	0.001	<0.010	0.002	0.001	<0.010
Cadmium	mg/L	0.0002	0.0055	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	0.0002	0.0001	<0.0001	0.0002	0.0001	<0.0001	-	-	<0.0001	-	-	-	-	-	-	-	-	<0.0010	-	-	<0.0010
Chromium	mg/L	0.001	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001			<0.001			<0.001	-	-	<0.001	-	-	-	-	-	-	-	-	<0.010	-	-	<0.010
Copper	mg/L	0.0014	0.0013	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001			<0.001			<0.001	0.001	0.001	<0.001	0.001	0.001	-	0.001	0.001	-	0.001	0.001	<0.010	0.001	0.001	<0.010
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001			<0.001			<0.001	-	-	<0.001	-	-	-	-	-	-	-	-	<0.010	-	-	<0.010
Manganese	mg/L	1.9	0.08	0.3	0.01	0.003	0.158	0.0178	0.001	0.0726	0.0218	0.385	0.083	0.0164	0.115	0.35	0.087	0.292	0.35	0.087	0.284	0.49	0.011	0.104	0.49	0.011	-	0.49	0.011	-	0.076	0.006	<0.010	0.076	0.006	<0.010
Nickel	mg/L	0.011	0.07	-	-	<0.001	-	-	<0.001	-	-	0.001	-	-	0.001	0.0034	0.001	<0.001	0.0034	0.001	0.001	0.002	0.001	<0.001	0.002	0.001	-	0.002	0.001	-	-	-	<0.010	-	-	<0.010
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	<0.10	-	-	<0.10
Silver	mg/L	0.00005	0.0014	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	-	-	-	<0.010	-	-	<0.010
Zinc	mg/L	0.008	0.015	0.007	0.005	<0.005	0.0062	0.0042	<0.005	0.0064	0.005	<0.005	0.006	0.005	<0.005	0.018	0.005	<0.005	0.018	0.005	<0.005	0.011	0.005	<0.005	0.011	0.005	-	0.011	0.005	-	0.005	0.005	<0.050	0.005	0.005	<0.050
Iron	mg/L	-	-	1.38	0.48	0.63	0.99	0.366	0.3	1.4	0.41	1.35	1.48	0.35	0.98	0.52	0.05	<0.05	0.52	0.05	<0.05	1.65	0.37	1.15	1.65	0.37	-	1.65	0.37	-	0.26	0.05	<0.50	0.26	0.05	<0.50
Mercury	mg/L	0.0006	0.0004	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001			<0.0001			<0.0001	-	-	<0.0001	-	-	-	-	-	-	-	-	<0.0001	-	-	<0.0001
Total Recoverable Hydrocarbons																																				
Naphthalene	µg/L	16	50	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		-	16		-	50		NA	50		NA
C6 - C10 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		NA	-		NA
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		NA	-		NA
>C10 - C16 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		NA	-		NA
>C16 - C34 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		NA	-		NA
>C34 - C40 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		NA	-		NA
>C10 - C40 Fraction (sum)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		NA	-		NA
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		NA	-		NA
BTEX																																				
Benzene	µg/L	950	700	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		-	950		-	700		NA	700		NA
Toluene	µg/L	180	180	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		-	180		-	180		NA	180		NA
Ethylbenzene	µg/L	80	5	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		-	80		-	5		NA	5		NA
m&p-Xylenes	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		NA	-		NA
o-Xylene	µg/L	350	350	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		-	350		-	350		NA	350		NA
Xylenes - Total	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		NA	-		NA
Sum of BTEX	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		NA	-		NA
Nutrients																																				
Total Phosphorus	mg/L	0.05	0.03	0.05	0.02	0.07	0.044		0.02	0.03	0.016	0.02	0.034	0.01	0.03	0.04	0.01	<0.05	0.04	0.01	<0.05	0.11	0.03	0.08	0.11	0.03	-	0.11	0.03	-	0.07	0.02	<0.05	0.07	0.02	0.06
Phosphate (reactive phosphorus)	mg/L	-	-	0.01	0.0034	<0.01	0.01	0.004	<0.01	0.018	0.0022	<0.01	0.01	0.003	<0.01	0.011	0.006	<0.01	0.011	0.006	<0.01	0.013	0.005	<0.01	0.013	0.005	-	0.013	0.005	-	0.029	0.01	0.01	0.029	0.01	0.01
																											-			-						
Total Nitrogen	mg/L	0.5	0.3	0.56	0.3	0.6	0.52	0.2	0.4	0.48	0.2	0.4	0.63	0.2	0.4	0.54	0.31	<0.5	0.54	0.31	<0.5	3.1	0.9	1.4	3.1	0.9	-	3.1	0.9	-	0.46	0.2	<0.5	0.46	0.2	<0.5
Total Kjeldahl Nitrogen	mg/L	-	-	0.5	0.3	0.6	0.5	0.2	0.4	0.34	0.2	0.3	0.6	0.2	0.4	0.5	0.2	<0.5	0.5	0.2	<0.5	2.8	0.8	1.4	2.8	0.8	-	2.8	0.8	-	0.3	0.2	<0.5	0.3	0.2	<0.5
																											-			-						
Nitrate	mg/L	0.7	-	0.102	0.01	0.03	0.054	0.01	0.02	0.208	0.01	0.05	0.2	0.01	<0.01	0.05	0.01	<0.01	0.05	0.01	<0.01	0.03	0.01	0.04	0.03	0.01	-	0.03	0.01	-	0.04	0.01	<0.01	0.04	0.01	<0.01
Nitrite	mg/L	-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	-	0.02	0.01	-	0.02	0.01	<0.01	0.02	0.01	<0.01
Ammonia	mg/L	0.9	-	0.036	0.01	0.03	0.02	0.01	0.06	0.046	0.02	0.03	0.062	0.012	0.05	0.116	0.022	<0.05	0.116	0.022	<0.05	0.06	0.01	0.02	0.06	0.01	-	0.06	0.01	-	0.15	0.024	0.09	0.15	0.024	0.1
TSS																																				
TSS	mg/L	<40	<10	19	5	18	12.8	5	11	14.8	5	10	8.7	5	14	25	5.5	8	25	5.5	7	350	9	17	350	9	-	350	9	-			17			14
Field Physical data																																				
Temperature	°C	-	-	24.3	16.27	29.68	24.52	16.79	26.78	23.98	17.36	26.15	24.7	17.65	24.10	25.9	19.5	31.38	25.9	19.5	31.23	25.84	19.1	31.05	25.84	19.1	-	25.84	19.1	-	26.56	21.32	30.23	26.56	21.32	30.23
pH	pH	-	6.5-8	7.478	6.23	7.42	7.192	6.42	7.16	7.138	6.61	6.43	6.98	6.21	6.6	6.86	6.46	7.33	6.86	6.46	7.3	6.9	6.08	6.91	6.9	6.08	-	6.9	6.08	-	7.56	6.58	6.8	7.56	6.58	7.05
Conductivity	mS/cm	0.125-2.2	-	0.3204	0.20184	0.248	0.3242	0.19076	0.156	0.313	0.2024	0.255	0.309	0.20188	0.266	20.918	0.50928	26.2	20.918	0.50928	26.1	0.842	0.334	1.12	0.842	0.334	-	0.842	0.334	-	48.42	12.65	45.9	48.42	12.65	46.8
Turbidity	NTU	50	10	26.16	5.94	5.7	27.32	3.72	7.4	14.98	3.34	10.6	17.16	4.59	13.5	26.1	2.4	7.2	26.1	2.4	9.2	66.8	11.6	144	66.8	11.6	-	66.8	11.6	-	19.04	5.81	15.7	19.04	5.81	17.6
Dissolved Oxygen	mg/L	5	5	7.43	1.5	2.76	6.88	2.28	1.5	8.472	5.08	1.26	7.59	2.63	3.44	6.65	5.02	3.88	6.65	5.02	4.96	7.3	1.78	6.95	7.3	1.78	-	7.3	1.78	-	8.47	6.88	6.1	8.47	6.88	6.17
Dissolved Oxygen	%			-		36.6	-		19.7	-		15.8	-		29.7	-		57.5	-		73.6	-		93.9	-		-	-		-		97.2	-		98.4
TDS	g/L	-	-	-		0.161	-		0.096	-		0.166	-		0.173	-		16.2	-		16.2	-		0.716	-		-	-		-		28.0	-		28.5

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 1b – Surface Water Quality Results – February 2017 Wet Event – 2

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				20-Feb-17			20-Feb-17			20-Feb-17			20-Feb-17			20-Feb-17			20-Feb-17			20-Feb-17			20-Feb-17			20-Feb-17			20-Feb-17			20-Feb-17		
Time of Sampling		Freshwater	Marine	3:03 PM			2:55 PM			2:37 PM			2:29 PM			1:22 PM			1:17 PM			2:11 PM			1:50 PM			1:45 PM			1:04 PM			12:56 PM		
Comments																									Unable to sample - water level too low			Unable to sample - water level too low			Wind chop - sediment stirred up			Wind chop - sediment stirred up		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Field Physical data																																				
Temperature	°C	-	-	24.3	16.27	25.86	24.52	16.79	26.92	23.98	17.36	24.09	24.7	17.65	23.31	25.9	19.5	28.67	25.9	19.5	29.48	25.84	19.1	27.23	25.84	19.1	-	25.84	19.1	-	26.56	21.32	29.79	26.56	21.32	29.11
pH	pH	-	6.5-8	7.478	6.23	7	7.192	6.42	7.11	7.138	6.61	6.6	6.98	6.21	6.69	6.86	6.46	6.98	6.86	6.46	6.59	6.9	6.08	6.52	6.9	6.08	-	6.9	6.08	-	7.56	6.58	7.41	7.56	6.58	7.33
Conductivity	mS/cm	0.125-2.2	-	0.3204	0.20184	0.217	0.3242	0.19076	0.244	0.313	0.2024	0.258	0.309	0.20188	0.26	20.918	0.50928	25.5	20.918	0.50928	26.4	0.842	0.334	1.96	0.842	0.334	-	0.842	0.334	-	48.42	12.65	44.9	48.42	12.65	44.8
Turbidity	NTU	50	10	26.16	5.94	9.3	27.32	3.72	16.1	14.98	3.34	6.2	17.16	4.59	12.5	26.1	2.4	3.9	26.1	2.4	10.8	66.8	11.6	256	66.8	11.6	-	66.8	11.6	-	19.04	5.81	111	19.04	5.81	51.9
Dissolved Oxygen	mg/L	5	5	7.43	1.5	0.49	6.88	2.28	2.86	8.472	5.08	0.81	7.59	2.63	1.99	6.65	5.02	5.4	6.65	5.02	4.42	7.3	1.78	7.58	7.3	1.78	-	7.3	1.78	-	8.47	6.88	6.45	8.47	6.88	7.68
Dissolved Oxygen	%			-		6.1	-		36.4	-		9.9	-		23.8	-		76.7	-		63.8	-		97.2	-		-	-		-	-		101.5	-		109.5
TDS	g/L	-	-	-		0.142	-		0.161	-		0.168	-		0.169	-		15.8	-		16.4	-		1.26	-		-	-		-	-		27.4	-		27.3

Table 1c – Surface Water Quality Results – February 2017 – Dry Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				23-Feb-17			23-Feb-17			23-Feb-17			23-Feb-17			23-Feb-17			23-Feb-17			23-Feb-17			23-Feb-17			23-Feb-17			23-Feb-17			23-Feb-17		
Time of Sampling		Freshwater	Marine	1:20 PM			1:07 PM			12:41 PM			12:28 PM			2:50 PM			2:40 PM			2:02 PM			1:45 PM			1:40 PM			2:28 PM			2:20 PM		
Comments																						Unable to sample - water level too low			Unable to sample - water level too low			Unable to sample - water level too low						Wind chop stirring sediment		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Field Physical data																																				
Temperature	°C	-	-	24.86	14.99	25.44	25.1	16.3	27.32	24.4	16	23.2	26.46	15.94	22.22	27.9	18.4	28.72	27.9	18.4	29.65	26.5	16.3	-	26.5	16.3	-	26.5	16.3	-	27.9	18.1	28.79	27.9	18.1	28.72
pH	pH	-	6.5-8	7.25	6.48	6.68	7.3	6.4	6.97	7.5	6.6	6.71	7.33	6.26	6.75	7.02	6.57	7.65	7.02	6.57	7.6	7	6.1	-	7	6.1	-	7	6.1	-	7	7	8.05	7	7	8.12
Conductivity	mS/cm	0.125-2.2	-	0.316	0.232	0.238	0.348	0.227	0.265	0.348	0.227	0.272	0.3338	0.2168	0.411	20.946	0.679	29.10	20.946	0.679	28.9	0.808	0.4234	-	0.808	0.4234	-	0.808	0.4234	-	47.32	29.44	48.9	47.32	29.44	45.5
Turbidity	NTU	50	10	10.96	4	8.2	9.9	3.5	22.7	9.9	3.5	2.6	5.97	3.74	8	6.82	1.83	2.9	6.82	1.83	13.2	52.78	11.3	-	52.78	11.3	-	52.78	11.3	-	19.3	6.7	5.44	19.3	6.7	24.5
Dissolved Oxygen	mg/L	5	5	4.98	1.91	0.16	4.8	2.6	1.87	4.8	2.6	1.66	6.34	3.52	3.42	7.98	5.07	4.40	7.98	5.07	4.69	6.4	1.75	-	6.4	1.75	-	6.4	1.75	-	9.1	7.4	5.44	9.1	7.4	6.2
Dissolved Oxygen	%			-	-	2	-	-	23.8	-	-	19.9	-	-	40.3	-	-	63.5	-	-	68.6	-	-	-	-	-	-	-	-	-	-	-	85.8	-	-	96.1
TDS	g/L	-	-	-		0.156	-		0.172	-		0.177	-		0.267	-		18.000	-		17.9	-		-	-		-	-		-	-		29.8	-		27.7

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 2a – Surface Water Quality Results - March 2017 – Wet Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17			6-Mar-17		
Time of Sampling		Freshwater	Marine	4:20 PM			4:13 PM			3:40 PM			3:28 PM			2:22 PM			2:11 PM			4:52 PM			4:50 PM			4:40 PM			3:03 PM			2:44 PM		
Comments																			Flooded			Water level too low to sample			Water level too low to sample			Water level too low to sample			Wind chop stirring sediment			Wind chop stirring sediment		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Laboratory data																																			
Metals																																			
Aluminium	mg/L	0.055	-	0.244	0.0162	0.03	0.194	0.016	<0.01	0.098	0.02	<0.01	0.114	0.01	<0.01	0.28	0.01	<0.01	0.28	0.01	0.01	0.25	0.02	-	0.25	0.02	-	0.25	0.02	-	0.11	0.01	0.24	0.11	0.01	<0.10
Arsenic	mg/L	0.024	0.0023	0.001	0.001	0.006	0.001	0.001	0.005	0.002	0.001	0.005	0.002	0.001	0.003	0.001	0.001	0.008	0.001	0.001	0.01	0.002	0.001	-	0.002	0.001	-	0.002	0.001	-	0.002	0.001	<0.010	0.002	0.001	<0.010
Cadmium	mg/L	0.0002	0.0055	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	0.0002	0.0001	0.0001	0.0002	0.0001	0.0002	-	-	-	-	-	-	-	-	-	-	<0.0010	-	-	<0.0010
Chromium	mg/L	0.001	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	<0.010	-	-	<0.010
Copper	mg/L	0.0014	0.0013	-	-	0.02	-	-	0.012	-	-	0.007	-	-	0.006	-	-	0.042	-	-	0.044	0.001	0.001	-	0.001	0.001	-	0.001	0.001	-	0.001	0.001	<0.010	0.001	0.001	<0.010
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	<0.010	-	-	<0.010
Manganese	mg/L	1.9	0.08	0.3	0.01	0.29	0.158	0.0178	0.16	0.0726	0.0218	0.063	0.083	0.0164	0.054	0.35	0.087	0.234	0.35	0.087	0.217	0.49	0.011	-	0.49	0.011	-	0.49	0.011	-	0.076	0.006	0.041	0.076	0.006	<0.010
Nickel	mg/L	0.011	0.07	-	-	<0.001	-	-	0.002	-	-	<0.001	-	-	0.003	0.0034	0.001	0.001	0.0034	0.001	0.002	0.002	0.001	-	0.002	0.001	-	0.002	0.001	-	-	-	<0.010	-	-	<0.010
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	<0.10	-	-	<0.10
Silver	mg/L	0.00005	0.0014	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	-	-	-	-	-	-	<0.010	-	-	<0.010
Zinc	mg/L	0.008	0.015	0.007	0.005	<0.005	0.0062	0.0042	<0.005	0.0064	0.005	<0.005	0.006	0.005	0.007	0.018	0.005	0.008	0.018	0.005	0.01	0.011	0.005	-	0.011	0.005	-	0.011	0.005	-	0.005	0.005	0.05	0.005	0.005	<0.050
Iron	mg/L	-	-	1.38	0.48	0.3	0.99	0.366	<0.05	1.4	0.41	0.31	1.48	0.35	<0.05	0.52	0.05	<0.05	0.52	0.05	0.12	1.65	0.37	-	1.65	0.37	-	1.65	0.37	-	0.26	0.05	<0.10	0.26	0.05	<0.10
Mercury	mg/L	0.0006	0.0004	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	-	<0.0001
Total Recoverable Hydrocarbons																																					
Naphthalene	µg/L	16	50	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		-	16		-	16		-	50		NA	50		NA
C6 - C10 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-		NA	-		NA
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-		NA	-		NA
>C10 - C16 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-		NA	-		NA
>C16 - C34 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-		NA	-		NA
>C34 - C40 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-		NA	-		NA
>C10 - C40 Fraction (sum)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-		NA	-		NA
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-		NA	-		NA
BTEX																																					
Benzene	µg/L	950	700	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		-	950		-	950		-	700		NA	700		NA
Toluene	µg/L	180	180	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		-	180		-	180		-	180		NA	180		NA
Ethylbenzene	µg/L	80	5	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		-	80		-	80		-	5		NA	5		NA
m&p-Xylenes	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-		NA	-		NA
o-Xylene	µg/L	350	350	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		-	350		-	350		-	350		NA	350		NA
Xylenes - Total	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-		NA	-		NA
Sum of BTEX	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		-	-		-		NA	-		NA
Nutrients																																					
Total Phosphorus	mg/L	0.05	0.03	0.05	0.02	0.02	0.044	0.016	0.05	0.03	0.016	0.02	0.034	0.01	<0.01	0.04	0.01	<0.05	0.04	0.01	<0.05	0.11	0.03	-	0.11	0.03	-	0.11	0.03	-	0.07	0.02	<0.05	0.07	0.02	<0.05
Phosphate (reactive phosphorus)	mg/L	-	-	0.01	0.0034	<0.01	0.01	0.004	<0.01	0.018	0.0022	<0.01	0.01	0.003	<0.01	0.011	0.006	<0.01	0.011	0.006	<0.01	0.013	0.005	-	0.013	0.005	-	0.013	0.005	-	0.029	0.01	<0.01	0.029	0.01	<0.01
																								-			-			-							
Total Nitrogen	mg/L	0.5	0.3	0.56	0.3	0.5	0.52	0.2	0.4	0.48	0.2	0.3	0.63	0.2	0.3	0.54	0.31	<0.5	0.54	0.31	0.6	3.1	0.9	-	3.1	0.9	-	3.1	0.9	-	0.46	0.2	<0.5	0.46	0.2	<0.5
Total Kjeldahl Nitrogen	mg/L	-	-	0.5	0.3	0.5	0.5	0.2	0.4	0.34	0.2	0.3	0.6	0.2	0.2	0.5	0.2	<0.5	0.5	0.2	0.6	2.8	0.8	-	2.8	0.8	-	2.8	0.8	-	0.3	0.2	<0.5	0.3	0.2	<0.5
																								-			-			-							
Nitrate	mg/L	0.7	-	0.102	0.01	<0.01	0.054	0.01	<0.01	0.208	0.01	<0.01	0.2	0.01	<0.01	0.05	0.01	<0.01	0.05	0.01	<0.01	0.03	0.01	-	0.03	0.01	-	0.03	0.01	-	0.04	0.01	<0.01	0.04	0.01	<0.01
Nitrite	mg/L	-	-	-	-	<0.01	-	-	<0.01	-	-	0.01	0.02	0.01	0.09	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	-	0.02	0.01	-	0.02	0.01	-	0.02	0.01	<0.01	0.02	0.01	<0.01
Ammonia	mg/L	0.9	-	0.036	0.01	0.01	0.02	0.01	<0.01	0.046	0.02	<0.01	0.062	0.012	0.02	0.116	0.022	<0.05	0.116	0.022	<0.05	0.06	0.01	-	0.06	0.01	-	0.06	0.01	-	0.15	0.024	<0.05	0.15	0.024	<0.05
TSS																																					
TSS	mg/L	<40	<10	19	5	9	12.8	5	<5	14.8	5	<5	8.7	5	6	25	5.5	<5	25	5.5	<5	350	9	-	350	9	-	350	9	-			<5			<5
Field Physical data																																					
Temperature	°C	-	-	24.3	16.27	24.96	24.52	16.79	25.37	23.98	17.36	22.99	24.7	17.65	23.19	25.9	19.5	27.56	25.9	19.5	28.47	25.84	19.1	-	25.84	19.1	-	25.84	19.1	-	26.56	21.32	28.79	26.56	21.32	28.83
pH	pH	-	6.5-8	7.478	6.23	7.34	7.192	6.42	7.54	7.138	6.61	7.56	6.98	6.21	8.18	6.86	6.46	6.98	6.86	6.46	6.82	6.9	6.08	-	6.9	6.08	-	6.9	6.08	-	7.56	6.58	7.65	7.56	6.58	7.71
Conductivity	mS/cm	0.125-2.2	-	0.3204	0.20184	0.187	0.3242	0.19076	0.228	0.313	0.2024	0.124	0.309	0.20188	0.314	20.918	0.50928	28	20.918	0.50928	29.6	0.842	0.334	-	0.842	0.334	-	0.842	0.334	-	48.42	12.65	45.9	48.42	12.65	45.9
Turbidity	NTU	50	10	26.16	5.94	32.9	27.32	3.72	15.9	14.98	3.34	20.4	17.16	4.59	61.7	26.1	2.4	5	26.1	2.4	5.5	66.8	11.6	-	66.8	11.6	-	66.8	11.6	-	19.04	5.81	31.2	19.04	5.81	43
Dissolved Oxygen	mg/L	5	5	7.43	1.5	3.18	6.88	2.28	2.52	8.472	5.08	5.09	7.59	2.63	5.83	6.65	5.02	5.49	6.65	5.02	5.61	7.3	1.78	-	7.3	1.78	-	7.3	1.78	-	8.47	6.88	5.37	8.47	6.88	5.58
Dissolved Oxygen	%			-		39.2	-		31.2	-		60.8	-		69.8	-		77.6	-		81.3	-		-	-		-	-		-	-		83.5	-		86.8
TDS	g/L	-	-	-		0.121	-		0.153	-		0.088	-		0.21	-		17.4	-		18.3	-		-	-		-	-		-	-		28.0	-		28

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 2b – Surface Water Monitoring – March 2017 – Wet Event 2

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17			21-Mar-17		
Time of Sampling		Freshwater	Marine	12:22 PM			12:13 PM			12:43 PM			12:35 PM			10:45 AM			10:40 AM			11:41 AM			11:52 AM			11:35 AM			11:09 AM			11:03 AM		
Comments							Water above crossing									Flooded			Flooded																	
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Field Physical data																																				
Temperature	°C	-	-	24.3	16.27	22.09	24.52	16.79	22.45	23.98	17.36	22.02	24.7	17.65	22.96	25.9	19.5	22.81	25.9	19.5	22.69	25.84	19.1	23.72	25.84	19.1	23.07	25.84	19.1	23.6	26.56	21.32	23.23	26.56	21.32	23.46
pH	pH	-	6.5-8	7.478	6.23	5.93	7.192	6.42	5.94	7.138	6.61	6.62	6.98	6.21	6.55	6.86	6.46	6.20	6.86	6.46	5.56	6.9	6.08	5.8	6.9	6.08	5.52	6.9	6.08	5.79	7.56	6.58	6.78	7.56	6.58	6.69
Conductivity	mS/cm	0.125-2.2	-	0.3204	0.20184	0.12	0.3242	0.19076	0.121	0.313	0.2024	0.138	0.309	0.20188	0.159	20.918	0.50928	0.185	20.918	0.50928	0.419	0.842	0.334	0.345	0.842	0.334	0.389	0.842	0.334	0.257	48.42	12.65	0.877	48.42	12.65	0.776
Turbidity	NTU	50	10	26.16	5.94	25.4	27.32	3.72	24.7	14.98	3.34	11.5	17.16	4.59	12.7	26.1	2.4	39.9	26.1	2.4	23	66.8	11.6	20.2	66.8	11.6	26.8	66.8	11.6	24.3	19.04	5.81	71.3	19.04	5.81	68.8
Dissolved Oxygen	mg/L	5	5	7.43	1.5	1.45	6.88	2.28	1.38	8.472	5.08	1.74	7.59	2.63	1.56	6.65	5.02	0.7	6.65	5.02	0.41	7.3	1.78	0.41	7.3	1.78	0.04	7.3	1.78	0.28	8.47	6.88	1.3	8.47	6.88	1.31
Dissolved Oxygen	%			-		17	-		16.3	-		20.4	-		18.6	-		8.4	-		0.1	-		4.9	-		0.5	-		3.4	-		15.6	-		15.7
TDS	g/L	-	-	-		0.080	-		0.081	-		0.093	-		0.106	-		0.125	-		0.281	-		0.228	-		0.248	-		0.171	-		0.561	-		0.517

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 2c – Surface Water Monitoring – March 2017 – Dry Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Low er Warrell Creek			Low er Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North		
				Upstream			Dow nstream			Upstream			Dow nstream			Upstream			Dow nstream			Upstream			Upstream			Dow nstream		
Freshw ater / Estuarine		ANZECC 2000 95% species protected		Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater			Freshw ater		
Date of Sampling				27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17			27-Mar-17		
Time of Sampling		Freshw ater	Marine	1:48 PM			1:33 PM			12:57 PM			12:30 PM			4:20 PM			4:07 PM			2:51 PM			3:07 PM			2:45 PM		
Comments																													Unable to sample - w ater level too low		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	
Laboratory data																															
Metals																															
Aluminium	mg/L	0.055	-	0.06	0.01	0.03	0.05	0.01	0.05	0.05	0.01	0.02	0.04	0.01	<0.01	0.06	0.01	0.06	0.06	0.01	0.1	0.1	0.01	0.08	0.1	0.01	0.12	0.1	0.01		
Arsenic	mg/L	0.024	0.0023	-	-	<0.001	-	-	<0.001	-	-	0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.002	0.001	0.007	0.002	0.001	0.006	0.002	0.001		
Cadmium	mg/L	0.0002	0.0055	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	0.0001	0.0001	<0.0001	0.0001	0.0001	0.0001	-	-	<0.0001	-	-	<0.0001	-	-		
Chromium	mg/L	0.001	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-		
Copper	mg/L	0.0014	0.0013	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-		
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-		
Manganese	mg/L	1.9	0.08	0.21	0.02	0.116	0.2	0.03	0.069	0.06	0.02	0.069	0.052	0.013	0.053	0.26	0.08	0.208	0.26	0.08	0.225	0.23	0.019	0.929	0.23	0.019	0.449	0.23	0.019		
Nickel	mg/L	0.011	0.07	-	-	0.001	-	-	0.001	-	-	<0.001	-	-	<0.001	0.001	0.001	0.005	0.001	0.001	0.005	0.001	0.001	0.002	0.001	0.001	0.004	0.001	0.001		
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-		
Silver	mg/L	0.00005	0.0014	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-		
Zinc	mg/L	0.008	0.015	-	-	0.005	-	-	<0.005	0.005	0.005	<0.005	0.005	0.005	<0.005	0.006	0.005	0.022	0.006	0.005	0.02	0.005	0.005	0.01	0.005	0.005	0.007	0.005	0.005		
Iron	mg/L	-	-	0.99	0.46	0.22	0.93	0.31	0.26	0.82	0.42	0.09	0.78	0.37	<0.05	0.83	0.05	0.15	0.83	0.05	0.4	2.01	0.25	5.91	2.01	0.25	1.12	2.01	0.25		
Mercury	mg/L	0.0006	0.0004	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001			<0.0001			<0.0001	-	-	<0.0001	-	-	<0.0001	-	-		
Total Recoverable Hydrocarbons																															
Naphthalene	µg/L	16	50	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16			-
C6 - C10 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-			-
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-			-
>C10 - C16 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-			-
>C16 - C34 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-			-
>C34 - C40 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-			-
>C10 - C40 Fraction (sum)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-			-
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-			-
BTEX																															
Benzene	µg/L	950	700	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950			-
Toluene	µg/L	180	180	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180			-
Ethylbenzene	µg/L	80	5	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80			-
m&p-Xylenes	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-			-
o-Xylene	µg/L	350	350	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350			-
Xylenes - Total	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-			-
Sum of BTEX	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-			-
Nutrients																															
Total Phosphorus	mg/L	0.05	0.03	0.04	0.01	0.02	0.03	0.01	0.02	0.04	0.01	<0.01	0.02	0.01	<0.01	0.04	0.01	0.02	0.04	0.01	0.02	0.12	0.03	0.11	0.12	0.03	0.15	0.12	0.03		-
Phosphate (reactive phosphorus)	mg/L	-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	0.01	0.0044	<0.01	0.01	0.0044	<0.01	0.01	0.005	<0.01	0.01	0.005	<0.01	0.01	0.005		-
																															-
Total Nitrogen	mg/L	0.5	0.3	0.62	0.2	0.7	0.6	0.2	0.6	0.3	0.1	0.3	0.41	0.1	0.4	0.5	0.2	0.7	0.5	0.2	0.8	2.8	1.1	1.6	2.8	1.1	1.4	2.8	1.1		-
Total Kjeldahl Nitrogen	mg/L	-	-	0.6	0.2	0.6	0.6	0.2	0.5	0.3	0.1	0.1	0.4	0.1	0.2	0.5	0.2	0.6	0.5	0.2	0.6	2.4	1	1.6	2.4	1	1.4	2.4	1		-
																															-
Nitrate	mg/L	0.7	-	0.04	0.01	0.14	0.03	0.01	0.09	0.03	0.01	0.17	0.03	0.01	0.19	0.04	0.01	0.14	0.04	0.01	0.19	0.04	0.01	0.02	0.04	0.01	0.02	0.04	0.01		-
Nitrite	mg/L	-	-	-	-	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.05	0.01	<0.01	0.05	0.01	<0.01	0.05	0.01		-
Ammonia	mg/L	0.9	-	-	-	0.1	-	-	0.02	-	-		-	-	<0.01	0.16	0.06	0.1	0.16	0.06	0.16	0.04	0.01	0.02	0.04	0.01	0.01	0.04	0.01		-
TSS																															
TSS	mg/L	<40	<10	14.8	5	7	8	5	<5	9	5	8	5.8	5	6	17.6	5	7	17.6	5	6	290	15	39	290	15	20	290	15		-
Field Physical data																															
Temperature	°C	-	-	24.86	14.99	22.24	25.1	16.3	22.38	24.4	16	22.29	26.46	15.94	22.83	27.9	18.4	28.36	27.9	18.4	28.62	26.5	16.3	25	26.5	16.3	25.17	26.5	16.3		-
pH	pH	-	6.5-8	7.25	6.48	6.55	7.3	6.4	6.63	7.5	6.6	6.97	7.33	6.26	7.06	7.02	6.57	6.74	7.02	6.57	6.44	7	6.1	6.58	7	6.1	6.58	7	6.1		-
Conductivity	mS/cm	0.125-2.2	-	0.316	0.232	0.215	0.348	0.227	0.212	0.348	0.227	0.185	0.3338	0.2168	0.193	20.946	0.679	0.87	20.946	0.679	0.977	0.808	0.4234	0.481	0.808	0.4234	0.248	0.808	0.4234		-
Turbidity	NTU	50	10	10.96	4	1	9.9	3.5	1.4	9.9	3.5	1.2	5.97	3.74	6	6.82	1.83	7.3	6.82	1.83	12.9	52.78	11.3	88.1	52.78	11.3	39.2	52.78	11.3		-
Dissolved Oxygen	mg/L	5	5	4.98	1.91	4.68	4.8	2.6	4.21	4.8	2.6	3.66	6.34	3.52	2.98	7.98	5.07	4.21	7.98	5.07	3.19	6.4	1.75	0.45	6.4	1.75	0.46	6.4	1.75		-
Dissolved Oxygen	%			-	-	55	-	-	54.8	-	-	43.1	-	-	35.5	-	-	54.8	-	-	41.6	-	-	5.6	-	-	5.7	-	-		-
TDS	g/L	-	-	-		0.14	-		0.554	-		6.43	-		0.125	-		0.554	-		0.625	-		0.312	-		0.161	-			-

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 3a – Surface Water Quality Results – April Dry Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				5-Apr-17			5-Apr-17			5-Apr-17			5-Apr-17			5-Apr-17			5-Apr-17			5-Apr-17			5-Apr-17			5-Apr-17			5-Apr-17			5-Apr-17		
Time of Sampling		Freshwater	Marine	3:00 PM			2:51 PM			2:29 PM			2:14 PM			3:25 PM			3:17 PM			4:15 PM			4:30 PM			4:10 PM			3:52 PM			4:00 PM		
Comments																			Flooded										Water level too low to sample			Wind chop stirring sediment			Wind chop stirring sediment		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Field Physical data																																					
Temperature	°C	-	-	24.86	14.99	19.27	25.1	16.3	19.91	24.4	16	19.66	26.46	15.94	21.31	27.9	18.4	21.53	27.9	18.4	22	26.5	16.3	21.99	26.5	16.3	20.48	26.5	16.3	-	27.9	18.1	23.71	27.9	18.1	22.98
pH	pH	-	6.5-8	7.25	6.48	6.66	7.3	6.4	6.72	7.5	6.6	6.99	7.33	6.26	7.26	7.02	6.57	6.41	7.02	6.57	6.35	7	6.1	6.58	7	6.1	6.27	7	6.1	-	7	7	7.21	7	7	7.29
Conductivity	mS/cm	0.125-2.2	-	0.316	0.232	0.167	0.348	0.227	0.171	0.348	0.227	0.194	0.3338	0.2168	0.204	20.946	0.679	0.483	20.946	0.679	0.514	0.808	0.4234	0.87	0.808	0.4234	0.381	0.808	0.4234	-	47.32	29.44	9.9	47.32	29.44	9.45
Turbidity	NTU	50	10	10.96	4	1.8	9.9	3.5	1.8	9.9	3.5	1	5.97	3.74	1	6.82	1.83	2.5	6.82	1.83	2.8	52.78	11.3	6.6	52.78	11.3	5.3	52.78	11.3	-	19.3	6.7	12.2	19.3	6.7	12.6
Dissolved Oxygen	mg/L	5	5	4.98	1.91	3.24	4.8	2.6	2.45	4.8	2.6	4.75	6.34	3.52	5.5	7.98	5.07	1.76	7.98	5.07	1.42	6.4	1.75	2.44	6.4	1.75	1.96	6.4	1.75	-	9.1	7.4	2.99	9.1	7.4	2.68
Dissolved Oxygen	%			-	-	36.2	-	-	27.6	-	-	53.4	-	-	63.7	-	-	20.5	-	-	16.7	-	-	28.7	-	-	20.1	-	-	-	-	-	37.1	-	-	32.9
TDS	g/L	-	-	-		0.109	-		0.111	-		0.126	-		0.132	-		0.314	-		0.329	-		0.517	-		0.248	-		-	-		6.25	-		5.96

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 4a – Surface Water Quality Results – May Dry Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17			10-May-17		
Time of Sampling		Freshwater	Marine	12:00 PM			11:50 AM			11:20 AM			11:00 AM			1:20 PM			1:10 PM			1:50 PM			2:00 PM			1:30 PM			2:40 PM			2:26 PM		
Comments																													Water level too low to sample			Wind chop stirring sediment			Wind chop stirring sediment		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Laboratory data																																				
Metals																																				
Aluminium	mg/L	0.055	-	0.06	0.01	<0.01	0.05	0.01	0.02	0.05	0.01	<0.01	0.04	0.01	<0.01	0.06	0.01	0.01	0.06	0.01	0.02	0.1	0.01	0.03	0.1	0.01	<0.01	0.1	0.01	-	0.02	0.01	<0.10	0.02	0.01	<0.10
Arsenic	mg/L	0.024	0.0023	-	-	<0.001	-	-	<0.001	-	-	<0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.001	-	0.002	0.001	<0.010	0.002	0.001	<0.010
Cadmium	mg/L	0.0002	0.0055	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	0.0001	0.0001	<0.0001	0.0001	0.0001	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	-	-	-	<0.0010	-	-	<0.0010
Chromium	mg/L	0.001	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Copper	mg/L	0.0014	0.0013	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	0.001	0.001	<0.010	0.001	0.001	<0.010
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Manganese	mg/L	1.9	0.08	0.21	0.02	0.092	0.2	0.03	0.097	0.06	0.02	0.039	0.052	0.013	0.055	0.26	0.08	0.105	0.26	0.08	0.099	0.23	0.019	0.136	0.23	0.019	0.204	0.23	0.019	-	0.03	0.002	0.067	0.03	0.002	0.049
Nickel	mg/L	0.011	0.07	-	-	0.001	-	-	<0.001	-	-	0.001	-	-	<0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	-	-	-	<0.010	-	-	<0.010
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	-	-	-	<0.10	-	-	<0.10
Silver	mg/L	0.00005	0.0014	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Zinc	mg/L	0.008	0.015	-	-	<0.005	-	-	<0.005	0.005	0.005	<0.005	0.005	0.005	<0.005	0.006	0.005	0.007	0.006	0.005	0.01	0.005	0.005	0.013	0.005	0.005	<0.005	0.005	0.005	-	0.005	0.005	<0.050	0.005	0.005	<0.050
Iron	mg/L	-	-	0.99	0.46	0.07	0.93	0.31	<0.05	0.82	0.42	<0.05	0.78	0.37	<0.05	0.83	0.05	0.08	0.83	0.05	0.09	2.01	0.25	0.66	2.01	0.25	0.2	2.01	0.25	-	-	-	<0.50	-	-	<0.50
Mercury	mg/L	0.0006	0.0004	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001			<0.0001			<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	-	-	-	<0.0001	-	-	<0.0001
Total Recoverable Hydrocarbons																																				
Naphthalene	µg/L	16	50	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		-	50		NA	50		NA
C6 - C10 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C16 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C16 - C34 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C34 - C40 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C40 Fraction (sum)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
BTEX																																				
Benzene	µg/L	950	700	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		-	700		NA	700		NA
Toluene	µg/L	180	180	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		-	180		NA	180		NA
Ethylbenzene	µg/L	80	5	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		-	5		NA	5		NA
m&p-Xylenes	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
o-Xylene	µg/L	350	350	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		-	350		NA	350		NA
Xylenes - Total	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
Sum of BTEX	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
Nutrients																																				
Total Phosphorus	mg/L	0.05	0.03	0.04	0.01	0.01	0.03	0.01	0.02	0.04	0.01	<0.01	0.02	0.01	<0.01	0.04	0.01	0.03	0.04	0.01	0.03	0.12	0.03	0.24	0.12	0.03	0.08	0.12	0.03	-	0.04	0.02	<0.05	0.04	0.02	<0.05
Phosphate (reactive phosphorus)	mg/L	-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	0.01	0.0044	<0.01	0.01	0.0044	<0.01	0.01	0.005	<0.01	0.01	0.005	<0.01	0.01	0.005	-	0.01	0.008	0.01	0.01	0.008	<0.01
																														-						
Total Nitrogen	mg/L	0.5	0.3	0.62	0.2	0.3	0.6	0.2	0.3	0.3	0.1	0.2	0.41	0.1	0.2	0.5	0.2	1.2	0.5	0.2	0.6	2.8	1.1	2.1	2.8	1.1	1.5	2.8	1.1	-	0.5	0.2	0.6	0.5	0.2	<0.5
Total Kjeldahl Nitrogen	mg/L	-	-	0.6	0.2	0.2	0.6	0.2	0.2	0.3	0.1	0.1	0.4	0.1	0.2	0.5	0.2	1.2	0.5	0.2	0.5	2.4	1	2.1	2.4	1	1.5	2.4	1	-	0.5	0.2	0.6	0.5	0.2	<0.5
																														-						
Nitrate	mg/L	0.7	-	0.04	0.01	0.07	0.03	0.01	0.07	0.03	0.01	0.05	0.03	0.01	0.02	0.04	0.01	0.05	0.04	0.01	0.06	0.04	0.01	<0.01	0.04	0.01	<0.01	0.04	0.01	-	0.02	0.01	0.01	0.02	0.01	<0.01
Nitrite	mg/L	-	-	-	-	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.05	0.01	<0.01	0.05	0.01	<0.01	0.05	0.01	-	0.02	0.01	<0.01	0.02	0.01	<0.01
Ammonia	mg/L	0.9	-	-	-	0.02	-	-	0.02	-	-	0.02	-	-	0.03	0.16	0.06	0.06	0.16	0.06	0.05	0.04	0.01	<0.01	0.04	0.01	0.01	0.04	0.01	-	0.03	0.01	0.08	0.03	0.01	0.05
TSS																																				
	mg/L	<40	<10	14.8	5	<5	8	5	<5	9	5	<5	5.8	5	<5	17.6	5	6	17.6	5	<5	290	15	38	290	15	17	290	15	-	71	19	<5	71	19	<5
Field Physical data																																				
Temperature	°C	-	-	24.86	14.99	16.69	25.1	16.3	17.12	24.4	16	17.32	26.46	15.94	16.42	27.9	18.4	19.56	27.9	18.4	20.12	26.5	16.3	20.44	26.5	16.3	16.82	26.5	16.3	-	27.9	18.1	21.35	27.9	18.1	21.54
pH	pH	-	6.5-8	7.25	6.48	6.77	7.3	6.4	7.02	7.5	6.6	7.37	7.33	6.26	7.57	7.02	6.57	6.72	7.02	6.57	6.66	7	6.1	6.63	7	6.1	6.25	7	6.1	-	7	7	7.70	7	7	7.58
Conductivity	mS/cm	0.125-2.2	-	0.316	0.232	0.251	0.348	0.227	0.251	0.348	0.227	0.227	0.3338	0.2168	0.226	20.946	0.679	1.45	20.946	0.679	1.44	0.808	0.4234	0.621	0.808	0.4234	0.467	0.808	0.4234	-	47.32	29.44	39.0	47.32	29.44	38.8
Turbidity	NTU	50	10	10.96	4	9.7	9.9	3.5	12.4	9.9	3.5	3.3	5.97	3.74	11.5	6.82	1.83	15.4	6.82	1.83	15.5	52.78	11.3	79.2	52.78	11.3	14.3	52.78	11.3	-	19.3	6.7	13.1	19.3	6.7	42.7
Dissolved Oxygen	mg/L	5	5	4.98	1.91	4.56	4.8	2.6	4.17	4.8	2.6	8.1	6.34	3.52	6.93	7.98	5.07	3.39	7.98	5.07	4.12	6.4	1.75	3	6.4	1.75	0.82	6.4	1.75	-	9.1	7.4	4.42	9.1	7.4	4.98
Dissolved Oxygen	%			-	-	48.4	-	-	44.6	-	-	87.1	-	-	73.2	-	-	38.2	-	-	46.8	-	-	34.2	-	-	8.8	-	-	-	-	-	59.0	-	-	66.8
TDS	g/L	-	-	-		0.163	-		0.163	-		0.147	-		0.147	-		0.927	-		0.924	-		0.398	-		0.304	-		-	-		23.8	-		23.7

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 4b – Surface Water Quality Results – May Wet Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17			15-May-17		
Time of Sampling		Freshwater	Marine	3:00 PM			2:40 PM			3:40 PM			3:25 PM			5:20 PM			5:10 PM			4:30 PM			4:45 PM			4:25 PM			5:50 PM			5:40 PM		
Comments																									Weed covering water surface			Water level too low to sample			Wind chop stirring sediment			Wind chop stirring sediment		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Laboratory data																																					
Metals																																					
Aluminium	mg/L	0.055	-	0.244	0.0162	0.01	0.194	0.016	0.02	0.098	0.02	<0.01	0.114	0.01	<0.01	0.28	0.01	0.03	0.28	0.01	<0.01	0.25	0.02	0.02	0.25	0.02	0.06	0.25	0.02	-	0.11	0.01	<0.10	0.11	0.01	<0.10
Arsenic	mg/L	0.024	0.0023	0.001	0.001	<0.001	0.001	0.001	<0.001	0.002	0.001	<0.001	0.002	0.001	<0.001	0.001	0.001	0.002	0.001	0.001	<0.001	0.002	0.001	0.004	0.002	0.001	0.002	0.002	0.001	-	0.002	0.001	<0.010	0.002	0.001	<0.010
Cadmium	mg/L	0.0002	0.0055	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	0.0002	0.0001	<0.0001	0.0002	0.0001	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	-	-	-	<0.0010	-	-	<0.0010
Chromium	mg/L	0.001	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Copper	mg/L	0.0014	0.0013	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.001	0.001	-	0.001	0.001	<0.010	0.001	0.001	<0.010
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Manganese	mg/L	1.9	0.08	0.3	0.01	0.138	0.158	0.0178	0.159	0.0726	0.0218	0.034	0.083	0.0164	0.052	0.35	0.087	0.107	0.35	0.087	0.105	0.49	0.011	0.138	0.49	0.011	0.336	0.49	0.011	-	0.076	0.006	0.06	0.076	0.006	0.061
Nickel	mg/L	0.011	0.07	-	-	<0.001	-	-	0.003	-	-	<0.001	-	-	<0.001	0.0034	0.001	0.002	0.0034	0.001	<0.001	0.002	0.001	0.001	0.002	0.001	0.002	0.002	0.001	-	-	-	<0.010	-	-	<0.010
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	-	-	-	<0.10	-	-	<0.10
Silver	mg/L	0.00005	0.0014	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	-	-	-	<0.010	-	-	<0.010
Zinc	mg/L	0.008	0.015	0.007	0.005	<0.005	0.0062	0.0042	0.007	0.0064	0.005	<0.005	0.006	0.005	<0.005	0.018	0.005	0.007	0.018	0.005	<0.005	0.011	0.005	0.006	0.011	0.005	<0.050	0.011	0.005	-	0.005	0.005	<0.050	0.005	0.005	<0.050
Iron	mg/L	-	-	1.38	0.48	0.17	0.99	0.366	0.53	1.4	0.41	<0.05	1.48	0.35	<0.05	0.52	0.05	0.17	0.52	0.05	<0.05	1.65	0.37	0.36	1.65	0.37	2.5	1.65	0.37	-	0.26	0.05	<0.50	0.26	0.05	<0.50
Mercury	mg/L	0.0006	0.0004	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	-	-	-	<0.0001	-	-	<0.0001
Total Recoverable Hydrocarbons																																					
Naphthalene	µg/L	16	50	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		-	50		NA	50		NA
C6 - C10 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C16 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C16 - C34 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C34 - C40 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C40 Fraction (sum)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
BTEX																																					
Benzene	µg/L	950	700	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		-	700		NA	700		NA
Toluene	µg/L	180	180	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		-	180		NA	180		NA
Ethylbenzene	µg/L	80	5	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		-	5		NA	5		NA
m&p-Xylenes	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
o-Xylene	µg/L	350	350	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		-	350		NA	350		NA
Xylenes - Total	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
Sum of BTEX	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		-	-		NA	-		NA
Nutrients																																					
Total Phosphorus	mg/L	0.05	0.03	0.05	0.02	0.01	0.044	0.016	<0.01	0.03	0.016	<0.01	0.034	0.01	0.09	0.04	0.01	<0.01	0.04	0.01	0.39	0.11	0.03	0.03	0.11	0.03	0.09	0.11	0.03	-	0.07	0.02	<0.05	0.07	0.02	0.02
Phosphate (reactive phosphorus)	mg/L	-	-	0.01	0.0034	<0.01	0.01	0.004	<0.01	0.018	0.0022	<0.01	0.01	0.003	<0.01	0.011	0.006	<0.01	0.011	0.006	<0.01	0.013	0.005	<0.01	0.013	0.005	<0.01	0.013	0.005	-	0.029	0.01	<0.01	0.029	0.01	<0.01
																														-						
Total Nitrogen	mg/L	0.5	0.3	0.56	0.3	0.4	0.52	0.2	0.7	0.48	0.2	0.3	0.63	0.2	0.2	0.54	0.31	0.4	0.54	0.31	0.5	3.1	0.9	1.6	3.1	0.9	1.6	3.1	0.9	-	0.46	0.2	<0.5	0.46	0.2	<0.5
Total Kjeldahl Nitrogen	mg/L	-	-	0.5	0.3	0.3	0.5	0.2	0.6	0.34	0.2	0.2	0.6	0.2	0.1	0.5	0.2	0.3	0.5	0.2	0.4	2.8	0.8	1.5	2.8	0.8	1.6	2.8	0.8	-	0.3	0.2	<0.5	0.3	0.2	<0.5
																														-						
Nitrate	mg/L	0.7	-	0.102	0.01	0.11	0.054	0.01	0.14	0.208	0.01	0.08	0.2	0.01	0.05	0.05	0.01	0.11	0.05	0.01	0.13	0.03	0.01	0.09	0.03	0.01	0.05	0.03	0.01	-	0.04	0.01	0.06	0.04	0.01	0.04
Nitrite	mg/L	-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	-	0.02	0.01	<0.01	0.02	0.01	<0.01
Ammonia	mg/L	0.9	-	0.036	0.01	0.04	0.02	0.01	0.06	0.046	0.02	0.02	0.062	0.012	0.01	0.116	0.022	0.07	0.116	0.022	0.1	0.06	0.01	0.02	0.06	0.01	0.02	0.06	0.01	-	0.15	0.024	<0.05	0.15	0.024	<0.05
TSS																																					
TSS	mg/L	<40	<10	19	5	6	12.8	5	<5	14.8	5	<5	8.7	5	5	25	5.5	6	25	5.5	<5	350	9	16	350	9	26	350	9	-			<5			<5
Field Physical data																																					
Temperature	°C	-	-	24.3	16.27	16.97	24.52	16.79	18.67	23.98	17.36	17.43	24.7	17.65	17.46	25.9	19.5	18.68	25.9	19.5	18.73	25.84	19.1	20.01	25.84	19.1	16.94	25.84	19.1	-	26.56	21.32	19.81	26.56	21.32	19.98
pH	pH	-	6.5-8	7.478	6.23	6.61	7.192	6.42	6.76	7.138	6.61	6.75	6.98	6.21	6.84	6.86	6.46	6.63	6.86	6.46	6.46	6.9	6.08	6.51	6.9	6.08	6.16	6.9	6.08	-	7.56	6.58	7.52	7.56	6.58	7.31
Conductivity	mS/cm	0.125-2.2	-	0.3204	0.20184	0.246	0.3242	0.19076	0.246	0.313	0.2024	0.216	0.309	0.20188	0.222	20.918	0.50928	1.65	20.918	0.50928	1.91	0.842	0.334	0.625	0.842	0.334	0.43	0.842	0.334	-	48.42	12.65	36	48.42	12.65	34.8
Turbidity	NTU	50	10	26.16	5.94	17.5	27.32	3.72	12.1	14.98	3.34	6.6	17.16	4.59	16.7	26.1	2.4	4.5	26.1	2.4	25.2	66.8	11.6	44.9	66.8	11.6	11.8	66.8	11.6	-	19.04	5.81	26.1	19.04	5.81	43.6
Dissolved Oxygen	mg/L	5	5	7.43	1.5	4	6.88	2.28	3.48	8.472	5.08	5.1	7.59	2.63	6.06	6.65	5.02	2.58	6.65	5.02	1.94	7.3	1.78	4.94	7.3	1.78	0.39	7.3	1.78	-	8.47	6.88	4.16	8.47	6.88	4.66
Dissolved Oxygen	%			-		42.7	-		38.4	-		54.8	-		65.3	-		28.6	-		21.6	-		56	-		4.1	-		-	-		53.4	-		59.7
TDS	g/L	-	-	-		0.160	-		0.16	-		0.14	-		0.144	-		1.1	-		22	-		0.4	-		0.28	-		-	-		22.0	-		21.2

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 4c – Surface Water Quality Monitoring – May Wet Event – 2

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling																																				
Time of Sampling		Freshwater	Marine																																	
Comments																									Weed covering water surface			Water level too low to sample			Wind chop stirring sediment			Wind chop stirring sediment		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Field Physical data																																				
Temperature	°C	-	-	24.3	16.27		24.52	16.79		23.98	17.36		24.7	17.65		25.9	19.5		25.9	19.5		25.84	19.1	-	25.84	19.1	-	25.84	19.1	-	26.56	21.32		26.56	21.32	
pH	pH	-	6.5-8	7.478	6.23		7.192	6.42		7.138	6.61		6.98	6.21		6.86	6.46		6.86	6.46		6.9	6.08	-	6.9	6.08	-	6.9	6.08	-	7.56	6.58		7.56	6.58	
Conductivity	mS/cm	0.125-2.2	-	0.3204	0.20184		0.3242	0.19076		0.313	0.2024		0.309	0.20188		20.918	0.50928		20.918	0.50928		0.842	0.334	-	0.842	0.334	-	0.842	0.334	-	48.42	12.65		48.42	12.65	
Turbidity	NTU	50	10	26.16	5.94		27.32	3.72		14.98	3.34		17.16	4.59		26.1	2.4		26.1	2.4		66.8	11.6	-	66.8	11.6	-	66.8	11.6	-	19.04	5.81		19.04	5.81	
Dissolved Oxygen	mg/L	5	5	7.43	1.5		6.88	2.28		8.472	5.08		7.59	2.63		6.65	5.02		6.65	5.02		7.3	1.78	-	7.3	1.78	-	7.3	1.78	-	8.47	6.88		8.47	6.88	
Dissolved Oxygen	%			-			-			-			-			-			-			-		-	-		-	-		-			-			
TDS	g/L	-	-	-			-			-			-			-			-			-		-	-		-	-		-			-			

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 5a – Surface Water Quality Monitoring – June Dry Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				2-Jun-17			2-Jun-17			2-Jun-17			2-Jun-17			2-Jun-17			2-Jun-17			2-Jun-17			2-Jun-17			2-Jun-17			2-Jun-17			2-Jun-17		
Time of Sampling		Freshwater	Marine	9:52 AM			9:42 AM			9:07 AM			9:20 AM			12:24 PM			12:16 PM			11:08 AM			10:55 AM			10:50 AM			11:35 AM			11:28 AM		
Comments																																				
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Field Physical data																																				
Temperature	°C	-	-	24.86	14.99	12.56	25.1	16.3	13.04	24.4	16	11.84	26.46	15.94	12.85	27.9	18.4	16.9	27.9	18.4	17.41	26.5	16.3	13.22	26.5	16.3	12.69	26.5	16.3	-	27.9	18.1	18.26	27.9	18.1	18.43
pH	pH	-	6.5-8	7.25	6.48	6.12	7.3	6.4	6.17	7.5	6.6	6.44	7.33	6.26	6.34	7.02	6.57	7.22	7.02	6.57	7.32	7	6.1	5.98	7	6.1	6	7	6.1	-	7	7	7.35	7	7	7.32
Conductivity	mS/cm	0.125-2.2	-	0.316	0.232	0.35	0.348	0.227	0.34	0.348	0.227	0.23	0.3338	0.2168	0.28	20.946	0.679	2.97	20.946	0.679	3.04	0.808	0.4234	0.7	0.808	0.4234	0.53	0.808	0.4234	-	47.32	29.44	40.0	47.32	29.44	39.88
Turbidity	NTU	50	10	10.96	4	8	9.9	3.5	5.1	9.9	3.5	5.2	5.97	3.74	2.7	6.82	1.83	10.6	6.82	1.83	12.7	52.78	11.3	62.2	52.78	11.3	13.6	52.78	11.3	-	19.3	6.7	17.8	19.3	6.7	7.1
Dissolved Oxygen	mg/L	5	5	4.98	1.91	4.28	4.8	2.6	3.80	4.8	2.6	6.94	6.34	3.52	7.43	7.98	5.07	4.37	7.98	5.07	5.86	6.4	1.75	2.61	6.4	1.75	1.51	6.4	1.75	-	9.1	7.4	5.13	9.1	7.4	6.99
Dissolved Oxygen	%			-	-	40	-	-	35.9	-	-	64	-	-	70.2	-	-	47	-	-	63.6	-	-	24.9	-	-	14.1	-	-	-	-	-	65.2	-	-	86.5
TDS	g/L	-	-	-		0.200	-		0.200	-		0.200	-		0.200	-		1.90	-		1.95	-		0.500	-		0.300	-		-	-		24.4	-		25.9

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 5b – Surface Water Quality Monitoring – June Wet Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				19-Jun-17			19-Jun-17			19-Jun-17			19-Jun-17			19-Jun-17			19-Jun-17			19-Jun-17			19-Jun-17			19-Jun-17			19-Jun-17			19-Jun-17		
Time of Sampling		Freshwater	Marine	4:15 PM			4:05 PM			3:40 PM			3:15 PM			12:45 PM			12:40 PM			2:15 PM			2:50 PM			2:25 PM			11:58 AM			12:05 PM		
Comments																																				
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Laboratory data																																				
Metals																																				
Aluminium	mg/L	0.055	-	0.244	0.0162	0.25	0.194	0.016	0.28	0.098	0.02	0.18	0.114	0.01	0.14	0.28	0.01	0.36	0.28	0.01	0.35	0.25	0.02	0.24	0.25	0.02	0.08	0.25	0.02	0.07	0.11	0.01	0.02	0.11	0.01	0.02
Arsenic	mg/L	0.024	0.0023	0.001	0.001	<0.001	0.001	0.001	<0.001	0.002	0.001	<0.001	0.002	0.001	<0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.002	0.001	<0.001	0.002	0.001	0.001	0.002	0.001	0.001	0.002	0.001	<0.001	0.002	0.001	0.001
Cadmium	mg/L	0.0002	0.0055	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	0.0002	0.0001	<0.0001	0.0002	0.0001	<0.0001	-	-	0.0002	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001
Chromium	mg/L	0.001	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001
Copper	mg/L	0.0014	0.0013	-	-	<0.001	-	-	0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	0.001	0.001	0.005	0.001	0.001	<0.001	0.001	0.001	0.003	0.001	0.001	<0.001	0.001	0.001	<0.001
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001
Manganese	mg/L	1.9	0.08	0.3	0.01	0.018	0.158	0.0178	0.013	0.0726	0.0218	0.026	0.083	0.0164	0.051	0.35	0.087	0.055	0.35	0.087	0.081	0.49	0.011	0.217	0.49	0.011	0.014	0.49	0.011	0.098	0.076	0.006	0.053	0.076	0.006	0.054
Nickel	mg/L	0.011	0.07	-	-	0.001	-	-	0.002	-	-	<0.001	-	-	<0.001	0.0034	0.001	0.003	0.0034	0.001	0.002	0.002	0.001	0.006	0.002	0.001	0.002	0.002	0.001	0.004	-	-	<0.001	-	-	<0.001
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01
Silver	mg/L	0.00005	0.0014	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001
Zinc	mg/L	0.008	0.015	0.007	0.005	<0.005	0.0062	0.0042	<0.005	0.0064	0.005	<0.005	0.006	0.005	<0.005	0.018	0.005	0.007	0.018	0.005	0.009	0.011	0.005	0.053	0.011	0.005	<0.005	0.011	0.005	0.011	0.005	0.005	<0.005	0.005	0.005	<0.005
Iron	mg/L	-	-	1.38	0.48	0.72	0.99	0.366	0.77	1.4	0.41	0.47	1.48	0.35	0.5	0.52	0.05	0.66	0.52	0.05	0.67	1.65	0.37	0.35	1.65	0.37	0.41	1.65	0.37	0.45	0.26	0.05	0.09	0.26	0.05	0.1
Mercury	mg/L	0.0006	0.0004	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001
Total Recoverable Hydrocarbons																																				
Naphthalene	µg/L	16	50	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	50		NA	50		NA
C6 - C10 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
>C10 - C16 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
>C16 - C34 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
>C34 - C40 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
>C10 - C40 Fraction (sum)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
BTEX																																				
Benzene	µg/L	950	700	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	700		NA
Toluene	µg/L	180	180	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA
Ethylbenzene	µg/L	80	5	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	5		NA	5		NA
m&p-Xylenes	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
o-Xylene	µg/L	350	350	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA
Xylenes - Total	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
Sum of BTEX	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
Nutrients																																				
Total Phosphorus	mg/L	0.05	0.03	0.05	0.02	0.02	0.044	0.016	0.01	0.03	0.016	<0.01	0.034	0.01	<0.01	0.04	0.01	0.02	0.04	0.01	0.02	0.11	0.03	0.04	0.11	0.03	0.03	0.11	0.03	0.03	0.07	0.02	0.04	0.07	0.02	0.03
Phosphate (reactive phosphorus)	mg/L	-	-	0.01	0.0034	<0.01	0.01	0.004	<0.01	0.018	0.0022	<0.01	0.01	0.003	<0.01	0.011	0.006	<0.01	0.011	0.006	<0.01	0.013	0.005	<0.01	0.013	0.005	<0.01	0.013	0.005	<0.01	0.029	0.01	<0.01	0.029	0.01	0.01
Total Nitrogen	mg/L	0.5	0.3	0.56	0.3	0.4	0.52	0.2	0.5	0.48	0.2	0.4	0.63	0.2	0.2	0.54	0.31	0.5	0.54	0.31	0.5	3.1	0.9	7.2	3.1	0.9	1.6	3.1	0.9	4.2	0.46	0.2	2.2	0.46	0.2	0.5
Total Kjeldahl Nitrogen	mg/L	-	-	0.5	0.3	0.3	0.5	0.2	0.4	0.34	0.2	0.1	0.6	0.2	<0.1	0.5	0.2	0.4	0.5	0.2	0.4	2.8	0.8	7.2	2.8	0.8	1.6	2.8	0.8	4.1	0.3	0.2	2.1	0.3	0.2	0.3
Nitrate	mg/L	0.7	-	0.102	0.01	0.07	0.054	0.01	0.08	0.208	0.01	0.26	0.2	0.01	0.22	0.05	0.01	0.12	0.05	0.01	0.12	0.03	0.01	0.03	0.03	0.01	0.02	0.03	0.01	0.05	0.04	0.01	0.14	0.04	0.01	0.16
Nitrite	mg/L	-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01	0.02	0.01	<0.01
Ammonia	mg/L	0.9	-	0.036	0.01	0.01	0.02	0.01	<0.01	0.046	0.02	<0.01	0.062	0.012	<0.01	0.116	0.022	0.03	0.116	0.022	0.04	0.06	0.01	<0.01	0.06	0.01	<0.01	0.06	0.01	0.05	0.15	0.024	0.08	0.15	0.024	0.06
TSS																																				
TSS	mg/L	<40	<10	19	5	<5	12.8	5	<5	14.8	5	<5	8.7	5	<5	25	5.5	<5	25	5.5	11	350	9	10	350	9	8	350	9	6			8			<5
Field Physical data																																				
Temperature	°C	-	-	24.3	16.27	16.12	24.52	16.79	16.54	23.98	17.36	17.4	24.7	17.65	17.72	25.9	19.5	16.87	25.9	19.5	17.37	25.84	19.1	18.54	25.84	19.1	16.7	25.84	19.1	16.46	26.56	21.32	18.09	26.56	21.32	17.81
pH	pH	-	6.5-8	7.478	6.23	6.56	7.192	6.42	6.65	7.138	6.61	6.51	6.98	6.21	6.54	6.86	6.46	6.44	6.86	6.46	6.36	6.9	6.08	5.81	6.9	6.08	6	6.9	6.08	6.1	7.56	6.58	7.17	7.56	6.58	7.33
Conductivity	mS/cm	0.125-2.2	-	0.3204	0.20184	0.212	0.3242	0.19076	0.207	0.313	0.2024	0.205	0.309	0.20188	0.214	20.918	0.50928	0.41	20.918	0.50928	0.436	0.842	0.334	0.715	0.842	0.334	0.282	0.842	0.334	0.399	48.42	12.65	14.4	48.42	12.65	14.2
Turbidity	NTU	50	10	26.16	5.94	4.4	27.32	3.72	4.9	14.98	3.34	2.1	17.16	4.59	0.8	26.1	2.4	1.7	26.1	2.4	1.8	66.8	11.6	17.4	66.8	11.6	6.2	66.8	11.6	20.5	19.04	5.81	6.1	19.04	5.81	2.4
Dissolved Oxygen	mg/L	5	5	7.43	1.5	2.97	6.88	2.28	2.99	8.472	5.08	2.68	7.59	2.63	4.14	6.65	5.02	1.83	6.65	5.02	4.91	7.3	1.78	7.2	7.3	1.78	0	7.3	1.78	0	8.47	6.88	5.56	8.47	6.88	4.72
Dissolved Oxygen	%			-		31.1	-		31.6	-		28.8	-		44.8	-		19.5	-		52.9	-		95.5	-		0	-		0	-		63.5	-		53.6
TDS	g/L	-	-	-		0.138	-		0.135	-		0.133	-		0.139	-		0.266	-		0.284	-		0.461	-		0.183	-		0.259	-		8.9	-		8.8

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 5c – Surface Water Quality Monitoring – June Wet Event 2

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				30-Jun-17			30-Jun-17			30-Jun-17			30-Jun-17			30-Jun-17			30-Jun-17			30-Jun-17			30-Jun-17			30-Jun-17			30-Jun-17			30-Jun-17		
Time of Sampling		Freshwater	Marine	2:25 PM			2:12 PM			1:54 PM			1:35 PM			10:15 AM			10:05 AM			12:55 PM			1:19 PM			1:03 PM			9:15 AM			9:40 AM		
Comments																																	Wind chop stirring sediment			Wind chop stirring sediment		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Field Physical data																																					
Temperature	°C	-	-	24.3	16.27	14.54	24.52	16.79	15.19	23.98	17.36	16.3	24.7	17.65	16.01	25.9	19.5	16.24	25.9	19.5	15.94	25.84	19.1	19.78	25.84	19.1	16.6	25.84	19.1	16.49	26.56	21.32	18.25	26.56	21.32	17.56
pH	pH	-	6.5-8	7.478	6.23	6.46	7.192	6.42	6.53	7.138	6.61	6.57	6.98	6.21	6.48	6.86	6.46	6.56	6.86	6.46	6.96	6.9	6.08	6.42	6.9	6.08	6.09	6.9	6.08	6.25	7.56	6.58	7.84	7.56	6.58	7.66
Conductivity	mS/cm	0.125-2.2	-	0.3204	0.20184	0.247	0.3242	0.19076	0.243	0.313	0.2024	0.215	0.309	0.20188	0.217	20.918	0.50928	0.589	20.918	0.50928	0.577	0.842	0.334	0.775	0.842	0.334	0.68	0.842	0.334	0.5	48.42	12.65	25.6	48.42	12.65	25.3
Turbidity	NTU	50	10	26.16	5.94	5.2	27.32	3.72	4.5	14.98	3.34	5.1	17.16	4.59	2.1	26.1	2.4	5.2	26.1	2.4	3.1	66.8	11.6	14.6	66.8	11.6	10.1	66.8	11.6	36.8	19.04	5.81	6.3	19.04	5.81	4.2
Dissolved Oxygen	mg/L	5	5	7.43	1.5	2.81	6.88	2.28	2.25	8.472	5.08	3.66	7.59	2.63	4.4	6.65	5.02	1.27	6.65	5.02	1.8	7.3	1.78	8.3	7.3	1.78	1.73	7.3	1.78	0	8.47	6.88	7.99	8.47	6.88	5.03
Dissolved Oxygen	%			-		28.5	-		23.1	-		38.5	-		46.1	-		13.4	-		18.8	-		93.6	-		18.3	-		0	-		95.5	-		59.3
TDS	g/L	-	-	-		0.161	-		0.158	-		0.14	-		0.145	-		0.377	-		0.369	-		0.496	-		0.435	-		0.325	-		15.9	-		15.7

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 6a – Surface Water Quality Monitoring – July Dry Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				12-Jul-17			12-Jul-17			12-Jul-17			12-Jul-17			12-Jul-17			12-Jul-17			12-Jul-17			12-Jul-17			12-Jul-17			12-Jul-17			12-Jul-17		
Time of Sampling		Freshwater	Marine	1:08 PM			1:20 PM			12:49 PM			12:20 PM			2:42 PM			2:32 PM			11:00 AM			11:42 AM			11:26 AM			3:12 PM			3:00 PM		
Comments																																				
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Laboratory data																																				
Metals																																				
Aluminium	mg/L	0.055	-	0.06	0.01	0.01	0.05	0.01	0.02	0.05	0.01	<0.01	0.04	0.01	<0.01	0.06	0.01	0.04	0.06	0.01	0.03	0.1	0.01	0.02	0.1	0.01	0.06	0.1	0.01	0.04	0.02	0.01	0.01	0.02	0.01	0.03
Arsenic	mg/L	0.024	0.0023	-	-	<0.001	-	-	<0.001	-	-	<0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.002	0.001	<0.001	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.001	0.001
Cadmium	mg/L	0.0002	0.0055	-	-	<0.0001	-	-	0.0001	-	-	<0.0001	-	-	<0.0001	0.0001	0.0001	<0.0001	0.0001	0.0001	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001
Chromium	mg/L	0.001	0.0044	-	-	0.002	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001
Copper	mg/L	0.0014	0.0013	-	-	<0.001	-	-	0.002	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	0.001	0.001	0.001	<0.001	0.001	0.001	<0.001
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001
Manganese	mg/L	1.9	0.38	0.21	0.02	0.047	0.2	0.03	0.002	0.06	0.02	0.034	0.052	0.013	0.079	0.26	0.08	0.056	0.26	0.08	0.04	0.23	0.019	0.07	0.23	0.019	0.064	0.23	0.019	0.179	0.03	0.002	0.036	0.03	0.002	0.028
Nickel	mg/L	0.011	0.07	-	-	<0.001	-	-	0.004	-	-	<0.001	-	-	<0.001	0.001	0.001	<0.001	0.001	0.001	0.001	0.001	0.001	<0.001	0.001	0.001	0.001	0.001	0.001	0.004	-	-	<0.001	-	-	<0.001
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01
Silver	mg/L	0.00005	0.0014	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001
Zinc	mg/L	0.008	0.015	-	-	0.012	-	-	0.014	0.005	0.005	0.009	0.005	0.005	0.005	0.006	0.005	0.189	0.006	0.005	0.014	0.005	0.005	0.021	0.005	0.005	0.193	0.005	0.005	0.024	0.005	0.005	0.009	0.005	0.005	0.007
Iron	mg/L	-	-	0.99	0.46	0.08	0.93	0.31	<0.05	0.82	0.42	<0.05	0.78	0.37	0.14	0.83	0.05	0.41	0.83	0.05	0.11	2.01	0.25	<0.05	2.01	0.25	0.31	2.01	0.25	0.68	-	-	<0.05	-	-	<0.05
Mercury	mg/L	0.0006	0.0004	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001			<0.0001			<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001
Total Recoverable Hydrocarbons																																				
Naphthalene	µg/L	16	50	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	16		NA	50		NA	50		NA
C6 - C10 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
>C10 - C16 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
>C16 - C34 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
>C34 - C40 Fraction	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
>C10 - C40 Fraction (sum)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
BTEX																																				
Benzene	µg/L	950	700	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	950		NA	700		NA	700		NA
Toluene	µg/L	180	180	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA	180		NA
Ethylbenzene	µg/L	80	5	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	80		NA	5		NA	5		NA
m&p-Xylenes	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
o-Xylene	µg/L	350	350	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA	350		NA
Xylenes - Total	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
Sum of BTEX	µg/L	-	-	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA	-		NA
Nutrients																																				
Total Phosphorus	mg/L	0.05	0.03	0.04	0.01	0.04	0.03	0.01	<0.01	0.04	0.01	0.01	0.02	0.01	<0.01	0.04	0.01	0.01	0.04	0.01	0.04	0.12	0.03	0.03	0.12	0.03	0.06	0.12	0.03	0.02	0.04	0.02	<0.05	0.04	0.02	<0.05
Phosphate (reactive phosphorus)	mg/L	-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	0.01	0.0044	<0.01	0.01	0.0044	0.01	0.01	0.005	<0.01	0.01	0.005	<0.01	0.01	0.005	<0.01	0.01	0.008	0.01	0.01	0.008	0.01
Total Nitrogen	mg/L	0.5	0.3	0.62	0.2	0.5	0.6	0.2	0.5	0.3	0.1	1100	0.41	0.1	0.4	0.5	0.2	0.4	0.5	0.2	0.5	2.8	1.1	1	2.8	1.1	1.1	2.8	1.1	0.8	0.5	0.2	<0.5	0.5	0.2	<0.5
Total Kjeldahl Nitrogen	mg/L	-	-	0.6	0.2	0.4	0.6	0.2	0.3	0.3	0.1	100	0.4	0.1	0.3	0.5	0.2	0.3	0.5	0.2	0.4	2.4	1	1	2.4	1	1.1	2.4	1	0.8	0.5	0.2	<0.5	0.5	0.2	<0.5
Nitrate	mg/L	0.7	-	0.04	0.01	0.08	0.03	0.01	0.2	0.03	0.01	999	0.03	0.01	0.08	0.04	0.01	0.1	0.04	0.01	0.07	0.04	0.01	<0.01	0.04	0.01	<0.01	0.04	0.01	0.01	0.02	0.01	<0.01	0.02	0.01	<0.01
Nitrite	mg/L	-	-	-	-	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.05	0.01	<0.01	0.05	0.01	<0.01	0.05	0.01	<0.01	0.02	0.01	0.02	0.02	0.01	<0.01
Ammonia	mg/L	0.9	-	-	-	0.03	-	-	<0.01	-	-	0.02	-	-	0.11	0.16	0.06	0.04	0.16	0.06	0.07	0.04	0.01	0.03	0.04	0.01	<0.01	0.04	0.01	0.05	0.03	0.01	0.06	0.03	0.01	0.08
TSS																																				
TSS	mg/L	<40	<10	14.8	5	<5	8	5	<5	9	5	<5	5.8	5	<5	17.6	5	<5	17.6	5	<5	290	15	7	290	15	22	290	15	9	71	19	<5	71	19	<5
Field (Physical data)																																				
Temperature	°C	-	-	24.86	14.99	12.63	25.1	16.3	12.91	24.4	16	13.18	26.46	15.94	11.46	27.9	18.4	14.74	27.9	18.4	14.23	26.5	16.3	14.08	26.5	16.3	16.56	26.5	16.3	14.54	27.9	18.1	17.38	27.9	18.1	17.35
pH	pH	-	6.5-8	7.25	6.48	6.54	7.3	6.4	6.2	7.5	6.6	6.48	7.33	6.26	6.63	7.02	6.57	6.65	7.02	6.57	6.63	7	6.1	6.14	7	6.1	5.94	7	6.1	6.46	7	7	7.93	7	7	7.96
Conductivity	mS/cm	0.125-2.2	-	0.316	0.232	0.266	0.348	0.227	0.262	0.348	0.227	0.227	0.3338	0.2168	0.2	20.946	0.679	0.661	20.946	0.679	0.635	0.808	0.4234	0.686	0.808	0.4234	0.648	0.808	0.4234	0.656	47.32	29.44	35.5	47.32	29.44	35.2
Turbidity	NTU	50	10	10.96	4	3.6	9.9	3.5	4.2	9.9	3.5	2.5	5.97	3.74	0.8	6.82	1.83	6.5	6.82	1.83	6	52.78	11.3	20.5	52.78	11.3	16	52.78	11.3	17.9	19.3	6.7	5.2	19.3	6.7	3
Dissolved Oxygen	mg/L	5	5	4.98	1.91	3.07	4.8	2.6	0.87	4.8	2.6	4.88	6.34	3.52	4.81	7.98	5.07	4.18	7.98	5.07	10.6	6.4	1.75	8.77	6.4	1.75	5.93	6.4	1.75	1.89	9.1	7.4	4.07	9.1	7.4	4.27
Dissolved Oxygen	%			-	-	29.9	-	-	8.5	-	-	48.1	-	-	45.6	-	-	42.6	-	-	127.2	-	-	88.3	-	-	62.8	-	-	19.2	-	-	49.8	-	-	52.2
TDS	g/L	-	-	-		0.173	-		0.170	-		0.147	-		0.135	-		0.423	-		0.405	-		0.439	-		0.398	-		0.420	-		21.6	-		21.5

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Table 7a – Surface Water Quality Monitoring – August Dry Event

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				8-Aug-17			8-Aug-17			8-Aug-17			8-Aug-17			8-Aug-17			8-Aug-17			8-Aug-17			8-Aug-17			8-Aug-17			8-Aug-17			8-Aug-17		
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Field Physical data																																				
Temperature	°C	-	-	24.86	14.99	12.31	25.1	16.3	13.45	24.4	16	14.37	26.46	15.94	14.31	27.9	18.4	17.43	27.9	18.4	17.86	26.5	16.3	18.45	26.5	16.3	15.33	26.5	16.3	17.4	27.9	18.1	19.35	27.9	18.1	19.9
pH	pH	-	6.5-8	7.25	6.48	6.56	7.1	6.4	6.44	7.5	6.6	6.87	7.33	6.26	7.47	7.02	6.57	7.17	7.02	6.57	7.63	7	6.1	6.29	7	6.1	6.44	7	6.1	6.46	7	7	7.88	7	7	7.73
Conductivity	mS/cm	0.125-2.2	-	0.316	0.232	0.273	0.348	0.227	0.268	0.348	0.227	0.237	0.3338	0.2168	0.269	20.946	0.679	3.58	20.946	0.679	3.81	0.808	0.4234	0.777	0.808	0.4234	0.471	0.808	0.4234	0.777	47.32	29.44	40.5	47.32	29.44	40.3
Turbidity	NTU	50	10	10.96	4	0	9.9	3.5	0	9.9	3.5	0	5.97	3.74	0	6.82	1.83	24.5	6.82	1.83	0	52.78	11.3	10.2	52.78	11.3	10.8	52.78	11.3	10.2	19.3	6.7	3.6	19.3	6.7	3.2
Dissolved Oxygen	mg/L	5	5	4.98	1.91	2.94	4.8	2.6	2.75	4.8	2.6	3.72	6.34	3.52	4.31	7.98	5.07	3.6	7.98	5.07	3.83	6.4	1.75	7.03	6.4	1.75	4.62	6.4	1.75	7.03	9.1	7.4	4.33	9.1	7.4	4.28
Dissolved Oxygen	%			-	-	28.4	-	-	27.2	-	-	37.6	-	-	43.5	-	-	39.2	-	-	42	-	-	77.4	-	-	47.7	-	-	77.4	-	-	56.2	-	-	55.4
TDS	g/L	-	-	-		0.178	-		0.174	-		0.154	-		0.175	-		2.290	-		2.440	-		0.496	-		0.306	-		0.496	-		24.7	-		24.6

Taken from ANZECC guidelines 95% protected species levels where no 80/20 trigger values provided

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of trigger values

Groundwater Monitoring Results

Table 8 – Groundwater Monitoring Results – February 2017

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH007		4BH008		4BH010			4BH011		4BH021			4BH022c			4BH025			4BH026			4BH037a			4BH038			4BH057			4BH058c			4BH061		4BH062	
Cut/Fill			Cut 4 - East (US)		Cut 4 - West (DS)		Cut 6 - West (DS)			Cut 6 - East (US)		Cut 11 - West (DS)			Cut 11 - East (US)			Cut 12 - West (DS)			Cut 12 - East (US)			Fill 15 - West			Fill 15 - East			Cut 17 - West (DS)			Cut 17 - East (US)			Cut 23 - West (US)		Cut 23 - East (DS)	
Date of Sampling			27/02/2017		27/02/2017		27/02/2017			27/02/2017		24/02/2017			27/02/2017			27/02/2017			27/02/2017			27/02/2017			27/02/2017			27/02/2017			24/02/2017			24/02/2017		24/02/2017	
			Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile (from 4LDBH015)		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile	Results
Comments				DRY		DRY			Water level too low to sample		Unable to sample									DRY			DRY			Ants in casing			Unable to sample			DRY					DRY			
Field Physical data																																							
Depth to standing water level from TOC	m	-	-	-	-	-	16.802		-	-	-	8.7420		8.99	16.0140		1.73	8.4500		-	14.4820		-	1.2000		1.87	1.3520		-	17.4120		-	13.8440		16.38	-	-	-	-
pH	pH	-	-	-	-	-	6.264	4.736	-	-	-	6.7800	5.8100	6.78	7.0900		5.67	6.7780	6.2080	-	7.34	6.2600	-	6.5080	5.9220	6.70	7.3040	6.7680	-	6.9800	5.2400	-	6.3960	5.5620	6.91	-	-	-	-
Conductivity	mS/cm	-	-	-	-	-	3630.000		-	-	-	111.300		0.127	231.000		3.01	0.342		-	322.000		-	5.550		9.42	8366.000		-	121.100		-	132.660		0.129	-	-	-	-
Temperature	○C	-	-	-	-	-	22.4420		-	-	-	22.3600		21.24	21.1500		24.96	22.6040		-	21.3000		-	25.9820		21.91	22.5600		-	22.8200		-	23.1940		23.81	-	-	-	-

Exceedance of trigger level

Table 9 – Groundwater Monitoring Results – March 2017

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH010			4BH021			4BH022c			4BH025			4BH037a			4BH038			4BH057			4BH058c			
Cut/Fill			Cut 6 - West (DS)			Cut 11 - West (DS)			Cut 11 - East (US)			Cut 12 - West (DS)			Fill 15 - West			Fill 15 - East			Cut 17 - West (DS)			Cut 17 - East (US)			
Date of Sampling			23/03/2017			23/03/2017			23/03/2017			23/03/2017			23/03/2017			23/03/2017			23/03/2017			23/03/2017			
			Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results
Comments																	Ants in casing								DRY			
Field Physical data																												
Depth to standing water level from TOC	m	-	16.802		16.50	8.7420		5.47	16.0140		1.15	8.4500		5.47	1.2000		0.58	1.3520		0.51	17.4120		-	13.8440		15.64		
pH	pH	-	6.264	4.736	6.09	6.7800	5.8100	6.36	7.0900		5.01	6.7780	6.2080	6.36	6.5080	5.9220	7.26	7.3040	6.7680	7.00	6.9800	5.2400	-	6.3960	5.5620	7.25		
Conductivity	mS/cm	-	3630.000		0.27	111.300		0.128	231.000		3.40	0.342		0.128	5.550		10.10	8366.000		11.3	121.100		-	132.660		0.210		
Temperature	○C	-	22.4420		22.39	22.3600		22.64	21.1500		25.10	22.6040		22.64	25.9820		22.82	22.5600		24.82	22.8200		-	23.1940		22.44		

Exceedance of trigger level

Table 10 – Groundwater Monitoring Results – April 2017

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH010			4BH021			4BH022c			4BH025			4BH037a			4BH038			4BH057			4BH058c		
Cut/Fill			Cut 6 - West (DS)			Cut 11 - West (DS)			Cut 11 - East (US)			Cut 12 - West (DS)			Fill 15 - West			Fill 15 - East			Cut 17 - West (DS)			Cut 17 - East (US)		
Date of Sampling			20/04/2017			20/04/2017			20/04/2017			20/04/2017			20/04/2017			20/04/2017			20/04/2017			20/04/2017		
			Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results
Comments								Insects in water						DRY			Ants in casing						DRY			
Laboratory data - awaiting results																										
Metals																										
Aluminium	mg/L	0.055	0.2740		0.2000	0.0216		<0.01	0.0122		0.440	0.0324		-	0.0264		<0.01	0.0050		<0.01	0.0050		-	0.0050		<0.01
Arsenic	mg/L	0.024	0.0009		<0.001	0.0020		<0.001	0.0001		<0.001	0.0005		-	0.0005		<0.001	0.0010		<0.001	0.0010		-	0.0005		<0.001
Cadmium	mg/L	<LOR	0.0005		<0.0001	0.0001		<0.0001	0.0001		0.0139	0.0002		-	0.0002		<0.0001	0.0005		0.0005	0.0005		-	0.0005		<0.0001
Chromium	mg/L	0.001	0.0013		<0.001	0.0001		<0.001	0.0002		<0.001	0.0007		-	0.0010		<0.001	0.0007		<0.001	0.0005		-	0.0005		<0.001
Copper	mg/L	0.0014	0.1620		0.0080	0.0108		0.014	0.0030		0.0100	0.0139		-	0.0139		<0.001	0.0026		<0.001	0.0009		-	0.0082		<0.001
Lead	mg/L	0.0034	0.0010		0.0010	0.0002		<0.001	0.0016		<0.001	0.0022		-	0.0005		<0.001	0.0005		<0.001	0.0009		-	0.0005		<0.001
Manganese	mg/L	-	0.2258		0.0450	0.0139		0.0060	0.4856		3.010	0.0124		-	5.2480		2.5000	1.5084		1.7000	0.4518		-	0.0800		0.0870
Nickel	mg/L	0.011	0.0196		0.0030	0.0058		0.0020	0.0036		0.1970	0.0007		-	0.0068		0.0030	0.0060		0.0220	0.0030		-	0.0033		0.0020
Selenium	mg/L	-	0.0050		<0.01	0.0050		<0.01	0.0050		<0.01	0.0050		-	0.0050		<0.01	0.0050		<0.01	0.0050		-	0.0050		<0.01
Silver	mg/L	<LOR	0.0005		<0.001	0.0001		<0.001	0.0001		<0.001	0.0005		-	0.0005		<0.001	0.0005		<0.001	0.0005		-	0.0005		<0.001
Zinc	mg/L	0.008	0.0532		0.0120	0.0176		0.021	0.0085		0.616	0.0102		-	0.0196		0.0180	0.0132		0.1070	0.0090		-	0.0100		0.0100
Iron	mg/L	-	6.5800		10.5000	0.0354		<0.05	1.1600		<0.05	0.0322		-	84.5600		<0.05	1.7500		1.2600	4.6344		-	0.0600		<0.05
Mercury	mg/L	0.0006	0.0003		<0.0001	0.0001		<0.0001	0.0001		<0.0001	0.0001		-	0.0001		<0.0001	0.0003		<0.0001	0.0003		-	0.0003		<0.0001
Total Petroleum Hydrocarbons		-																								
C6-C9 Fraction	µg/L or ppb	-	10		<20	16		<20	16		<20	10.0000		-	10.0000		<20	10.0000		<20	10.0000		-	10.0000		<20
C10-C14 Fraction	µg/L or ppb	-	85		<50	25		<50	45		<50	25.0000		-	219.0000		<50	25.0000		<50	25.0000		-	25.0000		<50
C15-C28 Fraction	µg/L or ppb	-	50		<100	50		<100	50		<100	50.0000		-	190.0000		<100	50.0000		<100	25.0000		-	25.0000		<100
C29-C36 Fraction	µg/L or ppb	-	50		<50	50		<50	50		<50	35.0000		-	35.0000		<50	50.0000		<50	25.0000		-	25.0000		<50
C10-C36 Fraction	µg/L or ppb	-	178		<50	35		<50	226		<50	25.0000		-	556.0000		<50	25.0000		<50	1426.0000		-	149.0000		<50
BTEX		-																								
Benzene	µg/L or ppb	950	0.5		<1	0.5		<1	0.5		<1	0.5000		-	0.5000		<1	0.5000		<1	0.5000		-	0.5000		<1
Toluene	µg/L or ppb	-	1		<2	1		<2	1		<2	1.0000		-	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
Ethylbenzene	µg/L or ppb	-	1		<2	1		<2	1		<2	1.0000		-	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
m+p-Xylene	µg/L or ppb	-	1		<2	1		<2	1		<2	1.0000		-	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
o-Xylene	µg/L or ppb	-	1		<2	1		<2	1		<2	1.0000		-	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
Naphthalene	µg/L or ppb	-	2.5		<5	2		<5	2		<5	2.0000		-	2.5000		<5	2.5000		<5	2.0000		-	2.0000		<5
Nutrients		-																								
Total Phosphorus	mg/L	-	0.0284		0.08	0.0568		0.16	0.0480		0.02	0.0680		-	0.1260		0.10	0.4064		0.10	0.0740		-	0.0300		0.31
Phosphate	mg/L	-	0.0110		<0.01	0.0142		0.01	0.0126		0.02	0.0070		-	0.0160		0.0300	0.0410		<0.01	0.0090		-	0.0070		<0.01
Total Nitrogen	mg/L	-	0.5800		1.0	0.3800		2.4	0.5786		4.2	0.7000		-	2.1600		2.6	1.1232		0.7	0.6600		-	0.7000		1.3
Total Kjeldahl Nitrogen	mg/L	-	0.5800		1.0	0.1936		2.2	0.2536		0.4	0.4000		-	2.1600		2.5	0.7752		0.6000	0.3678		-	0.7000		0.90
Nitrate	mg/L	-	0.0250		0.03	0.2460		0.20	0.4000		3.79	0.3840		-	0.4000		<0.01	0.4546		0.1000	0.2712		-	0.1200		0.39
Nitrite	mg/L	-	0.0050		<0.01	0.0050		<0.01	0.0050		0.02	0.0050		-	0.0130		0.81	0.0160		<0.01	0.0050		-	0.0050		<0.01
Ammonia	mg/L	-	0.1148		<0.01	0.0640		0.16	0.0940		0.03	0.0440		-	0.7920		2.40	0.2300		0.08	0.0672		-	0.0310		0.02
Major anions																										
Chloride	mg/L	-	1704.3180		389	15.2		16	78.8		410	24.4400		-	948.8000		1890	2340.3736		2370	22.2000		-	39.1000		16.0000
Sulfate	mg/L	-	53.0000		18	10.392		7	61.8		834	10.5600		-	2056.0000		4430	2752.0000		2940	22.9680		-	35.0000		12.0000
Bicarbonate	mg/L	-	63.6000		35	27.4		25	142.2		5	18.4000		-	61.2000		468	942.0000		818	34.4000		-	29.0000		10.0000
Major cations																										
Sodium	mg/L	-	865.6000		138	18		18	72.0000		261	29.0800		-	720.0000		1350	1871.5397		1590	28.2000		-	51.9000		20
Potassium	mg/L	-	2.0000		2	0.96		<1	5.0000		5	0.5000		-	41.4000		68	96.6986		81	1.5509		-	0.5700		<1
Calcium	mg/L	-	5.9909		10	1.4797		4	50.4000		92	1.4000		-	189.6000		364	265.9524		239	2.7120		-	1.2100		1.0000
Magnesium	mg/L	-	134.7963		18	2		3	11.8000		109	0.9280		-	306.2000		570	565.0706		480	8.0077		-	2.7300		3
Physical																										
Total Dissolved Solids	mg/L	-	3572.992		1	94.68		361	130.624		1520	132.6000		-	132.6000		6200	8095.1200		4	106.3280		-	110.9040		80
Field Physical data																										
Depth to standing water level from TOC	m	-	16.802		15.41	8.7420		6.44	16.0140		1.48	8.4500		-	1.2000		0.50	1.3520		0.65	17.4120		-	13.8440		14.76
pH	pH	-	6.264	4.736	7.39	6.7800	5.8100	2.31	7.0900	5.9300	4.23	6.7780	6.2080	-	6.5080	5.9220	7.07	7.3040	6.7680	7.64	6.9800	5.2400	-	6.3960	5.5620	4.93
Conductivity	mS/cm	-	3630.000		0.001	111.300		0.209	231.000		2.36	0.342		-	5.550		9.85	8366.000		0.006	121.100		-	132.660		0.123
Temperature	oC	-	22.4420		17.94	22.3600		20.32	21.1500		21.49	22.6040		-	25.9820		23.22	22.5600		23.17	22.8200		-	23.1940		22.73

Exceedance of trigger level

Table 11 – Groundwater Monitoring Results – May 2017

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH010			4BH021			4BH022c			4BH025			4BH037a			4BH038			4BH057			4BH058c		
Cut/Fill			Cut 6 - West (DS)			Cut 11 - West (DS)			Cut 11 - East (US)			Cut 12 - West (DS)			Fill 15 - West			Fill 15 - East			Cut 17 - West (DS)			Cut 17 - East (US)		
Date of Sampling			12/05/2017			12/05/2017			12/05/2017			12/05/2017			12/05/2017			12/05/2017			12/05/2017			12/05/2017		
			Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results
Comments																							DRY			
Field Physical data																										
Depth to standing water level from TOC	m	-	16.802		15.50	8.7420		6.85	16.0140		1.97	8.4500		8.09	1.2000		0.69	1.3520		0.75	17.4120		-	13.8440		14.80
pH	pH	-	6.264	4.736	6.76	6.7800	5.8100	6.03	7.0900	5.9300	5.59	6.7780	6.2080	6.02	6.5080	5.9220	7.28	7.3040	6.7680	6.33	6.9800	5.2400	-	6.3960	5.5620	6.37
Conductivity	mS/cm	-	3630.000		2.05	111.300		0.143	231.000		2.24	0.342		0.254	5.550		10.50	8366.000		8.30	121.100		-	132.660		0.419
Temperature	○C	-	22.4420		21.26	22.3600		20.84	21.1500		22.29	22.6040		21.80	25.9820		20.54	22.5600		22.31	22.8200		-	23.1940		20.75
		Exceedance of trigger level																								

Table 12 – Groundwater Monitoring Results – June 2017

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH010			4BH021			4BH022c			4BH025			4BH037a			4BH038			4BH057			4BH058c		
Cut/Fill			Cut 6 - West (DS)			Cut 11 - West (DS)			Cut 11 - East (US)			Cut 12 - West (DS)			Fill 15 - West			Fill 15 - East			Cut 17 - West (DS)			Cut 17 - East (US)		
Date of Sampling			7/06/2017			7/06/2017			7/06/2017			7/06/2017			7/06/2017			7/06/2017			7/06/2017			7/06/2017		
			Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results
Comments												DRY									DRY					
Field Physical data																										
Depth to standing water level from TOC	m	-	16.802		15.63	8.7420		6.95	16.0140		1.98	8.4500		-	1.2000		0.65	1.3520		0.73	17.4120		-	13.8440		14.80
pH	pH	-	6.264	4.736	5.41	6.7800	5.8100	5.85	7.0900	5.9300	5.77	6.7780	6.2080	-	6.5080	5.9220	6.28	7.3040	6.7680	5.90	6.9800	5.2400	-	6.3960	5.5620	5.19
Conductivity	mS/cm	-	3630.000		2.95	111.300		0.188	231.000		2.32	0.342		-	5.550		10.05	8366.000		2.25	121.100		-	132.660		0.105
Temperature	○C	-	22.4420		18.08	22.3600		18.56	21.1500		19.66	22.6040		-	25.9820		18.29	22.5600		18.84	22.8200		-	23.1940		18.44
		Exceedance of trigger level																								

Table 13 – Groundwater Monitoring Results – July 2017

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH010			4BH021			4BH022c			4BH025a			4BH037a			4BH038			4BH057			4BH058c		
Cut/Fill			Cut 6 - West (DS)			Cut 11 - West (DS)			Cut 11 - East (US)			Cut 12 - West (DS)			Fill 15 - West			Fill 15 - East			Cut 17 - West (DS)			Cut 17 - East (US)		
Date of Sampling			20/07/2017			20/07/2017			20/07/2017			20/07/2017			20/07/2017			20/07/2017			20/07/2017			20/07/2017		
			Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results
Comments																					DRY					
Laboratory data - awaiting results																										
Metals																										
Aluminium	mg/L	0.055	0.2740		<0.01	0.0216		<0.01	0.0122		0.410	0.0324		<0.01	0.0264		<0.01	0.0050		<0.01	0.0050		-	0.0050		<0.01
Arsenic	mg/L	0.024	0.0009		<0.001	0.0020		<0.001	0.0001		<0.001	0.0005		<0.001	0.0005		<0.001	0.0010		<0.001	0.0010		-	0.0005		<0.001
Cadmium	mg/L	<LOR	0.0005		<0.0001	0.0001		<0.0001	0.0001		0.0096	0.0002		<0.0001	0.0002		<0.0001	0.0005		0.0002	0.0005		-	0.0005		<0.0001
Chromium	mg/L	0.001	0.0013		<0.001	0.0001		<0.001	0.0002		<0.001	0.0007		<0.001	0.0010		<0.001	0.0007		<0.001	0.0005		-	0.0005		<0.001
Copper	mg/L	0.0014	0.1620		<0.001	0.0108		0.004	0.0030		0.0080	0.0139		<0.001	0.0139		0.0010	0.0026		<0.001	0.0009		-	0.0082		0.0010
Lead	mg/L	0.0034	0.0010		<0.001	0.0002		<0.001	0.0016		<0.001	0.0022		<0.001	0.0005		0.0020	0.0005		<0.001	0.0009		-	0.0005		<0.001
Manganese	mg/L	-	0.2258		0.2930	0.0139		0.0050	0.4856		2.380	0.0124		0.003	5.2480		2.0900	1.5084		0.0500	0.4518		-	0.0800		0.0160
Nickel	mg/L	0.011	0.0196		0.0030	0.0058		<0.001	0.0036		0.1290	0.0007		<0.001	0.0068		0.0150	0.006		0.007	0.0030		-	0.0033		<0.001
Selenium	mg/L	-	0.0050		<0.01	0.0050		<0.01	0.0050		<0.01	0.0050		<0.01	0.0050		<0.01	0.0050		<0.01	0.0050		-	0.0050		<0.01
Silver	mg/L	<LOR	0.0005		<0.001	0.0001		<0.001	0.0001		<0.001	0.0005		<0.001	0.0005		<0.001	0.0005		<0.001	0.0005		-	0.0005		<0.001
Zinc	mg/L	0.008	0.0532		<0.005	0.0176		0.006	0.0085		0.430	0.0102		<0.005	0.0196		0.0300	0.0132		0.0920	0.0090		-	0.0100		<0.005
Iron	mg/L	-	6.5800		37.3000	0.0354		<0.05	1.1600		0.0500	0.0322		<0.05	84.5600		<0.05	1.7500		<0.05	4.6344		-	0.0600		<0.05
Mercury	mg/L	0.0006	0.0003		<0.0001	0.0001		<0.0001	0.0001		<0.0001	0.0001		<0.0001	0.0001		<0.0001	0.0003		<0.0001	0.0003		-	0.0003		<0.0001
Total Petroleum Hydrocarbons		-																								
C6-C9 Fraction	µg/L or ppb	-	10		<20	16		<20	16		<20	10		<20	10.0000		<20	10.0000		<20	10.0000		-	10.0000		<20
C10-C14 Fraction	µg/L or ppb	-	85		<50	25		<50	45		<50	25		<50	219.0000		<50	25.0000		<50	25.0000		-	25.0000		<50
C15-C28 Fraction	µg/L or ppb	-	50		<100	50		<100	50		<100	50		<100	190.0000		<100	50.0000		<100	25.0000		-	25.0000		<100
C29-C36 Fraction	µg/L or ppb	-	50		<50	50		<50	50		<50	35		<50	35.0000		<50	50.0000		<50	25.0000		-	25.0000		<50
C10-C36 Fraction	µg/L or ppb	-	178		<50	35		<50	226		<50	25		<50	556.0000		<50	25.0000		<50	1426.0000		-	149.0000		<50
BTEX		-																								
Benzene	µg/L or ppb	950	0.5		<1	0.5		<1	0.5		<1	0.5		<1	0.5000		<1	0.5000		<1	0.5000		-	0.5000		<1
Toluene	µg/L or ppb	-	1		<2	1		<2	1		<2	1		<2	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
Ethylbenzene	µg/L or ppb	-	1		<2	1		<2	1		<2	1		<2	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
m+p-Xylene	µg/L or ppb	-	1		<2	1		<2	1		<2	1		<2	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
o-Xylene	µg/L or ppb	-	1		<2	1		<2	1		<2	1		<2	1.0000		<2	1.0000		<2	1.0000		-	1.0000		<2
Naphthalene	µg/L or ppb	-	3		<5	2		<5	2		<5	2		<5	2.5000		<5	2.5000		<5	2.0000		-	2.0000		<5
Nutrients		-																								
Total Phosphorus	mg/L	-	0.0284		<0.01	0.0568		<0.01	0.0480		<0.01	0.0680		0.09	0.1260		<0.01	0.4064		<0.01	0.0740		-	0.0300		0.34
Phosphate	mg/L	-	0.0110		<0.01	0.0142		<0.01	0.0126		<0.01	0.0070		<0.01	0.0160		<0.01	0.0410		<0.01	0.0090		-	0.0070		<0.01
Total Nitrogen	mg/L	-	0.5800		0.3	0.3800		0.3	0.5786		2.7	0.7000		1.4	2.1600		1.6	1.1232		0.7	0.6600		-	0.7000		1.5
Total Kjeldahl Nitrogen	mg/L	-	0.5800		0.3	0.1936		0.2	0.2536		0.8	0.4000		1.2	2.1600		0.8	0.7752		0.3000	0.3678		-	0.7000		1.20
Nitrate	mg/L	-	0.0250		<0.01	0.2460		0.12	0.4000		1.94	0.3840		0.16	0.4000		0.7500	0.4546		0.3800	0.2712		-	0.1200		0.33
Nitrite	mg/L	-	0.0050		<0.01	0.0050		<0.01	0.0050		<0.01	0.0050		<0.01	0.0130		<0.01	0.0160		<0.01	0.0050		-	0.0050		<0.01
Ammonia	mg/L	-	0.1148		<0.01	0.0640		0.03	0.0940		0.11	0.0440		<0.01	0.7920		0.08	0.2300		0.05	0.0672		-	0.0310		<0.01
Major anions																										
Chloride	mg/L	-	1704.3		1120	15.2		16	78.8		252	24.4		53	949		1760	2340		206	22.2000		-	39.1000		16.0000
Sulfate	mg/L	-	53.000		38	10.392		8	61.8		735	10.6		8	2056		3700	2752		161	22.9680		-	35.0000		13.0000
Bicarbonate	mg/L	-	63.6		62	27.4		18	142.2		2	18.4		27	61		704	942		33	34.4000		-	29.0000		10.0000
Major cations																										
Sodium	mg/L	-	866		554	18		16	72.0000		197	29.0800		47	720		1340	1872		110	28.2000		-	52		17
Potassium	mg/L	-	2.00		2.0000	0.96		<1	5.0000		4	0.5000		<1	41		75	97		4	1.5509		-	1		<1
Calcium	mg/L	-	5.99		7	1.4797		1	50.4000		73	1.4000		<1	190		382	266		77	2.7120		-	1		<1
Magnesium	mg/L	-	135		94	2		2	11.8000		90	0.9280		1	306		564	565		22	8.0077		-	3		2
Field Physical data																										
Depth to standing water level from TOC	m	-	16.802		14.89	8.7420		6.57	16.0140		1.79	8.4500		7.95	1.2000		0.54	1.3520		0.66	17.4120		-	13.84		14.25
pH	pH	-	6.26	4.74	5.74	6.78	5.81	5.77	7.09	5.93	5.51	6.78	6.21	5.64	6.51	5.92	7.19	7.30	6.77	6.68	6.98	5.24	-	6.3960	5.56	5.56
Conductivity	mS/cm	-	3630.000		3.63	111.300		0.130	231.000		1.81	0.342		0.316	5.550		9.40	8366.000		1.10	121.100		-	132.660		0.151
Temperature	○C	-	22.4420		30.00	22.3600		21.46	21.1500		20.95	22.6040		20.44	25.9820		19.40	22.5600		18.84	22.8200		-	23.1940		21.92
Total Dissolved Solids	g/L		3.5720		2.32	0.0946		0.087	0.1306		1.20	0.1326		0.20	0.1326		6.09	8.10		0.704	0.106		-	0.111		0.098

Exceedance of trigger level

Table 14 – Groundwater Monitoring Results – August 2017

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH007		4BH008		4BH010			4BH011		4BH021			4BH022c			4BH025a			4BH026			4BH037a			4BH038			4BH057			4BH058c			4BH061		4BH062	
Cut/Fill			Cut 4 - East (US)		Cut 4 - West (DS)		Cut 6 - West (DS)			Cut 6 - East (US)		Cut 11 - West (DS)			Cut 11 - East (US)			Cut 12 - West (DS)			Cut 12 - East (US)			Fill 15 - West			Fill 15 - East			Cut 15 - West (DS)			Cut 15 - East (US)			Cut 23 - West (US)		Cut 23 - East (DS)	
Date of Sampling			4/08/2017		4/08/2017		4/08/2017			4/08/2017		4/08/2017			4/08/2017			4/08/2017			4/08/2017			4/08/2017			4/08/2017			4/08/2017			4/08/2017			4/08/2017		4/08/2017	
			Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile (from 4LDBH015)		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile		Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile	Results
Comments			DRY		DRY		Sulfur odour			DRY								DRY			DRY									DRY							DRY		DRY	
Field Physical Data																																							
Depth to standing water level from TOC	m	-	-	-	-	-	16.802		15.11	-	-	8.7420		6.80	16.0140		2.21	8.4500		-	14.4820		-	1.2000		0.67	1.3520		0.71	17.4120		-	13.84		13.44	-	-	-	-
pH	pH	-	-	-	-	-	6.26	4.74	6.20	-	-	6.78	5.81	6.59	7.09	5.93	6.39	6.78	6.21	-	7.34	6.2600	-	6.51	5.92	6.95	7.30	6.77	8.03	6.98	5.24	-	6.3960	5.56	6.77	-	-	-	-
Conductivity	mS/cm	-	-	-	-	-	3630.000		3.55	-	-	111.300		0.145	231.000		1.99	0.342		-	322.000		-	5.550		10.40	8366.000		1.35	121.100		-	132.660		0.115	-	-	-	-
Temperature	oC	-	-	-	-	-	22.4420		20.73	-	-	22.3600		21.47	21.1500		21.01	22.6040		-	21.3000		-	25.9820		18.78	22.5600		19.83	22.8200		-	23.1940		21.90	-	-	-	-
Total Dissolved Solids	g/L		-	-	-	-	3.5720		2.27	-	-	0.0946		0.095	0.1306		1.28	0.1326		-	22.3000		-	0.1326		6.46	8.10		0.862	0.106		-	0.111		0.075	-	-	-	-
		Exceedance of trigger level																																					

APPENDIX B – Noise and Vibration Monitoring

Table 1 – Noise Monitoring Results – February 2017

Date	Time	Location	Rec ID	NCA	NML	Activity	Predicted levels for activity	L_{Aeq}	L_{AFMAX}	L_{AFMIN}	L_{AF10}	L_{AF50}	L_{AF90}	Principal sources/ operations	Construction noise dominant?	Corrective actions	Notes
16/02/2017	2:09 PM	Albert Drive	74	1	50	Cut	62	50.5	76.7	42.8	51.8	49.2	47	Loader	No	NA	Dominant noise highway, birds
20/02/2017	4:46 PM	Cockburns Lane	16	1	50	Cut	65	42.9	65.1	35.1	44.8	42.2	38.4	Excavator	No	NA	Construction not audible. Dominant noise source: highway
20/02/2017	3:30 PM	Bald Hill Rd	197	3	50	Cut	72	49.2	74.2	38.2	48.2	43.5	40.5	Excavator, roller, trucks	No	NA	Dominant noise sources: highway, local traffic
16/02/2017	12:35 PM	Letitia Rd	406	4	59	Cut	74	63	72.5	55	65.4	62.3	59	Water cart, roller, grader, excavator	Yes	NA	Within predicted levels
16/02/2017	12:03 PM	Mattick Rd	442	6	44	Cut	62	44.8	67.8	35.5	46.1	41.4	38.7	Trucks, water cart	No	NA	Dominant noise sources: birds, plane, power tools at residence
20/02/2017	11:35 AM	Nursery Rd	415	4	59	Cut	53	56	80	41	50.8	46.5	44.1	Crane	No	NA	Construction not audible. Dominant noise sources: highway, local traffic
20/02/2017	3:47 PM	Wallace St	148	3	50	Cut	47	64.4	83.8	46.8	64.6	54.9	50.5	Excavator, roller, trucks	No	NA	Construction not audible. Dominant noise sourcess: highway, local traffic
20/02/2017	5:20 PM	Gumma Rd	383	3	50	Bridgeworks	67	50	65.7	40.5	53.5	47.1	44.1	Excavator loading trucks	Yes	NA	Within predicted levels

Table 2 – Noise Monitoring Results – March 2017

Date	Time	Location	Rec ID	NCA	NML	Activity	Predicted levels for activity	L_{Aeq}	L_{AFMAX}	L_{AFMIN}	L_{AF10}	L_{AF50}	L_{AF90}	Principal sources/ operations	Construction noise dominant?	Corrective actions	Notes
13/03/2017	4:35 PM	Albert Drive	74	1	50	Cut	62	52.4	74.6	38.7	53	47.3	42.9	Asphalt plant, excavator	N	NA	Within predicted levels. Dominant noise sources: local traffic, highway, birds
13/03/2017	4:55 PM	Cockburns Lane	16	1	50	Cut	65	46	65	42.3	47.3	45.8	44.2	Abutment works	N	NA	Construction not audible. Dominant noise sources: highway, birds, train
29/03/2017	3:23 PM	Bald Hill Rd	197	3	50	Cut	72	49.9	71	40.8	49.4	44.9	42.9	Excavator, street sweeper	N	NA	Dominant noise sources: birds, local traffic
29/03/2017	5:01 PM	Letitia Rd	406	4	59	Cut	74	57	74.2	48	60.6	53.4	50.7	Excavator, grader	Y	NA	Within predicted levels
29/03/2017	11:43 AM	Mattick Rd	442	6	44	Cut	62	45.2	63.7	36.4	48.3	42.5	39.1	Excavator, scraper, tractor	Y	NA	Within predicted levels
29/03/2017	4:40 AM	Nursery Rd	415	4	59	Cut	53	58.4	75.6	49.2	60.3	54.9	51.8	Trucks, excavator	N	NA	Construction not audible. Dominant noise sources: highway, birds, local traffic
29/03/2017	3:47 PM	Wallace St	148	3	50	Cut	47	60.8	75.6	47.6	64.6	55.1	51	Excavators	N	NA	Construciton not audible. Dominant noise sources: highway, local traffic
29/03/2017	4:17 PM	Gumma Rd	383	3	50	Hauling material	60	51.6	66.5	42.5	54	48.4	45.7	Trucks, franna	N	NA	Dominant noise sources: local traffic, highway, crickets

Table 3 – Noise Monitoring Results April 2017

Date	Time	Location	Rec ID	NCA	NML	Activity	Predicted levels for activity	L_{Aeq}	L_{AFMAX}	L_{AFMIN}	L_{AF10}	L_{AF50}	L_{AF90}	Principal sources/ operations	Construction noise dominant?	Corrective actions	Notes
11/04/2017	10:00 AM	Albert Drive	74	1	50	Cut	62	52.6	75.2	43.6	49.9	47.6	46.2	Asphalt plant	N	NA	Dominant noise sources: highway, local traffic, birds
11/04/2017	9:26 AM	Cockburns Lane	16	1	50	Cut	65	47.1	60.8	41.4	48.8	46.2	44		N	NA	Construction not audible. Dominant noise sources: highway, birds
11/04/2017	12:07 PM	Bald Hill Rd	197	3	50	Cut	72	55	70.8	46.9	55.7	51.8	49.4	Trucks, excavator, LVs	N	NA	Dominant noise sources: local traffic, highway traffic
11/04/2017	2:50 PM	Letitia Rd	406	4	59	Cut	74	57.6	66.3	47.4	61	56.3	51.5	NFR earthworks	Y	NA	Within predicted levels
11/04/2017	3:15 PM	Mattick Rd	442	6	44	Cut	62	50.9	72.9	45.4	51	49	47.4	Truck, excavator, roller	Y	NA	Within predicted levels
11/04/2017	2:20 PM	Nursery Rd	415	4	59	Cut	53	55.3	79.9	40.4	51.2	46.6	43.3	Excavators removing rock	N	NA	Dominant noise sources: highway, birds
11/04/2017	12:32 PM	Wallace St	148	3	50	Cut	47	61.4	86.4	44.9	62.9	53.7	49.2	Excavators loading trucks	N	NA	Construciton not audible. Dominant noise sources: local traffic
11/04/2017	11:20 AM	Gumma Rd	383	3	50	Hauling material	60	61.8	79.9	38.2	62.8	44.3	40.4	Truck	N	NA	Dominant noise sources: local traffic

Table 4 – Noise Monitoring Results May 2017

Date	Time	Location	Rec ID	NCA	NML	Activity	Predicted levels for activity	L_{Aeq}	L_{AFMAX}	L_{AFMIN}	L_{AF10}	L_{AF50}	L_{AF90}	Principal sources/ operations	Construction noise dominant?	Corrective actions	Notes
25/05/2017	10:23 AM	Albert Drive	74	1	50	Cut	62	58.8	74.2	50.7	61	56.2	52.8	Excavator, crusher	Y	NA	Within predicted levels, crusher placed behind stockpile of material to reduce noise levels. Consultation also undertaken with nearby residents in relation to crushing activity
25/05/2017	10:59 AM	Cockburns Lane	16	1	50	Cut	65	45.2	65.7	39.1	47.7	44	41.8	Excavator, trucks	N	NA	Construction not audible. Dominant noise sources: highway, birds
25/05/2017	11:32 AM	Bald Hill Rd	197	3	50	Concreting	77	52.6	72.4	46	54.4	51.7	48.6	Concreting	N	NA	Dominant noise sources: local traffic, highway traffic
22/05/2017	2:40 PM	Letitia Rd	406	4	59	Cut	74	61.2	75.9	46.4	64.5	59.4	52.7	Northern ramps earthworks	Y	NA	Within predicted levels. Regular consultation undertaken with residents impacted by NFR construction activities.
22/05/2017	1:58 PM	Mattick Rd	442	6	44	Cut	62	51.8	71.1	40.9	54.9	50	43.4	Excavators removing material	Y	NA	Within predicted levels. Permanent noise mounds currently in place to reduce construction noise at sensitive receivers.
22/05/2017	3:02 PM	Nursery Rd	415	4	59	Cut	53	56.4	78	43.6	55.4	51.6	48.5	Excavator removing rock	N	NA	Construction not audible. Dominant noise sources: highway, birds.
22/05/2017	4:00 PM	Wallace St	148	3	50	Cut	47	60.4	70.8	47.7	64.3	56.4	50.1	Excavator, concreting	N	NA	Construction not audible. Dominant noise sources: local traffic, highway.
22/05/2017	3:30 PM	Gumma Rd	383	3	50	Hauling material	60	56.9	71	51.6	58.8	55.6	54.3	Trucks, roller, air compressor	N	NA	Within predicted levels. Equipment to be spread out on the fill as much as practical to reduce noise levels to nearby sensitive receiver.

Table 5 – Noise Monitoring Results – June 2017

Date	Time	Location	Rec ID	NCA	NML	Activity	Predicted levels for activity	L_{Aeq}	L_{AFMAX}	L_{AFMIN}	L_{AF10}	L_{AF50}	L_{AF90}	Principal sources/ operations	Construction noise dominant?	Corrective actions	Notes
20/06/2017	3:30 PM	Albert Drive	74	1	50	Cut	62	59.7	75.7	53.7	62.2	58.8	56.2	Crusher, excavator, front end loader, trucks	Y	NA	Within predicted levels, crusher placed behind stockpile of material to reduce noise levels. Consultation also undertaken with nearby residents in relation to crushing activity
20/06/2017	4:04 PM	Cockburns Lane	16	1	50	Cut	65	51.9	76	44.3	51.3	48.2	46.1	Positrack, LVs	N	NA	Construction not audible. Dominant noise sources: mill, highway, birds
21/06/2017	2:25 PM	Bald Hill Rd	197	3	50	Cut	72	54.6	66	49	56.3	53.8	51.6	Excavator, grader	Y	NA	Within predicted levels. Stockpile in place on east side of alignment to reduce noise levels from construction activities.
7/06/2017	3:54 PM	Letitia Rd	406	4	59	Cut	74	50.5	71.8	40.9	50.9	46.5	44.2	Excavator, backhoe	Y	NA	Within predicted levels. Regular consultation undertaken with residents impacted by NFR construction activities.
7/06/2017	3:12 PM	Mattick Rd	442	6	44	Cut	62	52.6	65.9	45.8	55.7	50.8	48.4	Excavator, scraper, roller	Y	NA	Within predicted levels. Permanent noise mounds currently in place to reduce construction noise at sensitive receivers.
5/06/2017	1:05 PM	Nursery Rd	415	4	59	Kerb and concrete barrier	41	53.9	75.7	43.3	54.9	51.9	51.9	48.4	Crane	N	NA	Construction not audible. Dominant noise sources: lawn mower, birds.
21/06/2017	1:55 PM	Wallace St	148	3	50	Cut	47	58	75.2	44.2	60.7	51.9	46.6	Excavator, grader, trucks	N	NA	Construction not audible. Dominant noise sources: local traffic, highway.
5/06/2017	11:54 AM	Gumma Rd	383	3	50	Bridgework	66	64.5	87.6	55.5	65.4	62.3	59.4	Excavator loading material to trucks, air compressor	Y	NA	Within predicted levels. Equipment to be spread out on the fill as much as practical to reduce noise levels to nearby sensitive receiver.

Table 6 – Noise Monitoring Results – July 2017

Date	Time	Location	Rec ID	NCA	NML	Activity	Predicted levels for activity	L_{Aeq}	L_{AFMAX}	L_{AFMIN}	L_{AF10}	L_{AF50}	L_{AF90}	Principal sources/ operations	Construction noise dominant?	Corrective actions	Notes
11/07/2017	4:07 PM	Albert Drive	74	1	50	Cut	62	54.9	79.3	48.4	55.6	53.3	51.2	Excavator, crusher	Y	NA	Within predicted levels, crusher placed behind stockpile of material to reduce noise levels. Consultation also undertaken with nearby residents in relation to crushing activity
11/07/2017	3:35 PM	Cockburns Lane	16	1	50	Cut	65	48.1	59.9	43.2	49.6	47.8	45.9	Excavator, concreting	N	NA	Construction not audible. Dominant noise sources: mill, highway, birds
11/07/2017	4:30 PM	Bald Hill Rd	197	3	50	Cut	72	56	76	48	56.9	53.4	50.6	Roller, positrack, grader, street sweeper	Y	NA	Within predicted levels. Stockpile in place on east side of alignment to reduce noise levels from construction activities.
17/07/2017	4:00 PM	Letitia Rd	406	4	59	Cut	74	50.8	69	44.7	51.6	48.4	46.8	Excavator, dozer	Y	NA	Within predicted levels. Regular consultation undertaken with residents impacted by NFR construction activities.
13/07/2017	3:59 PM	Mattick Rd	442	6	44	Cut	62	51.3	68.4	44.8	53.9	50	48.2	Excavators	Y	NA	Within predicted levels. Permanent noise mounds currently in place to reduce construction noise at sensitive receivers.
17/07/2017	4:20 PM	Nursery Rd	415	4	59	Cut	53	55.7	75.7	47.6	56.6	52.9	49.8	Excavator, trucks	N	NA	Construction not audible. Dominant noise sources: existing highway.
17/07/2017	5:00 PM	Wallace St	148	3	50	Cut	47	61.6	76.5	51.7	64	58.2	54.3	Excavator	N	NA	Construction not audible. Dominant noise sources: local traffic, highway.
17/07/2017	4:40 PM	Gumma Rd	383	3	50	Hauling material	60	53.3	76.1	44.7	54.9	51.5	49.4	Trucks, concreting	Y	NA	Within predicted levels.

Table 7 – Vibration Monitoring – 21/2/17

DATE	TIME	Location	Vector Sum	Comment
[Date]	[Time]		[mm/s]	
2017-02-21	11:04:00	51 OCR	0.203	Background - no roller
2017-02-21	11:05:00	51 OCR	0.194	Background - no roller
2017-02-21	11:32:00	51 OCR	0.212	Background - no roller
2017-02-21	11:33:00	51 OCR	1.209	Roller 100m-30m - heavy vibe
2017-02-21	11:34:00	51 OCR	2.111	Roller 30m - heavy vibe
2017-02-21	11:35:00	51 OCR	2.692	Roller 30m - heavy vibe
2017-02-21	11:36:00	51 OCR	2.707	Roller 30m - heavy vibe
2017-02-21	11:37:00	51 OCR	2.861	Roller 30m - heavy vibe
2017-02-21	11:38:00	51 OCR	1.291	Roller 30m - heavy vibe
2017-02-21	11:39:00	51 OCR	2.712	Roller 30m - heavy vibe
2017-02-21	11:41:00	51 OCR	3.345	Roller 30m - heavy vibe
2017-02-21	11:42:00	51 OCR	1.289	Roller 30m - heavy vibe
2017-02-21	11:43:00	51 OCR	3.226	Roller 30m - heavy vibe
2017-02-21	11:44:00	51 OCR	2.861	Roller 30m - heavy vibe
2017-02-21	11:45:00	51 OCR	3.022	Roller 30m - heavy vibe
2017-02-21	11:46:00	51 OCR	1.64	Roller 30m - heavy vibe
2017-02-21	11:47:00	51 OCR	2.535	Roller 30m - heavy vibe
2017-02-21	12:10:00	53 OCR	1.461	Padfoot roller 30m - heavy vibe
2017-02-21	12:11:00	53 OCR	1.682	Padfoot roller 30m - heavy vibe
2017-02-21	12:12:00	53 OCR	1.854	Padfoot roller 30m - heavy vibe
2017-02-21	12:13:00	53 OCR	1.917	Padfoot roller 30m - heavy vibe
2017-02-21	12:14:00	53 OCR	1.7	Padfoot roller 30m - heavy vibe
2017-02-21	12:15:00	53 OCR	0.26	Background - roller static
2017-02-21	12:16:00	53 OCR	0.257	Background - roller static
2017-02-21	12:17:00	53 OCR	0.207	Background - no roller

Table 8 – Vibration Monitoring 14/7/17

Location	DATE	TIME	Vector Su	Comments
	[Date]	[Time]	[mm/s]	
OCR South	2017-07-14	17:44:00	1.045	Smooth roller vibe
OCR South	2017-07-14	17:45:00	0.849	Smooth roller vibe
OCR South	2017-07-14	17:46:00	1.133	Smooth roller vibe
OCR South	2017-07-14	17:47:00	1.984	Smooth roller vibe
OCR South	2017-07-14	17:48:00	0.546	Background
OCR South	2017-07-14	17:49:00	0.456	Background
OCR South	2017-07-14	17:50:00	1.834	Smooth roller vibe
OCR South	2017-07-14	17:51:00	1.473	Smooth roller vibe
OCR South	2017-07-14	17:52:00	0.352	Background

Table 9 – Vibration Monitoring 8/8/17

Location	DATE	TIME	Vector Sum	
	[Date]	[Time]	[mm/s]	
51 Nursery Rd	2017-07-1	15:27:00	0.217	Background
51 Nursery Rd	2017-07-1	15:28:00	0.582	2 x trucks slow middle of road
51 Nursery Rd	2017-07-1	15:29:00	0.214	background
51 Nursery Rd	2017-07-1	15:30:00	0.193	background
51 Nursery Rd	2017-07-1	15:31:00	0.189	background
51 Nursery Rd	2017-07-1	15:32:00	0.48	Loaded truck slow middle of road
51 Nursery Rd	2017-07-1	15:33:00	0.443	Loaded truck slow middle of road
51 Nursery Rd	2017-07-1	15:45:00	1.182	Unloaded truck slow southern edge
51 Nursery Rd	2017-07-1	15:46:00	0.203	background
51 Nursery Rd	2017-07-1	15:47:00	1.972	truck 60km/h unloaded southern edge
51 Nursery Rd	2017-07-1	15:48:00	0.831	Unloaded truck slow southern edge
51 Nursery Rd	2017-07-1	15:49:00	0.889	Unloaded truck slow southern edge
51 Nursery Rd	2017-07-1	15:50:00	1.493	Unloaded truck fast southern edge
51 Nursery Rd	2017-07-1	15:51:00	0.23	background
51 Nursery Rd	2017-07-1	15:52:00	0.399	Loaded truck slow
51 Nursery Rd	2017-07-1	15:53:00	0.347	Loaded truck slow

APPENDIX C – Air Quality Monitoring

Table 1: Air Quality Monitoring Results – February 2017

			DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8	DDG9NE	DDG9E	DDG A1	DDG A2
			Start date of sampling		2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017	2/02/2017
			Finish date of sampling		6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017
Analyte	Time Period	Unit	Levels of Concern	LOR													
Ash Content	Current Month	g/m².month	4	0.1	0.2	0.8	0.8	0.5	22.7	1.7	1.7	0.5	1	0.2	0.3	----	----
		mg	N/A	1	4	16	16	9	428	32	32	9	19	4	6	----	----
	Previous Month	g/m².month			0.3	0.6	0.6	0.5	0.5	1.8	1.2	0.5	0.9	0.3	0.2	----	----
	Change	g/m².month	Increase of 2		-0.1	0.2	0.2	0	22.2	-0.1	0.5	0	0.1	-0.1	0.1	----	----
Combustible Matter	Current Month	g/m².month	N/A	0.1	0.4	0.5	1.1	0.4	2.4	0.6	0.4	0.2	0.6	0.2	0.2	----	----
		mg	N/A	1	8	9	20	8	46	11	8	4	11	4	4	----	----
Total Insoluble Matter (TIM)	Current Month	g/m².month	4	0.1	0.6	1.3	1.9	0.9	25.1	2.3	2.1	0.7	1.6	0.4	0.5	----	----
		mg	N/A	1	12	25	36	17	474	43	40	13	30	8	10	----	----
	Previous Month	g/m².month		0.1	1	1.1	1	0.7	0.7	3.5	1.8	1	1.4	0.6	0.5	----	----
	Change	g/m².month	Increase of 2	0.1	-0.4	0.2	0.9	0.2	24.4	-1.2	0.3	-0.3	0.2	-0.2	0	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----	<0.001	<0.001
Comments													Overtopped				

Table 2: Air Quality Monitoring Results – March 2017

			DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8	DDG9NE	DDG9E	DDG A1	DDG A2
			Start date of sampling		6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017	6/03/2017
			Finish date of sampling		3/04/2017	3/04/2017	3/04/2017	3/04/2017	3/04/2017	4/04/2017	4/04/2017	4/04/2017	4/04/2017	3/04/2017	4/03/2017	3/04/2017	3/04/2017
Analyte	Time Period	Unit	Levels of Concern	LOR													
Ash Content	Current Month	g/m².month	4	0.1	0.1	0.3	0.7	0.4	0.3	1.1	6.4	2.9	0.2	0.2	0.3	----	----
		mg	N/A	1	2	5	12	7	5	19	110	49	4	3	5	----	----
	Previous Month	g/m².month			0.2	0.8	0.8	0.5	22.7	1.7	1.7	0.5	1	0.2	0.3	----	----
	Change	g/m².month	Increase of 2		-0.1	-0.5	-0.1	-0.1	-22.4	-0.6	4.7	2.4	-0.8	0	0	----	----
Combustible Matter	Current Month	g/m².month	N/A	0.1	0.7	0.2	0.4	0.3	0.3	0.4	1.3	0.8	0.2	<0.1	0.1	----	----
		mg	N/A	1	11	4	6	4	5	7	21	15	3	1	2	----	----
Total Insoluble Matter (TIM)	Current Month	g/m².month	4	0.1	0.8	0.5	1.1	0.7	0.6	1.5	7.7	3.7	0.4	0.2	0.4	----	----
		mg	N/A	1	13	9	18	11	10	26	131	64	7	4	7	----	----
	Previous Month	g/m².month		0.1	0.6	1.3	1.9	0.9	25.1	2.3	2.1	0.7	1.6	0.4	0.5	----	----
	Change	g/m².month	Increase of 2	0.1	0.2	-0.8	-0.8	-0.2	-24.5	-0.8	5.6	3	-1.2	-0.2	-0.1	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----	<0.001	<0.001
Comments																	

Table 3: Air Quality Monitoring Results – April 2017

			DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8	DDG9NE	DDG9E	DDG A1	DDG A2
			Start date of sampling		3/04/2017	3/04/2017	3/04/2017	3/04/2017	3/04/2017	4/04/2017	4/04/2017	4/04/2017	4/04/2017	3/04/2017	4/03/2017	3/04/2017	3/04/2017
			Finish date of sampling		4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017
Analyte	Time Period	Unit	Levels of Concern	LOR													
Ash Content	Current Month	g/m².month	4	0.1	0.1	0.8	1.9	0.7	0.8	0.8	0.8	2.2	1	0.7	0.3	----	----
		mg	N/A	1	2	14	34	12	14	14	14	38	18	12	6	----	----
	Previous Month	g/m².month			0.1	0.3	0.7	0.4	0.3	1.1	6.4	2.9	0.2	0.2	0.3	----	----
	Change	g/m².month	Increase of 2		0	0.5	1.2	0.3	0.5	-0.3	-5.6	-0.7	0.8	0.5	0	----	----
Combustible Matter	Current Month	g/m².month	N/A	0.1	0.1	0.4	0.5	0.2	0.2	0.1	0.6	0.5	0.3	0.1	0.2	----	----
		mg	N/A	1	2	8	9	4	4	2	11	10	5	2	3	----	----
Total Insoluble Matter (TIM)	Current Month	g/m².month	4	0.1	0.2	1.2	2.4	0.9	1	0.9	1.4	2.7	1.3	0.8	0.5	----	----
		mg	N/A	1	4	22	43	16	18	16	25	48	23	14	9	----	----
	Previous Month	g/m².month		0.1	0.8	0.5	1.1	0.7	0.6	1.5	7.7	3.7	0.4	0.2	0.4	----	----
	Change	g/m².month	Increase of 2	0.1	-0.6	0.7	1.3	0.2	0.4	-0.6	-6.3	-1	0.9	0.6	0.1	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----	<0.001	<0.001
Comments																	

Table 4: Air Quality Monitoring Results – May 2017

			DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8	DDG9NE	DDG9E	DDG A1	DDG A2
			Start date of sampling		4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017	4/05/2017
			Finish date of sampling		1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017
Analyte	Time Period	Unit	Levels of Concern	LOR													
Ash Content	Current Month	g/m².month	4	0.1	0.1	0.4	1.2	0.3	0.7	0.8	0.6	0.5	0.2	0.2	1.5	----	----
		mg	N/A	1	2	6	19	5	12	13	10	8	4	4	24	----	----
	Previous Month	g/m².month			0.1	0.8	1.9	0.7	0.8	0.8	0.8	2.2	1	0.7	0.3	----	----
	Change	g/m².month	Increase of 2		0	-0.4	-0.7	-0.4	-0.1	0	-0.2	-1.7	-0.8	-0.5	1.2	----	----
Combustible Matter	Current Month	g/m².month	N/A	0.1	0.3	<0.1	0.2	0.1	<0.1	0.2	0.3	0.2	0.2	<0.1	0.2	----	----
		mg	N/A	1	4	1	4	1	<1	4	5	3	3	<1	4	----	----
Total Insoluble Matter (TIM)	Current Month	g/m².month	4	0.1	0.4	0.4	1.4	0.4	0.7	1	0.9	0.7	0.4	0.2	1.7	----	----
		mg	N/A	1	6	7	23	6	12	17	15	11	7	4	28	----	----
	Previous Month	g/m².month		0.1	0.2	1.2	2.4	0.9	1	0.9	1.4	2.7	1.3	0.8	0.5	----	----
	Change	g/m².month	Increase of 2	0.1	0.2	-0.8	-1	-0.5	-0.3	0.1	-0.5	-2	-0.9	-0.6	1.2	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----	<0.001	<0.001
Comments					Insects in gauge								Insects in gauge		Insects in gauge		

Table 5: Air Quality Monitoring Results – June 2017

			DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8	DDG9NE	DDG9E	DDG A1	DDG A2
			Start date of sampling		1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017	1/06/2017
			Finish date of sampling		3/07/2017	3/07/2017	3/07/2017	3/07/2017	3/07/2017	3/07/2017	3/07/2017	3/07/2017	3/07/2017	3/07/2017	3/07/2017	3/07/2017	3/07/2017
Analyte	Time Period	Unit	Levels of Concern	LOR													
Ash Content	Current Month	g/m².month	4	0.1	0.2	0.2	0.8	0.2	0.4	1.6	0.9	0.5	0.3	0.2	1.7	----	----
		mg	N/A	1	4	3	15	3	8	30	17	10	6	4	32	----	----
	Previous Month	g/m².month			0.1	0.4	1.2	0.3	0.7	0.8	0.6	0.5	0.2	0.2	1.5	----	----
	Change	g/m².month	Increase of 2		0.1	-0.2	-0.4	-0.1	-0.3	0.8	0.3	0	0.1	0	0.2	----	----
Combustible Matter	Current Month	g/m².month	N/A	0.1	0.1	0.1	0.5	<0.1	0.3	0.7	0.4	0.1	0.2	0.1	0.7	----	----
		mg	N/A	1	2	2	10	<1	5	13	8	1	3	2	14	----	----
Total Insoluble Matter (TIM)	Current Month	g/m².month	4	0.1	0.3	0.3	1.3	0.2	0.7	2.3	1.3	0.6	0.5	0.3	2.4	----	----
		mg	N/A	1	6	5	25	3	13	43	25	11	9	6	46	----	----
	Previous Month	g/m².month		0.1	0.4	0.4	1.4	0.4	0.7	1	0.9	0.7	0.4	0.2	1.7	----	----
	Change	g/m².month	Increase of 2	0.1	-0.1	-0.1	-0.1	-0.2	0	1.3	0.4	-0.1	0.1	0.1	0.7	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----	<0.001	<0.001
Comments								Lawn mowed around gauge									

APPENDIX D – Compliance Tracking Tables

Appendix D.1 Minister's Conditions of Approval

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
Part A – Administrative conditions					
	Terms of approval				
A1	The Proponent shall carry out the project generally in accordance with the: *a* Major Projects Application 07_0112; *b* Upgrading the Pacific Highway – Warrell Creek to Urunga – Environmental Assessment (Volumes 1 and 2), prepared by Sinclair Knight Merz Pty Ltd for the NSW Roads and Traffic Authority and dated January 2010; *c* Upgrading the Pacific Highway – Warrell Creek to Urunga – Environmental Assessment Submissions and Preferred Project Report, prepared by the NSW Roads and Traffic Authority and dated November 2010; *d* Letter from the NSW Roads and Traffic Authority titled Pacific Highway Upgrade – Warrell Creek to Urunga Upgrade Addendum to Submissions Report – Fauna Crossing Structures, dated 25 May 2011 and accompanying attachments and Letter from the NSW Roads and Traffic Authority titled Pacific Highway Upgrade – Warrell Creek to Urunga Upgrade Addendum to Submissions Report – Fauna Crossing Structures, dated 1 June 2011 and accompanying attachment; *e* The Roads and Maritime Services modification	Stage 1 and 2	Preconstruction, Construction and Operation	Open	Status of Compliance with this condition is detailed in this document. The Scope of Work and Technical Criteria (SWTC) requires compliance with these documents. The Project has prepared one (1) Consistency Review this reporting period that compared the proposed detailed design to the concept design. Details of the Consistency Review is provided in Section 2.2 above.

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	request and letter dated 23 October 2012 (07_0112 MOD1); *f* The Roads and Maritime Services modification request and letter dated 23 November 2012 to correct a minor error in condition C28 (07_0112 MOD2); *g* The Roads and Maritime Services modification request and letter dated 18 January 2013 to correct minor errors in condition A1 (07_0112 MOD3); *h* The Roads and Maritime Services modification request and letter dated 13 February 2013 to amend the definition of construction in Schedule 1 (07_0112 MOD4); *i* The Roads and Maritime Services modification request and letter dated 9 September 2013 to amend the heritage management requirements in conditions C16 and C27 (07_0112 MOD5); j The Roads and Maritime Services modification request and letter dated 12 February 2014 to delete reference to 'vegetation group remnant forest' conservation area in condition C15 (07_0112 MOD6); k The Roads and Maritime Services modification request and letter dated 29 October 2014 to delete reference to four cultural sites in condition C14 (07_0112 MOD7); l The Roads and Roads and Maritime Services modification request and letter dated 21 March 2016 and Pacific Highway Upgrade – Warrell Creek to Nambucca Heads North Macksville				

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	Ramps – Modification Environmental Assessment, prepared by Arup Aurecon Design Joint Venture and dated March 2016; and m The conditions of this approval.				
A2	In the event of an inconsistency between: *a* the conditions of this approval and any document listed from condition A1(a) to A1(j) inclusive, the conditions of this approval shall prevail to the extent of the inconsistency; and; *b* any document listed from condition A1 (a) to A1 (j) inclusive, and any other document listed from condition A1 (a) and A1 (j) inclusive, the most recent document shall prevail to the extent of the inconsistency.	Stage 1 and 2	Preconstruction, Construction and Operation	Open	No issues were prevalent during the reporting period.
A3	The Proponent shall comply with any reasonable requirement(s) of the Director General arising from the Department's assessment of: *a* any reports, plans or correspondence that are submitted in accordance with this approval; and *b* the implementation of any actions or measures contained within these reports, plans or correspondence.	Stage 1 and 2	Preconstruction, Construction and Operation	Open	No requests have been raised by the Director General in the reporting period.
A4	Subject to confidentiality, the Proponent shall make all	Stage 1 and 2	Preconstruction, Construction	Open	All documents required under the Planning Approval are available for public inspection on

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	documents required under this approval available for public inspection on request.		and Operation		the Project Website and in the Community Display Centre located at 124 Albert Drive, Warrell Creek. The documents currently available include: - Approved CEMP and Sub-plans - Nest Box Management Plan - Threatened Flora Management Plan - Ecological Monitoring Program - Water Quality Monitoring Program - Community Involvement Plan (Community Communications Strategy). - Construction Compliance Tracking Reports #1, #2, #3 and #4 - Urban Design and Landscape Plan - Nambucca River and Floodplain Flood Modelling Report - Fauna Connectivity Report - Biodiversity Offset Strategy Project Approval documents are available on the RMS Project Website: Link to website with project Documents
	Staging				
A5	The Proponent may elect to construct and/ or operate	Stage 1 and 2	Preconstruction	Closed	Initial staging report issued to DP&E on 12 March 2013 in regards to Stage 1 and Stage 2,

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	the project in stages. Where staging of the project is proposed, these conditions of approval are only required to be complied with at the relevant time and to the extent that they are relevant to the specific stages of works. Where staging is proposed, the Proponent shall submit a Staging Report to the Director General prior to the commencement of the first proposed stage, which provide details of: *a* how the project would be staged including general details of work activities associated with each stage and the general timing of when each stage would commence; and *b* details of the relevant conditions of approval, which would apply to each stage and how these shall be complied with across and between the stages of the project. The Proponent shall ensure that an updated Staging Report (or advice that no changes to staging are proposed) is submitted to the Director General prior to the commencement of each stage, identifying any changes to proposed staging or applicable conditions. The Proponent shall ensure that relevant plans, sub-plans and other management documents required by the conditions of this approval relevant to each stage (as identified in the Staging Report) are submitted to the Director General. no later than one month prior to the commencement of the relevant stages, unless an alternative timeframe is agreed to by the Director General.				Stage 2 being Warrell Creek to Urunga. Updated staging report for Stage 2 (2.1 and 2.2) issued to DP&E on 19 February 2014. DP&E responded 23 May 2014 noting the staging report satisfactorily addressed requirements of MCoA A5. During the reporting period, RMS was working on an updated Staging Report to: • describe the scope of proposed project staging for Stage 2 (Warrell Creek to Nambucca Heads) of the project to permit: o the early opening to traffic of the section of Stage 2 between Scotts Head Road and Stage 1 of the project (providing a bypass of the townships of Macksville and Bellwood (Nambucca Heads)); and o the later opening to traffic of the remainder of Stage 2; • detail how compliance with the Conditions of Approval and Roads and Maritime's statement of commitments will be ensured across and between the stages of the Project.

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	Statutory requirements				
A6	The Proponent shall ensure that all necessary licences, permits and approvals required for the development of the project are obtained and maintained as required throughout the life of the project. No condition of this approval removes the obligation for the Proponent to obtain, renew or comply with such necessary licences, permits or approvals except as provided under Section 75U of the Act. This shall include relevant certification requirements in accordance with section 109R of the Act.	Stage 1 and 2	Preconstruction, Construction and Operations	Open	AFJV (Acciona Infrastructure) have obtained an Environment Protection Licence (EPL 20533) pursuant to Section 48 of the Protection of the Environment Operations Act 1997 (POEO Act). A copy of the licence is kept on the premises and is publicly available on the Acciona Infrastructure website: Link to Acciona Website and Environmental Documents and RMS Website Link to Project Documents A list of the groundwater bore and surface water permits is available in Section 9 above.
	Limits of approval				
A7	This approval shall lapse ten years after the date on which it is granted, unless construction works the subject of this project approval are physically commenced on or before that date.	Stage 1 and 2	Preconstruction	Closed	Construction for WC2NH commenced on 9 February 2015
A8	The Proponent shall implement the bridge crossing option (Option 2 in the Environmental Assessment) to traverse the floodplain from the northern bank of the Nambucca River to the existing Pacific Highway.	Stage 2	Preconstruction and Construction	Closed	Option 2 has been adopted and has been incorporated into the detailed design of the Nambucca River bridge structure. Construction has commenced on 9 February 2015 with construction commencing on the Nambucca Bridge structure in July 2015.
A9	The proposed trailer exchange facility located in the vicinity of the Nambucca Heads rest area does not form part of this approval.	Stage 2	NA	NA	Not included in the scope of this Project

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	Part B – Prior to Construction				
	Biodiversity – Mitigation measures – Fauna and Waterway Crossings				
B1	The Proponent shall implement the fauna and waterway crossings identified in the documents listed under condition A1 (d) at the locations and in accordance with the minimum design dimensions identified in the documents listed under condition A1 (d), unless otherwise agreed to by the Director General.	Stage 1 and 2	Preconstruction and Construction	Open	Fauna crossing structures and waterway crossings have been designed to address the minimum requirements in the letter "*Pacific Highway Upgrade – Warrell Creek to Urunga Upgrade Addendum to Submission Report – Fauna Crossing Structures (25/5/11)"* referred to in condition A1 (d) and progressed by AFJV in detailed design with ecological input. Consultation has been undertaken with EPA, DPI and DoE. Structures have been refined in consultation with EPA and DPI (Fisheries); several locations of the combined and dedicated structures have been moved as a result of this consultation. Specific fauna crossings/ fish passage requirements outlined within SWTC App 4.5 and Table 4.1 as well as SWTC App 5. Initial fauna and fish design discussions were held with EPA and DPI on 18 June 2014 (ERG 2). Onsite investigation / walkthrough with EPA, DoE and experienced ecologists to determine fauna crossing arrangements was undertaken in Aug 2014. The outcomes of this meeting were used to update the SWTC Table 4.1 to ensure the most appropriate underpass locations were identified and carried through

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
					into the design. The Design is based on the updated Table 4.1 of the SWTC. The detailed design has been issued to the EPA and DPI (Fisheries) for comment and has also been discussed at ERG meetings. The following fauna connectivity culverts have moved to more suitable locations (please note the new location is shown in the new Project chainage): - 13285 (55050) now located at 55120 - 14555 (56320) now located at 56410 - 16630 (58395) now located at 58510 and 58560 (as 1 x 3m x 3m combined culvert and 1 x 3m x 3m Dedicated culvert) - 17205 (58970) now located at 59090 - 17720 (59485) now located at 59550 - 18515 (60280) now located at 60600 NB and 60610 SB - 19350 (61115) now located at 61115 A Fauna Connectivity report was provided to the Director General in accordance with Condition B3 prior to the commencement of construction of the fauna connectivity structures, this was sent to DP&E by RMS on 17/7/2015. A letter confirming compliance was received by DP&E on the 21st April 2016. Construction of the crossings has commenced

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
					in accordance with the approved design and above report.
B2	As part of detailed design, the Proponent shall further investigate design refinements to improve fauna connectivity between Chainages 19150 and 19820.	Stage 1 and 2	Preconstruction	Open	Roads and Maritime proposed to increase the widened median area from 2500 m2 to 7500 m2 in ERG 2 (June 2014) and have agency comments in regard to this. The SWTC requires the addition of three crossing points (two glider poles and 1 rope ladder) to be installed within the widened median area. A pre-clearing assessment of the potential glider trees has been undertaken by Geolink. The potential glider trees have been identified to be retained. Post mainline clearing a Widened Median Detailed Glidability Assessment was completed on the 18/1/16 by Geolink (in consultant with Ross Goldingay) on behalf of AFJV to determine the retained glider trees and number of crossing points. The assessment determined that due to the existing terrain causing the carriageways to remain grade separated, the opportunities for two-way complete alignment crossing points is limited. The retained glider crossing trees allowed movements in a mostly west-east direction with minimal crossing points in an east-west direction. Only 2 crossing points were identified between chainages 59620 and 61180 utilising vegetation retained in the widened median. In both of these circumstances, movement of gliders is from west to east only. No movement east to west

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
					across both carriageways was demonstrated in the calculations. A workshop was held on site (2/6/16) with AFJV, RMS and the EPA to discuss the potential for additional glider crossing points including glider poles and rope bridges. Roads and Maritime have approved a total of 3 rope bridges and 4 sets of glider poles creating 7 crossing points. This is an additional 4 crossing points to the original 3 proposed as part of the SWTC. The design of the additional crossing points is being undertaken by AFJV with the support of RMS. Three additional dedicated fauna connectivity culverts have been installed. The details have been included in the Fauna Connectivity Report provided to DP&E in July 2015. A letter confirming compliance was received from DP&E on the 21st April 2016.
B3	All investigations into fauna crossings design undertaken during detailed design (with respect to the crossing design and locations identified in conditions B1 and B2 shall be undertaken with the input of a qualified and experienced ecologist and in consultation with EPA and DPI (Fisheries) through a process of workshops and on-site ground verification. Where detailed design refinements are made, the Proponent shall prior to the commencement of construction of the relevant crossings, submit a report to the Director General identifying the final design of the fauna crossings and demonstrating consistency with the	Stage 1 and 2	Preconstruction and Construction	Open	Initial fauna and fish design discussions with EPA and DPI (Fisheries) were held on 18 June 2014 (ERG 2). Onsite investigation / walkthrough with EPA, DoE and experienced ecologists to determine fauna crossing arrangements was undertaken in Aug 2014. The outcomes of this meeting were used to update the SWTC Table 4.1 to ensure the most appropriate underpass locations were identified and carried through into the design. The Design has progressed based on the

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	locations and minimum design parameters identified in the documents listed under condition A1 (d) or where there have been changes, how the new location and/ or design would result in a better biodiversity outcome. The report shall also clearly identify how the fauna crossings structures will work in conjunction with complementary fauna exclusion fencing measures to be implemented for the project. The report must be accompanied by evidence of consultation with EPA and DPI (Fisheries) in relation to the suitability of any changes to the crossings design.				updated Table 4.1 of the SWTC. The detailed design was provided to the EPA and Fisheries for comment and was also discussed during ERG meetings. There are SWTC App 4.5 / SWTC App 5 requirements in regards to fauna fencing. The fauna fencing locations have been revised based on advice from Roads and Maritime to address comments raised by DoE. The location of revised fauna fencing was discussed at the ERG meeting in August and September 2014. The revised fauna fencing locations were agreed in principle with the EPA during the ERG to progress the detailed design. A review of the locations of the fauna drop down structures was undertaken during this reporting period and final locations have been determined. A refined design of the structure has also been accepted by RMS. The installation of the structures is ongoing with the installation of the fencing. The Fauna Connectivity Report was submitted to DP&E in accordance with the approval conditions on 17th July 2015. A letter confirming compliance was received from DP&E on the 21st April 2016. Additional fauna fencing has been incorporated into the design of the Project at the request of the EPA between Floodplain Bridge 1 and Floodplain Bridge 2 on the Gumma Floodplain to ensure fauna species

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
					are directed to the designated fauna crossing points underneath the plank bridges on the floodplain.
B4	The Proponent shall in consultation with EPA, ensure that the design of the project as far as feasible and reasonable, incorporates provision for glider crossings (such as widened medians and maintenance or enhancement of habitat within the medians and corresponding carriageway boundaries) where the alignment crosses areas of recognised glider habitat.	Stage 1 and 2	Preconstruction	Open	The Project has incorporated a "widened median" design between chainage 59700 – 61100 through an area identified as glider habitat. This has been incorporated into the detailed design. The SWTC requires the addition of three crossing points (two glider poles and 1 rope ladder) to be installed within the widened median area. A pre-clearing assessment of the potential glider trees has been undertaken by Geolink. The potential glider trees have been identified to be retained. Post mainline clearing a Widened Median Detailed Glidability Assessment was completed on the 18/1/16 by Geolink (in consultation with Ross Goldingay) to determine the retained glider trees and number of crossing points. The assessment determined that due to the existing terrain causing the carriageways to remain grade separated, the opportunities for two-way complete alignment crossing points is limited. The retained glider crossing trees allowed movements in a mostly west-east direction with minimal crossing points in an east-west direction. Only 2 crossing points were identified between chainages 59620 and 61180 utilising vegetation retained in the widened median. In both of these

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
					circumstances, movement of gliders is from west to east only. No movement east to west across both carriageways was demonstrated in the calculations. A workshop was held on site (2/6/16) with AFJV, RMS and the EPA to discuss the potential for additional glider crossing points including glider poles and rope bridges. Roads and Maritime have approved a total of 3 rope bridges and 4 sets of glider poles creating 7 crossing points. This is an additional 4 crossing points to the original 3 proposed as part of the SWTC. The design of the additional crossing points is being undertaken by AFJV with the support of RMS.
B5	The Proponent shall in consultation with DPI (Fisheries) ensure that all waterway crossings are designed and constructed consistent with the principles of the *Guidelines for Controlled Activities Watercourse Crossings (DWE), Fish Note: Policy and Guidelines for Fish Friendly Waterway Crossings (NSW Fisheries) and Policy and Guidelines for Design and Construction of Bridges, Roads, Causeways, Culverts and Similar Structures (NSl4/ Fisheries)*. As far as feasible and reasonable, culvert replacements as part of the project shall incorporate naturalised bases and where multiple cell culverts are proposed for creek crossings, shall include at least one cell for fish passage, with an invert or bed level that mimics creek flows.	Stage 1 and 2	Preconstruction	Open	Early design consultation with DPI (Fisheries) has been undertaken the culverts requiring fish passage as agreed with Fisheries have been noted in Table 4.1 of the SWTC. All waterway crossings are being designed in accordance with the SWTC which incorporates the requirements of this condition (B5) and DPI Fisheries requirements. DPI Fisheries have been provided with the opportunity to comment on the detailed design of culverts that provide fish passage. The fish passage culverts have been designed to incorporate naturalised bases. Where multiple cell culverts have been proposed, an invert that mimics bed level and natural creek flows has been incorporated. DPI Fisheries

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					have requested that the low flow channel be conveyed through the scour rock at the culvert inlet and outlet. This has been incorporated into the detailed design. An unexpected find of Giant Barred Frogs occurred at Butchers Creek during the previous reporting period. EPA provided advice regarding natural bases for the culvert cells to provide a robust surface treatment for the base slabs which would be conducive to frog movements. A rock treatment has been provided in this culvert which has been inspected by the EPA. The EPA is supportive of AFJV's approach in this culvert. The rock treatment appears to be an effective approach at recreating the natural substrate of the creek line. DPI (Fisheries) and the EPA have also raised the use of alternative "soft treatments" in creek lines and channel realignments in conjunction with the use of scour rock. Soft treatments have been incorporated into the design at several creek lines along the Project alignment including Williamsons Creek, Stony Creek, Butchers Creek and Rosewood tributary. This detail has been included in the Urban Design and Landscaping Drawings (UD02) and has been reviewed by the EPA and DPI (Fisheries) as part of this process. Discussions on the implementation of the soft landscaping treatments will continue during the construction phase of the project via the ERG

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					site inspections and design updates. Issues are being raised at the monthly ERG meetings and closed out through site visits and/or ongoing communication. The installation of soft landscaping treatments has commenced at Stoney Creek, Williamsons Creek, Rosewood Tributary and Butchers Creek.

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	Biodiversity – Mitigation measures – Nest Boxes				
B6	Prior to the commencement of any construction work that would result in the disturbance of any native vegetation (or as otherwise agreed to by the Director General), the Proponent shall in consultation with EPA prepare and submit for the approval of the Director General a Nest Box Plan to provide replacement hollows for displaced fauna consistent with the requirements of SoC F7. The plan shall detail the number and type of nest boxes to be installed which must be justified based on the number and type of hollows removed (based on detailed pre-construction surveys), the density of hollows in the area to be cleared and adjacent forest, and the availability of adjacent food resources. The plan shall also provide details of maintenance protocols for the nest boxes installed including responsibilities, timing and duration.	Stage 1 and 2	Preconstruction and Construction	Open	The Nest Box plan prepared by Roads and Maritime was approved by DP&E on 20/03/2013. In accordance with the Nest Box Management Plan, 92 nest boxes have been installed along the Project alignment between the 26 November and the 11 December 2014 prior to the commencement of vegetation clearing on the Project. The nest boxes were installed by the Project Ecologist David Havilah (Geolink) in appropriate locations mapped within the approved Plan. As required by the Nest Box Management Plan, AFJV have calculated the final number of nest boxes requiring installation during the post-clearing phase. The revised calculation shows a slight reduction in the overall number of nest boxes required. The original number required was 152 this has now been reduced to 143. All nest boxes have been installed. An update to the Nest Box Management Plan has been approved by RMS and the Project ER. Nest Box Monitoring in accordance with the approved Plan was undertaken in Winter 2017.
	Biodiversity – Mitigation measures – *Amorphospermum whitei* and *Marsdenia longiloba*				
B7	Prior to the commencement of any construction work that would result in the disturbance of *Amorphospermum whitei* and *Marsdenia longiloba*, the	Stage 1 and 2	Preconstruction and Construction	Open	Potential impacts to *Amorphospermum whitei* and Marsdenia longiloba are incorporated into the Threatened Flora Management Plan (Ver

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	Proponent shall in consultation with the EPA develop a management plan for these species which: a investigates the potential for the translocation of plants impacted by the project; b if investigation under Condition B7(a) reveals translocation of impacted plants is feasible, includes details of a translocation plan for the plants consistent with the Australian Network for Plant Conservation 2"d Ed 2004: Guidelines for the Translocation of Threatened Species in Australia, including details of ongoing maintenance such as responsibilities, timing and duration; c identifies a process for incorporating appropriate compensatory habitat for the impacted plants in the Biodiversity Offset Strategy referred to in Condition B8 should the information obtained during the investigation referred to in Condition B7(a) find that translocation is not feasible or where the monitoring undertaken as part of condition B10 finds that translocation measures have not been successful (as identified through performance criteria); and d includes detail of mitigation measures to be implemented during construction to avoid and minimise impacts to areas identified to contain these species, including excluding construction plant, equipment, materials and unauthorised personnel. Unless otherwise agreed to by the Director General, the Plan shall be submitted for the Director General's approval prior to the commencement of any construction work that would result in the disturbance				4) (TFMP) which was provided to DP&E and approved on the 16/12/14. The TFMP was further updated on the 24/12/14 to incorporate comments from the Federal Department of Environment (Ver 5). A minor change to the TFMP to incorporate an additional monitoring event for November 2016 (as only 3 monitoring events were completed in year 1 of construction) was accepted by the ER in June 2016. The TFMP recommended translocating *A. whitei* and *M. longiloba* individuals that are either directly or indirectly impacted by the Project works. AFJV has engaged Ecos Environmental (Andrew Benwell) to complete the translocation of these species in accordance with the translocation plan detailed in the approved Plan. The translocation has been completed. • Translocated individuals and individuals noted to be “protected In situ” in the Plan have been protected on site using “No-Go Zone fencing” and signage. • Monitoring of the translocated and protected in-situ individuals will be undertaken in November 2017 in accordance with the approved TFMP.

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	of *Amorphospermum whitei* and *Marsdenia longiloba*.				
	Biodiversity offsets				
B8	The Proponent shall, in consultation with the EPA and DPI (Fisheries), develop a Biodiversity Offset Strategy that identifies available options for offsetting the biodiversity impacts of the project in perpetuity, with consideration to EPA's Principles for the Use of Biodiversity Offsets in NSW (EPA Website, June 2011). Unless otherwise agreed to by EPA, offsets shall be provided on a like-for-like basis and at a minimum ratio of 4:1 'for areas of high conservation value (including EEC and threatened species or their habitat identified in the Environmental Assessment to be impacted by the project and poorly conserved vegetation communities identified as being more than 75% cleared in the catchment management area) and 2:1 for the remainder of native vegetation areas (including mangroves, seagrass, salt marsh and riparian vegetation). The Strategy shall include, but not necessarily be limited to: a confirmation of the vegetation communities/ habitat (in hectares) to be offset and the size of offsets required (in hectares); b details of the available offset measures that have been identified to compensate for the biodiversity impacts of the project, such as (but not necessarily limited to): suitable compensatory land options and/ or contributions towards biodiversity programs for high conservation value areas on nearby lands (including research programs). Where the use of State Forest land managed in accordance with an	Stage 1 and 2	Preconstruction and Construction	Open	Comments were received from DP&E on the draft Biodiversity Offset strategy for Warrell Creek to Urunga (12 September 2013, April 2014). The Final Biodiversity Offset Strategy was submitted to DP&E on 23/10/14 for approval. DP&E approved the WC2U Biodiversity Offset Strategy on the 24 November 2014.

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	Integrated Forestry Operations Approval is proposed to offset biodiversity impacts, the Proponent shall clearly demonstrate how this would provide the biodiversity outcomes required under this condition including any additional offset requirements to cover residual impacts; c the decision-making framework that would be used to select the final suite of offset measures to achieve the aims and objectives of the Strategy, including the ranking of offset measures; d a process for addressing and incorporating offset measures for changes to impact (where these changes are generally consistent with the biodiversity impacts identified for the project in the documents listed under condition A1, including: i. changes to footprint due to design changes; ii. changes to predicted impacts resulting from changes to mitigation measures; iii. identification of additional species/habitat through pre-clearance surveys; and iv. additional impacts associated with ancillary facilities; and e options for the securing of biodiversity options in perpetuity. The Biodiversity Offset Strategy shall be submitted to, and approved by, the Director General prior to the commencement of any construction work that would result in the disturbance of any native vegetation, unless otherwise agreed by the Director General. Unless otherwise agreed, the Biodiversity Offset Strategy shall be submitted to the Director General for				

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	approval no later than 6 weeks prior to the commencement of any construction that would result in the disturbance of any native vegetation. The Proponent may elect to satisfy the requirements of this condition by implementing a suitable offset package which addresses impacts from multiple Pacific Highway Upgrade projects (including the Warrell Creek to Urunga Project) within the North Coast Bio-region. Any such agreement made with the EPA must be made in consultation with the Department and approved by the Director General within a timeframe agreed to by the Director General.				
B9	Within two years of the approval of the Biodiversity Offset Strategy, unless otherwise agreed by the Director General, the Proponent shall prepare and submit a Biodiversity Offset Package which identifies the final suite of offset measures to be implemented for the project for the approval of the Director General. The Package shall be developed in consultation with EPA, and shall provide details of: a the final suite of the biodiversity offset measures selected for the project demonstrating how it achieves the requirements and aims of the Biodiversity Offset Strategy (including specified offset ratios); b the final selected means of securing the biodiversity values of the offset package in perpetuity including ongoing management, monitoring and maintenance requirements; and c timing and responsibilities for the implementation of the provisions of the package over time.	Stage 1 and 2	Construction and Operations	Open	The WC2NH Biodiversity Offset Package was approved by DP&E on 13 June 2017.

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	The requirements of the Package shall be implemented by the responsible parties according to the timeframes set out in the Package.				
	Ecological Monitoring				
B10	Prior to the commencement of any construction work that would result in the disturbance of any native vegetation, the Proponent shall develop an Ecological Monitoring Program to monitor the effectiveness of the mitigation measures implemented as part of the project. The program shall be developed in consultation with EPA and prepared by a suitably qualified ecologist and shall include but not necessarily be limited to: a an adaptive monitoring program to assess the effectiveness of the mitigation measures identified in condition B1 to B6, B7(b), B7(d), B21(c) and B31(b)and allow amendment to the measures if necessary. The monitoring program shall nominate appropriate and justified monitoring periods and performance targets against which effectiveness will be measured. The monitoring shall include operational road kill surveys to assess the effectiveness of fauna crossing and exclusion fencing implemented as part of the project; b mechanism for developing additional monitoring protocols to assess the effectiveness of any additional mitigation measures implemented to address additional impacts in the case of design amendments or unexpected threatened species finds during construction (where these additional	Stage 1 and 2	Preconstruction and Construction	Open	Ecological Monitoring Program for WC2NH has been finalised and submitted to DP&E for approval on the 25/11/14. All EPA comments have been addressed as part of the final Ecological Monitoring Program. The Ecological Monitoring Program was approved by DP&E on the 16/12/14. The Ecological Monitoring Program has been implemented on site with the following monitoring undertaken during the reporting period: • Grey-Headed Flying Fox – monthly detailed population counts and daily pre works presence checks (undertaken prior to the 1st May) in accordance with the approved Grey-Headed Flying Fox Management Plan; • Giant Barred Frog population monitoring (Autumn year 3 of construction) • Nest Box Monitoring (Winter year 3 of construction) • Microbat Monitoring including roost box, overwintering and habitat monitoring (Roost Box

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	impacts are generally consistent with the biodiversity impacts identified for the project in the documents listed under condition A1; c monitoring shall be undertaken during construction (for construction-related impacts) and from opening of the project to traffic (for operation/ongoing impacts) until such time as the effectiveness of mitigation measures can be demonstrated to have been achieved over a minimum of five successive monitoring periods (i.e. 5 years) after opening of the project to traffic, unless otherwise agreed to by the Director General. The monitoring period may be reduced with the agreement of the Director General in consultation with EPA, depending on the outcomes of the monitoring; d provision for the assessment of the data to identify changes to habitat usage and if this can be attributed to the project; e details of contingency measures that would be implemented in the event of changes to habitat usage patterns directly attributable to the construction or operation of the project; and f provision for annual reporting of monitoring results to the Director General and EPA, or as otherwise agreed by those agencies. The Program shall be submitted for the Director General's approval prior to the commencement of any construction work that would result in the disturbance of any native vegetation. Unless otherwise agreed, the Program shall be submitted to the Director General for approval no later than 6 weeks prior to the				monitoring has occurred in year 3 during Summer, Autumn and Winter. Overwintering monitoring occurred in year 3 during Winter. Habitat monitoring involves monthly flyway photo points and a 6-monthly report). • Roadkill monitoring in accordance with the Roadkill Monitoring Strategy • 6-Monthly Weed Monitoring Reports (June 2017). • Landscape Rehabilitation Monitoring has also commenced (Monthly photo points and a quarterly checklist is completed). No negative impacts from construction to habitat usage have been noted. The Project ER endorsed a change to the Ecological Monitoring Program in June 2017 to incorporate the monitoring requirements for landscape rehabilitation in accordance with the approved Urban Design and Landscape Plan.

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	commencement of any construction that would result in the disturbance of any native vegetation.				
	Hydrology and flooding				
B11	The Proponent shall undertake further flood modelling during detailed design to ensure that the Nambucca River crossing is designed and constructed with the aim of not exceeding the afflux and other flood characteristics predicted in the Environmental Assessment and Response to Submissions.	Stage 2	Preconstruction	Closed	AFJV have undertaken flood modelling based on the detailed design. The flood modelling identified that there would be a minor increase in water levels directly upstream of the Nambucca Bridge structure due to the presence of the bridge piers but this effect does not result in any change to the flow distributions through the channel or across the floodplain. Predicted water level increases are within the afflux limit of 15mm specified in the Project EA. This also meets the afflux requirements included in Section 4.28 of Appendix 4 of the SWTC. The Flood Modelling and Hydrology Report for the Nambucca River and Floodplain were provided to DP&E on the 23/04/15 for review. This document aims to demonstrate compliance with Conditions B11, B12, B13, B14 and B15. The ER endorsed the report and confirmed compliance with Conditions B11-B15 on the 23/04/15. RMS provided AFJV with written approval to commence works within the floodplain on the 24/04/15. Comments from DP&E were received on the 22/05/15 which was addressed by AFJV and a revised report submitted to DP&E on 24th July 2015. DP&E approval obtained on 10/8/2015.

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					No changes to the document or the design throughout the reporting period.
B12	Prior to the commencement of construction within areas affected by an increased afflux from the project, the Proponent shall in consultation with the EPA, DPI (Fisheries) and Nambucca Shire Council undertake flood modelling of the Nambucca River and floodplain based on the detailed design of the project, and submit the flood modelling report for the approval of the Director General. The flood modelling shall: a assess the impacts of the project on flood behaviour (in relation to Nambucca River and floodplain; b confirm the location and size of structures for the crossing the Nambucca River and floodplain which meet the performance criteria outlined in Condition B11; c examine flood behaviours through the full range of flood events including but not limited to the 10%, 5%, 2%, 1% 0.5% and 0.2% Annual Exceedance Probability; d examine any changes in the flood behaviour under climate change conditions; and e examine any changes to existing conditions for flood timing, afflux, inundation, flood velocity, scour and siltation flood warning and flood evacuation strategies including stock.	Stage 2	Preconstruction	Closed	AFJV have undertaken flood modelling based on the detailed design. The flood modelling identified that there would be a minor increase in water levels directly upstream of the Nambucca Bridge structure due to the presence of the bridge piers but this effect does not result in any change to the flow distributions through the channel or across the floodplain. Predicted water level increases are within the afflux limit of 15mm specified in the Project EA. This also meets the afflux requirements included in Section 4.28 of Appendix 4 of the SWTC. The Flood Modelling and Hydrology Report for the Nambucca River and Floodplain were provided to DP&E on the 23/04/15 for review. This document aims to demonstrate compliance with Conditions B11, B12, B13, B14 and B15. The ER endorsed the report and confirmed compliance with Conditions B11-B15 on the 23/04/15. RMS provided AFJV with written approval to commence works within the floodplain on the 24/04/15. Comments from DP&E were received on the 22/05/15, addressed by AFJV and formal response sent on 31/7/2015 (Version 8 of B12 Report). DP&E approved on 10/08/2015. No changes to the document or the design were made throughout the reporting period.

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B13	Prior to commencement of construction within areas affected by an increased afflux from the Nambucca River and Kalang River crossings, the Proponent shall submit a hydrological mitigation report for the approval of the Director General detailing all feasible and reasonable flood mitigation measures for all properties where flood impacts are predicted to increase as a result of the project. The Report shall be based on detailed floor level survey and associated assessment of potentially flood affected properties. The report shall: a identify all properties likely to have an increased flooding impact and detail the predicted increased flooding impact; b identify mitigation measures to be implemented where increased flooding is predicted to adversely affect access, property or infrastructure; c identify measures to be implemented to minimise scour and dissipate energy at locations where flood velocities are predicted to increase as a result of the project and cause localised soil erosion and/or pasture damage; d be developed in consultation with EPA, the relevant Council, NSW State Emergency Service and directly-affected property owners; and e identify operational and maintenance responsibilities for items (a) to (e) inclusive. The Proponent shall not commence construction of the project on or within areas likely to alter flood conditions until such time as works identified in the hydrological mitigation report have been completed, unless	Stage 1 and 2	Preconstruction and Construction	Closed	AFJV have undertaken flood modelling based on the detailed design. The flood modelling identified that there would be a minor increase in water levels directly upstream of the Nambucca Bridge structure due to the presence of the bridge piers but this effect does not result in any change to the flow distributions through the channel or across the floodplain. Predicted water level increases are within the afflux limit of 15mm specified in the Project EA. This also meets the afflux requirements included in Section 4.28 of Appendix 4 of the SWTC. No properties were identified as impacted by increased afflux from the Project works. Therefore, no mitigation measures are proposed for properties. The Flood Modelling and Hydrology Report for the Nambucca River and Floodplain were provided to DP&E on the 23/04/15 for review. This document aims to demonstrate compliance with Conditions B11, B12, B13, B14 and B15. The ER endorsed the report and confirmed compliance with Conditions B11-B15 on the 23/04/15. RMS provided AFJV with written approval to commence works within the floodplain on the 24/04/15. Comments from DP&E were received on the 22/05/15 which was addressed by AFJV and a revised report submitted to DP&E on 24th July 2015. DP&E approval obtained on 10/8/2015. No changes to the document or the design

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	otherwise agreed by the Director General.				were made throughout the reporting period.
B14	Based on the mitigation measures identified in condition B13, the Proponent shall prepare a final schedule of feasible and reasonable flood mitigation measures proposed at each directly affected property in consultation with the property owner. The schedule shall be provided to the relevant property owner(s) no later than two months prior to the implementation of the mitigation works, unless otherwise agreed by the Director General. A copy of each schedule of flood mitigation measures shall be provided to the relevant Council and the Department prior to the implementation / construction of the mitigation measures on the property.	Stage 1 and 2	Preconstruction and Construction	Closed	No properties were identified as impacted by increased afflux from the Project works. Therefore, no mitigation measures are proposed for properties. The Flood Modelling and Hydrology Report for the Nambucca River and Floodplain were provided to DP&E on the 23/04/15 for review. This document aims to demonstrate compliance with Conditions B11, B12, B13, B14 and B15. The ER endorsed the report and confirmed compliance with Conditions B11-B15 on the 23/04/15. RMS provided AFJV with written approval to commence works within the floodplain on the 24/04/15. Comments from DP&E were received on the 22/05/15 which was addressed by AFJV and a revised report submitted to DP&E on 24th July 2015. DP&E approval obtained on 10/8/2015. No changes to the document or the design were made throughout the reporting period.
B15	In the event that the Proponent and the relevant property owner cannot agree on feasible and reasonable flood mitigation measures to be applied to a property within one month of the first consultation on the measures (as required under Condition B14), the Proponent shall employ a suitably qualified and experienced independent hydrological engineer (who has been approved by the Director General for the purposes of this condition prior to the commencement of construction) to advise and assist affected property owners in negotiating feasible and reasonable	Stage 1 and 2	Preconstruction and Construction	Closed	WMA still are the project hydrological consultant used for independent review/ comment of designs eg. the B12/B13 report as approved.

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	mitigation measures.				
B16	The Proponent shall provide assistance to the relevant Council's and/ or NSW State Emergency Service to prepare any new or necessary update(s) to the relevant plans and documents in relation to flooding, to reflect changes in flooding levels, flows and characteristics as a result of the project, as identified in the documents listed under condition A1 and the modelling undertaken as part of condition B12.	Stage 1 and 2	Preconstruction and Construction	Open .	AFJV provides Roads and Maritime with all the information, details and data as a consequence of the Project Works that Roads and Maritime requires in providing assistance. RMS has provided assistance to NSC and SES for WC2U Stage 2 component as per B16. B12 Report submitted to NSC and SES as part of the consultative component for preparation finalisation of the report. RMS has provided assistance to council to prepare any new or necessary update to relevant plans and documents in relation to flooding to reflect changes in flooding levels, flows and characteristics as a result of the project. Email sent from RMS to DP&E detailing consultation on 31/7/2015. During the reporting period, RMS commenced a review of the flood studies for Warrell Creek in the vicinity of Browns Crossing Road and the Upper Warrell Creek crossing. Should the review result in changes to the flood modelling report, the updated report will be provided to Council, at no cost to Council, for use in floodplain management planning.
	Water Quality				
B17	The Proponent shall prepare and implement a Water Quality Monitoring Program to monitor the impacts of the project on SEPP 14 wetlands, surface water quality and groundwater resources during construction and	Stage 1 and 2	Preconstruction, Construction and Operation	Open	a) Shown in the Geolink approved WQMP plan as approved by DP&E 23 May 2014. The interpretative report recommends refinement of bore locations

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	operation. The Program shall be developed in consultation with EPA and DPI and shall include but not necessarily be limited to: a identification of surface water and groundwater quality monitoring locations which are representative of the potential extent of impacts from the project; b identification of works and activities during construction and operation of the project, including emergencies and spill events, that have the potential to impact on surface water quality and risks to oyster farming in the Nambucca, Bellinger, and Kalang rivers; c representative background monitoring of surface water and groundwater quality parameters for a minimum of six (6) months (considering seasonality) prior to the commencement of construction to establish baseline water conditions; d development and presentation of indicators or standards against which any changes to surface water quality will be assessed, having regard to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (ANZECC, 2000); e contingency and ameliorative measures in the event that adverse impacts to surface water quality are identified; f a minimum monitoring period of three years following the completion of construction or until any disturbed waterways/ groundwater resources are certified by an independent expert as being rehabilitated to an acceptable condition. The				based on prior monitoring results and the detailed design of cuts and fills. The final plan indicating refinements was issued to DP&E as an addendum to the 23 May 2014 approved WQMP once completed end of September 2015. b) Outlined in the approved WQMP as approved by DP&E 23 May 2014 c) The attached interpretative report and data sets are pursuant with the approval letter dated 25 May 2014 and forms the additional 4 months baseline monitoring data to that approved for January and February 2014 per DP&Es approval letter dated 23.5.14. It is noted that the monitoring data sets were collected 6 months prior to start of construction on 9 February 2015 and those up to Dec 2014 were issued to DP&E via the required preconstruction compliance report (PCCR) as approved in December 2014 d) Outlined in the approved WQMP as DP&E approved 23 May 2014 e) Outlined in the approved WQMP plan DP&E approved 23 May 2014 f) Not yet entered completion phase anticipated such end of 2017 g) Results are presented to EPA and DPI monthly via the ERG and 6 monthly via the CTR to the DP&E Submission of WQMP to DG DP&E 6 months prior to commencement of construction; The WQMP was submitted on 22 April 2014 and approved on 23 May 2014. Construction

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	monitoring shall also confirm the establishment of operational water control measures (such as sedimentation basis and vegetation swales); and g reporting of the monitoring results to the Department, EPA and DPI. The Program shall be submitted to the Director General for approval six (6) months prior to the commencement of construction of the project, or as otherwise agreed by the Director General. A copy of the Program shall be submitted to EPA and DPI prior to its implementation.				commenced 9 February 2015 thus DP&E DG approval sought and obtained 6 months prior to construction commencing. AFJV (AFJV) is currently undertaking the Surface Water and Groundwater monitoring programs during the construction phase of the Project. Monitoring results are summarised in Section 7 above. The results are presented at the monthly ERG meetings and are discussed in detail. The surface water monitoring results are compared with trigger values and ANZECC guidelines where the trigger value is absent. The Project has not recorded any impacts on surface water or groundwater that is attributable to construction activities. AFJV are currently proposing a change to the approved Groundwater Monitoring Program to remove several bores from the program that have been dry throughout construction. The updated monitoring program has been provided to DP&E for approval.
	Heritage impacts				
B18	As part of detailed design, the Proponent shall ensure that the final design of the alignment is aligned to minimise project impacts on the Cow Creek Aboriginal Reserve (21-6-0228) as far as practicable and detail these design considerations in the Heritage Management Plan required to be prepared under	Stage 1	Preconstruction	NA	Not applicable to the WC2NH Project (Stage 2).

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	condition B31(e).				

B19	Prior to the commencement of pre-construction and construction activities affecting the following Aboriginal sites the Proponent shall undertake the relevant salvage mitigation measures outlined in the Environmental Assessment for these sites:
	a Butchers Creek 1 (previously PAD 1);
	b Stoney Creek 1 (previously PAD 24);
	c Bald Hill Road 1 (previously PAD 7);
	d Old Coast Road Stone Artefact (previously PAD 2);
	e Boggy Creek Artefact 1 & resource gathering area (previously PAD 16);
	f Cow Creek Artefact Scatter (previously PAD 8);
	g Kalang Spur Artefact Scatter (previously PAD 12);
	h Kalang Flat 1 9(a) (previously PAD 9);
	i Kalang Flat 2 9(b) (previously PAD 9);
	j South Arm Road 1;
	k Tyson's Flat Ridge Artefact Scatter (previously PAD 29);
	l Tyson's Flat I (previously PAD 28); and
	m Tyson's Flat 2 (previously PAD 27).
	The results of the salvage program shall be provided to the Department, OEH and Aboriginal stakeholders within six months of the completion of the salvage program, unless otherwise agreed by the Director General.
		Stage 1 and 2	Preconstruction	Closed	Archaeological Salvage works have been undertaken by Roads and Maritime. Sites located within the Project Boundary have been cleared to commence construction in October 2014.
					RMS submitted salvage report to LALC's in August 2012. RMS submitted the results of the salvage report to DP&E (formally DOPI) on 1/8/2012.

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B20	Prior to the commencement of pre-construction and construction activities affecting the possible house site identified as Site 12 in Table 19-3 of the Environmental Assessment, the Proponent shall prepare an archaeological assessment in consultation with the OEH (Heritage Branch), and generally in accordance with the Departments Archaeological Assessments Guideline (1996), and submit the assessment for the Director General's approval. Any further archaeological work recommended on this site by the assessment shall be undertaken by the Proponent in consultation with the OEH (Heritage Branch) and reported to the Director General within six months of the completion of the work, unless otherwise agreed by the Director General.	Stage 1	Preconstruction	NA	Not applicable to the WC2NH Project (Stage 2).
	Urban design and landscaping				
B21	Prior to the commencement of construction (unless otherwise agreed to by the Director General), the Proponent shall prepare and implement an Urban Design and Landscape Plan for the project. The plan shall be prepared in consultation with the relevant Council and shall present an integrated urban design for the project. The plan shall include, but not necessarily be limited to: a a principle goal of achieving the urban design objectives outlined in Section 13.4 of Volume 1 of the Environmental Assessment; b sections and perspective sketches; c locations along the project corridor directly or	1 and 2	Preconstruction and Construction	Open	A letter seeking approval for a staged Plan and to submit the UDLP after the commencement of construction was provided to DP&E on the 25/11/14. A letter confirming staged submission of the Project UDLP was provided by DP&E on the 04/12/14. Stage 1 of the UDLP was provided to DP&E on the 01/06/15. Stage 1 of the UDLP included the Project design at the 15% detailed design phase. It included a methodology for bushland regeneration, riparian zone rehabilitation, preferred seed mixes and concepts for the

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	indirectly impacted by the construction of the project (e.g. temporary ancillary facilities, access tracks, watercourse crossings, etc.) which are proposed to be actively rehabilitated, regenerated and/ or revegetated to promote biodiversity outcomes and visual integration. Details of species to be replanted/ revegetated shall be provided,, including their appropriateness to the area and considering existing vegetation and habitat for threatened species; d location of existing vegetation and proposed landscaping, including use of indigenous and endemic species where possible. The plan shall assess the visual screening effects of existing vegetation and the proposed landscaping at residences and businesses, which have been identified as likely to experience high visual impact as a result of the project. Where high residual impacts are identified to remain (including in relation to headlight intrusion), the plan shall in consultation with affected receptors, identify opportunities for providing at-receptor landscaping to further screen views of the project. Where agreed to with the landowner, these measures shall be implemented during the construction of the project; e strategies for progressive landscaping incorporating other environmental controls such as erosion and sedimentation controls, drainage, noise mitigation; f location and design treatments for built elements including retaining walls, cuttings, bridges, and noise barriers;				design of built elements. Comments were received from DP&E on the 26/06/15. The comments were addressed by AFJV as part of the 85% UDLP Review Process. UDLP Community Consultation was undertaken by RMS/AFJV on the 07/11/2015 at the Macksville Senior Citizens Centre Stage 2 of the UDLP was provided to DP&E on the 1/12/2016 and included details of the final design of built elements, evidence of community consultation and other outstanding information. Comments were received from DP&E on the 15/1/2016. The comments were addressed by AFJV and a response provided by RMS to DP&E on the 5/2/2016. Approval of the Stage 2 of the UDLP was provided by DP&E on 19/02/2016 The UDLP has been updated to include the North Facing Ramps into the design and is currently with RMS for internal review. The design has incorporated headlight screening measures as required by Modification 8. Ongoing consultation and discussion with residents located in the vicinity of the North Facing Ramps is being undertaken to determine the surface treatment of these mounds. Advice has been received from DP&E that construction on the North Facing Ramps can commence prior to the submission

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	g location and design treatments for any associated footpaths and cyclist elements, and other features such as seating, lighting (in accordance with AS 4282-1997 Control of the Obtrusive Effect of Outdoor Lighting), fencing, and signs; h evidence of consultation with the community on the proposed urban design and landscape measures prior to its finalisation; and i monitoring and maintenance procedures for the built elements and landscaping (including weed control) including responsibilities, timing and duration and contingencies where landscaping measures fail. The Plan shall be submitted for the approval of the Director General prior to commencement of construction of the project. The Plan may be submitted in stages to suit the staged construction program of the project.				of the updated UDLP. This was confirmed in an email from DP&E in May 2016. Once AFJV and RMS have completed their review of the updated UDLP, this will be provided to DP&E.
	Traffic and access				
B22	The Proponent shall ensure that the project is designed in consultation with DPI (Forests NSW) to ensure that access of a standard that is at least equivalent to that currently existing and which meets relevant road safety standards is maintained within the State forests to enable continued forestry operations, fire management and recreation during construction	Stage 1 and 2	Preconstruction and Construction	Open	Roads and Maritime has reached agreement with Forestry Corporation in regards to this requirement, with proposal from Forestry Corporation on the work it will undertake in State Forests. The detailed design has incorporated permanent adjustments to forestry tracks to maintain access at an equivalent standard to

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	and operation.				that which currently exists. AFJV in consultation with Forests NSW is maintaining safe access to forestry tracks during temporary traffic staging/construction. AFJV notified Forests NSW in May 2015 that vegetation clearing operations were due to commence. Consultation on the property adjustment drawings was undertaken in December 2015. Access ways are currently under construction in accordance with the approved design. AFJV to comply with requirements for merchantable timber and construction property adjustments as per agreements made by RMS. No issues have been raised by Forestry NSW regarding access during the reporting period. Minor adjustments to the design have been made in consultation with RMS. The finalised Property Adjustments were accepted by Forestry NSW in October 2016. Further adjustments have been made to the design of the several Property Adjustments Drawings in discussions with Forestry NSW. The revised drawings are currently with RMS for approval prior to final sign off by Forestry.
B23	The Proponent shall ensure that the project is designed to incorporate appropriate signage for townships along the project alignment, in consultation	Stage 1 and 2	Preconstruction and Construction	Open	The requirement of this condition has been included as part of the permanent signage and line-marking (Road Furniture) design package. The Road Furniture Design package has been

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	with the relevant Council and businesses policy, and provide information on the range of services available within the towns including advice that the route through the towns may be taken as an alternative route to the bypass.				provided to Nambucca Shire Council for comment prior to finalizing the package. Specific community consultation for directional signage was undertaken from 19 July through to 14 August. This included: two Community Information Sessions held at Nambucca Heads 26 July and Albert Drive Compound 27 July; five static displays located at the Warrell Creek construction compound, Macksville and Nambucca Heads libraries, Nambucca Plaza, Bowraville Community Technology Centre and Scotts Head Bowling Club; two drop-in map displays at Nambucca Woolworths and Macksville Foodworks; presentations to the Nambucca Shire Council and Bowraville Chamber of Commerce. The signage maps were also available to view on the Roads and Maritime website throughout the period of consultation. The Project received more than 60 items of feedback via feedback forms, telephone, email, and an on-line survey.
	Property and landuse				
B24	The Proponent shall ensure that the project is designed to minimise land take impacts to surrounding	Stage 1 and 2	Preconstruction	Open	The acquisition for the final property to the south of the Project was executed in February

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	properties (including agricultural properties) as far as feasible and reasonable, in consultation with the affected landowners. Where the viability of existing agricultural operations are identified to be highly affected by the land requirements of the project, the Proponent shall as part of detailed design employ a suitably qualified and experienced independent agricultural specialist (that is approved by the Director General for the purpose of this condition), to assist in the following (where agreed to by the relevant landowner): a identifying alternative farming opportunities for the relevant properties including purchase of other residual land to enable existing/new agricultural activities to continue; and/or b negotiating appropriate compensation and/or arrangements for the purchase of the property under the Land Acquisition (Just Terms Compensation) Act 1991.				2016 No land use has been identified as being affected by the project to such an extent jeopardising continued agricultural use – the design has allowed for parcels separated under the one title for grazing to have stock under passes provided. No agricultural specialist has been required to be employed to determine offsets. Landholders have been consulted with in regard to acquisitions and offset works (gates fences access tracks revegetation) as required. Acquisitions complete and works for property adjustments fencing accesses permanent and temporary are ongoing with minor adjustment with fence alignment worked on in the field and captured on final DP plans once Registered.
	Compliance tracking				
B25	The Proponent shall develop and implement a Compliance Tracking Program to track compliance with the requirements of this approval. The Program shall be submitted to the Director General for approval prior to the commencement of construction and relate to both the construction and operational phases of the project, and include, but not necessarily be limited to: a provisions for the notification of the Director	Stage 1 and 2	Preconstruction, Construction and Operation	Open	Roads and Maritime submitted Compliance Tracking Program to DP&E on 7 March 2013, which was subsequently approved by DP&E on 20 March 2013. The Compliance Tracking Program was updated and approved by DP&E on the 16/12/14. A standalone compliance tracking register is in

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	General of the commencement of works prior to the commencement of construction and prior to the commencement of operation of the project (including prior to each stage, where works are being staged); b provisions for periodic review of project compliance with the requirements of this approval, Statement of Commitments and documents listed under condition A1; c provisions for periodic reporting of compliance status against the requirements of this approval, Statement of Commitments and documents listed under condition A1 to the Director General including at least one month prior to the commencement of construction and operation of the project and at other intervals during the construction and operation, as identified in the Program; d a program for independent environmental auditing in accordance with ISO 19011:2003 - Guidelines for Quality and/ or Environmental Management Systems Auditing; e mechanisms for reporting and recording incidents and actions taken in response to those incidents; f provisions for reporting environmental incidents to the Director General during construction and operation; and g procedures for rectifying any non-compliance identified during environmental auditing, review of compliance or incident management.				place for WC2NH is reviewed and updated on an ongoing basis and summarised at progressive six (6) monthly intervals within Compliance Tracking Reports (first report issued one (1) month prior to commencement of construction and an update reports issued to cover each six (6) months during construction). This report is the fifth Six (6) Monthly Compliance report prepared for the Project to cover the reporting period 9 February 2017 – 8 August 2017.

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	Community information and involvement – provision of electronic information				
B26	Prior to the commencement of construction, the Proponent shall establish and maintain a new website, or dedicated pages within an existing website, for the provision of electronic information associated with the project. The Proponent shall, subject to confidentiality, publish and maintain up-to-date information on the website or dedicated pages including, but not necessarily limited to: a information on the current implementation status of the project; b a copy of the documents referred to under condition A1 of this approval, and any documentation supporting modifications to this approval that may be granted from time to time; c a copy of this approval and any future modification to this approval; d a copy of each relevant environmental approval, licence or permit required and obtained in relation to the project; e a copy of each current strategy, plan, program or other document required under this approval; and f the outcomes of compliance tracking in accordance with the requirements of Condition B25.	Stage 1 and 2	Preconstruction and Construction	Open	Roads and Maritime managed web site for WC2NH is in place. Project documentation and information can be found at the link below: Link to Project Documents AFJV will provide Roads and Maritime with all relevant information, details and data (electronically in WCAG 2.0 web accessible format) in regard to construction in compliance with the requirements of this condition, to enable Roads and Maritime to maintain the website and ensure it is up to date. Copies of the relevant documentation as required by this condition are available on the website.
	Complaints and enquiries procedure				
B27	Prior to the commencement of construction, the Proponent shall ensure that the following are available	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has established the following methods and tools for community complaints and

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	for community complaints and enquiries during the construction period: a a telephone number on which complaints and enquiries about construction and operation activities may be registered; b a postal address to which written complaints and enquiries may be sent; and c an email address to which electronic complaints and enquiries may be transmitted. The telephone number, the postal address and the email address shall be published in a newspaper circulating in the local area prior to the commencement of construction and prior to the commencement of project operation. The above details shall also be provided on the website (or dedicated pages) required by this approval. The Proponent must prepare and implement a Construction Complaints Management System consistent with *AS 4269 Complaints Handling* prior to the commencement of construction activities and must maintain the System for the duration of construction activities. Information on all complaints received, including the means by which they were addressed and whether resolution was reached and whether mediation was required or used, must be maintained by the Proponent and included in a complaints register. The information contained within the System must be made available to the Director General on request.				enquiries about construction activities: (a) a telephone number for registration of complaints and enquiries: 1800 074 588 (b) a postal address enabling written complaints and enquiries to be received: PO Box 254, Macksville NSW 2447 (c) an email address to which electronic complaints and enquiries may be transmitted: community@afjv.com.au An advertisement advising of the commencement of Early Works was undertaken on the 31/11/2015 and was presented in the Bellingen Shire Courier-Sun on 31/10/2015 A Construction Complaints Management System consistent with AS 4269 Complaints Handling is in place (Consultation Manager). Information on the complaint raised and the resolution is maintained in this register. Complaints received during the reporting period are provided in Section 5 above.
	Community involvement				

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B28	The Proponent shall prepare and implement a Community Communication Strategy for the project. This Strategy shall be designed to provide mechanisms to facilitate communication between the Proponent, the Contractor, the Environmental Representative, the relevant Council and the local community (broader and local stakeholders) on the construction and environmental management of the project. The Strategy shall include, but not necessarily be limited to: a identification of stakeholders to be consulted as part of the Strategy, including affected and adjoining landowners; b procedures and mechanisms for the regular distribution of information to stakeholders on the progress of the project and matters associated with environmental management; c procedures and mechanisms through which stakeholders can discuss or provide feedback to the Proponent and/or Environmental Representative in relation to the environmental management and delivery of the project; d procedures and mechanisms through which the Proponent can respond to any enquires or feedback from stakeholders in relation to the environmental management and delivery of the project; and e procedures and mechanisms that would be implemented to resolve any issues/disputes that may arise between parties on the matters relating to environmental management and the delivery of	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has an approved Community Involvement Plan (which covers the requirements of the Condition B28 Community Communication Strategy) to provide the mechanisms to facilitate communication between the Proponent, the Contractor, the Environmental Representative, the relevant Council and the local community (broader and local stakeholders) on the construction and environmental management of the project, covering all tasks and procedures in meeting the requirements of this condition. The Plan was approved by DP&E on the 16/12/14. AFJV will maintain and implement the Strategy throughout construction of the project. • 30 community notifications; and • 2 quarterly community project updates ıity information and drop-in sessions on the following dates: • 15 March at Warrell Creek construction compound (regular Community Information Session) • 11 May at Warrell Creek construction compound (in relation to Browns Crossing Road flooding) • 26 and 27 July at Nambucca Heads and Warrell Creek (in relation to directional signage community consultation).

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	the project. This may include the use of an appropriately qualified and experienced independent mediator. The Proponent shall maintain and implement the Strategy throughout construction of the project. The Strategy shall be approved by the Director General prior to the commencement of construction, or as otherwise agreed by the Director General.				Nine regular roadside community meetings were held specifically for residents in close proximity to the North Facing Ramps. Relevant and timely community relations topics were provided to the Construction Team through "Toolbox Talks" every week during this period. Feedback from the Community to the Project team can be made at the following locations: • Site compound at 124 Albert Drive, Warrell Creek • Nambucca Shire Council via the project phone No1800 074 588 or via email community@afjv.com.au The Community Involvement Plan has been reviewed and revised. An updated version of the Plan was provided to DP&E in August 2017 for approval.
	Environmental management – Environmental Representative				
B29	Prior to the commencement of construction of the project, or as otherwise agreed by the Director General, the Proponent shall nominate for the approval of the Director General a suitably qualified and experienced Environment Representative(s) that is independent of the design (including preparation of documentation referred to condition A1), and construction personnel. The Proponent shall employ	Stage 1 and 2	Preconstruction and Construction	Open	David Bone – Onsite Environmental Management – approved as the Environmental Representative (ER) for WC2NH on 12 September 2013. The ER Deed has been signed and the ER is now engaged on the project and undertaking the requirements of this condition.

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	the Environmental Representative(s) for the duration of construction, or as otherwise agreed by the Director General. The Environment Representative(s) shall: a be the principal point of advice in relation to the environmental performance of the project; b be consulted in responding to the community concerning the environmental performance of the project; c monitor the implementation of all environmental management plans and monitoring programs required under this approval; d monitor the outcome of all environmental management plans and advise the Proponent upon the achievement of all project environmental outcomes; e have responsibility for considering and advising the Proponent on matters specified in the conditions of this approval, and all other licences and approvals related to the environmental performance and impacts of the project; f ensure that environmental auditing is undertaken in accordance with the requirements of condition B25 and the project Environmental Management System(s); g be given the authority to approve/ reject minor amendments to the Construction Environment Management Plan. What constitutes a "minor" amendment shall be clearly explained in the Construction Environment Management Plan required under condition B30; and h be given the authority and independence to require				

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	reasonable steps be taken to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such steps, to direct that relevant actions be ceased immediately should an adverse impact on the environment be likely to occur.				
	Construction Environmental Management Plan				
B30	Prior to the commencement of construction, the Proponent shall prepare and (following approval) implement a Construction Environmental Management Plan for the project. The Plan shall outline the environmental management practices and procedures that are to be followed during construction, and shall be prepared in consultation with the EPA, DPI and relevant Council and include, but not necessarily be limited to: a a description of all relevant activities to be undertaken during construction of the project or stages of construction, as relevant; b statutory and other obligations that the Proponent is required to fulfil during construction including all approvals, consultations and agreements required from authorities and other stakeholders, and key legislation and policies. Evidence of consultation with relevant public authorities, shall be included identifying how issues raised by these public authorities have been addressed in the plan; c a description of the roles and responsibilities for all relevant employees involved in the construction of the project including relevant training and induction provisions for ensuring that all employees,	Stage 1 and 2	Preconstruction and Construction	Open	DP&E approved the WC2NH CEMP and Sub-plans on the 16/12/14. CoA B30 Requirements (a) to (e) are covered within the approved CEMP, prescribing: • Scope and description of all relevant activities to be undertaken during construction • Statutory and other obligations that AFJV is required to fulfil during construction • Consultation with relevant public authorities, • Roles and responsibilities for all relevant personnel involved in the construction • Training and awareness for all employees, including contractors and sub-contractors • identification of ancillary facility site locations including a detailed Ancillary Facilities Assessment (Also refer to Reference / Comment provided in condition C27) • Environmental risk analysis and register

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	including contractors and sub-contractors are aware of their environmental and compliance obligations under these conditions of approval; d identification of ancillary facility site locations, including an assessment against the location criteria outlined in condition C27; e an environmental risk analysis to identify the key environmental performance issues associated with the construction phase and details of how environmental performance would be monitored and managed to meet acceptable outcomes including what actions will be taken to address identified potential adverse environmental impacts (including any impacts arising from concurrent construction works with adjacent Pacific Highway Upgrade projects, as relevant). In particular, the following environmental performance issues shall be addressed in the Plan: *i.* measures to monitor and manage **dust emissions** including dust generated by haulage trucks, traffic on unsealed public roads and stockpile management; *ii.* measures to monitor and manage **waste** generated during construction including but not necessarily limited to: general procedures for waste classification, handling, reuse, and disposal; how contaminated materials would be handled and disposed; use of secondary waste material in construction wherever feasible and reasonable; procedures for dealing with green waste including timber and much from clearing activities; and measures				• Details on environmental performance monitoring The CEMP is also supplemented by construction Sub-plans to address specific environmental aspects of the projects in accordance with the requirements of this condition as follows: • Requirement (e)(i) is covered within the Air Quality Management Sub-plan (AQMP). • Requirement (e)(ii) is covered within the Waste & Energy Management Sub-plan (WEMP). • Requirement (e)(iii) is covered by the Spoil Management Protocol (Appendix I to the Soil and Water Management Sub-plan (SWMP)). Requirement (e)(iv) is covered by the CEMP incorporating measures to monitor and manage hazard and risks including emergency management. Requirement (e)(v) is covered by the CEMP and associated Sub-plans (see B31 Reference / Comment response). Requirement (f) and (g) are covered within the Community Involvement Plan (CIP) and linked to the CEMP. Requirement (h) is covered by the CEMP on procedures for the periodic review and

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	for reducing demand on water resources (including the potential for reuse of treated water from sediment control basins); *iii.* measures to monitor and manage **spoil and fill** including details of how excavated material would be handled, stockpiled, reused and disposed and a stockpile management protocol detailing location criteria that would guide the placement of stockpiles and minimum management measures (including rehabilitation) that would be implemented to avoid/ minimise amenity impacts to surrounding residents and environmental risks (including to surrounding watercourses); *iv.* measures to monitor and manage **hazard and risks** including emergency management; and *v.* the issues identified in condition B31; f details of community involvement and complaints handling procedures during construction, consistent with the requirements of conditions B26 to B28; g details of compliance and incident management consistent with the requirements of condition B25; and h procedures for the periodic review and update of the Construction Environmental Management Plan as necessary (including where minor changes can be approved by the Environmental Representative). The Plan shall be submitted for the approval of the Director General no later than one month prior to the				continual improvement of the CEMP. The CEMP was reviewed during the reporting period, no changes to the document were identified. Several updates have been incorporated into the relevant sub-plans as discussed below.

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	commencement of construction, or within such period otherwise agreed by the Director General. Construction works shall not commence until written approval has been received from the Director General.				
B31	As part of the Construction Environment Management Plan for the project required under condition B30 of this approval, the Proponent shall prepare and implement the following sub plan(s): a a **Construction Traffic Management Plan**, prepared in accordance with the RTA's *QA Specification G10 - Control of Traffic and Traffic Control at Work Sites Manual* (2003) to manage disruptions to highway and local traffic movements as a result of construction traffic associated with the project. The Plan shall be developed in consultation with Council and shall include, but not necessarily be limited to: *i.* identification of construction traffic routes and quantification of construction traffic volumes (including heavy vehicle/spoil haulage) on these routes; *ii.* details of vehicle movements for construction sites and site compounds including parking, dedicated vehicle turning areas, and ingress and egress points; *iii.* potential impacts to traffic on the existing highway and associated local roads including intersection level of service and potential disruptions to arrangements for pedestrians, property access, public transport, parking and/ or cyclist;	Stage 1 and 2	Preconstruction and Construction	Open	DP&E approved the WC2NH CEMP and associated Sub-plans on the 16/12/14. The approved Traffic and Safety Management Plan (TSMP) has been prepared in accordance with RMS Specification G10 and complies with the requirements of this condition. An audit of the TSMP was conducted by RMS in September 2016, no non-compliances were raised. The traffic arrangements are regularly inspected by both RMS and the site team.

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	iv. details of temporary and interim traffic arrangements including intersections, property access and alternative traffic routes; *v.* traffic and other arrangements to minimise impacts including safe pedestrian access at all times, and the provision of alternative facilities and locations for pedestrians and/or cyclist access; *vi.* a response procedure for dealing with traffic incidents; and *vii.* mechanism for the monitoring, review and amendment of this plan;				
	b a **Construction Flora and Fauna Management Plan** to detail how construction impacts on ecology will be minimised and managed. The Plan shall be developed in consultation with the EPA and shall include, but not necessarily be limited to: *i.* details of pre-construction surveys undertaken to verify the construction boundaries/ footprint of the project based on detailed design and to confirm the vegetation to be cleared as part of the project (including tree hollows, threatened flora and fauna species, mangroves and riparian vegetation). The surveys shall be undertaken by a qualified ecologist and include surveys of existing bridges and culverts for the presence of micro-bat roosting at least 6 months prior to the planned disturbance of such structures and targeted surveys for the Giant Barred Frog within and in the vicinity of the project corridor undertaken during suitable	Stage 1 and 2	Preconstruction and Construction	Open	DP&E approved the Flora and Fauna Management Plan (FFMP) on the 16/12/14. The Flora and Fauna Management Plan (FFMP) incorporates the following plans and strategies in regards to minimising impacts on flora and fauna: • Giant Barred Frog Management Strategy • Grey-Headed Flying Fox Management Plan • Koala Management Plan • Spotted Tail Quoll Management Plan • Threatened Flora Management Plan • Nest Box Management • Ecological Monitoring Program • Green-Thighed Frog Management Strategy

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	conditions; *ii.* updated sensitive area vegetation maps based on B31(b)(i) above and previous survey work; *iii.* a Giant Barred Frog management plan, in the case that this species or its habitat is identified to occur in the project corridor or its vicinity, based on surveys undertaken as part of B31(b)(i); *iv.* a micro-bat management strategy, in the case that micro bats or evidence of roosting are identified during pre-construction surveys. The strategy shall detail measures to avoid, minimise and mitigate impacts to these species and identified roost sites, including short and long term management measures; *v.* details of general work practices to minimise the potential for damage to native vegetation (particularly EECs) not proposed to be cleared as part of the project and native fauna during construction, including (but not necessary limited to): fencing of sensitive areas, a protocol for the removal and relocation of fauna during clearing, presence of an experienced ecologist to oversee clearing activities and facilitate fauna rescues and re-location, clearing timing with consideration to breeding periods, measures for maintaining existing habitat features (such as bush rock and tree branches etc), seed harvesting and appropriate topsoil management, construction worker education, weed management, erosion and sediment control and progressive re-				• Microchiropteran Bat Management Strategy • Pre-Clearing Checklist • Working Around Trees Guideline • Fauna Handling and rescue Procedure • Unexpected Threatened Species/EEC Procedure • Weed Management Plan Roads and Maritime has developed a construction and operational phase monitoring strategy for the Yellow - Bellied Glider. In addition to these plans and strategies, sensitive area plans have been prepared identifying vegetation EECs, incorporated within the draft CEMP (Appendix A6). Controls on topsoil management and erosion and sedimentation are covered within the Soil and Water Management Sub-plan of the CEMP. As required by the AFJV scope of work, AFJV will implement the requirements of the FFMP and subordinate plans, strategies and guidelines, and associated CEMP Sub-plans. The FFMP will undergo periodic review and continual improvement in accordance with the requirements specified within the CEMP. Pre-clearing surveys have been completed for the main Project alignment and mapping for EEC, hollow bearing trees, threatened

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	vegetation; *vi.* specific procedures to deal with EEC/ threatened species anticipated to be encountered within the project corridor including re-location, translocation and/or management and protection measures; *vii.* a procedure for dealing with unexpected EEC/ threatened species identified during construction including stopping works and notification of EPA, determination of appropriate mitigation measures in consultation with EPA (including relevant relocation measures) and update of ecological monitoring and/ or biodiversity offset requirements consistent with conditions B8 and B10; and *viii.* mechanism for the monitoring, review and amendment of this plan;				species, etc has been updated to reflect ground-truthed data. No disturbance to bridge or culvert structures with the presence of micro-bats has occurred. A colony of micro-bats present in a bridge structure adjacent to the Project alignment at Crouches Creek (Williamson Creek) is being monitored in accordance with the approved *Microchiropteran* Bat Management Strategy. Targeted surveys for Giant barred Frog were also completed at Butchers Creek and Upper Warrell Creek prior to clearing commencing in accordance with the Giant Barred Frog Management Strategy. The majority of vegetation clearing on the Project is now complete. Vegetation clearing processes have been monitored regularly to ensure vegetation clearing is minimised. Exclusion flagging is checked during pre-clearing inspections and whilst clearing is being undertaken. Exclusion of sensitive habitat and retention of features for landscape rehabilitation are consistent with the requirements of the FFMP. Fauna rescue and retrieval has been in accordance with the approved procedure attached to the FFMP. A review of the FFMP was undertaken during the reporting period. Several documents that make up appendices to the FFMP were updated during the reporting period including:

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					- Nest Box Management Plan; - Spotted-Tailed Quoll Management Plan; - Koala Management Plan; and - Ecological Monitoring Program The minor changes to this sub-plan have been endorsed by the ER and accepted by RMS. The Nest Box Management Plan was updated to include the final calculations for nest box numbers post completion of mainline clearing. The calculations concluded that 143 nest boxes in total were required, which is a reduction from the original number of 152 in the original approved Plan. It is noted that all 143 nest boxes are now installed alongside the main alignment in approved Nest Box Management Zones in accordance with the approved Plan. AFJV have sought approval from RMS for the permanent reuse of spoil material within the Project alignment for earth mounds. A Consistency Review was prepared and approved. The mounds are designed in accordance with RMS Specification and are approved through the required design process by RMS and the Project Verifier.
	c a **Construction Noise and Vibration Management Plan** to detail how construction	Stage 1 and	Preconstruction and	Open	DP&E approved the WC2NH Noise and Vibration Management Plan (NVMP) on the

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	noise and vibration impacts will be minimised and managed. The Plan shall be developed in consultation with the EPA and include, but not necessarily be limited to: *i.* identification of nearest sensitive receptors and relevant construction noise and vibration goals applicable; *ii.* identification of key noise and/or vibration generating construction activities (based on representative construction scenarios) that have the potential to impact on surrounding sensitive receivers including expected noise/ vibration levels; *iii.* identification of all feasible and reasonable measures proposed to be implemented to minimise construction noise and vibration impacts (including construction traffic noise impacts); *iv.* procedure for dealing with out-of-hour works in accordance with condition C4, including procedures for notifying the Director General concerning complaints received in relation to the extended hours approved under condition C4(d); *v.* procedures and mitigation measures to ensure relevant vibration and blasting criteria are achieved, including a suitable blast program supported by test blast results, applicable buffer distances for vibration intensive works, use of low vibration generating equipment vibration dampeners or alternative construction methodology, and pre- and post- construction	2	Construction		16/12/14. The Plan incorporates the identification and procedures of: - Nearest sensitive receptors and relevant construction noise and vibration goals - Key noise and vibration generating construction activities accompanied with Plant and Equipment sound power data - Measures proposed to be implemented to minimise construction noise and vibration impacts - Out-Of-Hour Works Procedure - Blast Management Program - Notification to sensitive receivers and handling of noise and vibration complaints - Noise and vibration monitoring and managing potential exceedances As required by the AFJV scope of work, AFJV will implement the requirements of the NVMP and subordinate procedures and programs. The Blast Management Program has been updated to reflect the vibration and air blast overpressure limit change approved by DP&E on 17/7/2015. Implementation of the NVMP has been ongoing throughout construction. Out of hours

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	dilapidation surveys of sensitive structures where blasting and/ or vibration is likely to result in building damage; *vi.* procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity, as well as procedures for dealing with and responding to noise complaints; and *vii.* a program for construction noise and vibration monitoring clearly indicating monitoring frequency, location, how the results of this monitoring would be recorded and, procedures to be followed where significant exceedances of relevant noise and vibration goals are detected;				activities are managed through a permit system to ensure compliance with the Out of Hours Approvals Procedure (attached to the NVMP) and the Project EPL. Noise monitoring and vibration monitoring have been undertaken in relation to complaints and information has been provided to the complainant. Vibration monitoring has also been undertaken for several residents located close to earthworks activities on an "as needs" basis. Ongoing monthly noise monitoring is undertaken and the results are presented in Appendix B.
	d a **Construction Water Quality Management Plan** to manage surface water quality and groundwater impacts during construction of the project. The Plan shall be developed in consultation with EPA, DPI (Fisheries and NOW) and include, but not necessarily be limited to: *i.* a contingency plan, consistent with the *Acid Sulfate Soils Manual*, to deal with the unexpected discovery of actual or potential acid sulfate soils; *ii.* a tannin leachate management protocol to manage the stockpiling of mulch and use of cleared vegetation and mulch filters for erosion and sediment control;	Stage 1 and 2	Preconstruction and Construction	Open	DP&E approved the WC2NH Soil and Water Management Plan (SWMP) on the 16/12/14. The Plan incorporates requirements for soil and water quality management including requirements for mitigation and management of erosion and sedimentation. The SWMP incorporates specific plans and procedures including: • Acid Sulfate Soil Management Procedure • Management of Tannins from Vegetation Mulch • Sediment Basin Management and Discharge Procedure • Pacific Highway Projects Dewatering

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	iii. details of how construction activities would be managed and mitigated to minimise erosion and sedimentation consistent with condition C17; *iv.* where construction activities have the potential to impact on waterways or wetlands (through direct disturbance such as construction of waterway crossings or works in close proximity to waterways or wetlands), site specific mitigation measures to be implemented to minimise water quality, riparian and steam hydrology impacts as far as practicable, including measures to stabilise bank structure and rehabilitate affected riparian vegetation to existing or better condition (including relevant performance indicators and monitoring requirements). The timing of rehabilitation of the waterways shall be as agreed to with DPI (Fisheries and NOW) shall be identified in the plan; *v.* construction water quality monitoring requirements consistent with condition B17; and *vi.* a groundwater management strategy, including (but not necessarily limited to): i. description and identification of groundwater resources (including depths of the water table and groundwater quality) potentially affected by the proposal based on baseline groundwater monitoring undertaken in accordance with condition B17(c);				Practice Note • Water Quality Monitoring Program • Groundwater Management Strategy • Spoil and Fill Management Procedure • Stockpile Management Protocol • Unexpected Discovery of Contaminated Land Procedure • Arsenic Rock Management Strategy As required by the AFJV scope of work, AFJV will implement the requirements of the SWMP and subordinate procedures and programs. Implementation of the SWMP is monitored regularly by AFJV including fortnightly inspections by the Project Soil Conservationist to determine compliance with the “Blue Book”. Site controls are also regularly inspected by AFJV staff prior to, during and after rainfall events. Monitoring results for groundwater and surface water are summarised in Section 7 above. Incidents raised relating to erosion and sediment controls are detailed in Sections 5 above. The SWMP was reviewed during the reporting period. The following documents that form part of the SWMP were updated: - Groundwater Monitoring Program;

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	ii. identification of surrounding licensed bores, dams or other water supplies and groundwater dependant ecosystems and potential groundwater risks associated with the construction of the project on these groundwater users and ecosystems; iii. measures to manage identified impacts on water table, flow regimes and quality and to groundwater users and ecosystems; iv. groundwater inflow control, handling, treatment and disposal methods; and v. a detailed monitoring plan to identify monitoring methods, locations, frequency, duration and analysis requirements; and				- Groundwater Management Strategy During the reporting period, RMS submitted a revised Groundwater Monitoring Program to remove the requirement to monitor dry bores.
	e a **Construction Heritage Management Plan** to detail how construction impacts on Aboriginal and non-Aboriginal heritage will be minimised and managed. The Plan shall be developed in consultation with the OEH (Heritage Branch) (for non-Aboriginal heritage) and EPA and Registered Aboriginal Stakeholders (for Aboriginal heritage), and include, but not necessarily be limited to: *ii.* In relation to Aboriginal Heritage: i. details of management measures to be carried out in relation to already recorded sites and potential Aboriginal deposits (including further archaeological investigations, salvage measures and/ or measures to protect unaffected sites during construction works in	Stage 1 and 2	Preconstruction and Construction	Open	DP&E approved the WC2NH Heritage Management Plan (HMP) on the 16/12/14. The Plan incorporates requirements for mitigation and management of construction impacts on Aboriginal and Non-Aboriginal heritage, including management measures to be carried out in relation to already recorded sites and potential Aboriginal deposits and non-Aboriginal heritage sites. The HMP incorporates specific plans and procedures including: • Methodology for Aboriginal and Historical Heritage Investigation for Works Outside the Project Corridor

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	the vicinity); ii. procedures for dealing with previously unidentified Aboriginal objects excluding human remains (including halting of works in the vicinity, assessment of the significance of the item(s) and determination of appropriate mitigation measures including when works can re-commence by a qualified archaeologist in consultation with registered Aboriginal stakeholders, assessment of the consistency of any new Aboriginal heritage impacts against the approved impacts of the project, and registering of the new site in the OEH AHIMS register); iii. procedures for dealing with human remains (including halting of works in the vicinity and notification of the NSW Police, OEH and registered Aboriginal stakeholders and not-recommending any works in the area unless authorised by OEH and/ or the NSW Police); and iv. Aboriginal cultural heritage induction processes for construction personnel (including procedures for keeping records of inductions undertaken for the duration of the project) and procedures for ongoing Aboriginal consultation and involvement; and (iii) In relation to non-Aboriginal Heritage: i. details of management measures to be carried out in relation to already recorded sites (including further heritage investigations,				• Aboriginal heritage education and training package • Non-Aboriginal heritage education and training package • Roads and Maritime Standard Management Procedure – Unexpected Heritage Items As required by the AFJV scope of work, AFJV will implement the requirements of the HMP and subordinate management procedures, and training packages for heritage induction and training. HMP implementation is ongoing, AFJV are undertaking ongoing consultation with the RAP's in accordance with the approved HMP. Protective fencing around heritage significant areas is inspected regularly and reinstated where required. An Aboriginal Focus group meeting was held in March 2017 to discuss Project progress. Cultural Heritage training was also held in March 2017 for Project personnel.

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	archival recordings and/ or measures to protect unaffected sites during construction works in the vicinity), consistent with the measures listed in Environmental Assessment Table 19-4; ii. procedures for dealing with previously unidentified non-Aboriginal objects, (including halting of works in the vicinity, assessment of the significance of the item(s) and determination of appropriate mitigation measures including when works can re-commence by a qualified archaeologist and assessment of the consistency of any new non-Aboriginal heritage impacts against the approved impacts of the project; and iii. non-Aboriginal cultural heritage induction processes for construction personnel.				
	Part C – During construction				
	Biodiversity				
C1	The Proponent shall employ all feasible and reasonable measures to minimise the clearing of native vegetation to the greatest extent practicable during the construction of the project.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has conducted ground truthing surveys whilst preparing the FFMP. The ecology surveys have informed the clearing extent for detailed design to minimise the clearing of native vegetation to the greatest extent practicable. All vegetation clearing required for the Project is assessed and determined to be consistent with the Planning Approval and Environmental

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					Assessment by RMS and the ER prior to being undertaken. A Vegetation Clearing Tracking Register is maintained and compared with the approved clearing requirements. The approved clearing is consistent with the Biodiversity Offset Strategy. The quantity of EEC clearing is much lower than the area provided in the EA, however the overall quantity of native vegetation clearing is marginally higher than the area provided in the EA. The Project considers the retention of vegetation with conservation significance is a positive outcome for the Project. Exclusion flagging is provided on site along the clearing limits to prevent incidental clearing of unapproved areas. The majority of clearing for the Project is complete and no major incidents regarding breaches of the clearing limits have been recorded.
	Air quality impacts				
C2	The Proponent shall employ all feasible and reasonable measures (including temporary cessation of relevant works, as appropriate) to ensure that the project is constructed in a manner that minimises dust emissions from the site, including wind-blown, traffic-generated dust, stockpiles and material tracking from construction sites onto public roads.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has detailed management and mitigation measures to achieve this requirement within the approved Air Quality Management Plan (AQMP). The AQMP includes the locations of dust sensitive areas and monitoring locations. The Project is currently using chemical suppressants on haul roads, stockpiles and for batter stabilisation. Dust monitoring is ongoing. Several exceedances of the requirements

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					stipulated in the AQMP have been reported to the EPA in the EPA Monthly Report. The Project has investigated each exceedance and applied additional dust mitigation measures. Results of the monitoring are provided above in Section 7. The Project is undertaking early topsoiling and revegetation of exposed batters to minimise dust impacts.
	Noise and vibration impacts – construction hours				
C3	The Proponent shall only undertake construction activities associated with the project during the following standard construction hours: a 7:00am to 6:00pm Mondays to Fridays, inclusive; and b 8:00am to 1:00pm Saturdays; and c at no time on Sundays or public holidays.	Stage 1 and 2	Preconstruction and Construction	Open	The requirements of this condition are included within the NVMP Sub-plan for implementation by AFJV during construction. These construction hours have been implemented on the Project. All activities undertaken outside of these hours are approved by the AFJV Environment Manager in accordance with the Out of Hours Procedure. One non-compliance was raised during the reporting period relating to a breach of the Out of Hours Noise Procedure. The EPA require notification of all Out of Hours activities that are being undertaken under Condition L4.2(d) of the EPL. On one circumstance, the Project did not inform the EPA of the activity being undertaken in advance due to the works being unforeseen.
C4	Works outside of the construction hours identified in	Stage 1 and 2	Preconstruction and	Open	The requirements of this condition are included within the NVMP Sub-plan and the Out-Of-

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	conditions C3 may be undertaken in the following circumstances: a works that generate noise that is not audible at any sensitive receptor; b for delivery of materials required outside these hours by the Police or other authorities for safety reasons; or c where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or d construction works undertaken through sparsely populated areas in which sensitive receptors are located greater than 300 metres away from the project boundary. In this case construction is permissible during the following hours: 6.00am to 6.00pm Monday to Friday and 7.00am to 4.00pm Saturdays and at no time on Sundays or public holidays. These works hours may be reviewed and/ or revoked by the Director General in consultation with the EPA in the case of excessive or unresolved noise complaints; or e where an EPL applies to the construction of the project, construction hours which are approved in accordance with the conditions of an EPL for the project; or f where an EPL does not apply to the construction of the project, Out of Hours Works as agreed to by the Director general in accordance with condition C5.		Construction		Hours Works procedure included in the NVMP, for implementation by AFJV during construction. Noise requirements are also subject to the Environment Protection Licence 20533 conditions. The Project has undertaken a number of activities outside of standard construction hours in accordance with this condition and the conditions of the EPL. Works undertaken outside of standard construction hours are managed in accordance with the Out of Hours Approval Procedure and require a Permit signed by the AFJV Environment Manager and Community Manager prior to commencement. Notification is also provided to the EPA, RMS and the ER in accordance with the procedure. One non-compliance was raised during the reporting period relating to a breach of the Out of Hours Noise Procedure. The EPA require notification of all Out of Hours activities that are being undertaken under Condition L4.2(d) of the EPL. On one circumstance, the Project did not inform the EPA of the activity being undertaken in advance due to the works being unforeseen.

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C5	For the purposes of condition C4 (f), certain construction activities (Out of Hours Works) may be allowed to occur outside the construction hours specified in conditions C3 with the prior written approval of the Director General. Requests for out of hours approval will be considered for construction activities which cannot be undertaken during the construction hours specified in conditions C3 for technical or other justifiable reasons and will be considered on a case by case or activity-specific basis. Any request for Out of Hours Works must be accompanied by: a details of the nature and need for activities to be conducted during the varied construction hours; b written evidence to the EPA and the Director General that activities undertaken during the varied construction hours are justified, appropriate consultation with potentially affected receivers and notification of Council has been undertaken, issues raised have been addressed, and all feasible and reasonable mitigation measures have been put in place; and c evidence of consultation with the EPA on the proposed variation in standard construction hours. Despite the above, Out of Hours Works may also occur in accordance with an approved Construction Environment Management Plan or Construction Noise and Vibration Management Plan for this project, where that plan provides a process for considering the above on a case by case or activity specific basis by the Proponent, including factors a) to c) above.	Stage 1 and 2	Preconstruction and Construction	Open	The NVMP contains an Out of Hours Works Procedure which covers the process for considering activities to be undertaken outside of standard construction hours. This has been approved by DP&E in December 2014. All works undertaken outside of standard construction hours comply with the approved Out of Hours Works Procedure. One non-compliance was raised during the reporting period relating to a breach of the Out of Hours Noise Procedure. The EPA require notification of all Out of Hours activities that are being undertaken under Condition L4.2(d) of the EPL. On one circumstance, the Project did not inform the EPA of the activity being undertaken in advance due to the works being unforeseen.

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C6	Blasting associated with the project shall only be undertaken during the following hours a 9:00 am to 5:00 pm, Mondays to Fridays, inclusive; b 9:00 am to 1:00 pm on Saturdays; and c at no time on Sundays or public holidays. This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons to avoid loss of life, property loss and/or to prevent environmental harm.	Stage 1 and 2	Construction	Closed	Blasting activities have commenced on the Project in July 2015 and were completed by the 31st August 2016. All blasts are undertaken in accordance with the hours specified in this condition.
	Noise and vibration impacts – construction noise and vibration goals				
C7	The Proponent shall implement all feasible and reasonable noise mitigation measures with the aim of achieving the construction noise management levels detailed in the *Interim Construction Noise Guideline* (DECC, 2009) during construction activities, Any activities that could exceed the construction noise management levels shall be identified and managed in accordance with the Construction Noise and Vibration Management Plan required under condition B31(c) of this approval.	Stage 1 and 2	Preconstruction and Construction	Open	Proposed noise mitigation measures are included within the NVMP Sub-plan for implementation by AFJV during construction. AFJV have commenced monitoring construction noise levels in accordance with the NVMP. The levels recorded are within the criteria specified in the NVMP. Where the noise levels exceed the Noise Management Levels provided in the NVMP, AFJV provides an explanation and investigates additional mitigation measures in the EPA Monthly Report. AFJV also discusses noise monitoring results at the monthly ERG meeting and a discussion regarding reasonable mitigation measures is also undertaken.
C8	The Proponent shall implement all feasible and reasonable mitigation measures with the aim of	Stage 1 and 2	Construction	Open	Proposed construction noise and vibration goals are included within the NVMP Sub-plan

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	achieving the following construction vibration goals and ground-borne noise levels: a for structural damage vibration, the vibration limits set out in the German Standard D/N 4150 Part 3-1999 Structural Vibration in Buildings - Effects on Structures; b for works in the vicinity of the heritage structures, the vibration limits set out in the German Standard DIN 4150-3: 1999 Structural Vibration - part 3: Effects of vibration on structures; and c for human exposure, the acceptable vibration values set out in the Environmental Noise Management Assessing Vibration: A Technical Guideline (DEC 2006); and d the ground-borne noise levels set out in the Interim Construction Noise Guidelines (DECC, 2009).				for implementation by AFJV during construction. The mitigation measures included in the NVMP are based on the standards provided in Condition C8. Vibration monitoring has been conducted for the blasting undertaken on the Project and for the use of vibratory equipment. Vibration monitoring has also been undertaken in response to complaints received on the Project from nearby sensitive receivers in accordance with the Project EPL requirements. The results have been compared to the NVMP which is based on the standards set out in Condition C8. Results of monitoring is summarised in Section 7 above. Noise monitoring is conducted in accordance with the NVMP. The results are summarised in Section 7 above. No monitoring results have shown exceedances of the requirements for structural damage (there are no heritage structures in the vicinity of the Project that require monitoring). On the occasions where the human comfort criteria has not been met, the resident is consulted to determine reasonable and feasible mitigation measures.

<table>
<tr><th>CoA No.</th><th>Requirement</th><th>Stage</th><th>Timing</th><th>Status</th><th>Reference / Comment</th></tr>
<tr><td>C9</td><td>The Proponent shall ensure that air blast overpressure generated by blasting associated with the project does not exceed the criteria specified in Table 1 when measured at the most affected residence or other sensitive receiver. To ensure that criteria are satisfied at the most affected residence or other sensitive receiver, blasting trials shall be undertaken prior to the commencement of the project blasting program, with results from the trials used to determine site specific blast design to satisfy the criteria specified in Table 1.
Table 1 Airblast overpressure criteria<table><tr><td>Airblast overpressure (dB(Lin Peak))</td><td>Allowable exceedance</td></tr><tr><td>115</td><td>5% of total number of blasts over a 12 month period</td></tr><tr><td>120</td><td>0%</td></tr></table></td><td>Stage 1 and 2</td><td>Construction</td><td>Closed</td><td>The requirements of this condition are included within the NVMP Sub-plan and subordinate Blast Management program for implementation by AFJV during construction.
AFJV sought approval from DP&E in accordance with Condition C11 to increase the blast vibration and airblast overpressure limits.
An approval request was submitted to DP&E on the 08/07/15 to increase the airblast overpressure limit to 125 dB(L) and the ground vibration limit to 25mm/s (PPV). An approval was obtained from DP&E on 17/7/2015 subject to conditions being met.
A request was submitted to DP&E to increase the number of blasts in Cut 10. This was approved by DP&E on the 26/2/2016.
Production blasting undertaken to date has shown compliance with the airblast overpressure requirements of 125 dB(L). Blasting on the Project was completed on the 31/8/16.</td></tr>
<tr><td>C10</td><td>The Proponent shall ensure that ground vibration generated by blasting associated with the project does not exceed the criteria specified in Table 2 when measured at the most affected residence or other sensitive receiver. To ensure that criteria are satisfied at the most affected residence or other sensitive receiver, blasting trials shall be undertaken prior to the commencement of the project blasting program, with</td><td>Stage 1 and 2</td><td>Construction</td><td>Closed</td><td>The requirements of this condition are included within the NVMP Sub-plan and subordinate Blast Management program for implementation by AFJV during construction.
AFJV sought approval from DP&E in accordance with Condition C11 to increase the blast vibration and airblast overpressure limits.</td></tr>
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<tr><td></td><td>results from the trials used to determine site specific blast design to satisfy the criteria specified in Table 2.
Table 2 Peak particle velocity criteria<table><tr><td>Peak particle velocity (mms-1)</td><td>Allowable exceedance</td></tr><tr><td>5</td><td>5% of total number of blasts over a 12 month period</td></tr><tr><td>10</td><td>0%</td></tr></table></td><td></td><td></td><td></td><td>An approval request was submitted to DP&E on the 08/07/15 to increase the airblast overpressure limit to 125 dB(L) and the ground vibration limit to 25mm/s (PPV). An approval was obtained from DP&E on 17/7/2015 subject to conditions being met.
A request was submitted to DP&E to increase the number of blasts in Cut 10. This was approved by DP&E on the 26/2/2016.
No exceedances of the approved limit increases have been measured. Blasting on the Project was completed on the 31/8/16.</td></tr>
<tr><td>C11</td><td>The blasting criteria identified in condition C9 and/ or C10 do not apply where the Proponent has a written agreement with the relevant landowner to exceed the criteria identified in condition C9 and/ or C10 and the Director General has approved the terms of the written agreement. In obtaining the Director General approval for any such agreement, the Proponent shall submit to the Director General:
a details of the proposed blasting program and justification for the proposed increase to blasting criteria including alternatives considered (where relevant);
b an assessment of the environmental impacts of the increased blast limits on the surrounding environment and most affected residences or other sensitive receivers including, but not limited to</td><td>Stage 1 and 2</td><td>Construction</td><td>Closed</td><td>The requirements of this condition are included within the NVMP Sub-plan and subordinate Blast Management Program for implementation by AFJV during construction.
An approval request was submitted to DP&E on the 08/07/15 to increase the airblast overpressure limit to 125 dB(L) and the ground vibration limit to 25mm/s (PPV). Approval was received from DP&E on 17/07/2015. This approval request contained information to comply with this condition.
A request was submitted to DP&E to increase the number of blasts in Cut 10. This was approved by DP&E on the 26/2/2016. Blasting on the Project was completed on the 31/8/16.</td></tr>
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	noise, vibration and air quality and any risk to surrounding utilities, services or other structures; c details of the blast management, mitigation and monitoring procedures to be implemented; and d details of consultation undertaken and agreement reached with the relevant landowners (including a copy of the agreement in relation to increased blasting limits). The following exclusions apply to the application of this condition: a any agreements reached may be terminated by the landowner at any time should concerns about the increased blasting limits be unresolved; b the blasting limit agreed to under any agreement can at no time exceed a maximum Peak Particle Velocity vibration level of 25 mm/s or maximum Airblast Overpressure level of 125 dBL; and c the provisions under condition C11 (to increase applicable blast criteria in agreement with the relevant landowners) do not apply where the property is a heritage property.				
	Operational noise mitigation review				
C12	Unless otherwise agreed to by the Director General, within six months of commencing construction, the Proponent shall in consultation with EPA prepare and submit for the approval of the Director General, a review of the operational noise mitigation measures proposed to be implemented for the project. The review shall:	Stage 1 and 2	Construction	Open	RMS submitted a letter requesting an extension of time from DP&E for submission of the Operational Noise Mitigation Review (5/8/2015). DP&E approved the extension of time on 14/8/2015 for 9 months. A further extension of time was granted by the DP&E on the 20/05/16 allowing the report to be submitted for approval on the 8 May 2017. An

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	a confirm the operational noise predictions of the project based on detailed design. This operational noise assessment shall be based on an appropriately calibrated noise model (which has incorporated additional noise monitoring, where necessary for calibration purposes). The assessment shall specifically include verification of noise levels at Nambucca Heads Rest Area, based on additional noise monitoring undertaken at this location; b review the suitability of the operational noise mitigation measures identified in the documents listed under condition A1 to achieve the criteria outlined in the Environmental Criteria for Road Traffic Noise (EPA, 1999) and the Industrial Noise Policy (EPA, 2000) in relation to the Nambucca Heads Rest Area, based on the operational noise performance of the project predicted under (a) above; and c where necessary, investigate additional feasible and reasonable noise mitigation measures to achieve the criteria outlined in the Environmental Criteria for Road Traffic Noise (EPA, 1999) and the Industrial Noise Policy (EPA, 2000) in relation to the Nambucca Heads Rest Area including the applicability of noise walls in the vicinity of River Road in Macksville.				update on the progress of the report was provided to DP&E on the 8 February 2017. Additional background noise monitoring and traffic counts were undertaken during the reporting period to supplement the information provided in the document. A revised document including changes requested by RMS was submitted to RMS in February 2017. The document was further revised in August 2017 after additional comments were received from RMS and the ER. A draft report and a further extension of time request to 8 October 2017 were submitted to DP&E on 2 May 2017. At the time of the end of the reporting period, verbal approval had been provided to the extension. (NOTE_ the final Operational Noise Mitigation Review was submitted to EPA and DP&E on 14 September 2017).
	Heritage impacts				
C13	This approval does not allow the Proponent to destroy, modify or otherwise physically affect human remains.	Stage 1 and 2	Preconstruction, Construction and Operations	Open	The approved Heritage Management Plan includes the Standard Management Procedure: Unexpected Archaeological Finds Roads and Maritime August 2013. The HMP

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					also includes Aboriginal and Non-Aboriginal heritage induction training packages. These controls will be implemented by AFJV. No human remains have been encountered on the Project.
C14	The Proponent shall not destroy, modify or otherwise physically affect the Aboriginal cultural sites identified in Table 15-3 of the Environmental Assessment (including AHIMS site numbers 21-6-36, 21-6-0287, 21-6-0016, 21-6-0163, 21-6-0039, 21-6-0090, 21-6-0102, 21-6-0141, 21-6-0164, 21-6-0064, and 21-6-0044), Boggy Creek spiritual area, Buchanan Conflict Site at Cow Creek (21-6-00286), burial site, ~~Cabbage tree palm resource site~~, Aboriginal mirrah (21-3-0034), Rosewood Scarred Tree or ~~potential archaeological deposits (PAD) 31~~.	Stage 1 and 2	Preconstruction, Construction and Operations	Open	Site surveys within the WC2NH project area have been undertaken to determine relevant sites, and no-go zone fencing and signage has been erected. Impacts to the Cabbage tree palm resource site and potentially PAD 31 (for fencing works), have been addressed through a modification of the approval by DP&E (Mod 7) which was approved on the 15/01/15. The Rosewood Scarred Tree has been permanently fenced and protected from construction activities.
C15	The Proponent shall not destroy, modify or otherwise physically affect the following historic sites: the ferry/punt crossing at Boulton Hill; old municipal tip; Valla Gold Mine; former stock route; tramway and quarry, Martells Road; and the native swamp conservation area.	Stage 1 and 2	Preconstruction, Construction and Operations	Open	Relevant site surveys for WC2NH (Ferry Punt at Boulton Hill, and old municipal tips) have been undertaken to determine relevant sites, and no-go zone fencing and signage has been erected. No impacts have occurred to the ferry/punt crossing at Boulton Hill and the Old Municipal Tip.
C16	The measures to protect any Aboriginal or historic heritage sites near or adjacent to the project during construction shall be detailed in the Heritage Management Plan required under condition B31 (e).	Stage 1 and 2	Preconstruction, Construction and Operations	Open	The requirement of this condition has been incorporated by AFJV into management and mitigation measures and procedures within the approved Heritage Management Plan. Sites are protected using no-go zone fencing and

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					signage which is regularly inspected and maintained.
C16A	a i) Where permanent works (including utilities, services and permanent access and service roads, or similar works required for the project) located outside the approved project footprint and described in the documents listed in condition A1 are required, and those works have the potential to impact upon previously unidentified non-Aboriginal and Aboriginal archaeology, the proponent shall undertake archaeological investigations to determine the impacts of those works. ii) The proponent shall undertake the investigations required in accordance with condition C16A (a)(i) consistent with the Construction Heritage Management Plan required under Condition B31 (e), or using a methodology prepared in consultation with OEH and approved by the Director General. iii) The proponent shall report on the results of the archaeological investigations prior to commencement of permanent works, and: · where the potential heritage impacts identified in the report are less than those described in the documents listed in condition A1, the report shall be provided to the Director General; · where the potential heritage impacts identified in the report are the same as those described in the documents listed in condition A1, the report shall be prepared in consultation with	Stage 1 and 2	Preconstruction and Construction	Open	The approved methodology - Methodology for Aboriginal and Historical Heritage Investigation for Works Outside the Project Corridor", is incorporated as Appendix A to the approved Heritage Management Plan for implementation by AFJV. Accordingly, archaeological reports have been provided to DP&E in accordance with this condition. Heritage assessments have been undertaken for Public Utility realignment works, private property adjustments and design refinements outside of the previous approved Project Boundary. The approved Methodology has been followed under the guidance of the Project Archaeologist Jacobs and the Registered Aboriginal Parties. In all circumstances, a report has been prepared and approved by RMS and the ER. No impacts to heritage items have been identified from additional permanent work activities. The Cultural Heritage Assessment Reports for the Project permanent works were submitted to DP&E in December 2015.

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	OEH and submitted to the Director General; · where the potential heritage impacts identified in the report are greater than those described in the documents listed in condition A1, the report shall be prepared in consultation with OEH and submitted to the satisfaction of the Director General. iv) The report on the results of the archaeological investigation is to include recommendations (such as for further archaeological work) and shall include, but not necessarily be limited to, consideration of measures to avoid or minimise disturbance to Aboriginal objects where objects of moderate to high significance are found to be present. b i) The proponent shall undertake salvage work with the approval of the Director General, when recommended by the results of the archaeological investigation required under condition C16A. ii) In determining whether to approve salvage work, the Director General is to have reference to the results of all relevant archaeological investigations undertaken under condition C16A(a) and the views of OEH.				
	Sedimentation, erosion and water				
C17	Soil and water management measures consistent with *Managing Urban Stormwater - Soils and Construction Vols 1 and 2, 4th Edition* (Landcom, 2004) and *Managing Urban Stormwater Soils And Construction*	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has incorporated soil and water management measures consistent with the requirements of this condition, into the approved Soil and Water Quality Management

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	Vols 2A and 2D Main Road Construction (DECC 2008) shall be employed during the construction of the project for erosion and sediment control.				Sub-plan (SWMP). AFJV have contracted a Project Soil Conservationist to ensure that erosion and sediment control plans (ESCP) are compliant with this condition. The Project Soil Conservationist also conducts regular site inspections to ensure the ESCP's are being implemented on site. Details of incidents raised for this condition during the reporting period are included in Section 3 above.
C18	Where available, and of appropriate chemical and biological quality, the Proponent shall use stormwater, recycled water or other water sources in preference to potable water for construction activities, including concrete mixing and dust control.	Stage 1 and 2	Preconstruction and Construction	Open	The Project has constructed several large water holding dams to hold water captured during rainfall events in sediment basins located on site. AFJV have also sought approval from the NSW Office of Water to extract water from Upper Warrell Creek and Lower Warrell Creek and from groundwater bores that have been installed adjacent to the alignment. However, due to drier than usual weather and poor water yield from the groundwater bores, potable water is currently being used to supplement the water supply for dust suppression in the northern extent of the Project. Also, potable water is used for concrete batching due to quality issues arising from recycled water and bore water. Due to community feedback, other local sources of surface water were not available to the Project.

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	Property and landuse – property impacts				
C19	The Proponent shall construct the project in a manner that minimises impacts to private properties and other public or private structures (such as dams, fences, utilities, services etc.) along the project corridor. In the event that construction of the project results in direct or indirect damage to any such property or structure, the Proponent shall arrange and fund repair of the damage to a standard comparable to the in existence prior to the damage.	Stage 1 and 2	Preconstruction and Construction	Open	The WC2NH Project has been designed to minimise the impacts to private property and private property structures. AFJV has obtained building condition surveys of existing structures located adjacent to the alignment to ensure all damage is rectified to the pre-existing standard prior to construction commencing. Several issues have been raised regarding potential impacts to property from the Project works during the reporting period. The Project has a process in which a third party assessor will review the claim and repairs will be undertaken if necessary.
C20	The Proponent shall ensure that access to all properties is maintained during construction unless agreed with the property owner in advance and that any access physically affected by the Project is reinstated to at least an equivalent standard, in consultation with the landowner.	Stage 1 and 2	Construction	Open	The AFJV will ensure that access to properties is maintained during construction. No complaints have been received in relation to this condition during the reporting period.
C21	The Proponent shall in consultation with relevant landowners construct the project in a manner that minimises intrusion and disruption to agricultural operations/activities in surrounding properties (e.g. stock access, access to farm dams etc.).	Stage 1 and 2	Construction	Open	AFJV has consulted with relevant landowners on construction of the project, addressing construction activities and approach to minimise intrusion and disruption to agricultural operations/activities in surrounding properties (e.g. stock access, access to farm dams etc.). AFJV has provided stock access through the

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
					alignment where necessary. AFJV have also allowed access to creeks and waterways along the alignment for cattle during drier than average conditions.
	Property and landuse – forestry impacts				
C22	Where the project traverses Nambucca, Newry and Little Newry State Forests, the Proponent shall in consultation with DPI (Forestry) ensure that construction activities do not unduly disrupt existing forestry activities, access for firefighting and recreation activities during construction.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has consulted with Forestry Corporation to ensure that construction activities do not unduly disrupt existing forestry activities, access for firefighting and recreation activities during construction. Forests NSW were notified in May 2015 that vegetation clearing was due to commence and access through the alignment would be limited. No issues were raised by Forests NSW regarding impacts to access, fire-fighting or recreational use. The Project is in regular communication with Forests NSW to ensure there are no impacts to access for forestry operations.
	Traffic impacts				
C23	Road dilapidation reports shall be prepared for all local roads likely to be used by construction traffic prior to use by construction heavy vehicles. A copy of the relevant report shall be provided to the relevant Council. Any damage resulting from the construction of the project, aside from that resulting from normal wear and tear, shall be repaired at the cost of the	Stage 1 and 2	Preconstruction and Construction	Open	In accordance with the approved Traffic and Safety Management Plan, a road dilapidation review has been undertaken by the Project for i) the Pacific Hwy and ii) Local Roads affected by the project. A copy of the dilapidation report has been provided to the relevant road authority, RMS

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	Proponent. The roads likely to be used by heavy construction vehicles should be identified in the Traffic Management Plan required under condition B31 (a).				and Nambucca Shire Council respectively.
	Waste management				
C24	The Proponent shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence under the *Protection of the Environment Operations Act 1997*, if such a licence is required in relation to that waste.	Stage 1 and 2	Preconstruction and Construction	Open	No waste generated offsite is being brought on to the project. All imported materials meet the general waste exemptions approved under the POEO Act where applicable.
C25	The Proponent shall maximise the reuse and/or recycling of waste materials generated on site as far as practicable, to minimise the need for treatment or disposal of those materials off site.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has detailed the requirements of this condition within the approved Waste and Energy Management Plan (WEMP). The Plan includes measures to reduce wastage and provide recycling for construction waste. The Project has reused crushed concrete and demolition materials on site. Recycling receptacles are available for comingled paper, cardboard, plastics, etc. The Project is also currently reusing mulch material generated on the Project and excess soil material is being incorporated into noise and visual barriers. The Project has an Asphalt Manufacturing Plant on site that is capable of reusing waste asphalt products.
C26	The Proponent shall ensure that all liquid and/or non-	Stage 1 and 2	Construction	Open	AFJV has detailed the requirements of this condition within the approved Waste and

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	liquid waste generated on the site is assessed and classified in accordance with *Waste Classification Guidelines* (DECC, 2008), or any future guideline that may supersede that document and where removed from the site is only directed to a waste management facility lawfully permitted to accept the materials.				Energy Management Plan (WEMP). All liquid and non-liquid wastes are classified prior to transportation and disposal. The waste classification is recorded in the AFJV Waste Tracking Register for all materials removed from site. All wastes are being classified and recorded in accordance with EPA's guidelines.
	Ancillary facilities				
C27	Unless otherwise approved by the Director General in accordance with this condition, the sites for ancillary facilities associated with the construction of the project shall: a be located more than 50 metres from a waterway; b have ready access to the road network or direct access to the construction corridor; c be located in areas of low ecological significance and require minimal clearing of native vegetation (not beyond that already required by the project); d be located on relatively level land; e be separated from the nearest residences by at least 200 metres (or at least 300 metres for a temporary batching plant); f be above the 20 ARI flood level unless a contingency plan to manage flooding is prepared and implemented; g not unreasonably affect the land use of adjacent properties;	Stage 1 and 2	Construction	Open	Both the main site compounds in the northern and southern ends of the Project have been approved under Major Consistency Reviews and were both compliant with this condition. The approved methodology - Methodology for Aboriginal and Historical Heritage Investigation for Works Outside the Project Corridor", is incorporated as Appendix A to the approved Heritage Management Plan for implementation by AFJV. An approval from the DP&E was received on 17 December 2015 for the Northern Concrete Batch plant to operate within 300m of a nearby sensitive receiver. A Major Consistency Review to construct and operate a concrete batch plant opposite Scotts Head Road, Macksville was approved during the reporting period. An approval to place the batch plant within 300m of a residents was received from DP&E on the 28/9/16.

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	h provide sufficient area for the storage of raw materials to minimise, to the greatest extent practical, the number of deliveries required outside standard construction hours; and i be located in areas of low heritage conservation significance (including identified Aboriginal cultural value) and not impact on heritage sites beyond those already impacted by the project. Ancillary sites identified that do not meet the above criteria shall be assessed against this criteria to demonstrate how any impacts can be mitigated and managed to acceptable standards (including demonstrating consistency with project impacts identified in the documents listed under condition 41, to the satisfaction of the Director General. Such assessment(s) can be submitted separately or as part of the Construction Environmental Management Plan required under condition B30.				A Major Consistency Review to construct and operate an asphalt batch plant at 124 Albert Drive, Warrell Creek was approved during the reporting period. This facility is more than 300m from the nearest residence. An addendum to the Minor Consistency Review for Temporary Stockpiles outside of the Project Boundary was prepared to include crushing operations at one of the stockpile sites. The crushing operations were located more than 300m from the nearest senstive receiver.
C27A	a The Proponent may undertake archaeological investigations at ancillary sites that do not meet the criterion set out in condition C27(i) of this approval, where this is required to assess the potential non-Aboriginal and Aboriginal archaeological impacts of the ancillary facility on previously unidentified heritage sites. b Any archaeological investigations undertaken under this condition must be undertaken consistent with the Construction Heritage Management Plan required under Condition B31 (e) or a methodology prepared in consultation with OEH and approved by the Director General.	Stage 1 and 2	Preconstruction and Construction	Open	Archaeological assessments of nominated ancillary site facilities have been undertaken in accordance with the approved Methodology for aboriginal heritage and historic investigation for works outside the project corridor. The assessment results have been provided to Roads and Maritime and the ER as part the Consistency Review for the Albert Drive Compound and the Northern Compound. No impacts to areas or items of heritage significance have been undertaken for either of the Ancillary Site Facilities approved for the Project.

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	c The results of any relevant archaeological investigations undertaken under this condition must be described				The Project currently has a register of Minor Ancillary Facilities that is provided to the ER for approval. There are currently 21 approved Minor Ancillary Facilities on the Project. The register compares the Minor Ancillary Facility to this condition and also to C27. No archaeological investigations were required for the concrete batch plant located near Scotts Head Road, Macksville.

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
C28	The Director General's approval is not required for minor ancillary facilities (e.g. lunch sheds, office sheds, and portable toilet facilities) that do not comply with the criteria set out in condition C27 of this approval and which: a are located within an active construction zone within the approved project footprint; and b have been assessed by the Environmental Representative to have: (i) minimal amenity impacts to surrounding residences, with consideration to matters such as noise and vibration impacts, traffic and access impacts, dust and odour impacts, and visual (including light spill) impacts, and (ii) minimal environmental impact in respect to waste management, and no impacts on flora and fauna, soil and water, and heritage beyond those approved for the project; and c have environmental and amenity impacts that can be managed through the implementation of environmental measures detailed in a Construction Environment Management Plan for the project.	Stage 1 and 2	Preconstruction and Construction	Open	The Project currently has a register of Minor Ancillary Facilities that is provided to the ER for approval. There are currently 21 approved Minor Ancillary Facilities on the Project. The register compares the Minor Ancillary Facility to this condition and also to C27.
	Part D – Prior to Operations				
	Operational Environment Management System				
D1	Prior to the commencement of operation, the Proponent shall incorporate the project into its existing environmental management system.	Stage 1 and 2	Operations	Open	RMS will incorporate the works as executed within RMS operational management systems per the requirements for both stage 1 and stage 2 within 6 months of the stages being deemed fully operational.

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	Part E – During Operations				
	Operational noise				
E1	Within 12 months of the commencement of operation of the project, or as otherwise agreed by the Director General, the Proponent shall undertake operational noise monitoring to compare actual noise performance of the project against noise performance predicted in the review of noise mitigation measures required by condition C12 and prepare an Operational Noise Report to document this monitoring. The Report shall include, but not necessarily be limited to: a noise monitoring to assess compliance with the operational noise levels predicted in the review of operational noise mitigation measures required under condition C12 and documents specified under condition A1 of this approval; b a review of the operational noise levels in terms of criteria and noise goals established in the Environmental Criteria for Road Traffic Noise (EPA, 1999); c methodology, location and frequency of noise monitoring undertaken, including monitoring sites at which project noise levels are ascertained, with specific reference to locations indicative of impacts on sensitive receivers; d details of any complaints and enquiries received in relation to operational noise generated by the project between the date of commencement of operation and the date the report was prepared;	Stage 1 and 2	Operations	Open	Not yet commenced.

CoA No.	Requirement	Stage	Timing	Status	Reference / Comment
	e any required recalibrations of the noise model taking into consideration factors such as actual traffic numbers and proportions; f an assessment of the performance and effectiveness of applied noise mitigation measures together with a review and if necessary, reassessment of all feasible and reasonable mitigation measures; and g identification of any additional feasible and reasonable measures to those identified in the review of noise mitigation measures required by condition C12, that would be implemented with the objective of meeting the criteria outlined in the *Environmental Criteria for Road Traffic Noise* (EPA, 1999), when these measures would be implemented and how their effectiveness would be measured and reported to the Director General and the EPA. The Proponent shall provide the Director General and the EPA with a copy of the Operational Noise Report within 60 days of completing the operational noise monitoring referred to a) above and no later than 12 months after the date of the commencement of operation, or as otherwise agreed by the Director General.				

Appendix D.2 Revised statement of commitments

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
	Environmental management				
M1	The head contractor for the project will have an environmental management system.	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA B30 and B31 for status update.
M2	Suitably qualified and experienced personnel will develop and implement project specific environmental management plans and procedures, incorporating as a minimum the mitigation and management measures in the environmental assessment.	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA B30 and B31 for status update.
M3	RTA and the contractor will implement a performance and compliance program.	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA B25 for status update.
	Community consultation				
CC1	Keeping the community informed will include: • regular project updates. • prior notice of project activities. • changes to traffic and access and works outside standard working hours. • contact details for enquiries. Targeted consultation with affected individuals or groups will occur as necessary (e.g. waterway users, farmers, noise affected residents, etc.).	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA B28 for status update.

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
CC2	Complaint management will include: • A published 24 hour toll free complaints number. • Directions on how to register a complaint. • Acknowledgment of complaints within eight working hours. • Complaint recording. • Tracking of complaints until resolution.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV have implemented a Construction Complaints Management System consistent with AS 4269 Complaints Handling. AFJV has established the following methods and tools for community complaints and enquiries about construction activities: (a) a telephone number for registration of complaints and enquiries (b) a postal address enabling written complaints and enquiries to be received (c) an email address to which electronic complaints and enquiries may be transmitted. An advertisement advising of the commencement of Early Works was undertaken on the 31/11/2015 and was presented in the Bellingen Shire Courier-Sun on 31/10/2015
	Traffic and transport				
T1	Construction vehicle movements and work programs will incorporate traffic control measures to minimise traffic and transport impacts on local roads and the existing Pacific Highway.	Stage 1 and 2	Preconstruction and Construction	Open	The Traffic Management & Safety Plan (TM&SP) has been prepared by AFJV and approved by DP&E on the 16/12/14. In accordance with the TM&SP, AFJV will submit Area / Discipline specific Traffic Management Plans (TMP) to the Roads and Maritime Representative. The TMP has been implemented to identify the

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
					Traffic Control Plans, access requirements and vehicle movement plans to ensure adequate and safe accesses are provided to minimise impact to all road users. The TMP details the specific road safety and traffic management measures that will be applied during the staged delivery of the elements of a specific area of the project.
T2	Any use of non-arterial roads by construction traffic will require the preparation of pre-construction and post construction dilapidation reports, with copies to go to the relevant roads authority. Repair of any damage resulting from construction (normal wear and tear), will occur, unless there are alternative arrangements with the relevant roads authority.	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA B23 for status update
T3	Construction vehicle movement arrangements will limit impacts on other road users (including pedestrians, vehicles, cyclists and disabled persons), having regard to other road works in the area, local traffic movement requirements, and peak traffic volumes, including those during long weekends and holiday periods.	Stage 1 and 2	Preconstruction and Construction	Open	The Project must comply with the Road Occupancy Licence (ROL) regime, which limits the use of traffic control during peak times, weekends and major events/holiday periods. TCP's are developed to incorporate all road users and construction requirements. Vehicle Movement Plans (VMP) are developed to ensure that all construction personnel are aware of the permitted vehicle movements, interaction between plant and workers on foot and any site specific details such as bus stops, pedestrian routes and characteristics of local vehicle movements.

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
T4	Where the Proposal temporarily or permanently affects any legal property access, the provision of feasible and reasonable alternative access to an equivalent standard will be necessary, unless a property owner agrees to alternative arrangements.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV consults with relevant landowners on construction of the project, addressing construction activities and approach to minimise intrusion and disruption to property access. Property access has been maintained to an equivalent standard unless agreed with the resident.
T5	Construction vehicle movements and work programs will incorporate traffic control measures to maintain access to state forests.	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA B22 for status update
	Noise and vibration				
N1	Further investigation of all feasible and reasonable mitigation and management measures to minimise construction noise at sensitive receivers will occur as part of detailed design (including consideration of early implementation of operational noise mitigation measures). Noise and vibration monitoring will measure against predicted levels and assess effectiveness. Implementation of further feasible and reasonable mitigation measures will occur where necessary.	Stage 1 and 2	Preconstruction, Construction and Operation	Open	Measures to minimise construction noise have been investigated during detailed design. Mitigation measures have been incorporated into the approved Noise and Vibration Management Plan (NVMP). The NVMP also prescribes the noise monitoring requirements to be undertaken during construction. Visual and noise mounds have been included in the detailed design and have been constructed as early as practical during the construction phase. Noise mounds in the vicinity of Albert Drive, Rosewood Drive and Mattick Road are currently under construction. Roads and Maritime will undertake at residence noise mitigation treatments in regard to operational noise mitigation.

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
N2	Consultation with affected education institutions during construction works in their vicinity will attempt to limit audible construction works during important events, such as examination periods.	Stage 1 and 2	Construction	Open	Noise sensitive areas have been investigated as part of developing the NVMP covering requirements for mitigation of potential noise impacts to educational institutions during construction. It is noted that the nearest educational institute is located approximately 400m to the west of the alignment at the floodplain south of Nambucca River.
N3	Best practice mitigation and management measures will be used to minimise construction noise and vibration at sensitive receivers.	Stage 1 and 2	Preconstruction and Construction	Open	Mitigation measures are incorporated into the approved NVMP. This is addressed in MCoAs C3 to C11 in regard to construction noise.
N4	Construction would normally be limited to the following hours: • Between 6am and 6pm Monday to Friday. • Between 7am and 4pm Saturday. There would be no works outside these hours or on Sundays or public holidays except: a) Works that do not cause construction noise to be audible at any sensitive receivers. b) For the delivery of materials required outside these hours by the Police or other authorities for safety reasons. c) Where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm. d) Any other work as agreed through negotiations between	Stage 1 and 2	Preconstruction and Construction	Open	The requirements of this SoC are included within the approved NVMP Sub-plan for implementation by AFJV during construction. Refer to CoA C3 & C4 for status update.

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
	the RTA and potentially affected sensitive receivers. Any such agreement must be recorded in writing and a copy kept on site for the duration of the works. e) Where the work is identified in the CNVMP and approved as part of the Construction Environmental Management Plan. f) As agreed by Department of Planning and or Department of Environment, Climate Change and Water in an EPL for the construction of the Proposal Local residents and the Department of Environment, Climate Change and Water must be informed of the timing and duration of work approved under items (d) and (e) at least 48 hours before that work commences.				
N5	All reasonable attempts will be made to contact sensitive receivers located within 500 metres of a blast location. The contact will be at least 48 hours before a blast and will include a schedule of blast time(s), and a telephone contact name and number.	Stage 1 and 2	Preconstruction and Construction	Closed	The Project's Blast Management Plan outlines the requirements for community consultation leading up to a blast. The Blast Management Plan includes notification to be made with residents 500m from the blast at least 48 hours prior to the blast via email or SMS which will include the date, time and no. of blasts. This was undertaken throughout the production blasting program which was completed on the 31/8/16.
N6	Where complaints relating to noise or vibration impacts as a result of extended workings cannot be satisfactorily resolved with the affected residents then works hours will revert back to standard working hours at that particular	Stage 1 and 2	Construction	Open	The requirements of this SoC are included within the NVMP Sub-plan and OOHW Procedure for implementation by AFJV during construction.

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
	location for that particular activity. Resident(s) will be consulted before recommencing any works outside standard working hours. Any complaints received in relation to working hours will be made available to DoP and DECCW.				Isolated complaints have been received in relation to works occurring outside of standard construction hours. All complaints have been satisfactorily resolved, with ongoing works being cancelled on one occasion.
N7	Confirmation of all feasible and reasonable mitigation and management measures to minimise operational noise at sensitive receivers will occur as part of detailed design. Implementation of the measures would occur as construction proceeds.	Stage 1 and 2	Preconstruction, Construction and Operations	Open	The Operational Noise Modelling and Mitigation Report is currently in draft form and is being reviewed by RMS. Roads and Maritime have commenced at-house noise treatments to mitigate operational noise impacts to over 150 residences. Residences that are highly affected have been targeted in the first package and remaining residences will be progressively rolled out over the course of the project. During the reporting period, RMS engaged the contractor GHD to oversee the installation of at house noise mitigation treatments. RMS is in regular communication with DP&E regarding the status of at house noise mitigation treatments. As at 15 September 2017, the status of noise treatments for the 151 eligible residences is as follows: • 47 Completed • 81 Being installed or have installation contracts awarded • 3 In tendering Phase • 8 Deed signed by owner, To be included in next installation package

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
					• 4 Feasibility of at-house treatment to be assessed • 3 On hold • 5 Deed to be signed by Owner Scheduled (contracted) completion dates for the 84 at-house treatments being installed, have installation contracts awarded or in tendering Phase: • End Sept '17 – 10 • 1st week in Nov '17 – 26 • 1st week in Dec '17 – 3 • End Dec ' 17 – 30 • 1st week in Jan '18 – 15 In summary, 116 of the 151 eligible residences (77%) are scheduled to be treated by the opening of the northern section of the project to traffic. An additional 15 residences (10%) are scheduled for completion shortly after this opening. By mid-January 2018 the only untreated residences will be the 20 residences for which contracts have not yet been awarded or are not yet in the tendering phase.
N8	Monitoring of operational noise will be undertaken within one year after completion of construction. If monitoring indicates a clear trend that traffic noise levels exceed those predicted, investigation of all further feasible and reasonable management measures will occur. Consultation with a suitably qualified and experienced acoustic	Stage 1 and 2	Operations	Open	Not yet required

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
	specialist and the affected property owner will be necessary during the development of any additional mitigation measures.				
	Flora and Fauna				
F1	Clearing of native vegetation (including endangered ecological communities (EECs)) will be restricted to the minimum area necessary for construction.	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA C1 for status update.
F2	A qualified ecologist will identify any vegetation (including Marsdenia longiloba) to be retained and to be clearly delineated on work plans within the construction corridor. Erection of flagging/fencing on-site prior to any construction works, which is to remain in place for the full construction period, will clearly delineate this vegetation.	Stage 1 and 2	Preconstruction and Construction	Open	Threatened flora species are protected from the Project works during the construction period using delineation flagging. The location of protected vegetation is shown on the Project's Sensitive Area Plan mapping. A qualified Project Ecologist has been engaged by AFJV as part of the project team to advise on erection of vegetation flagging/fencing to be in place throughout construction. Flagging is inspected on a weekly basis and reinstated where needed.
F3	A threatened flora survey will be undertaken prior to clearing to identify individuals to be translocated and to confirm the extent of clearing. Erection of exclusion fencing to prevent any further encroachment into Newry State Forest to the east of the construction footprint.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has undertaken ground truthing ecological surveys of the alignment to identify threatened flora individuals that require translocation. Threatened flora noted in the Threatened Flora Management Plan as Directly or Indirectly impacted have been translocated to protected areas outside of the clearing limits. These areas

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
	Threatened species directly impacted by the Proposal will be translocated to a suitable location outside the impact zone. A further visual inspection will be conducted post clearance to identify threatened species which may be indirectly impacted outside the cleared zone. Landscape planting to commence along the road boundary as soon as possible during construction.				have been delineated with no-go zone fencing and signage. Additional threatened plants have been identified during the Pre-clearing inspections undertaken by the Project Ecologist. These plants have been translocated in accordance with the TFMP. **Note: requirements for Newry State Forest not applicable to Project (Newry State Forest north of WC2NH).** The Urban Design and Landscape Plan has been approved by the DP&E. Permanent landscaping including batter stabilisation has commenced in accordance with this Plan.
F4	Plantings of rusty plum (*Amorphospermum whitei*) in areas of suitable habitat adjacent to the Proposal will follow from seed collection and propagation.	Stage 1 and 2	Construction	Open	Seed collection and propagation of *A.whitei* is being managed by Eco's Environmental on behalf of AFJV in accordance with the TFMP. The individuals will be nursery raised and planted along the alignment once suitable.
F5	Site induction of construction workers will inform and instruct them of vegetation to be retained and on the identification of threatened species	Stage 1 and 2	Preconstruction and Construction	Open	The site induction covers the identification of key threatened flora species located along the alignment.
F6	A suitably qualified ecologist will undertake pre-clearance surveys for threatened species including frogs. Searches will include nests and hollow bearing trees. Re-location of fauna species at risk of injury found in pre-clearance surveys or during construction will be in suitable habitat as close as possible to the area in which they were found.	Stage 1 and 2	Preconstruction and Construction	Open	A qualified Project Ecologist has been engaged by AFJV as part of the project team. The Project Ecologist undertakes inspections of all areas prior to clearing to inspect for potential fauna habitat, nests and hollow bearing trees. Fauna at risk of injury is relocated outside of the

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
	Immediately prior to clearing an inspection will confirm that the sites subject to pre-clearance surveys remain free of fauna.				clearing area where practical.
F7	Where feasible and reasonable the identification and distribution of natural and artificial habitat features and resources (such as hollow-bearing trees, hollow logs, nest boxes and bush rocks) will occur along the Proposal. This relocation will limit injury to fauna and damage to existing vegetation. A nest box plan will be developed for the Proposal.	Stage 1 and 2	Preconstruction and Construction	Open	The AFJV Project Ecologist has identified hollows and coarse woody debris that has been reused within the Project alignment for habitat. The Nest Box plan prepared by Roads and Maritime was approved by DP&E on 20/03/2013. All nest boxes to be installed prior to clearing commencing have been installed. Installation of next boxes post clearing is now complete.
F8	Retention of mature trees in the median at locations identified in the environmental assessment will provide a stepping stone for gliders. Protection of these trees will occur (F2), and lopping and pruning is not to occur without expert advice.	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA B4 for status update.
F9	Provision of fauna crossings will be as identified in the environmental assessment. All fauna crossings will be confirmed with the DECCW and I&I (Fisheries) during the detailed design phase.	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA B1, B2 and B3 for status update.
F10	Design and construction of waterway crossings will be in accordance with the fish habitat classification of each waterway and in consultation with the Department of Industry and Investment. All fauna crossings will be	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA B5 for status update.

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
	confirmed with the DECCW and I&I (Fisheries) during the detailed design phase.				
F11	Erection of fauna exclusion fencing (e.g. floppy-top fencing) along the Proposal at appropriate locations will direct fauna movement towards fauna-crossing structures.	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA B3 for status update.
F12	Development of an offset strategy will occur in consultation with the Department of Environment, Climate Change and Water.	Stage 1 and 2	Preconstruction, Construction and Operations	Open	Refer to CoA B8 for status update.
F13	A targeted, adaptive monitoring program will be undertaken for a minimum of 12 months to assess the effectiveness of fauna and flora impact mitigation measures. After 12 months a report will be completed to assess the need for additional measures and/or further targeted monitoring.	Stage 1 and 2	Preconstruction and Construction	Open	The Ecological Monitoring Program was approved by DP&E as part of the Flora and Fauna Management Plan on the 16/12/14. An Annual Report of the Ecological Monitoring outcomes was produced after the first and second year of construction.
F14	The RTA will set bed levels for culverts and ledges for combined fauna passage in consultation with the Department of Environment, Climate Change and Water.	Stage 1 and 2	Preconstruction and Construction	Open	Early design consultation with DPI (Fisheries) have been undertaken and included in tender documentation. The culverts requiring fish passage as agreed with Fisheries have been noted in Table 4.1 of the SWTC. The Design is currently progressing to incorporate the requirements of Table 4.1. The bed levels and ledges for fauna culverts have been designed. AFJV has provided agencies with design drawings for review and

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
					comment. Issues are being raised at the monthly ERG meetings and closed out through site visits and/or ongoing communication.
	Aboriginal heritage				
AH1	The protection of items and areas of archaeological significance not directly affected by construction will occur.	Stage 1 and 2	Preconstruction and Construction	Open	Heritage sites identified during the EA and subsequent Cultural Heritage Assessments are identified on the Project's Sensitive Area Plans. The areas are flagged on site with no-go zone flagging and signage to prevent construction access.
AH2	There will be protocols will be established and implemented to manage any previously unidentified Aboriginal objects or skeletal remains encountered during construction. All works in the vicinity of the find will cease to obtain Aboriginal heritage specialist advice and inform the Department of Environment, Climate Change and Water.	Stage 1 and 2	Preconstruction and Construction	Open	The approved HMP incorporates specific plans and procedures including Roads and Maritime Standard Management Procedure – Unexpected Heritage Items
AH3	The management of any Aboriginal heritage items directly affected will be in consultation with Aboriginal stakeholders and the Department of Environment, Climate Change and Water.	Stage 1 and 2	Preconstruction and Construction	Open	Archaeological Salvage works have been undertaken by Roads and Maritime in consultation with Aboriginal stakeholders and DP&E. Sites located within the Project Boundary have been cleared to commence construction. Subsequent Cultural Heritage Assessments undertaken for the Project have not identified

SoC No.	Requirement	Stage	Timing	Status	Reference / Comment
					any Aboriginal Heritage items that will be directly affected. An artefact has been salvaged to permit the construction of a permanent access road. The Cultural Heritage Assessment for this work has been provided to the RAP's and the proposed design was discussed during the Aboriginal Focus Group, including OEH during a meeting in September 2015. The item has been salvaged and provided to the RAP's for safe keeping until the end of the Project. RMS will provide correspondence to DP&E closer to project completion verifying reburial if required.
AH4	All construction personnel will receive training on their obligations for protection of Aboriginal cultural materials, including information on site locations, conservation management and legal obligations in regard to Aboriginal cultural materials.	Stage 1 and 2	Preconstruction and Construction	Open	The HMP includes an Aboriginal heritage education and training package. AFJV will implement the requirements of the HMP and subordinate management procedures, and training packages for heritage induction and training. The first training session was held in October 2015. A follow up training session was help in March 2017.
AH5	The RTA will comply with the NSW Government's *Aboriginal Participation in Construction Guidelines*.	Stage 1 and 2	Preconstruction and Construction	Open	An Aboriginal Participation Plan is currently being implemented by AFJV. Compliance with the Aboriginal Participation Plan is discussed in the regular Aboriginal Focus Group Meetings.

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	Non-Aboriginal heritage				
NH1	The detailed design will minimise impacts to identified non-Aboriginal heritage items where feasible and reasonable.	Stage 1 and 2	Preconstruction and Construction	Open	Relevant site surveys for WC2NH (Ferry Punt at Boulton Hill, and old municipal tips) have been undertaken to determine relevant sites, these areas have been identified with no-go zone flagging and signage. The detailed design has avoided impacts to non-aboriginal heritage items identified in the approved HMP.
NH2	If any material of potential archaeological significance is unearthed, work will cease to obtain specialist heritage advice.	Stage 1 and 2	Construction	Open	The approved HMP incorporates specific plans and procedures including Roads and Maritime Standard Management Procedure – Unexpected Heritage Items
NH3	Preparation of archival and photographic records for impacted heritage items would be in accordance with relevant guidelines.	Stage 1 and 2	Preconstruction and Construction	Open	The Old Farm House in North Macksville has been subject to archival recording during demolition in accordance with relevant procedures and guidelines. The archival recording has been undertaken by the Project Archaeologist/Heritage consultant – Jacobs in accordance with the approved Heritage Management Plan.
	Water quality and hydrology				
W1	Minimisation of the area of soil exposure during	Stage 1 and 2	Preconstruction and Construction	Open	The Project works are inspected on a fortnightly basis by the Project Soil Conservationist who

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	construction.				provides guidance and advice to reduce the area of soil exposed during construction. The clearing and topsoil strip phases of construction have been undertaken progressively to avoid exposing soil to erosion. Batter stabilisation and progressive rehabilitation has commenced and positive landscaping outcomes are being achieved in accordance with the approved Urban Design and Landscaping Plan.
W2	Detailed design will further investigate any additional feasible and reasonable mitigation and management measures to minimise construction erosion and sedimentation.	Stage 1 and 2	Preconstruction and Construction	Open	Sediment basins and other water quality control measures have been designed and managed by AFJV during the detailed design phase. These have been further developed and managed by AFJV and the Project Soil Conservationist after the detailed design was released. The design of the alignment aims to minimise the footprint where possible in order to minimise potential for erosion and sedimentation.
W3	Monitoring of groundwater impacts and surface water quality upstream and downstream of the site during construction will determine the effectiveness of mitigation strategies. Implementation of additional feasible and reasonable management measures will occur if necessary.	Stage 1 and 2	Preconstruction and Construction	Open	The SWMP incorporates a: • Water Quality Monitoring Program; and • Groundwater Management Strategy AFJV is currently undertaking the monitoring of groundwater and surface water during construction in accordance with the approved plans. Monitoring results are discussed during

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					the monthly ERG meetings and are provided to the EPA in the EPA Monthly Report. Monitoring data is also available on the ACCIONA website.
W4	Development and implementation of specific construction measures for in-stream works to limit water quality impacts will occur in consultation with relevant government agencies.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV have developed specific EWMS's for works in or near waterways. The EWMS's have been reviewed by DPI Fisheries and the EPA. DPI Fisheries are specifically notified prior to undertaking works in or near waterways. These areas are also regularly inspected during ERG meetings by DPI Fisheries and the EPA.
W5	Managing operational water quality will occur by applying RTA's Code of Practice for Water Management – Road Development and Management (1999).	Stage 1 and 2	Construction and Operations	Open	Operational water quality basins have been designed in accordance with the SWTC. Roads and Maritime will manage operational water quality during the operational phase.
W6	Investigation of the potential for changes in the groundwater table will take place before starting any major earthworks. Where a potential for change is identified, the significance of the change and any resultant impacts will be determined and measures to manage the changes will be designed and implemented as necessary.	Stage 1 and 2	Preconstruction and Construction	Open	Roads and Maritime has prepared the monitoring program and implementation for the pre and post construction requirements. AFJV is currently monitoring groundwater in accordance with the approved groundwater monitoring program. A Groundwater Management Strategy is a part of the approved SWMP. This Strategy includes management and mitigation measures for groundwater resource areas that may be impacted by the Project. Monitoring results for groundwater are discussed during the monthly ERG and any changes from the trigger levels

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					are discussed in the EPA Monthly Report.
W7	Baseline monitoring of groundwater levels and chemical levels at cutting sites near springs, creeks or endangered ecological communities prior to construction commencing.	Stage 1 and 2	Preconstruction and Construction	Open	Roads and Maritime has undertaken baseline monitoring up to construction commencing. AFJV is currently implementing the construction-phase monitoring requirements.
	Soils and fill				
S1	Identification and management of Acid Sulphate Soils will be in accordance with the Guidelines for the Management of Acid Sulphate materials: Acid Sulphate Soils, Acid Sulphate Rock and Mono-sulphidic Black Ooze (RTA 2005).	Stage 1 and 2	Preconstruction and Construction	Open	The approved SWMP includes an Acid Sulphate Material Management Plan which is based on this guideline document. This is currently being implemented on site. A small quantity of Acid Sulphate soil has been generated from the piling works within the floodplain and adjacent to Nambucca River and Lower Warrell Creek. This has been treated in accordance with the approved SWMP.
S2	There will be identification, investigation and appropriate management of areas of potential soil contamination (including works in the vicinity of the old municipal tip site in Nambucca State Forest).	Stage 1 and 2	Preconstruction and Construction	Open	Potential contamination within and adjacent to the Project site has been assessed and will be managed in consideration of design requirements and construction. All known areas of soil contamination were assessed in reports prepared by Coffeys, including the April 2014 report. Contaminated areas are managed in accordance with RMS specification requirements including the preparation and implementation of a Remedial Action Plan. In addition, procedures have been included

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					within the SWMP in dealing with unexpected contamination detected during construction.
	Air quality				
AQ1	To minimise windblown, traffic generated or equipment generated dust emissions, there will be feasible and reasonable mitigation and management measures.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has detailed management and mitigation measures to achieve this requirement within the approved Air Quality Management Plan (AQMP). Refer to CoA C2.
AQ2	Dust generating activities will stop where visible dust is being emitted outside the construction corridor and dust suppression measures are ineffective.	Stage 1 and 2	Preconstruction and Construction	Open	AQMP includes the locations of dust sensitive areas and indicative monitoring locations. Specific controls for managing potential for air quality (dust) impacts are prescribed within the approved AQMP. Refer to CoA C2.
	Greenhouse gases and energy				
G1	Wherever feasible and reasonable detailed design will consider whole of life reductions in greenhouse gas emissions and energy consumption.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has detailed the requirements of this SoC within the approved Waste and Energy Management Plan (WEMP). The detailed design has endeavoured to reuse material won from the Project alignment to reduce the need for carting material to and from the worksite. The long term design also supports less vehicle emissions through smarter road design (e.g. less inclines, less stopping and starting, etc.).
G2	Energy efficient work practices will be adopted to limit energy use.	Stage 1	Preconstruction	Open	AFJV has detailed the requirements of this SoC

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	Where reasonable and feasible, equipment and management measures will be adopted to minimise energy use and greenhouse gas production.	and 2	and Construction		within the approved Waste and Energy Management Plan (WEMP). Construction machinery is inspected to ensure it is operating efficiently prior to commencing on site. Machinery is regularly maintained to minimise emissions. Operators are tool-boxed to switch of machinery when not in use. Solar lighting towers are also used over diesel powered towers when practical.
	Visual amenity and design				
UD1	The preparation of detailed urban and landscape design will be in consultation with Nambucca and Bellingen Shire councils and the community. The detailed design and implementation of built elements and landscapes and the mitigation of residual impacts will be in accordance with the visual and urban design objectives and principles of the Proposal.	Stage 1 and 2	Preconstruction and Construction	Open	Refer to CoA B21
UD2	The species to be used in the landscaping treatments will include native and locally indigenous plants.	Stage 1 and 2	Preconstruction and Construction	Open	Included in SWTC App 15, R176, R178 and R179 in regards to urban design and landscape treatments. Refer to CoA B21.
UD3	Landscape and rehabilitation works will be subject to monitoring and maintenance where necessary for a minimum of two years after construction.	Stage 1 and 2	Construction and Operation	Open	Not yet commenced
	Hazards and risks				
HR1	Hazardous materials used during construction will be stored in bunded areas within construction sites. Hazardous materials will not be stored on the floodplain below the 20 year ARI flood level. Use of hazardous	Stage 1 and 2	Preconstruction and Construction	Open	These requirements are incorporated as part of the CEMP in the approved SWMP. For site/activity specific works, EWMS's have been prepared and implemented for the prevention

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	materials in floodplain areas will be limited to a daily or weekly threshold. Containers, workshops, plant, material stores and storage tanks will not be sited on the floodplain of watercourses where avoidable.				and mitigation of potential hazards and risk. Hazardous materials are not stored within the floodplain or adjacent to creek lines.
HR2	Potentially hazardous and contaminating activities (such as washing construction plant and handling hazardous chemicals) and activities with the potential for spillage such as refuelling, maintenance of equipment, mixing of cutting oil and bitumen will be in bunded areas or in other areas where suitable containment measures are in place to prevent discharge into watercourses.	Stage 1 and 2	Preconstruction and Construction	Open	These requirements are incorporated as part of the approved SWMP. Activities that may cause contaminated run-off are undertaken in appropriately bunded areas.
	Waste and resource management				
WR1	The waste minimisation hierarchy principles of avoid / reduce / re-use / recycle / dispose will apply to all aspects of the Proposal, including work programs, purchase strategies and site inductions. Quarterly assessments will identify opportunities for improvement.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has detailed the requirements of this SoC within the approved Waste and Energy Management Plan (WEMP). Waste management is reviewed quarterly in line with ACCIONA infrastructure internal reporting requirements.
WR2	Where reuse or recycling of water is not possible, it will be sent to an appropriately licensed facility.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has detailed the requirements of this SoC within the approved Waste and Energy Management Plan (WEMP). Water is reused or disposed in accordance with the Environment Protection Licence 20533.
	Landuse and property				
P1	Negotiation of all property acquisitions will be in accordance with the RTA Land Acquisition Policy Statement.	Stage 1 and 2	Preconstruction and Construction	Open	Property purchases have all been completed in February 2016. Refer CoA B24

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	Compensation assessment will be in accordance with the Land Acquisition (Just Terms Compensation) Act 1991.				
P2	The Department of Industry and Investment will have access to state forest land identified for acquisition by RTA to remove any harvestable timber within the footprint of the Proposal prior to commencement of construction. Access to state forest land adjacent to the Proposal will provide for forestry operations, fire management activities and recreation purposes.	Stage 1 and 2	Preconstruction and Construction	Open	Roads and Maritime has reached agreement with Forestry Corporation in regards to this requirement, with proposal from Forestry Corporation on the work it will undertake in State Forests.
P3	Where the Proposal adversely affects a licensed bore, dam or other property water supply, RTA will investigate an alternate source or negotiate compensation for the loss with the landowner.	Stage 1 and 2	Preconstruction and Construction	Open	The Project has not impacted on any licenced bores to date. Supplementary water supplies (such as water tanks) have been provided to landowners where farm dams have been removed.
	Socio economic impacts				
S1	There will be ongoing consultation with affected businesses, agricultural and aquaculture landowners.	Stage 1 and 2	Preconstruction and Construction	Open	AFJV has an approved Community Involvement Plan (which covers the requirements of the Condition B28 Community Communication Strategy) to provide the mechanisms to facilitate communication between the Proponent, the Contractor, the Environmental Representative, the relevant Council and the local community (broader and local stakeholders) on the construction and environmental management of the project, covering all tasks and procedures in meeting the requirements of this SoC.
S2	The identification of utilities and services potentially affected by construction, including requirements for diversion, protection and / or support will occur prior to the start of construction. Consultation with the service providers will determine alterations to services, the limitation of disruptions and requirements for advice to	Stage 1 and 2	Preconstruction and Construction	Open	The AFJV has actively consulted with Utilities providers and has prepared a design of the relocation of impacted public utilities. This is currently being implemented on site to prevent damage to necessary public utilities.

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	customers.				
S3	Sites chosen for ancillary facilities will satisfy criteria outlined in Chapter 7 of the EA. Occupation and use of compound and work sites will seek to minimise disturbance to adjacent residents.	Stage 1 and 2	Preconstruction and Construction	Open	Consistency Assessments for two Ancillary Site Facilities (Southern Compound and Northern Compound) addressing the facilities compliance with the Planning Approval have shown the facilities are consistent with the EA and Planning Approval Ancillary Facilities are checked for compliance on a register which is regularly sent to the ER for approval. The register ensures the facility is compliant with this condition and the MCoA requirements. A Consistency Assessment was prepared and approved for a concrete batch plant near Scotts Head Road, Macksville. An addendum to the Minor Consistency Review for Temporary Stockpiles outside of the Project Boundary was prepared to allow crushing activities to occur.
S4	Fencing will be erected around construction activities to prevent livestock from adjacent properties entering construction areas. Inclusion of water quality protection measures during the installation of in-stream structures to protect aquaculture.	Stage 1 and 2	Preconstruction and Construction	Open	Rural fencing was installed prior to the commencement of substantial construction to prevent livestock entering active construction zones. The works in-stream incorporate water quality protection measures such as silt curtains and hydrocarbon booms.