



Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

■ August 2017

Pacifico Project Number: WC2NH



A team consisting of RMS and Pacifico (ACCIONA Ferrovia JV) to upgrade the Pacific Highway at Warrell Creek to Nambucca Heads

Contents

1.	Introduction.....	2
2.	Weather	5
3.	Surface Water Monitoring	9
4.	Sediment Basin Water Monitoring.....	9
5.	Noise Monitoring.....	10
6.	Vibration Monitoring	10
7.	Dust Monitoring.....	10
8.	Groundwater Monitoring	11
9.	Acoustic Investigations.....	12
10.	Complaints.....	13
11.	Non-Compliance	13

1. Introduction

Environmental Protection Licence (EPL) 20533 was issued to ACCIONA Infrastructure for the Warrell Creek to Nambucca Heads Pacific Highway Upgrade project on the 16th December 2014. Condition R1.8 of the EPL requires the licensee to provide the EPA with a monthly report containing the following information:

- a) details of all non-compliances with the conditions of this licence and measures taken, or proposed, to prevent a recurrence of such a non-compliance; and
- b) details of all discharges from the sediment basins where the water quality results exceed the limits prescribed by Condition L2.4 including the results of rainfall measurements to demonstrate compliance with Condition L2.5; and
- c) details of results of any acoustic investigation made in relation to Condition L4.2d); and

The report referred to in this condition must be received by the EPA within 10 working days of the end of each month.

This document has been prepared to fulfil the requirements of Condition R1.8.

1.1 Description of Works

The project's construction activities during August 2017 included the following:

- Bitumen sealing work
- Earthworks including material resizing
- Continuing bridge works including deck unit installation and deck concrete pours
- Continuing works in the Pergola area near Upper Warrell Creek
- Continuing long drainage works
- Scour rock installation
- Batter stabilisation using hydromulch (permanent design seed mix)
- Topsoil Amelioration and Blending
- Concrete Lined Drains
- Basin Decommissioning
- Basin Maintenance including dewatering and desilting
- Installation of Erosion and Sediment Controls
- Pavement (Asphalt and Concrete)
- Line marking
- Decommissioning of the Precast Facility
- Concrete Lined Drains
- Verge / Median Placement including median Topsoil Placement
- Operation of concrete and asphalt batch plants
- Decommissioning of the Precast Facility
- Continue removing rock platforms at Nambucca River
- Temporary waterway crossing removal (Williamson Creek)
- Asphalt milling and removal of highway diversion under Nambucca Bridge
- Temporary Side-track removal – Rosewood Rd

Works scheduled for next month include

- Bitumen sealing work
- Earthworks
- Continuing bridge works including deck unit installation and deck concrete pours
- Continuing long drainage works
- Scour rock installation
- Batter stabilisation using hydromulch (permanent design seed mix)
- Topsoil Amelioration and Blending
- Concrete Lined Drains
- Basin Decommissioning
- Basin Maintenance including dewatering and desilting
- Permanent Basin Fit-out
- Decommissioning of the Precast Facility
- Installation of Erosion and Sediment Controls
- Pavement (Asphalt and Concrete)
- Verge / Median Placement including median Topsoil Placement
- Temporary Side-track removal – Rosewood Rd
- Fauna Furniture Installation
- Glider Pole and Rope Bridge Installation

1.2 Consultation Activities

The project’s consultation activities during August 2017 included the following:

Table 1 – Consultation Activities

Groups	Date	Key Topics
Environmental Review Group	8 August	Project update, environmental monitoring, upcoming out of hours, site inspection
Toolboxes	Wednesday each week	Environmental and community issues communicated to the workforce.
Nambucca Shire Council	15 August	Local road maintenance and repairs, traffic matters
North Facing Ramps group	7 and 28 August	Matters pertaining to ongoing works nearby

Other Consultation Activities:

- Continuation of directional signage consultation through to August 14 that included static displays at Macksville and Nambucca libraries, Scotts Head Bowling Club, Nambucca Plaza Shopping Centre, and Bowraville Community Technology Centre

- Ongoing appropriate notification about night time saw cutting at the Letitia Close roundabout up until mid-August;
- Emailed database with quarterly project update;
- Emailed database and letterbox dropped Rosewood Road and Albert Drive residents with notification for opening of Rosewood Road bridge;
- Emailed database with notification for opening of Old Coast Road north bridge;
- Started to obtain agreements from approximately 80 residents for project wide OOHW activities through to March 2018;
- Obtained two agreements for OOHW for quarry access bridge; and
- Ongoing notifications to various stakeholders impacted by paving and saw-cutting activities north of Mattick Road, and near Bald Hill works.

At House Noise Treatments

The at house noise treatment program is currently being managed by RMS and is not part of the ACCIONA (Pacifico) Scope of Works and Technical Criteria.

Upcoming Community and stakeholder activities:

- Conduct next Nambucca Shire Council liaison meeting – 19 September;
- Conduct next North Facing Ramps tri-weekly roadside community meetings scheduled for Monday 18 September;
- Issue fifth edition of the North Facing Ramps three-month look-ahead;
- Issue notification for opening of Old Coast Road South Bridge;
- Continue to seek project wide agreements with potentially impacted residents for all anticipated Out of Hours construction works through to March 2018;
- Continue to consult stakeholders impacted by visual mounds along the entire alignment; and
- Start to draft communications and consultation in relation to the new highway opening to traffic pre-Christmas 2017.

2. Weather

2.1 Discussion

The automatic recording weather stations at the main site compounds (North and South) records rainfall totals daily at 9AM. The total rainfall received for the month is as follows: -

Table 2 – Rainfall recorded at the two weather stations operated by Pacifico

Month	Total monthly rainfall	Location
1/08/2017 – 31/08/2017	0.4 mm	Northern Compound
1/08/2017 – 31/08/2017	1.4 mm	Albert Drive Compound

The site experienced a total of two rain days throughout the month of August 2017.

During August, rainfall received on site was lower than the August monthly average of 78.7mm. A summary of weather conditions recorded over the month for Smoky Cape by the Bureau of Meteorology is detailed below in Table 2.3.

The daily summaries for rainfall received in August at the Albert Drive Compound and Northern Compound are shown below in Table 2.1 and 2.2.

Table 2.1 – Rainfall recorded at Albert Drive Southern Compound Automated Weather Station

August 2017

Date	Time	TOTAL Rain Gauge (mm)
1/08/2017	9:00:00	0
2/08/2017	9:00:00	0
3/08/2017	9:00:00	0
4/08/2017	9:00:00	0.6
5/08/2017	9:00:00	0
6/08/2017	9:00:00	0
7/08/2017	9:00:00	0
8/08/2017	9:00:00	0
9/08/2017	9:00:00	0
10/08/2017	9:00:00	0
11/08/2017	9:00:00	0
12/08/2017	9:00:00	0
13/08/2017	9:00:00	0
14/08/2017	9:00:00	0
15/08/2017	9:00:00	0
16/08/2017	9:00:00	0
17/08/2017	9:00:00	0
18/08/2017	9:00:00	0
19/08/2017	9:00:00	0
20/08/2017	9:00:00	0
21/08/2017	9:00:00	0
22/08/2017	9:00:00	0
23/08/2017	9:00:00	0
24/08/2017	9:00:00	0
25/08/2017	9:00:00	0.8
26/08/2017	9:00:00	0
27/08/2017	9:00:00	0
28/08/2017	9:00:00	0
29/08/2017	9:00:00	0
30/08/2017	9:00:00	0
31/08/2017	9:00:00	0

Table 2.2 – Rainfall recorded at the Northern Compound Automated Weather Station

August 2017

Date	Time	TOTAL Rain Gauge (mm)
1/08/2017	9:00:00	0
2/08/2017	9:00:00	0
3/08/2017	9:00:00	0
4/08/2017	9:00:00	0.2
5/08/2017	9:00:00	0
6/08/2017	9:00:00	0
7/08/2017	9:00:00	0
8/08/2017	9:00:00	0
9/08/2017	9:00:00	0
10/08/2017	9:00:00	0
11/08/2017	9:00:00	0
12/08/2017	9:00:00	0
13/08/2017	9:00:00	0
14/08/2017	9:00:00	0
15/08/2017	9:00:00	0
16/08/2017	9:00:00	0
17/08/2017	9:00:00	0
18/08/2017	9:00:00	0
19/08/2017	9:00:00	0
20/08/2017	9:00:00	0
21/08/2017	9:00:00	0
22/08/2017	9:00:00	0
23/08/2017	9:00:00	0
24/08/2017	9:00:00	0.2
25/08/2017	9:00:00	0
26/08/2017	9:00:00	0
27/08/2017	9:00:00	0
28/08/2017	9:00:00	0
29/08/2017	9:00:00	0
30/08/2017	9:00:00	0
31/08/2017	9:00:00	0

Table 2.3: Weather conditions recorded in August 2017 at Smoky Cape by the Bureau of Meteorology.

August 2017			
Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/08/2017	12.6	20.8	0
2/08/2017	12	21.2	0
3/08/2017	11.5	21	0
4/08/2017	13.6	21	1.4
5/08/2017	12.5	20.2	0
6/08/2017	14.5	21	0
7/08/2017	15.3	23.5	0
8/08/2017	12	21.2	0
9/08/2017	11.8	21.4	0
10/08/2017	13.5	22	0
11/08/2017	15.5	27	0
12/08/2017	16.4	24.4	0
13/08/2017	13.4	22.6	0
14/08/2017	13.7	23	0
15/08/2017	15	23.9	0
16/08/2017	18.1	31	0
17/08/2017	17.6	25	0
18/08/2017	16.3	21	0
19/08/2017	10.5	17.1	0
20/08/2017	9.3	17.5	0
21/08/2017	11	17.8	0
22/08/2017	11.1	23	0
23/08/2017	12.4	24.5	0
24/08/2017	14.3		0
25/08/2017		22.4	
26/08/2017	10.7	22	2.2
27/08/2017	13.5	23.6	0
28/08/2017	8.9	18.5	0
29/08/2017	11	21.8	0
30/08/2017	12.3	22	0
31/08/2017	11.3		0

3. Surface Water Monitoring

Pacifico have been provided trigger levels for baseline monitoring from RMS, these will be compared against monthly data as well as between upstream and downstream sites to determine works impact.

Monthly sampling was undertaken by ACCIONA (Pacifico):

Dry Sampling Event

A "dry" sampling event was undertaken on the 8th August 2017, field testing was undertaken. Results are attached in Appendix A.

pH levels noted to be outside of trigger levels at:

Stony Creek recorded slightly elevated levels downstream (pH 7.47 recorded, pH 7.33 trigger). It is noted that these levels are within ANZECC criteria (6.5-8.0).

Lower Warrell Creek recorded elevated levels upstream (pH 7.17 recorded, pH 7.02 trigger) and downstream (pH 7.63 recorded, pH 7.02 trigger). It is noted that these levels are within ANZECC criteria (6.5-8.0).

Nambucca River recorded elevated levels upstream (pH 7.88) and downstream (pH 7.73). It is noted that trigger levels are pH 7.00, with any value outside of this being outside of trigger levels. It is also noted that these levels are within ANZECC criteria (6.5-8.0).

Dissolved Oxygen (DO) noted to be below trigger levels at:

Lower Warrell Creek recorded low levels upstream (3.6mg/L recorded, 5.07mg/L trigger) and downstream (3.83mg/L recorded, 5.07mg/L trigger). It is noted that dissolved oxygen levels increased from upstream to downstream sites and are therefore unlikely to be due to construction impacts. A potential cause for the low levels is decaying vegetation within the waterway and below average rainfall for the area (1.4mm of rainfall received at the Southern Compound in August, 78.7mm average rainfall during August).

Nambucca River recorded low levels upstream (4.33mg/L recorded, trigger level 7.4mg/L) and downstream (4.28mg/L recorded, trigger level 7.4mg/L). It is noted that levels were consistent between upstream and downstream sites and works within the waterway had been completed (i.e. piling, headstocks etc). A potential cause for the lower levels is decaying vegetation within the waterway and below average rainfall for the area.

4. Sediment Basin Water Monitoring

Water was released from commissioned basin B47.96 to allow for permanent design works to be undertaken. A statistical correlation has been developed which identified the relationship between Turbidity (NTU) and Total Suspended Solids (TSS) for water quality in the WC2NH Project sediment basins in order to determine the NTU equivalent of 50mg/L TSS. This statistical correlation has been developed to meet EPL Licence No 20533 Condition L2.7 to determine compliance with the Water and/or Land Concentration Limits Condition L2.4. A positive correlation has been calculated between Total Suspended Solids (TSS) and Turbidity (NTU) ($R^2 = 0.4941$, $p < 0.00001$, $n=227$). The regression equation for the analytical results calculates a turbidity (NTU) value of 120.716 for a TSS value of 50mg/L. A safety factor of 30% has been applied to the NTU result of the correlation,

providing a turbidity (NTU) value of 84.50, rounded to an NTU value of 85. To measure NTU in the field a Horiba U-52G multi-parameter water quality meter has been utilised, which is maintained and calibrated in accordance with manufacturer’s specifications. TSS sampling is being undertaken to ensure compliance with 1 in 10 sampling to validate the correlation.

Table 3 below has the water quality results recorded for the water release events:

Table 3 – Water Release Register August 2017

Date	Basin ID	Oil and Grease (visible) (Limit = No visible)	pH (6.5-8.5)	Turbidity (NTU) (Limit <85 NTU)	TSS (mg/L) (Limit <50mg/L)	Approx Volume Discharged (kL)	Comments
29/08/2017	B47.96	N	6.83	52.7		100	Released for permanent basin works
30/08/2017	B47.96	N	7.04	34.6	TBA - Awaiting lab TSS result	100	Released for permanent basin works
31/08/2017	B47.96	N	7.1	27.2		100	Released for permanent basin works

5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on the 10th and 11th of August 2017 at eight locations near to construction works. Monitoring results are available in Appendix A, Table 2.

All sites were within predicted levels for the activity being undertaken or were not the dominant noise source at the nearest residence.

6. Vibration Monitoring

Vibration monitoring was undertaken during the month of August 2017 and results are available in Appendix A.

Vibration monitoring was undertaken on the 8th, 21st and 28th of August as a result of nearby vibratory rolling being undertaken for the North Facing Ramps near Old Coast Road. All results were within 5mm/s vibration criteria (3.491mm/s peak value).

7. Dust Monitoring

Dust deposition gauges (DDG) were placed at nearby sensitive receivers from 3rd July to 1st August 2017, DDG results are available in Appendix A.

All dust deposition gauges were below the level of concern for Total Insoluble Matter (TIM) and Ash Content (AC) (4g/m².month or increase of 2g/m²/month) during the monitoring period, with the exception of DDG6 and DDG8.

DDG6 is located at Letitia Close and recorded a TIM level of 4.7g/m²/month. It is noted that the Ash Content level (relating more to construction dust) was below compliance levels at 2.2g/m².month. The elevated TIM was therefore a result of a significant amount of combustible material within the gauge, such as grass clippings or other organic matter. DDG6N is located within the same dust catchment and is within the WC2NH Project Boundary which returned compliant results for the monitoring period (1.2g/m².month TIM, 1.0g/m².month AC).

DDG8 recorded an unusually high result (10.6g/m².month TIM, 8.4g/m².month AC). In the previous monitoring period DDG8 recorded 0.5g/m².month TIM and 0.3g/m².month AC, with similar construction activities and climatic condition to this reporting period. It is also noted that dust suppression activities on Old Coast Road have continued with frequencies of visits similar over the two-month period. The high reading from DDG8 during August 2017 is not believed to be due to construction activities with another source of contamination impacting on the results.

Dust mitigation measures including water carts and wetting of quarry material before arrival to site will continue.

8. Groundwater Monitoring

ACCIONA (Pacífico) undertook groundwater monitoring on the 4th of August 2017. Field testing was undertaken. The results from the groundwater monitoring is available in Table 4 of Appendix A.

pH levels noted to be outside of trigger levels at:

Fill 15 bores recorded low pH at 4BH037a (pH 6.95 recorded, pH 6.51 trigger) and elevated pH at 4BH038 (pH 8.03 recorded, pH 7.30 trigger). It is noted that 4BH037a has been relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. These are consistent with previous results for 4BH037a e.g. pH 7.19 in July 2017, pH 7.28 in May 2017, pH 7.07 in April 2017 and 4BH038 e.g. pH 7.64 in April 2017, pH 7.50 in March 2016.

Cut 15 bore recorded elevated pH at the upgradient bore 4BH058c (pH 6.77 recorded, pH 6.40 trigger). It is noted that 4BH058c has been relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. Downgradient bore 4BH057 was dry, with no results recorded for the bore. This is consistent with previous results for the bore e.g. pH 7.25 in March 2017, pH 6.91 in February 2017.

Conductivity noted to be outside of trigger levels at:

4BH037a – Fill 15 west of 10.40mS/cm (trigger value 5.55mS/cm). 4BH038 Fill 15 east recorded 1.35mS/cm (trigger value of 8.36 mS/cm). It is noted that this

bore had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. This is consistent with previous results for 4BH037a e.g. 10.05mS/cm in June 2017, 10.50mS/cm in May 2017 and 9.11mS/cm January 2017.

Total Dissolved Solids (TDS) noted to be above trigger levels at:

Cut 11 bores recorded elevated levels of TDS at the upgradient 4BH022c (1.28g/L recorded, 0.13g/L trigger). Bulk earthworks have been completed at this location with no groundwater ingress noted on the cut face or floor. It is also noted that this bore had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. This is consistent with previous results for the bore e.g. 1.20g/L in July 2017, 1.52g/L in April 2017, 1.81g/L in January 2017.

4BH037a – Fill 15 west bore recorded elevated TDS (6.46g/L recorded, 0.1326g/L trigger level). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. This is consistent with previous results for the bore e.g. 6.09g/L in July 2017, 6.20g/L in April 2017, 5.74g/L in January 2017.

9. Acoustic Investigations

Out of Hours Works undertaken during the month of August 2017 under Condition L4.2(d) of the EPL are outlined in Table 4.

Table 4 – August Out of Hours Works approved under L4.2 (d)

Out of Hours Activity	>5dB(A) above background	Complete? Y/N
Lower Warrell Creek Deck Pours (Monitoring and results provided in July 2017)	N	Ongoing
Nambucca River Bridge Works	N	Ongoing
BR12 Concreting Works	N	Ongoing
Letitia Overbridge Parapet Installation	N	Y
Letitia Overbridge Steel Handrail Installation	N	Y
Paver Movement Gate 6N	N	Y
Upper Warrell Creek – Concrete Finishing Works	N	Y
Old Coast Road North	N	Ongoing
CC05 Finishing Works	N	Ongoing
Minor Paving Setup	N	Y

Acoustic Investigations (field monitoring) have been conducted for Out of Hours Works during the month of August 2017, results are included in Appendix A.

10. Complaints

9.1 Summary of Complaints for the month of August 2017

23/08/2017 – Resident at southern Pacific Highway contacted Pacifico regarding concerns around dust generation from site activities nearby. An additional water cart was immediately allocated to this location to suppress dust (total 2 allocated to the area). The adjacent earthworks batter was trimmed and a soil binder reapplied the following week to minimise dust generation from the adjacent fill batter. Asphalt profiling was placed at the property access within 48 hours to provide a stabilised entry point to the property. The area foreman toolboxed all workers to be aware of the sensitivities of nearby stakeholders. A dust suppression curtain was also installed at the property boundary in late August 2017.

11. Non-Compliance

11.1 Summary of Non-compliances

One (1) Non Compliance was raised against ACCIONA's Environmental Protection Licence during the month of August 2017 relating to EPL Condition R2 and Section 148 of the Protection of the Environment Operations Act 1997.

A formal warning letter was issued to AFJV on 30th August 2017 stating that ACCIONA had not notified the EPA that an incident had occurred during a significant rainfall event at Browns Crossing Rd (Service Road A). Under section 64 of the Protection of the Environment Operations Act 1997 it is an offence to contravene any licence condition.

Appendix A – Monitoring Results

Table 1 – Surface Water Results August 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			Downstream			Upstream			Downstream							
			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine							
			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	-	6.5-8	7.25	6.48	6.56	7.3	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	-	-	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

Table 2 - Noise Monitoring Results August 2017

Date	Time	Location	Rec ID	NCA	NML	Activity	Predicted levels for activity	Laeq	LAFMAX	LAFMIN	LAF10	LAF50	LAF90	Principal sources/ operations	Construction noise dominant?	Corrective actions	Notes
10/08/2017	3:30 PM	Albert Drive	74	1	50	Cut	62	49.1	70.7	43.4	50	47.8	46.1	Trucks, front end loader, excavator	Y	NA	Within predicted levels and NML
11/08/2017	1:20 PM	Cockburns Lane	16	1	50	Cut	65	47.2	65.4	38.1	46.8	43.5	40	Excavator, concreting	N	NA	Construction not audible. Dominant noise sources: highway, resident installing fence
10/08/2017	4:00 PM	Bald Hill Rd	197	3	50	Cut	72	54.6	71.6	41	57.8	50.8	45.8	Excavator, tipper trucks	Y	NA	Within predicted levels. Stockpile in place on east side of alignment to reduce noise levels from construction activities.
11/08/2017	11:37 AM	Letitia Rd	406	4	59	Cut	74	48.2	63.5	41.6	50.2	47.3	44.2	Bulldozer, hand tools	Y	NA	Within predicted levels and NML. Regular consultation undertaken with residents impacted by NFR construction activities.
11/08/2017	11:13 AM	Mattick Rd	442	6	44	Cut	62	54.6	71	41.9	58.2	48.4	45.3	Excavators, moxies, grader	Y	NA	Within predicted levels. Permanent noise mounds currently in place to reduce construction noise at sensitive receivers.
11/08/2017	12:00 PM	Nursery Rd	415	4	59	Cut	53	49.6	64.2	40.7	52	47.3	43.3	Excavator, trucks	N	NA	Construction not audible. Dominant noise sources: existing highway.
11/08/2017	12:52 PM	Wallace St	148	3	50	Cut	47	56	69.8	40.5	58.8	51.1	44.6	Excavator	N	NA	Construction not audible. Dominant noise sources: local traffic, highway.
11/08/2017	12:30 PM	Gumma Rd	383	3	50	Concreting	63	58.4	72.8	53.6	60.3	57.1	55.5	Concrete agitator, generator, compressor	Y	NA	Within predicted levels.

Table 3 - Dust Monitoring Results July - August 2017

		DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8	DDG9NE	DDG9E	DDG A1	DDG A2	
		Start 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	
		Finish date of sampling		1/08/2017	1/08/2017	1/08/2017	1/08/2017	1/08/2017	1/08/2017	1/08/2017	1/08/2017	1/08/2017	1/08/2017	1/08/2017	1/08/2017	1/08/2017	
Analyte	Time Period	Unit	Levels of Concern	LOR													
Ash Content	Current Month	g/m ² .month	4	0.1	0.2	0.5	0.6	0.2	0.5	2.2	1	0.3	8.4	0.3	0.4	----	----
	Previous Month	mg	N/A	1	4	9	11	4	8	37	17	5	143	5	7	----	----
	Change	g/m ² .month	Increase of 2		0	0.3	-0.2	0	0.1	0.6	0.1	-0.2	8.1	0.1	-1.3	----	----
Combustible Matter	Current Month	g/m ² .month	N/A	0.1	0.6	0.2	0.3	0.2	0.1	2.5	0.2	0.1	2.2	<0.1	0.3	----	----
	Previous Month	mg	N/A	1	10	3	5	3	3	43	4	2	38	<1	5	----	----
Total Insoluble Matter (TIM)	Current Month	g/m ² .month	4	0.1	0.8	0.7	0.9	0.4	0.6	4.7	1.2	0.4	10.6	0.3	0.7	----	----
	Previous Month	mg	N/A	1	14	12	16	7	11	80	21	7	181	5	12	----	----
	Change	g/m ² .month	Increase of 2	0.1	0.3	0.3	1.3	0.2	0.7	2.3	1.3	0.6	0.5	0.3	2.4	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----	<0.001	<0.001
Comments					Grass mowed around gauge	Insects in funnel	Grass mowed around gauge						Insects in gauge		Animal excrement in gauge		Insects in gauge

Table 4 – 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
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	-
pH		-	-	-	6.26	4.74	6.20	-	6.78	5.81	6.59	7.09	5.93	6.39	6.78	6.21
Conductivity	mS/cm	-	-	-	3630.000	3.55	-	-	111.300	0.145	231.000	1.99	0.342	-	322.000	-
Temperature	C	-	-	-	22.4420	20.73	-	-	22.3600	21.47	21.1500	21.01	22.6040	-	21.3000	-
Total Dissolved Solids	g/L	-	-	-	3.5720	2.27	-	-	0.0946	0.095	0.1306	1.28	0.1326	-	22.3000	-
Exceedance of trigger level																

Table 5 – Vibration Monitoring Results August 2017

Location	DATE	TIME	Triggered	Vector Sum (mm/s)	Comments
51 OCR	2017-08-08	16:38:00	Continuous	0.198	Background
51 OCR	2017-08-08	16:39:00	Continuous	1.147	Smooth drum (heavy vibe)
51 OCR	2017-08-08	16:40:00	Continuous	1.457	Smooth drum (heavy vibe)
51 OCR	2017-08-08	16:41:00	Continuous	1.322	Smooth drum (heavy vibe)
51 OCR	2017-08-08	16:42:00	Continuous	1.506	Smooth drum (heavy vibe)
51 OCR	2017-08-08	16:43:00	Continuous	1.59	Smooth drum (heavy vibe)
51 OCR	2017-08-08	16:44:00	Continuous	1.481	Smooth drum (heavy vibe)
51 OCR	2017-08-08	16:45:00	Continuous	1.473	Smooth drum (heavy vibe)
51 OCR	2017-08-08	16:46:00	Continuous	1.331	Smooth drum (heavy vibe)
51 OCR	2017-08-08	16:47:00	Continuous	1.293	Smooth drum (heavy vibe)
51 OCR	2017-08-08	16:48:00	Continuous	0.174	Background
53 OCR	2017-08-21	16:52:00	Continuous	0.196	Static heavy roller
53 OCR	2017-08-21	16:53:00	Continuous	3.491	Heavy vibe heavy roller
53 OCR	2017-08-28	12:05:00	Continuous	0.216	Background
53 OCR	2017-08-28	12:06:00	Continuous	0.346	truck OCR
53 OCR	2017-08-28	12:07:00	Continuous	0.286	truck OCR
53 OCR	2017-08-28	12:08:00	Continuous	0.34	Heavy vibe 7T roller
53 OCR	2017-08-28	12:09:00	Continuous	0.388	Heavy vibe 7T roller
53 OCR	2017-08-28	12:10:00	Continuous	0.403	Heavy vibe 7T roller
53 OCR	2017-08-28	12:11:00	Continuous	0.421	Heavy vibe 7T roller

Table 5 – Field Monitoring for Out of Hours Works August 2017 (Acoustic Investigation) Description of Works	Date	Time	Location	NCA	NML (dB(A))	Laeq (dB(A))	Distance to receiver (m)	Compliant	Notes
Letitia Overbridge - Parapet Finishing Works	2/08/2017	6:05pm	Letitia Roundabout	4	48	40.2	90m	Yes	Highway Traffic Dominant. Monitoring to verify compliance with L4.2(d)
Letitia Overbridge - Steel Handrail Installation	5/08/2017	13:15pm	Letitia Roundabout	4	48	43.7	90m	Yes	Steel Handrail Installation. Monitoring to verify compliance with L4.2(d)
Paver Movement Gate 6N	11/08/2017	6:05am	Quarry Access Overbridge	1	45	41.7	220m	Yes	Highway Traffic Dominant. Monitoring to verify compliance with L4.2(d)
BR12 Finishing Parapet Install	12/08/2017	1:03 PM	OC21 OCR Eastern Tie-in	5	46	26.7	580m	Yes	Monitoring to verify compliance with L4.2(d)
Nambucca Bridge Concreting Works	12/08/2017	1:30 PM	BR09 North Abutment	4	46	33.4	260m	Yes	Highway Traffic Dominant. Monitoring to verify compliance with L4.2(d)
Upper Warrell Creek Concrete Finishing	14/08/2017	7:05pm	Stockpile adjacent to existing pacific highway	1	40	40.3	160m	Yes	Highway Traffic Dominant. Monitoring to verify compliance with L4.2(d)
Minor Paving Setup	17/08/2017	18:05pm	OC17 (old gate) Cut 27	5	44	24.1	1080m	Yes	Paving Finishing Works. Monitoring to verify compliance with L4.2(d)
BR12 Finishing Works / Northern Tie in OCR	19/08/2017	1:10pm	Eastern Tie-in	5	44	38.6	520m	Yes	BR12 and Tie-in Works (excavator and plate compactor) and OCR Traffic . Monitoring to verify compliance with L4.2(d)
Old Coast Road North Bridge Finishing Works	20/08/2017	8:20am	OC21 OCR Eastern Tie-in	5	44	35.1	520m	Yes	Handtools, Rattlegun and OCR North Traffic. Monitoring to verify compliance with L4.2(d)
Old Coast Road North Concrete Finishing Works	21/08/2017	7:38pm	OC21 OCR Eastern Tie-in	5	44	29.4	520m	Yes	Concrete Finishing Works. Monitoring to verify compliance with L4.2(d)