



Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

■ December 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

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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 December 2017 included the following:

- Bitumen sealing work
- Earthworks including removal of the plug at the Rail Pergola area
- Continuing bridge works including deck unit installation and deck concrete pours
- Continuing works in the Pergola area near Upper Warrell Creek
- Continuing drainage works
- Scour rock installation
- Batter stabilisation using hydromulch (permanent design seed mix)
- Topsoil Amelioration and Blending
- Concrete Lined Drains and turnouts
- Basin Maintenance including dewatering and desilting
- Permanent Basin Fit-out
- Installation and maintenance of Erosion and Sediment Controls
- Pavement (Asphalt and Concrete)
- Line marking
- Decommissioning of the Precast Facility
- Decommissioning of the Southern Concrete Batch Plant
- Verge / Median Placement including median Topsoil Placement
- Operation of concrete and asphalt batch plants
- Landscape Planting Works

Works scheduled for next month include

- Bitumen sealing work
- Earthworks
- Continuing bridge works including deck unit installation and deck concrete pours
- Continuing drainage works

- Scour rock installation
- Batter stabilisation using hydromulch (permanent design seed mix)
- Topsoil Amelioration and Blending
- Concrete Lined Drains and turnouts
- Basin Maintenance including dewatering and desilting
- Permanent Basin Fit-out
- Installation and maintenance of Erosion and Sediment Controls
- Pavement (Asphalt)
- Line marking
- Decommissioning of the Precast Facility
- Verge / Median Placement including median Topsoil Placement
- Operation of concrete and asphalt batch plants
- Landscape Planting Works

1.2 Consultation Activities

The project's consultation activities during December 2017 included the following:

Table 1 – Consultation Activities

Groups	Date	Key Topics
Environmental Review Group	5 December	Project update, environmental monitoring, upcoming out of hours, site inspection
Toolboxes	Wednesday each week	Environmental and community issues communicated to the workforce.
Emergency services group	1 December	Road and traffic changes for the new highway, contact points
North Facing Ramps group	10 December	Matters pertaining to ongoing works nearby
Business Information Session	13 December	Project update and outline of changes with the new highway opening

Other Consultation Activities:

- Ongoing appropriate notification about OOH and night time asphaltting and construction work;
- Emailed database with Highway opening notification and Christmas shutdown details;
- Emailed database and letterbox dropped some residents with invitation for the opening of Nambucca Bridge and the open day;
- Obtained further agreements from approximately 80 residents for project wide OOHW activities through to March 2018;
- Obtained further agreements for Sunday operation of the Asphalt Plant;
- Ongoing notifications to various stakeholders impacted by work near Mattick Road, the flood plains and near Bald Hill Road;

- Consultation with residents for tree plantings to mitigate traffic and light impacts; and
- Bridge walk and highway opening ceremony for local community to celebrate the opening of the Philip Hughes / Nambucca River Bridge;

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 – Mid February;
- Conduct final North Facing Ramps roadside community meetings on Monday 15 January;
- Issue notification for traffic diversion at the southern interchange near Browns Crossing Road;
- Continue to seek project wide agreements with potentially impacted residents for all anticipated Out of Hours construction works through to March 2018; and
- Continue to consult stakeholders impacted by visual mounds along the entire alignment;

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
1/12/2017 – 31/12/2017	147.4mm	Northern Compound
1/12/2017 – 31/12/2017	140.2mm	Albert Drive Compound

The site experienced a total of thirteen (13) rain days throughout the month of December 2017.

During December 2017, rainfall received on site was higher than the December monthly average of 117.6mm. 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 November 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

December 2017

Date	Time	TOTAL Rain Gauge (mm)
1/12/2017	9:00:00	0.2
2/12/2017	9:00:00	0
3/12/2017	9:00:00	2.8
4/12/2017	9:00:00	0
5/12/2017	9:00:00	1.6
6/12/2017	9:00:00	13.4
7/12/2017	9:00:00	0.2
8/12/2017	9:00:00	0
9/12/2017	9:00:00	0.6
10/12/2017	9:00:00	0
11/12/2017	9:00:00	0
12/12/2017	9:00:00	0
13/12/2017	9:00:00	0
14/12/2017	9:00:00	0
15/12/2017	9:00:00	0
16/12/2017	9:00:00	0
17/12/2017	9:00:00	0
18/12/2017	9:00:00	0
19/12/2017	9:00:00	0
20/12/2017	9:00:00	0
21/12/2017	9:00:00	1.8
22/12/2017	9:00:00	13.8
23/12/2017	9:00:00	0
24/12/2017	9:00:00	0
25/12/2017	9:00:00	20.6
26/12/2017	9:00:00	7.6
27/12/2017	9:00:00	60.6
28/12/2017	9:00:00	16
29/12/2017	9:00:00	0
30/12/2017	9:00:00	0
31/12/2017	9:00:00	1

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

December 2017

Date	Time	TOTAL Rain Gauge (mm)
1/12/2017	9:00:00	0
2/12/2017	9:00:00	0
3/12/2017	9:00:00	1.6
4/12/2017	9:00:00	0
5/12/2017	9:00:00	1.2
6/12/2017	9:00:00	10.8
7/12/2017	9:00:00	0
8/12/2017	9:00:00	0
9/12/2017	9:00:00	2.4
10/12/2017	9:00:00	0
11/12/2017	9:00:00	0
12/12/2017	9:00:00	0
13/12/2017	9:00:00	0
14/12/2017	9:00:00	0
15/12/2017	9:00:00	0
16/12/2017	9:00:00	0
17/12/2017	9:00:00	0
18/12/2017	9:00:00	0
19/12/2017	9:00:00	0
20/12/2017	9:00:00	0
21/12/2017	9:00:00	3
22/12/2017	9:00:00	16
23/12/2017	9:00:00	0
24/12/2017	9:00:00	0
25/12/2017	9:00:00	23.8
26/12/2017	9:00:00	8.2
27/12/2017	9:00:00	70.2
28/12/2017	9:00:00	9.4
29/12/2017	9:00:00	0
30/12/2017	9:00:00	0
31/12/2017	9:00:00	0.8

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

December 2017			
Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/12/2017	21.1	27.8	0
2/12/2017	20.4	25.1	0
3/12/2017	18	29	3
4/12/2017	19.7	25.4	4.8
5/12/2017	19	26.9	2.4
6/12/2017	17	26	4
7/12/2017	20.3	29.4	0
8/12/2017	20.7	27.5	0
9/12/2017	18.2	26	6.2
10/12/2017	17.4	29	0.6
11/12/2017	18.1	28.6	0
12/12/2017	18.9	29.4	0
13/12/2017	19.5	27.9	0
14/12/2017	20.7	26.8	0
15/12/2017	20.5	27	0
16/12/2017	21	27.5	0
17/12/2017	21	27	0
18/12/2017	20.8		0
19/12/2017		27.5	0
20/12/2017	20.2	26.4	0
21/12/2017	20.2	22	6.2
22/12/2017	19.1	26.3	10.8
23/12/2017	19.4	28.9	0
24/12/2017	21.2	27.2	0
25/12/2017	18.6	26	21
26/12/2017	18.2	21.8	7.2
27/12/2017	17.5	28.6	102
28/12/2017	19	28.9	0
29/12/2017	22	26.5	0
30/12/2017	22.1	29.9	0
31/12/2017	21.1	27.8	1

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):

Wet Sampling Event

A "wet" sampling event was undertaken on the 6th of December 2017 after an event was triggered (>10mm of rain in 24 hour period). Field testing and lab sampling was undertaken. Results are attached in Appendix A.

pH levels noted to be outside of trigger levels at:

Lower Warrell Creek recorded slightly elevated pH levels upstream and downstream (pH 7.20 upstream, pH 7.16 downstream, 6.86 trigger level). It is noted that these levels are within ANZECC criteria (pH 6.5-8.0). These results are consistent with previous results for the site (pH 7.33 upstream, pH 7.3 downstream recorded, February 2017 and pH 7.18 upstream, pH 7.35 downstream recorded, October 2017).

Gumma Wetlands downstream recorded slightly elevated pH levels (pH 7.16 recorded upstream, pH 7.10 recorded downstream, pH 6.90 trigger level). It is noted that these levels decreased from upstream to downstream sites and are unlikely to be due to construction impacts. These results are consistent with previous results for the site (pH 8.08 upstream, pH 7.42 downstream recorded, February 2016).

Nambucca River recorded slightly elevated pH levels (pH 7.86 recorded upstream, pH 7.88 recorded downstream, pH 7.56 trigger level). It is noted that levels were consistent between upstream and downstream sites and are unlikely to be due to construction impacts. These results are consistent with previous results for the site (pH 7.93 upstream, pH 7.99 downstream recorded January 2017).

Turbidity (NTU) noted to be outside of trigger levels at:

Nambucca River recorded elevated NTU upstream and downstream (29.1 NTU upstream, 28.1 NTU downstream). It is noted that levels decreased between upstream and downstream sites, with construction impacts unlikely to be the cause of the elevated levels. These levels are consistent with previous results for the site.

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

Stony Creek recorded low DO levels upstream and downstream (0.5mg/L recorded upstream, 5.08mg/L trigger, 0.59mg/L recorded downstream, 2.63mg/L trigger). It is noted that levels increased from upstream to downstream sites and are unlikely to be due to construction impacts. A potential cause for these levels is decaying vegetation within the waterway. It should also be noted that DO levels are consistent between upstream and downstream sampling sites.

Lower Warrell Creek recorded low DO levels upstream and downstream (2.07 mg/L recorded upstream, 2.01 mg/L recorded downstream, 5.02 mg/L trigger). It is noted that these levels are consistent between upstream and downstream sites, with these levels unlikely to be due to construction impacts. A potential cause for these results is decaying

vegetation within the waterway. These levels are consistent with previous results for the site (1.27mg/L recorded upstream, 1.8mg/L recorded downstream in June 2017).

Nambucca River recorded low DO levels upstream and downstream (6.11mg/L recorded upstream, 5.2mg/L recorded downstream, 6.88mg/L trigger). It is noted that these levels are above ANZECC criteria (5mg/L). These levels are consistent with previous results for the site (3.42 mg/L recorded upstream, 5.69 mg/L recorded downstream October 2017).

Metals noted to be above trigger levels at:

Upper Warrell Creek recorded slightly elevated levels of manganese downstream (0.202 mg/L recorded downstream, 0.158 mg/L trigger, 0.208 mg/L recorded upstream, 0.3 mg/L trigger). It is noted that levels decreased from upstream to downstream sites, with elevated levels unlikely to be due to construction impacts. It is noted that these levels are within ANZECC criteria (1.9mg/L). These levels are consistent with previous results for the site (e.g. 0.328mg/L downstream recorded November 2016).

Stony Creek recorded elevated levels of manganese upstream and downstream (0.187 mg/L recorded upstream, 0.0726 mg/L trigger and 0.171 mg/L recorded downstream, 0.083 mg/L trigger). It is noted that levels decreased from upstream to downstream sites, with elevated levels unlikely to be due to construction impacts. It is noted that these levels are within ANZECC criteria (1.9mg/L). These levels are consistent with previous results for the site (0.385 mg/L recorded upstream, 0.115 mg/L recorded downstream February 2017).

Gumma Wetlands recorded elevated levels of copper upstream and downstream (0.002mg/L and 0.006mg/L recorded upstream, 0.003mg/L recorded downstream, 0.001mg/L trigger). These levels are consistent with previous results for the site (0.003mg/L recorded downstream October 2017).

Nutrients noted to be outside trigger levels at

Upper Warrell Creek recorded elevated levels of nitrogen upstream (0.8mg/L recorded, 0.56mg/L trigger) and downstream (0.9mg/L recorded, 0.52mg/L trigger). All controls were verified to be in place for the site, with the surrounding agricultural lands being a possible source for the elevated levels.

Stony Creek recorded elevated levels of nitrogen upstream (0.6mg/L recorded, 0.48mg/L trigger) and downstream (0.9mg/L recorded, 0.63mg/L trigger), nitrate downstream (0.23mg/L recorded, 0.2mg/L trigger) and ammonia downstream (0.14mg/L recorded, 0.062mg/L trigger). All controls were verified to be in place for the site. The surrounding agricultural lands were a possible source for the elevated levels.

Lower Warrell Creek recorded elevated levels of nitrogen upstream and downstream (0.6mg/L recorded upstream, 0.8mg/L recorded downstream, 0.54mg/L trigger), and nitrate downstream (0.1mg/L recorded, 0.05mg/L trigger). All controls were verified to be in place for the site. A potential cause for the elevated levels is runoff from the surrounding agricultural lands.

Total Suspended Solids noted to be outside trigger levels at:

Stony Creek downstream recorded elevated Suspended Solids levels downstream (20mg/L). All controls were verified to be in place for the site as per the Progressive Erosion and Sediment Control Plan, with no uncontrolled discharges noted from site. A potential cause

of the elevated levels is from runoff from the nearby roadway or adjacent agricultural activities.

Lower Warrell Creek recorded elevated Suspended Solids levels upstream (26mg/L recorded) and downstream (30mg/L recorded, 25mg/L trigger level). All controls were verified to be in place for the site, with no uncontrolled discharges noted from site.

Dry Sampling Event

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

pH levels noted to be outside of trigger levels at:

Lower Warrell Creek recorded elevated pH levels upstream and downstream (pH 7.39 recorded upstream, pH 7.17 recorded downstream, pH 7.02 trigger). It is noted that bridge construction works have been completed at this location with only isolated finishing works being undertaken in December 2017. It is also noted that these levels are within ANZECC criteria (pH 6.5-8.0). These results are consistent with previous results for the site (e.g. pH 7.48 upstream, pH 7.46 downstream in January 2017).

Gumma Wetlands recorded elevated pH levels downstream (pH 7.07 recorded downstream, pH 6.7 recorded upstream, pH 7.0 trigger level). It is noted that bridge construction works have been completed at this location with only isolated finishing works being undertaken in December 2017. It is also noted that these levels are within ANZECC criteria (pH 6.5-8.0). These results are consistent with previous results for the site (e.g. pH 6.85 upstream, pH 7.64 downstream in December 2015).

Nambucca River recorded elevated levels upstream (pH 7.93) and downstream (pH 7.95). 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 bridge construction works have been completed at this location with only isolated finishing works being undertaken. It is also noted that these levels are within ANZECC criteria (6.5-8.0). These results are consistent with previous results for the site (e.g. pH 8.13 upstream, pH 8.18 downstream in December 2016).

Conductivity (mS/cm) noted to be outside of trigger levels at:

Gumma Wetlands recorded elevated conductivity levels upstream (0.887mS/cm recorded upstream, 0.885mS/cm recorded downstream, 0.808mS/cm trigger level). These levels are consistent with previous results for the site (e.g. 0.453mS/cm upstream, 1.64mS/cm downstream recorded December 2015).

Turbidity (NTU) noted to be outside of trigger levels at:

Upper Warrell Creek recorded elevated NTU levels upstream and downstream (18.9 NTU recorded upstream with 10.96 NTU trigger, 22.3 NTU recorded downstream with 9.9 NTU trigger). Controls were noted to be installed onsite as per the Progressive Erosion and Sediment Control Plan with no site runoff or dewatering activities being undertaken during the monitoring session. Pacifico believe this exceedance is most likely due to a source upstream of the site. These results are consistent with previous results for the site (16.9 NTU recorded upstream, 25.8 NTU recorded downstream January 2017).

Stony Creek recorded elevated NTU levels upstream and downstream (17.6 NTU recorded upstream with 9.9 NTU trigger, 18.0 recorded downstream with 5.97 NTU trigger).

Controls were noted to be installed onsite as per the Progressive Erosion and Sediment Control Plan with no site runoff or dewatering activities being undertaken during the monitoring session. Pacifico believe this exceedance is most likely due to an upstream source unrelated to construction activities.

Lower Warrell Creek recorded elevated NTU levels upstream and downstream (32.6 NTU recorded upstream, 17.9 NTU recorded downstream, 6.82 NTU trigger). Controls were noted to be installed onsite as per the Progressive Erosion and Sediment Control Plan with no site runoff or dewatering activities being undertaken during the monitoring session. It is also noted that bridge construction works have been completed at this location with only isolated finishing works being undertaken. Pacifico believe this exceedance is most likely from an upstream source unrelated to construction.

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

Upper Warrell Creek recorded low DO levels upstream and downstream (0.28mg/L recorded upstream, 4.98mg/L trigger, 2.44mg/L recorded downstream, 4.8mg/L trigger). It is noted that levels increased from upstream to downstream sites and therefore are not related to construction activities. These levels are consistent with previous results for the sites (e.g. 0.16mg/L upstream, 1.87mg/L downstream in February 2017). Pacifico believe that the low levels are most likely due to a source unrelated to construction, such as decaying vegetation within the waterway.

Stony Creek recorded low DO levels upstream and downstream (1.63mg/L recorded upstream, 2.6mg/L trigger, 1.04mg/L recorded downstream, 3.52mg/L trigger). These levels are consistent with previous results for the site (e.g. 1.66mg/L upstream, 3.42mg/L downstream February 2017). Pacifico believe that the low levels are most likely due to a source unrelated to construction, such as decaying vegetation within the waterway.

Lower Warrell Creek recorded low DO levels upstream and downstream (3.14mg/L recorded upstream, 3.37mg/L recorded downstream, 5.07mg/L trigger level). It is noted that levels increased between upstream and downstream sites and works within the waterway had been completed (i.e. piling, headstocks etc). Pacifico believe that the low levels are most likely due to a source unrelated to construction, such as decaying vegetation present within the waterway.

Nambucca River recorded low levels upstream and downstream (5.92mg/L recorded upstream, 6.47mg/L recorded downstream, trigger level 7.4mg/L). It is noted that levels increased between upstream and downstream sites and works within the waterway had been completed (i.e. piling, headstocks etc). It is also noted that levels are above ANZECC criteria (5mg/L). These levels are consistent with previous results for the site (4.72mg/L upstream, 5.01mg/L downstream in December 2016).

2nd Wet Sampling Event

A second "wet" sampling event was undertaken on the 22nd of December 2017 after an event was triggered (>10mm of rain in 24 hour period). Field testing was undertaken. Results are attached in Appendix A.

pH levels noted to be outside of trigger levels at:

Lower Warrell Creek recorded low pH levels upstream and downstream (pH 6.35 upstream, pH 6.4 downstream, 6.46 trigger level). It is noted that the downstream level is only slightly below trigger levels.

Conductivity (mS/cm) noted to be outside of trigger levels at:

Upper Warrell Creek recorded elevated conductivity levels upstream (0.335mS/cm recorded, 0.3204mS/cm trigger) and downstream (0.333mS/cm recorded, 0.3242mS/cm trigger). It is noted that levels are consistent with previous results for the site (0.321mS/cm upstream, 0.326mS/cm downstream recorded October 2015).

Gumma Wetlands recorded elevated conductivity levels upstream (1.21mS/cm upstream, 1.27mS/cm downstream, 0.842mS/cm trigger). It is noted that levels are consistent with previous results for the site (1.17mS/cm recorded upstream, 1.04mS/cm recorded October 2017).

Turbidity (NTU) noted to be outside of trigger levels at:

Stony Creek recorded elevated NTU upstream (19.1 NTU recorded, 14.98 NTU trigger) and downstream (37.7 NTU recorded, 17.16 NTU trigger). It is noted that these levels are consistent with previous results for the site (58.3 NTU upstream, 58.1 NTU downstream recorded February 2016).

Nambucca River recorded elevated NTU upstream and downstream (19.4 NTU upstream, 30.9 NTU downstream). Levels are consistent with previous results for the site (29.1 NTU upstream, 28.1 NTU downstream recorded November 2017).

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

Lower Warrell Creek recorded low DO levels upstream and downstream (3.96 mg/L recorded upstream, 3.9 mg/L recorded downstream, 5.02 mg/L trigger). It is noted that these levels are consistent between upstream and downstream sites, with these levels unlikely to be due to construction impacts. A potential cause for these results is decaying vegetation within the waterway. These levels are consistent with previous results for the site (2.07mg/L recorded upstream, 2.01mg/L recorded downstream in November 2017).

Nambucca River recorded low DO levels upstream and downstream (3.69mg/L recorded upstream, 3.42mg/L recorded downstream, 6.88mg/L trigger). These levels are consistent with previous results for the site (3.48 mg/L recorded upstream, 3.07mg/L recorded downstream January 2017).

4. Sediment Basin Water Monitoring

Water was released from commissioned basins after rainfall on the 25th-28th December 2017. 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 December 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
28/12/2017	B42.30	N	7.16	59.3		700	
28/12/2017	B48.20	N	6.76	35	<5	900	
31/12/2017	B49.45	N	7.06	71.3		1500	

5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on the 13th of December 2017 at five 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 December 2017. Results are available in Appendix A, Table 5. Results were within compliance levels (5mm/s) for building damage.

7. Dust Monitoring

Dust deposition gauges (DDG) were placed at nearby sensitive receivers from the 31st October to 4th December 2017. DDG results are available in Appendix A, Table 3.

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 DDG9NE and DDG6N.

DDG9NE recorded elevated levels of TIM (12.2g/m²/month) and AC (11.0g/m²/month). It is noted that the second gauge installed at this location, DDG9E, recorded results well within criteria (0.7g/m²/month TIM, 0.5g/m²/month AC). It is also noted that the grass adjacent to this gauge had been recently slashed, with this being a potential source for the elevated reading.

DDG6N recorded elevated levels of TIM (4.2g/m²/month). It is noted that AC recorded at DDG6N was 2.9g/m²/month which is within the criteria of 4g/m²/month. It is also noted that the second gauge installed at this location, DDG6, recorded results within criteria (1.7g/m²/month TIM, 1.4g/m²/month AC). It should also be noted that DDG6N results could not be compared with the previous month as the gauge was broken in transport to the NATA Accredited Laboratory. Field notes taken during collection of the gauge in December 2017 also highlighted that insects and a frog were located within the gauge which may have contributed to this elevated result.

Dust mitigation measures including water carts, surfactant additives and wetting of quarry material before arrival and during placement will continue.

8. Groundwater Monitoring

ACCIONA (Pacífico) undertook groundwater monitoring on the 14th of December 2017. Field testing was undertaken. The results from the groundwater monitoring is available in Appendix A.

pH levels noted to be outside of trigger levels at:

Cut 11 bores recorded low pH at upslope bore 4BH022c (pH 5.79 recorded, pH 5.93 trigger). It is noted that the upslope bore was relocated from its original location due to it being located within the construction footprint, with the trigger levels not necessarily correlating with the new bore location. These results are consistent with previous results e.g. pH 5.17 at 4BH022c in November 2017.

Fill 15 bores recorded elevated pH at 4BH037a (pH 6.94 recorded, pH 6.51 trigger) and 4BH038 (pH 7.57 recorded, 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 7.07 in April 2017 and 4BH038 e.g. pH 8.03 recorded in August 2017.

Conductivity (mS/cm) noted to be above trigger levels at:

4BH037a – Fill 15 west bore recorded elevated conductivity levels (10.30mS/cm recorded, 5.55mS/cm trigger). 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 result is consistent with previous results for the bore e.g. 9.68mS/cm recorded in November 2017.

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

Cut 11 bores recorded elevated TDS levels at upgradient bore 4BH022c (1.22g/L recorded, 0.1306g/L trigger) and downgradient bore 4BH021 (0.104g/L recorded, 0.0946g/L trigger). It is noted that TDS levels decreased from upgradient to downgradient bores and are unlikely to be due to construction impacts. This result is consistent with previous results for the bores e.g. 1.12g/L recorded at 4BH022c, 0.104g/L recorded at 4BH021 in October 2017.

4BH037a – Fill 15 west bore recorded elevated TDS (6.36g/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. 5.74g/L in January 2017.

Water depth noted to be below trigger levels at:

4BH058c – Cut 15 upslope bore recorded low water depth (15.69m from top of casing recorded, 13.84m trigger). 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. It is also noted that bulk earthworks have been completed in this area, with no groundwater seepage from cut faces or groundwater ingress noted.

9. Acoustic Investigations

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

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

Out of Hours Activity	>5dB(A) above background	Complete? Y/N
CC05 Ride Testing (Bump Car)	N	Y
Asphalt Paving Works Old Coast Road North	N	Y
CC05 Finishing Works	N	Y
Lower Warrell Creek – Williamson Creek Sunday Works	N	Y
Floodplain Bridge 1 and 2	N	Y
CC04 Finishing Works	N	Y
Nambucca River Bridge Installation of HDPE Blocks	N	Y
Lower Warrell Creek – Fill 15C Finishing Works	N	Y
Old Coast Road North Bridge Patching and Repairs	N	Y
Quarry Access Bridge Guardrail Mesh	N	Y
CC05 Line marking	N	Y
CC03 CCTV and Wire Rope Tensioning	N	Y

Acoustic Investigations (field monitoring) have been conducted for Out of Hours Works during the month of December 2017, results are included in Appendix A, Table 6.

Out of Hours Works undertaken during the month of November 2017 undertaken under Condition L4.5 of the EPL are outlined below:

1. Northern Concrete Batch Plant Operation (Approved under EPL Condition L4.5 16/11/2017)

10. Complaints

10.1 Summary of Complaints for the month of December 2017

11/12/2017 – A resident from Reid Street, Macksville contacted Pacifico regarding concerns around noise from out of hours works. The works being undertaken included Asphalt Paving Works at the Bald Hill Road Existing Highway Connection. The resident raised concerns regarding noise generation during night works and wanted further information on works being undertaken at this location. An Out of Hours Works Permit was in place for this activity and had been approved under EPL Condition L4.3 with noise modelling not highlighting Reid Street as requiring agreement with the predicted noise level below the Noise Mitigation Level (NML) at this location for night works. The community team contacted the resident and discussed the programmed Out of Hours Works at this location in the lead up to the partial opening. The community team provided the programme for Out of Hours Works at this location which included two additional asphalt paving out of hours works at this location, however it should be noted that the upcoming out of hours works were located closer to the dual carriageway alignment and were further from the property. The resident stated that this work would be ok as the resident wanted the works to be completed. The community team also apologised for not contacting the resident however it was noted that no issues had been identified at the resident property during past works and the resident stated that a strand of trees were removed from the property recently which may have contributed to the impacts from the night works. No further complaint was received by this resident during future our of hours works at this location.

12/12/2017 – A resident from Ainsworth Close, adjacent to Bald Hill Road contacted Pacifico regarding concerns around noise from out of hours works. The works being undertaken included Asphalt Paving Works at Bald Hill Road Western Ramps. The resident raised concerns regarding notification of Out of Hours Works and also regarding operational noise at the property post partial opening. An Out of Hours Works Permit was in place for this activity and had been approved under EPL Condition L4.3 with noise modelling not highlighting Ainsworth Close as requiring agreement with the predicted noise level below the Noise Mitigation Level (NML) at this location for night works. The community team contacted the resident and discussed the programmed Out of Hours Works at this location and also discussed the operational noise requirements, managed by RMS. The resident acknowledged that they had not had an issue with Out of Hours Works in the past and were happy with the works to proceed due to the minimal number of nights required to complete the asphalt paving works at this location. No further complaint was received by this resident during future our of hours works at this location.

21/12/2017 – A resident from Letitia Close contacted Pacifico regarding light spill from the Letitia Close Roundabout post partial opening. The light spill was regarding the roundabout lighting, which has been installed as per the design and headlight light spill from the southbound lanes on the highway. The community team provided a response to the resident that this information would be provided to RMS for comment. A RMS FAQ on highway noise levels and operational noise monitoring was also provided.

23/12/2017 – A resident from Old Coast Road contacted Pacifico over the Christmas Shutdown Period regarding the operational water quality basin adjacent to their property. The resident was concerned that the dam was filling faster than it had in the past and that it would overtop during a rainfall event. The community team

provided information to the resident on the drainage arrangements at this location, including the additional area of the bridge deck which now reports to the Operational Water Quality Basin as per the design requirements for the Project. RMS have requested Pacifico to undertake water quality testing and release the water within the Basin inline with the POEO Act and ACCIONA's EPL conditions. This work is programmed for completion in January 2018.

11. Non-Compliance

11.1 Summary of Non-compliances

One (1) Non-Compliances were raised against ACCIONA's Environmental Protection Licence during the month of December 2017, relating to a discharge of turbid water from Williamson Creek during the October 2017 Environment Review Group Meeting. This non-compliance related to a breach of Condition L1.1 of the Environmental Protection Licence 20533 and Section 120 of the POEO Act. A Penalty Infringement Notice was provided to Pacifico by the EPA on 8th December 2017 relating to the above environmental incident.

Table 3 – Dust Monitoring Results October – December 2017

		DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8A	DDG9NE	DDG9E	DDG10	DDG A1	DDG A2	
		Start date of sampling		31/10/2017	31/10/2017	31/10/2017	31/10/2017	31/10/2017	31/10/2017	31/10/2017	31/10/2017	31/10/2017	31/10/2017	31/10/2017	31/10/2017	31/10/2017	31/10/2017	
		Finish date of sampling		4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	
Analyte	Time Period	Unit	Levels of Concern	LOR														
Ash Content	Current Month	g/m ² .month	4	0.1	0.4	0.8	0.5	1	2.5	1.4	2.9	2.6	0.9	11	0.5	1.5	----	----
	Previous Month	g/m ² .month	N/A	1	9	17	10	20	171	28	59	53	18	220	11	30	----	----
	Change	g/m ² .month	Increase of 2		-24.6	NA	-0.5	0.6	1.9	-2.2	NA	0.1	-0.6	10.1	-2.4	0.8	----	----
Combustible Matter	Current Month	g/m ² .month	N/A	0.1	0.6	0.5	0.2	0.3	1.9	0.3	1.3	0.7	1	1.2	0.2	0.3	----	----
		mg	N/A	1	12	9	5	7	37	6	25	14	21	25	3	7	----	----
Total Insoluble Matter (TIM)	Current Month	g/m ² .month	4	0.1	1	1.3	0.7	1.3	2.9	1.7	4.2	3.3	1.9	12.2	0.7	1.8	----	----
	Previous Month	g/m ² .month	N/A	1	21	26	15	27	208	34	84	67	39	245	14	37	----	----
	Change	g/m ² .month	Increase of 2	0.1	-28.8	NA	-0.8	0.7	1.9	-2.9	NA	-0.2	-0.4	11	-2.9	1.1	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----	<0.001	<0.001	
Comments											Insects and frog in gauge		Beetles in gauge	Grass mowed adjacent to gauge	Grass mowed adjacent to gauge			

Table 4 – Groundwater Monitoring Results December 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 15 - West (DS)		Cut 15 - East (US)											
Date of Sampling	14/12/2017		14/12/2017		14/12/2017		14/12/2017		14/12/2017		14/12/2017		14/12/2017		14/12/2017											
			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	16.62	8.7420	7.76	16.0140	2.37	8.4500	-	1.2000	0.98	1.3520	0.94	17.4120	-	13.84	15.69								
pH	pH	-	6.26	4.74	6.27	6.78	5.81	6.15	7.09	5.93	5.79	6.78	6.21	-	6.51	5.92	6.94	7.30	6.77	7.57	6.98	5.24	-	6.3960	5.56	5.71
Conductivity	mS/cm	-	3630	3.59	111.3	0.159	231	1.90	0.342	-	5.550	10.30	8366	1.090	121.100	-	132.660	0.126								
Temperature	C	-	22.4420	21.09	22.3600	23.89	21.1500	26.48	22.6040	-	25.9820	23.65	22.5600	25.79	22.8200	-	23.1940	23.96								
Total Dissolved Solids	g/L	-	3.5720	2.30	0.0946	0.104	0.1306	1.22	0.1326	-	0.1326	6.36	8.10	0.696	0.106	-	0.111	0.082								
			Exceedance of trigger level																							

Table 5 – Vibration Monitoring December 2017

Location	DATE	TIME	Triggered	Vector Sum (mm/s)	Comments
53 OCR	2017-12-07	12:26:00	Continuous	0.117	Background
53 OCR	2017-12-07	12:55:00	Continuous	1.790	Light vibe padfoot ~45m
53 OCR	2017-12-07	12:56:00	Continuous	3.422	Heavy vibe padfoot ~45m
53 OCR	2017-12-07	12:57:00	Continuous	0.130	Background

Table 6 – Field Monitoring for Out of Hours Works December 2017 (Acoustic Investigation)

Description of Works	Date	Time	Location	NCA	NML (dB(A))	Laeq (dB(A))	Distance to receiver (m)	Compliant	Notes
Asphalting (Old Coast Road North)	1/12/2017	9:40pm	Alexandra Drive	5	44	52.5	600	Yes	Construction not audible. Highway (45-70dBA) dominant noise source.
CC04 Finishing Works	2/12/2017	1:35pm	Old Coast Road	6	38	48.2	100	Yes	Construction not audible. Old Coast Road traffic (44-50dBA) dominant noise source.
CC04 Finishing Works	3/12/2017	9:40am	Old Coast Road	6	38	46.0	100	Yes	Construction not dominant. Old Coast Road traffic (45-50dBA) and highway (41-47dBA) dominant noise sources.
CC05 Finishing Works	3/12/2017	10:20am	Alexandra Drive	5	44	67.4	600	Yes	Construction not audible. Highway (66-68dBA) dominant noise source.
Asphalting CC04	9/12/2017	2:18pm	Mattick Road	6	38	57.0	500	Yes	Construction not dominant. Wind in vegetation (55-65dBA) dominant noise source.
Asphalting CC04	9/12/2017	3:14pm	Mattick Road	6	38	51.0	500	Yes	Construction not dominant. Wind in vegetation (47-55dBA) dominant noise source.
CC04 Finishing Works	9/12/2017	2:40pm	Old Coast Road	6	37	65.0	400	Yes	Construction not dominant. Cicadas (60-68dBA) and Old Coast Road traffic (60-70dBA) dominant noise source.
HDPE Installation Nambucca Bridge	9/12/2017	1:41pm	Gumma Road	3	41	49.1	60	Yes	Construction not audible. Local traffic (45-60dBA) and wind in vegetation (48-52dBA) dominant noise sources.
CC04 Asphalting	10/12/2017	12:25pm	Old Coast Road	6	38	40.3	120	Yes	Construction not dominant. Cicadas (50-55dBA) dominant noise source.
CC05 Finishing Works & BR12 Bridge Patching and Repairs	10/12/2017	11:10am	Alexandra Drive	5	44	73.1	600	Yes	Construction not audible. Cicadas (70-75dBA) dominant noise source.
CC05 Line marking	10/12/2017	6:30am	Alexandra Drive	5	44	80.1	110	Yes	Construction not audible. Cicadas (73-83dBA) dominant noise source.
Finishing Works Lower Warrell Creek – Nambucca River Bridge	10/12/2017	9:09am	Bald Hill Road	3	39	57.3	350	Yes	Construction not dominant. Highway (52-59dBA) dominant noise source.
FPB2 Finishing	10/12/2017	8:30am	FPB2	3	39	48.7	700	Yes	Construction not dominant. Cicadas (46-53dBA) dominant noise source.
HDPE Installation Nambucca Bridge	10/12/2017	10:30am	Nursery Road	4	46	62.9	400	Yes	Construction not audible. Cicadas (56-75dBA) dominant noise source.
Quarry Access Bridge Guardrail Mesh Installation & Lower Warrell Creek – Williamson Creek Sunday Works	10/12/2017	9:50am	Gate 7A	1	40	55.4	110	Yes	Construction not dominant. Highway (50-60) dominant noise source.
CC04 Earthworks	16/12/2017	3:45pm	Old Coast Road	6	38	54.7	100	Yes	Construction not dominant. Old Coast Road traffic (52-53) and wind (49-55) dominant noise source.
CC03 Wire Rope Tensioning	17/12/2017	10:08am	River Street	3	39	50.1	60	Yes	Construction not dominant. River St traffic (48-62) dominant noise source.
CC04 Earthworks	17/12/2017	9:10am	Mattick Road	6	38	34.5	335	Yes	Within NML
CC05 Earthworks	17/12/2017	9:35am	Alexandra Drive	5	44	80.0	600	Yes	Construction not audible. Cicadas (78-80dBA) dominant noise source.